Re-sampling in beach- and sand dune communities at South West Karmøy - 2008. Some comparisons and interpretations.

by
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This picture features my mother, Ingeborg Neeraas, at the far right together with some friends playing at Åkrasanden - one of the sites for this study. She was born in 1916 and died in 1991. The picture is probably dating from ca 1920.

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Contents

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I also want to thank **Fride Høistad** who kindly assisted me in getting meteorological data from www.e-klima.no which appeared to be somewhat more complicated than expected – at least regarding data from Karmøy. .

Thank you all, very much!

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Øystein Langåker

Abstract

Sandy beaches with accompanying immature dunes as well as mature sand dunes are regarded a rare biotope in Norway. The localities of this survey are situated at the south west coast of Karmøy. As a former resident of the area it has been noticed severe alterations of the landscape within these settings and during the last decades it seems that wear to the vegetation is escalating, probably due to increasing population and leisure activities performed at these beach sites. Also, climatic change might be considered a cause of changes to biota. Some quite rare species have been recorded at these beach localities and it is regarded as the northernmost location for *Atriplex lacinata* on a world scale. Several other species in this vicinity are also at their fringes of distribution northward. The aim of this study is to provide some more documentation regarding biotic as well as abiotic circumstances and to try to explain changes in vegetation patterns due to results gathered from these observations.
It became both challenging and promising that Anders Lundberg had conducted extensive floristic surveys in these semi-natural settings earlier. For his cand. scient degree he surveyed plant communities at several of the beach- and dune localities of South West Karmøy in 1981. As he conducted some transect based studies, it presented an opportunity to conduct re-samplings and thereby to study potential changes in biota over time.

It was managed to re-locate the transect routes and the picked sites were at Åkrasanden, Stavasanden and Sandvesanden – mentioned from north to south. These different beach localities provide some quite interesting features as they are exposed differently to human activities. They have also been highly differently subjected to developments during the last part of the twentieth century.
In addition to floristic surveys within transects there were also gathered samples from several stabile plant communities characteristic for these vicinities.
Two soil properties, pH and Loss on Ignition (LOI) were analysed from each site. Ordinations were chosen for analysing the data gathered from floristic observations within transects. Simpler statistical methods were applied to the soil sample results to be able to depict differences or equalities in mean values between partial or whole transects at the survey sites.

From all transects results show an increase in species richness. Simultaneously, it is obvious that wear to the areas have aggravated, especially at Åkrasanden. This can be observed both by comparing older photos with new ones and is also immediately obvious for the local resident. It is a well known phenomenon within biology that a certain degree of disturbance is associated with increase in species diversity. However, some of the wear patterns observed during this survey are quite extensive. Paradoxically, these sites are not included in the study. Whether climatic changes have so far contributed to alterations in biota is not properly treated in this study. There are, however, some observations that might be indicating a trend toward warmer conditions. More topical are probably the biotic observations for the evaluation of the future development of especially the dune meadows, as agriculture has ceased to impose influences and new kinds of human activities have entered the arena.

1. Introduction

Worldwide, ecological studies seem to indicate that species diversity and composition are changing at a high pace, particularly during the last decades (Herron et al. 2007). Several causes of change in biotic compositions might be considered and regarded as topics for further investigation. In addition to climatic change it is likely to consider disturbances from human settlements and their activities as sources of impacts to biotic communities (Mack & Erneberg 2002).
Habitats are sometimes threatened or limited due to different human requirements. Leisurely outdoor activities seem to increase and have probably a certain potential of causing wear to habitats and thereby harming conditions for sensible biota.
Not least has modern agriculture a certain reputation of introducing and maintaining an array of species which are not indigenous to the area where they are grown (Chornesky, E.A. & Randall, J.M. 2003; Pheloung 1995).

European and North American studies are probably most numerous within research considering changes in biota driven indirectly by climate change, or more directly by other kinds of human activities (Holzinger et al. 2007, Kullman 2006, Lenoir et al. 2008, Parmesan 2006, Rogers et al. 2008).
The relatively new knowledge of recent climatic changes is likely to have urged the agenda for studying ecological matters and the different biotic responses to impacts caused by human activities or by more subtle mechanisms (White et al. 2006).
Today, climatic changes are viewed as a major force in biotic alterations within many plant communities and ecosystems. Several studies show a remarkable response to a warmer climate by changes in compositions and abundances.
Especially, such changes are evident at high altitudes in certain transition zones in alpine areas (Holzinger et al. 2007, Lenoir et al. 2008). However, other and more directly provided actions from human activities should not be underestimated in the broader discussion of this topic.

It is well documented that changes in biota due to different kinds of human activities has seriously influenced the natural environment as landscapes have been altered for human purposes (Iversen 1941 and 1949, Pennington 1970 and 1975, Turner 1970).
Even prehistoric agriculture had huge consequences for the surrounding landscape, which has been thoroughly documented through several palaeoecological studies in Europe during the twentieth century (Birks et al.1975, Odgaard et al.1975).
However, alterations of the landscape can be observed as more devastating and with more visible and alarming effects in the recent, modern era as the technological development has provided possibilities of changing the environment in a way that was unthinkable of in earlier times.
In many instances, relatively rapid changes in agricultural practices and land management have to an astonishing degree changed the features of the landscape. Not least should this be regarded a topical characteristic of the changes observed within coastal heath-lands at northern European latitudes (Granström 1988; Webb 1998). This study, though, is aiming to present some ecological interpretations founded on observations from another small and fragile habitat within Norway:

sandy beaches with their closely related dune formations and the floral communities of these settings (Lundberg 1987).

Coastal areas like beaches, bays and estuaries have been greatly affected by developments in practically every part of the world. Calls for harbours, convenient locations for industry and also the steadily increasing sporting and leisure activities have all had a great impact on sensible biotic beach communities (Carter et al. 1992, Meulen et al. 1989).
Different kinds of opposing interests and conflicts between developments and the need for protection of these small, remaining areas have been described in several publications by A. Lundberg (Lundberg 1983, 1984 and 1992).
The coastal areas of Norway are mostly dominated by rocks. Sandy beaches with accompanying dunes are thereby regarded as rare natural settings. (Lundberg 1987).

During the twentieth century there also appeared a growing concern for the status of biomes as well as for smaller, local natural or semi-natural settings. Nature conservation movements were founded and became important in establishing an increased consciousness toward natural environments.
At the relatively newly established web site 'Miljøstatus i Norge; truede vegetasjonstyper' there is readily available information about endangered plant species and plant communities within several natural and semi-natural settings in Norway. By searching for beach- and sand dune sites, it becomes apparent that several species within communities in these settings are to different degrees threatened or even highly endangered. This is the case for, for instance, *Atriplex lacinata* and *Salsola kali,* (Miljøstatus i Norge; Truede vegetasjonstyper).

Today, it is becoming more evident that different kinds of human activities are influencing the quite scarce beach- and dune areas. This can be observed by comparing photos taken at different occasions and by the highly visual changes that take place over time – obvious for local residents.
The areas examined in this survey are very limited, especially in the seaward direction and the sand dunes that extend from the beach proper have to a large extent been subjected to different purposes, from serious and irreversible developments and housing projects to lighter alterations of the dunes and back dunes as for playing grounds or parking grounds.

Though it seems that more serious and irreversible damages not have occurred during the very last decades, it was still in the 1970s that a large and esthetical valuable back dune area was completely devastated as it became the target for the location of a sports arena. Some years earlier, a substantial part of a sandy beach in the same vicinity was destroyed due to dumping of boulders and excavated masses from the construction of an artificial harbour nearby. These major impacts are also described in Karmøys Flora (Lundberg 1998).

Although changes within plant communities at these low-residing and highly disturbed areas might not be considered as good a climate change indicator as at more remote alpine sites, it is expected that areas at higher latitudes generally

should be more prone to consequences from climatic changes than sites at lower latitudes. This is due to the assumption that plants growing under marginal conditions probably are quite sensible toward minor environmental changes as they already are managing at the very limits of their tolerances. It is likely to consider these kinds of ecological challenges to be valid both for boreal as well as for nemoral species and to be of paramount importance for the continuous existence of both. Several of the species adapted to the extreme conditions within tidal zones or immature dunes have a narrow ecological amplitude (Lundberg 1982). Their preferred substrates therefore are selecting few and physiologically specialized species that are not encountering competition from generalists and climate may, in fact, be the ultimate determining constraint.
These low-residing beach areas should thereby be considered interesting with regard to immigrating species, also from the fact that the locations are highly exposed to oceanic currents and incoming matter of different sources.

In the 1950s *Atriplex lacinata* was recorded at these beaches for the first time. Today it is a rather common species, at least at certain localities, and these areas are regarded as its northernmost recording site in the world (Lundberg 1982). Another species, *Salsola kali,* was recorded at one beach locality by A. Lundberg in 1997 (Lundberg 1998). Since several species within this area apparently belong to the nemoral zone and reside here at their northernmost frontier, the locations should be viewed as a meeting site for boreal and nemoral species (personal comment by A. Lundberg).
In addition, these beach and dune sites are profoundly subjected to several kinds of wear from spare-time activities and the plant communities do receive many new influences from nearby residential areas (www.h-avis.no). While sampling during the summer months of 2008, I came across fully developed tomato plants in the tidal zone at one of the beach locations. Other species of nemoral or nemo-boreal origin that are common, or even numerous is *Geranium sanguineum* and *Saponaria officinalis*.

Several attempts have been made to explore and document the plant biota at these locations from the mid 1800s and onward (Lundberg 1982). First mentioned is Scübeler already in 1862. Later, approaching the century turn, Hoffstad and Røskeland are referred to as authors of 'Stavanger amts flora' and they both contributed to new species' discoveries. Further, in the early 1930s a local amateur and teacher, Vigleik Rosseland, did extended botanical recordings at different sites of the island (Lundberg 1982). He was later assisted by Torkel Lillefosse from the Bergen Museum.
In his short historical review, Lundberg continues by referring to Rolf Nordhagen who visited both Åkrasanden and Sandvesanden in 1938. Nordhagen was probably pioneering floristic descriptions from tidal zone settings in these vicinities.
In 1939 surveys were conducted by the University of Oslo as part of the education for cand. scient students (excursions). Lundberg refers to Dahl & Hadac who conducted a transect analysis depicting the floristic compositions typical for a coastal dune setting. It was this very survey that resulted in the first *Atriplex lacinata* recording this far north.

At last Tüxen and Westhoff are mentioned for their plant sociological surveys within dune settings at Sandvesanden (1961). Recordings were published in a paper describing the dune vegetation of South-West Norway.
Anders Lundberg made his cand. scient. degree from recordings within plant sociological studies at different locations in beach and dune communities in 1982. It thereby became a possible and challenging task to perform re-samplings based on Lundberg's recordings 27 years later.
The outcome of the surveys, weather based on comparisons to former studies or on independent findings, should be useful in making theories of different causal factors that might have influenced changes in the plant communities of the sites chosen for this thesis. The main aim of the study is to get a better understanding of what kinds of changes within plant communities that have occurred during the past 20–30 years and to try to interpret the changes from observations within biotic, as well as abiotic, parameters.

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2. Materials and methods

2.1 Study area description

The surveys were conducted at three different locations at the south western coast of the island of Karmøy, which is positioned between 59˚8´ and 59˚25´north and between 5˚33´and 5˚23´west. The longitudinal reference seems to be related to Oslo (Lundberg 1982). The island is relatively large, covering 177 square kilometres and is regarded the most densely populated island in Norway. Rocky coasts are the most common natural transitions to the sea in the whole area. However, there are some major bay formations at the south western coast which feature sandy beaches with accompanying dunes.
Lundberg refers to geological descriptions of the island in his survey (Lundberg 1982). He points to the fact that all of the beaches are situated within a geological setting termed 'Vest-Karmøy eruptivkompleks' (Western Karmøy Eruptional Complex). The bedrock is thereby consisting of hard, granite-dominated rock types that resist much withering and also offers little nutrients for the biota. It is emphasized that the plant communities within these biotopes are highly dependent on nutrients from the sandy soil mixtures which are considered as resulting from scouring of the glaciers on to the bedrock during ice-ages and further modified by added organic substances from biota.
The huge accumulations of marine, sandy sediments are very rich in lime due to a high content of particulate shell remnants originating from different animals (Lundberg 1982). Another interesting feature considering the sediments, particularly in the Åkra area, is the fact that there are peat layers supporting sand layers which indicates transgression events as there have been variations in the sea-level, as well as in the land-level, during the post glacial era (Lundberg 1982).
Quite large areas in this vicinity are regarded as former sea-floor settings during relatively long-lasting periods about 6000 years ago (Lundberg 1982).

2.1.1 Selection of sampling sites and their characteristic features

Lundberg's report from 1982 is mainly concerning plant sociological surveys. However, there were altogether seven different sites at which plant surveys along transect routes were conducted. These were located at four different beach bays: Åkrasanden, Stavasanden, Hemnessanden and Sandvesanden, mentioned from north to south.
In this very study it was, however, focused on three of the beach locations. One of the original sites, Hemnessanden, was omitted as it did not contain as a pointed and well developed dune locality as the other locations.
It should be mentioned that the chosen sites are topographically very similar with the same pattern of featuring a low rise of the beach, some degree of embryonal dunes and then well developed white dunes transforming into grey dunes further inland. What should be regarded as interesting and promising for comparative studies are, among several features, the inequalities in environmental influences that

can be expected due to their differences in proximities to certain human developments as housing and agriculture and also from the observations that they are differently preferred for leisure activities as swimming, surf riding and wind kiting etc.

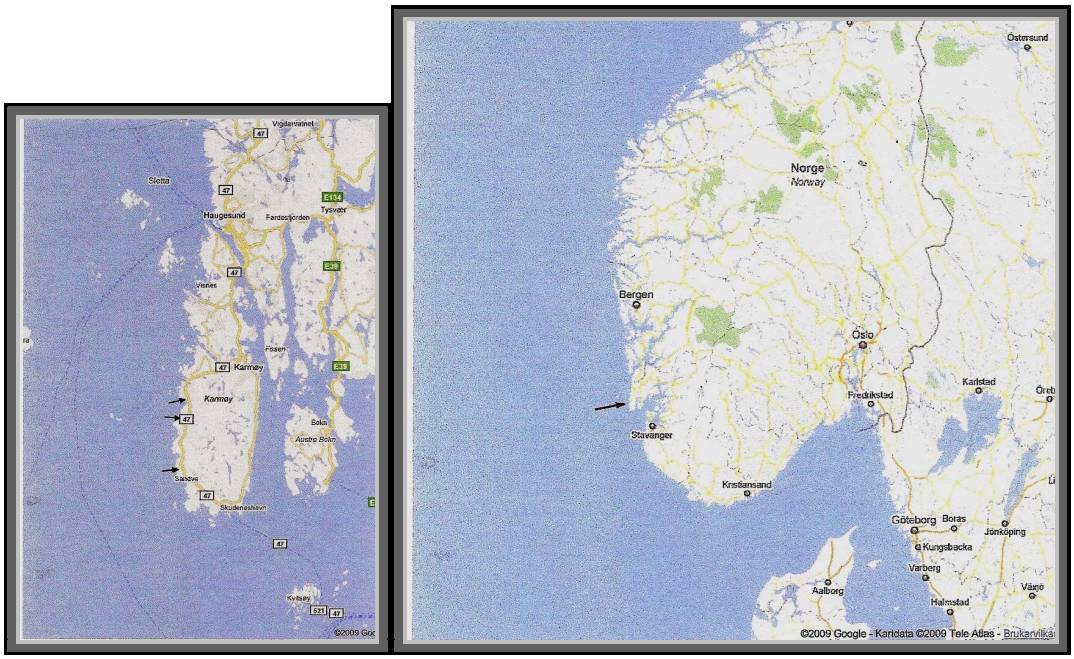

Fig. 2.1 Map of southern Norway to the right with arrow pointing at Karmøy. The smaller map to the left is a magnification of the Karmøy region with demarcations of the beach sites by arrows. Followed from north to south are: Åkrasanden, Stavasanden and Sandvesanden.

Source: Google–Kartdata 2009

Åkrasanden is the northernmost location in this study. It is a relatively small beach with rich dunes and back dune areas which, together with the neighbouring dunes, are locally famous for their mid summer floral displays. It is located at the northern part of a continuous row of several beaches which are bordering a quite spacious bay region. The dunes here reach elevations of about 7–8 metres and are heavily traversed by local all-year around. The beaches in this part of the bay are preferred for swimming and sunbathing during the season probably since they are closest to the more densely populated areas in the region. Additionally, these beaches also provide quite shallow waters and to some degree protection from prevailing and often chilly north western winds. There are some smaller islets outside these beaches which probably contribute to calm the seas.
The dune front at this location had been subjected to damages from surfs some years earlier during a ferocious storm (told by local). The main erosion was very close to the transect route. At other dune front positions there were occasionally jumping activities by kids who like to run over the dune edge for shear fun. The back dune area at this location is abruptly bordering housing developments.
This beach was the only of the beaches in question which offered plant communities at the high tide levels. It was also noticed that there was situated a major outlet pipe at this beach site.

Fig. 2.2 The bay at the Åkrehamn region is featuring several beaches. Note the close proximity to housing and development areas. Åkrasanden is situated between the two prominent rock-formations near the northern boundary of the bay (upper part in picture).

Source: Google Earth

Fig. 2.3 A close-up view of Åkrasanden. The dotted line has been drawn to show where the initial transect demarcation was outlined. The two parallel transects 1A and 1B were positioned on each side of the line at distances of three metres (six metres between the centres of transects).

Source: Google Earth

Stavasanden is situated a few kilometres further southward from Åkrasanden. This locality is by far the one most severely disrupted and even partially destroyed, both in the beach region and in the dune and back dune region. These matters are

mentioned in the introduction. The beach at this site is somewhat wider compared to Åkrasanden. What remains of dune vegetation has to some degree been subjected to protection efforts by fencing off the main dune meadow area to prevent cars from parking or driving in the dunes.
I have never noticed any high tide level vegetation at Stavasanden. Probably this comes from the very harsh weather conditions that prevail here as the beach bay is facing directly toward north-west. In addition, there are no sheltering rocks or islets outside the beach. This is probably the main reason that people are not so much enjoying the beach for swimming or sunbathing, however there are some surfing activities all year around (personal observation).
People are to some degree traversing the dunes by existing paths, but the overall impression is that this site has not much wear of what there is left from the original dunes. Because of the different developmental actions that have highly altered this dune site, the remains are very much cut off from their surroundings. There is thereby no direct continuity with other vegetation types.
Apparently, the dune vegetation here does not seem as rich in species as at, for instance, Åkrasanden. Some of the showy species, i.e. *Geranium sanguineum* are either lacking or are very scarce at this location. It is, however, rich in beach-associated grasses, as *Ammophila arenaria*, *Elytrigia juncea and Leymus arenarius.* The site has some quite well-developed immature dunes.

Fig. 2.4 Picture of the Stavasanden area. Note the developed area just opposite the traversing road, landward from the dune (white and green rectangles). This was once a highly priced back-dune area, now completely devastated and replaced be a sports arena.

Source: Google Earth

Fig. 2.5 A close-up view of Stavasanden. The dotted line has been drawn to show where the initial transect demarcation was outlined. The two parallel transects 2A and 2B were positioned on each side of the line at distances of three metres (six metres between the centres of transects).

Source: Google Earth

Sandvesanden is at the southernmost study site. This beach differs some from the other beach sites due to its topography. The beach is about as long as it is wide and is abruptly delimited by rock formations at its ends. In addition, the dunes are steeper and higher compared to the other sites. This makes the site more sheltered and hidden within the surrounding landscape. The place is highly prized for its good surfing conditions and also for its beautiful floristic settings. Agriculture is approaching the dune vegetation at this site and there is continuity between the dunes and the surroundings in a way that has been much degraded at the other localities of this survey.

The beach proper is very slightly ascending from the water at all of the locations and measures 20–30 metres at Åkrasanden and somewhat more at Stavasanden. At Sandvesanden the beach proper is noticeably wider compared to the other locations, reaching about 150 metres at its widest part.
All of the beaches are situated within bays and are separated from each other by stretches of rocky coast lines of a few kilometres.
Generally, the transitions to the dunes are relatively smooth and the dunes reach elevations of about 7–8 metres. Though, at Sandvesanden some of the dunes reach higher elevations, probably approaching about 14 metres.
The dunes and back dune areas have to different degrees been subjected to reversible usages as agriculture or to more or less irreversible impacts from permanent developments. Particularly, the back dune areas are to a serious degree hampered and thereby these biotopes as a whole should be considered more or less just remnants of what once most probably was a substantial element in this coastal

landscape setting. The locations are all facing mainly westward and are heavily exposed to the actions from the seas.

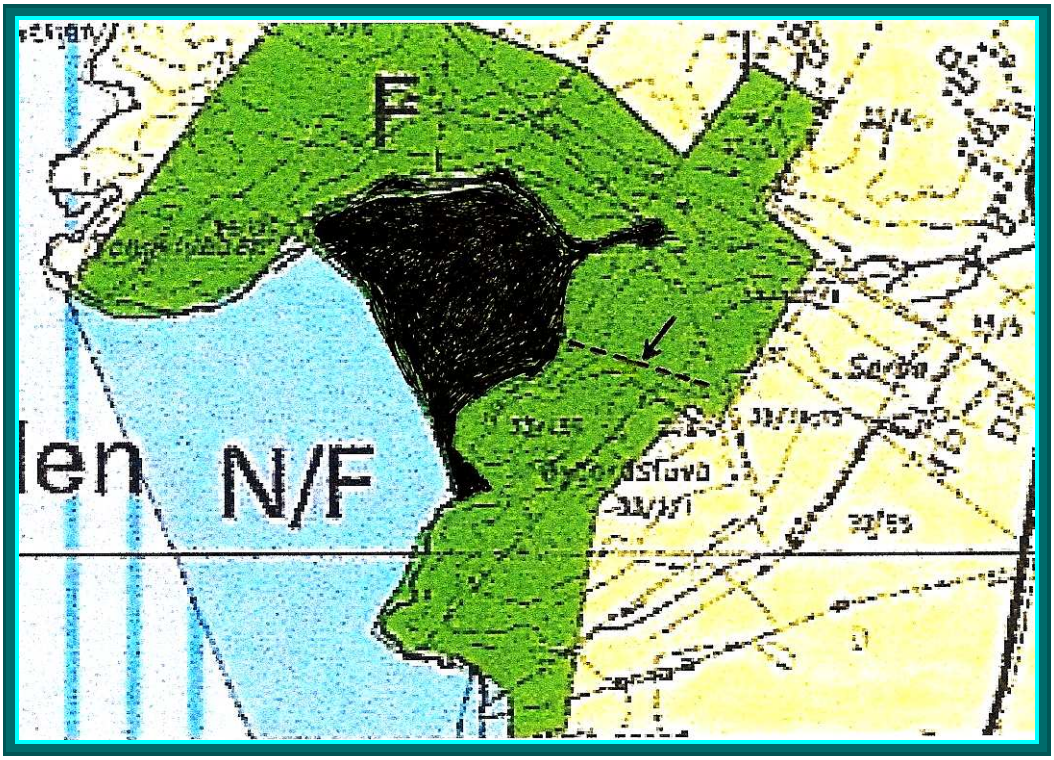

Fig. 2.6 Magnification of municipality chart made for area planning purposes (Karmøy kommune). Dark shaded area depicts the beach proper at Sandvesanden. The attempt to outline the main transect route is visible as a dotted line to the right within the green area (see arrow).

Source: **Karmøy kommune, kommuneplanens arealdel 2004-2015–sone 1.**

2.2 Sampling procedures

2.2.1 Transect sampling

The samplings within transects were conducted from 17th of June to late August. The transect routes at these three locations were quite readily relocated thanks to Lundberg's original field notes and his helpful assistance. One feature that seemed to be of great importance in the relocation of the routes was the fact that Lundberg had traced his transects through the highest points of the dune heights at each site. In this context it should be mentioned that the dunes providing these landmarks are not regarded as mobile dunes. This issue is more thoroughly treated in some of Lundberg's publications (Lundberg 1987, 1993).
The original sampling routes dating from 1981 were identified by the means of several measures. The distances from the highest points of the dunes to the starting points of transects could easily be read from Lundberg's field notices as his transect analyses were supplied with graphical diagrams depicting a cross-section of each site, extending from the lower beach region to the back part of the dunes (Appendix;

figures 6.1-6.3). He had supplied his diagrams with several measures of distances from the highest point of each major dune. Based on the degree of uncertainty with regard to the exact relocation of the transect routes, the intrinsic distances between the two parallel transects at each site were estimated. The uncertainty was mainly due to some difficulties in determining 'the highest point' of the dunes, as these 'lumps' in the terrain to some degree were indecisive with uncertainties in the range of a few metres.
It was decided to sample within two parallel transects at each locality to be able to measure also the local variances in plant compositions at each site.
It has though to be admitted that the accuracy concerning positioning of transects was more centred on the direction perpendicular to the transect direction than on the longitudinal one.

The distances between transects were set to six (6) metres at each sampling location (measured centre to centre of the quadrates in each transect).
To be able to keep to the determined routes at repeated occasions of sampling it became useful to insert wooden flower sticks or other markings at certain distances in the transects and to visualize the stretches further by the aid of a metering band.
The quadrate used for sampling in the transects was made from wood and measured one by one metre from edge to edge inside the quadrate frame. This was in accordance with the data from Lundberg's original study. The sampling was then conducted by progressively moving the wooden frame on to the ground metre by metre continuously in all of the transects. All species were thereby recorded and given scores depending on their cover related to the area of the quadrate. These scores are determined by the Hult-Sernander scale (Lundberg 1982, p 30).

It is appropriate to mention a few errors that occurred in the field while attempting to relocate the original transects and which might have had some disturbing effects for the validity of the results.
As the sampling was about to complete at Stavasanden, it became rather obvious that there were some inconsistencies regarding the locations of the former transect compared to the 'new' transect routes. I shall not go into details about this issue, but it apparently was a fact that there had been some misunderstandings or misinterpretations due to certain landmarks at the site while trying to relocate transect. This meant that the actual transects of re-sampling at Stavasanden are positioned about 30–40 metres from the original transect route.
At Sandvesanden the 'new' transects appeared to be a little shorter than the original ones, which also became evident relatively late in the sampling procedure. I think the reasons for the discrepancies at this site are as a result of some degree of inaccurate inclination of the relocated transect route. As transects here intersected with an old pasture fence with a small angle, the error became visually very obvious since a rather minor alteration of the transect direction thereby meant a quite large difference in length. There is good reason to regard the position of this very fence to have been unaltered during several decades.
In Lundberg's report the different species scores are continuously depicted as differently sized bars due to the successive appearances of species in the direction of investigation and to their abundances, progressing landward from the beach. He has measured and recorded the species scores in smaller or larger 'chunks' dependent on

the homogeneity of the plant communities that he encountered. However, as he supplied his graphics with some very strategic measures, it became possible to convert his findings to a 'meter-by-meter' species score registration.

Table 2.1 Overview of abbreviations used for the different transects.

The transects were named in the following manner:

Åkrasanden
Reconstructed transect sampled by A. Lundberg in 1981 : 0C
Left/northern transect sampled by Ø. Langåker in 2008 : 1A
Right/southern transect sampled by Ø. Langåker in 2008 : 1B

Stavasanden
Reconstructed transect sampled by A. Lundberg in 1981 : 0D
Left/northern transect sampled by Ø. Langåker in 2008 : 2A
Right/southern transect sampled by Ø. Langåker in 2008 : 2B

Sandvesanden
Reconstructed transect sampled by A. Lundberg in 1981 : 0E
Left/inner transect sampled by Ø. Langåker in 2008 : 3A
Right/outer transect sampled by Ø. Langåker in 2008 : 3B

Table 2.2 Coordinates for transects. The measures were provided by 'Garmin Quest'.

Locality	Coordinates for transect start	Coordinates for transect end
Åkrasanden	N: 59° 15.100´ E: 5° 11.528´	N: 59° 15.143´ E: 5° 11.535´
Stavasanden	N: 59° 13.917 E: 5° 11.001´	N: 59° 13.870 E: 5° 11.002´
Sandvesanden	N: 59° 10.244 E: 5° 11.812	N: 59° 10.247 E: 5° 11.867

2.2.2 Community sampling (square analyses)

Besides sampling from transect routes it was also decided to conduct some degree of surveys from certain relative stabile plant communities. These were determined from Lundberg's report and comprised plant communities in the tidal zones, embryo dunes and developed sand dunes. Sampling was conducted in late July and in early August. The same kind of procedures were utilized as for the transect analyses. There were made efforts to conduct these samplings relatively evenly distributed within each seemingly stabile and characteristic community.
These recordings are termed 'square analyses' or 'community analyses' in the report and are presented quite briefly without much commenting. The detailed recordings can be read from tables in the appendix.

Table 2.3 The Hult-Sernander scoring scale for plant cover values (Lundberg, 1982).

Score	Cover within square
1	< 6.25 %
2	6.25 % – 12.50 %
3	12.50 % - 25.00 %
4	25.00 % - 50.00 %
5	50.00 % - 75.00 %
6	75.00 % - 100.00 %

2.2.3 Soil sampling

In addition to plant samples, soil samples for measuring pH and 'Loss On Ignition'– LOI were gathered as Lundberg, among several other abiotic parameters, had conducted pH- and LOI-measurements in his study from 1981 and the fact that these samples are easily collected and can be analysed reasonably.
These samples were excavated from the A-transects at each location and dependent on the length of transect, soil samples were taken from every second or from every third quadrate in transect to provide a sufficient number of samples for statistical analyses. They were collected relatively late in the season – from the middle of September to late October. Also on the basis of procedures' descriptions in Lundberg's former studies it was collected soil samples from two depths at each excavation, namely from 3-5 cm and from ca 10 cm depths. Each pH- and LOI-measurement is based on four different soil samples taken from the corner regions of the quadrate.
The soil samples were excavated by the aid of a sharp garden spade for digging the main cavities. To further get the samples from the different depths, a sharp table spoon was inserted into the wall of the cutting at the actual levels which were determined by the use of a metering device.
The soil samples were then packed and sealed in household plastic bags and transported to the University of Bergen within two days. The samples were put in a deep freezing storage room awaiting further treatment.
Later in the season they were subjected to the procedures for pH- and LOI-measurements. These follow standard descriptions adopted by the Department of Biology at the University of Bergen.

2.3 Climate - meteorological data

Lundberg is also referring quite thoroughly to climatic conditions. His figures are collected from a local weather station then situated in Skudenes, five to fifteen kilometres south of the sampling sites. The list of temperatures collected from eKlima@met.no. refers to the same weather station at Skudenes for the period 1961-1990 (appendix, table 6.28).
The climate at these beach sites are very much influenced by the close relation to the open ocean. This means that there is a relatively small difference in the mean temperatures of July and of January. February was referred to as the coldest month

with a mean temperature of +1.3˚C, while August was the warmest month with a mean temperature of +13.6˚C. The climatic values presented by Lundberg were based on observations from 1931-1960 (Lundberg 1982).

Table 2.4 Mean normal temperatures from different time intervals at Karmøy.

Observed time interval	Mean normal T February	Mean normal T August
1931 – 1960	+ 1.3° C	+ 14.9° C
1961 - 1990	+ 1.9° C	+ 14.2° C

From eKlima@met.no I was not able get climatic observations from the station at Karmøy further than 1990. In this study it is solely presented figures from mean normal temperatures regarding the period 1961-1990.

Lundberg also presents figures concerning precipitation in his study from 1982. These are also based on observations from the time span of 1931-1960. Yearly precipitation was at 1165 mm. May was recorded as the driest month while September was regarded the wettest.

Though these climatic conditions are paramount to some of the sensible, oceanic species of the outer coastal regions (*Erica cinerea, Ilex aquifolium*), the beach- and dune communities are not considered dependent on these climatic extremes (Lundberg 1982).

2.4 Nomenclature

All taxa were identified by using Lids flora (Lid and Lid 2007).
Mosses were not considered in this study.
A few of the topical species have undergone changes of names since 1981 and these have been termed with new species' names according to Lid. All subspecies categories were combined to their higher species' taxonomic group.
Euphrasia, Hieracium, Rosa except for Rosa rugosa and *Taraxacum* were all identified to the genus level. In Lundberg's report from 1982 his recordings from transects are referring to *Hieracium vulgata* and to *Taraxacum cordatum* respectively.

2.5 Analyses

All field data were transferred to spread sheets with the different cover scores as the variables for the plant species. Also transferred were the pH- and LOI-measurements. Before conducting data analyses, Lundberg's data from 1981 had to be converted from his graphical tables and further transferred to spread sheets. The former collected data had to be gathered by super-positioning Lundberg's species' scores onto the line containing information about the distances within

transect. Thereby it was created transect analyses based on observations in 1981 compatible with those resulting from the field work through the season of 2008.

For each main locality it was then made a common spread sheet containing data from the two parallel transects of this study and from Lundberg's study in 1981.
As the aim of this study primarily is searching for differences in compositions within plant communities, both in situ and over time, we addressed ordination methods as the statistical methods of choice (Leps and Smilauer 2003). The main purpose was to visualize the relation between the compositional variances in the recorded field data from transect samples and distances from the start of transect at the ultimate beach position approaching the back dune area.
First, detrended correspondence analyses, DCA tests, were employed in 'R' with package 'Vegan' and default values for the complete data sets i.e. of former and recent plant recordings together (Oksanen 2005). By this means the total variances in the data set are depicted. Rare species were weighted down appropriately and site plots as well as species plots were called for. It became thereby possible to discern some quite illustrative patterns of sites' and species' distributions along certain axes.
By employing canonical correspondence analyses, CCA tests, it became possible to explore changes in species composition between the two main surveys of 1981 and 2008, i.e. changes in vegetation over time.

Further, the pH- and LOI-measures were subjected to statistical analyses. The measures from each locality were analysed and compared by utilizing ANOVA tests to check for significant differences in mean values between the pH- and LOI-measures from different localities. These measures were subdivided due to potentially interesting correlations with corresponding plant cover. Thereby comparisons were made between measures from the beach proper sections of the three main transects as well as from the dune meadow sections. Some graphs depicting the correlations of pH values and LOI values with distance from the start of transects were also called for.

Altogether, there were made floristic registrations in 460 quadrates within transects, 186 pH-measurements and 187 LOI-measurements. In addition it was conducted floristic registrations in 169 quadrates from seemingly stable communities at the three main beach- and dune localities. These were represented by the higher tidal zones, immature dune communities and dune communities.
Some photographs were made from several aspects to be able to compare with regard to wear, developments etc, as Lundberg has provided photos in his report.

* * *

3. Results

3.1 Transect analyses

Table 3.1 Counts of species recorded from transect surveys of 1981 and 2008 at the three sampling localities.

Locality	Transect	Count of species
Åkrasanden	0C–1981	44
Åkrasanden	1A–2008	52
Åkrasanden	1B-2008	58
Stavasanden	0D–1981	26
Stavasanden	2A–2008	37
Stavasanden	2B–2008	37
Sandvesanden	0E-1981	23
Sandvesanden	3A–2008	35
Sandvesanden	3B–2008	33

Table 3.1 features the species counts from all transects surveyed in 1981 and in 2008. It is referred to tables 6.1-6.3 in the Appendix for more detailed information about species records and sub-sample figures.

3.1.1 Åkrasanden–floristic comparisons

Transects at Åkrasanden were the only ones that had the potentiality of intersecting the tidal zones and their plant communities. At the other locations the transect routes had their origin in the immature dune regions.
Tidal zone plant communities reside between the highest tidal level and the normal tidal level and are mainly nourished by degrading remnants of particularly *Fucus spp., Laminaria hyperborea* and *Laminaria saccarina* (Lundberg 1982). Influence from salt, sand accumulations and highly variable conditions regarding nutrients and fresh water supplies make growing conditions extremely challenging and requires plants with adaptive specializations to cope with such environmental constraints. However, as Lundberg points to in his report, the tidal zone communities might present a high abundance of specimens, though a rather poor diversity of species. This fact became quite obvious at Åkrasanden during the sampling of 2008. The relatively scarce plant cover at the tidal zones in early to mid summer developed into a dominating physiognomy of the beach later on in August and September. This was highly contrasting the situation back in 1981, as Lundberg in his report confirms that there was no vegetation in the tidal zones then.
All of the species found in the tidal zones are characterized as preferential for either tidal zones or marine beaches (Lid and Lid, 2007). However, *Tripleurospermum maritimum* are referred to as a common participant in many different community settings at several altitudes and latitudes.
As such, the result of the transect analyses intersecting this very zone is within the expected. All species are more or less common in this area and are debated by Lundberg in Karmøys flora (Lundberg 1998).

At the moment of sampling there was no obviously visible division between a lower and a higher tidal zone. The establishment of two distinguished tidal zones was a feature that developed gradually, but later this distinction became blurred as the vegetation developed into a more or less continuous community.
The composition of species resulting from analysis of transects crossing the tidal zones at Åkrasanden seems to harmonize with what Lundberg refers to as the association termed 'Atriplicetum latifolii Nordh.40' in his report from 1982.
Species that are mentioned as potentially belonging to this category, in addition to *Atriplex prostrata,* are *Honckenya peploides, Tripleurospermum maritimum, Rumex crispus, Agrostis stolonifera, Atriplex lacinata, Cakile maritimum, Catabrosa aquatica, Elytrigia juncea, Elytrigia repens and Ligusticum scoticum.*

It is quite well visualized from the combined DCA scatter plots in figures 3.1, 3.4 and 3.5 that the recordings from the beach bound vegetation at Åkrasanden are differing much from the main bulk of pointed site plots. The plots in red, and brown correspond to the registrations in the eight first populated samples of transects 1A and 1B (appendix; tables 6.20 and 6.21, samples 7-11).
It is within the expected that the plots become substantially more aggregated as the species diversity and abundance are getting more uniform. This is in alignment with the standard interpretation of these kinds of diagrams as similar samples are expected to be closer to each other than dissimilar ones (Leps and Smilauer, 2003).

The following combined DCA scatter plots depict all samples at all localities in different axes.

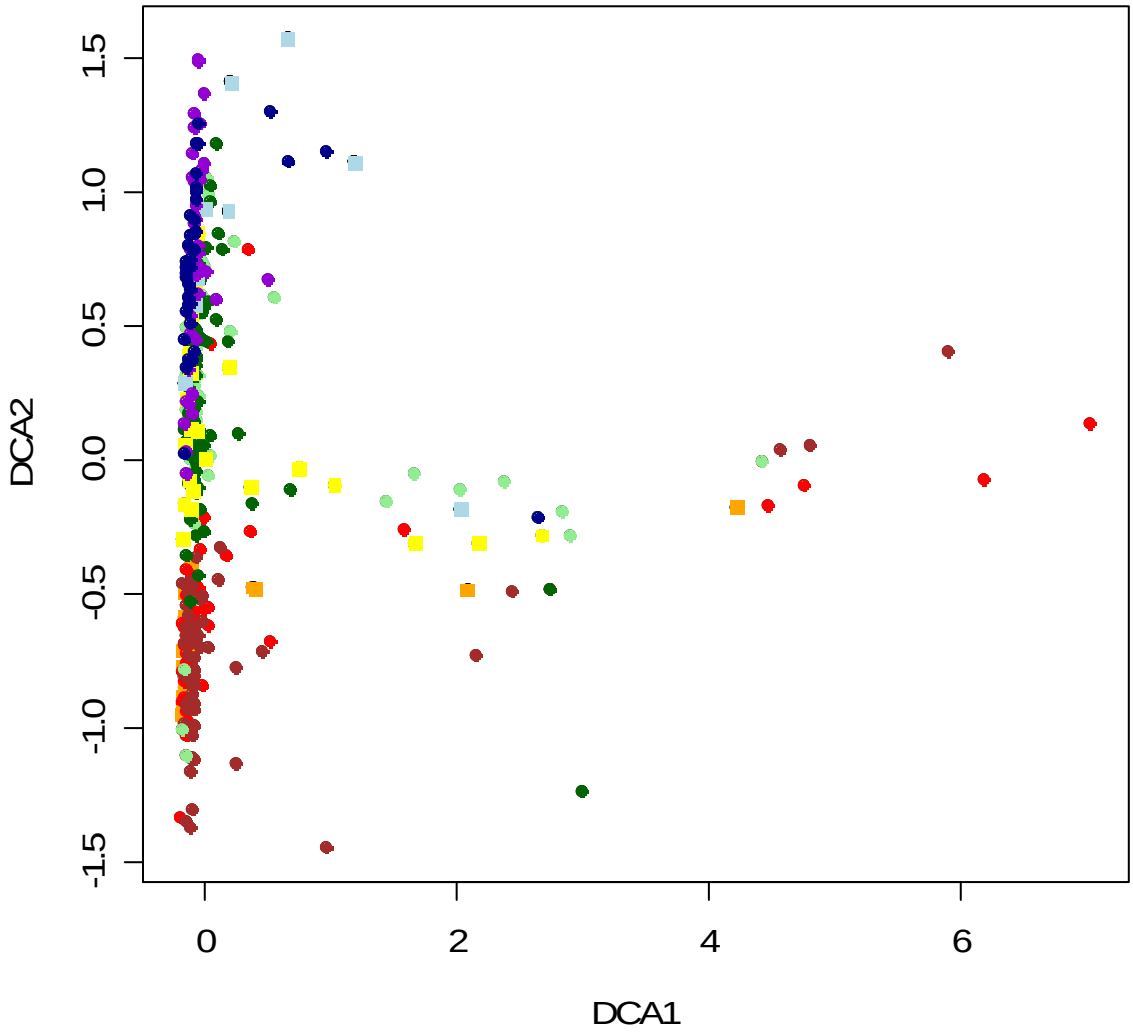

Fig. 3.1 DCA scatter plot of all sample sites in axes 1 and 2 + coloured site plots in nine different shades showing the sites at Åkrasanden, Stavasanden and Sandvesanden. The different shades are explained below. (The excel sheet has been changed by removing the scores for *Alopecurus pratensis* in transect 3A and *Catabrosa aquatica* in transect 3B to give a better spread of the site plots).

¤ Orange squares = Åkrasanden; transect 0C (1981)
¤ Red diamonds= Åkrasanden; transect 1A (2008)
¤ Brown diamonds = Åkrasanden; transect 1B (2008)

¤ Yellow squares = Stavasanden; transect 0D (1981)
¤ Light green diamonds = Stavasanden; transect 2A (2008)
¤ Dark green diamonds = Stavasanden; transect 2B (2008)

¤ Light blue squares = Sandvesanden; transect 0E (1981)
¤ Dark violet diamonds = Sandvesanden; transect 3A (2008)
¤ Dark blue diamonds = Sandvesanden; transect 3B (2008)

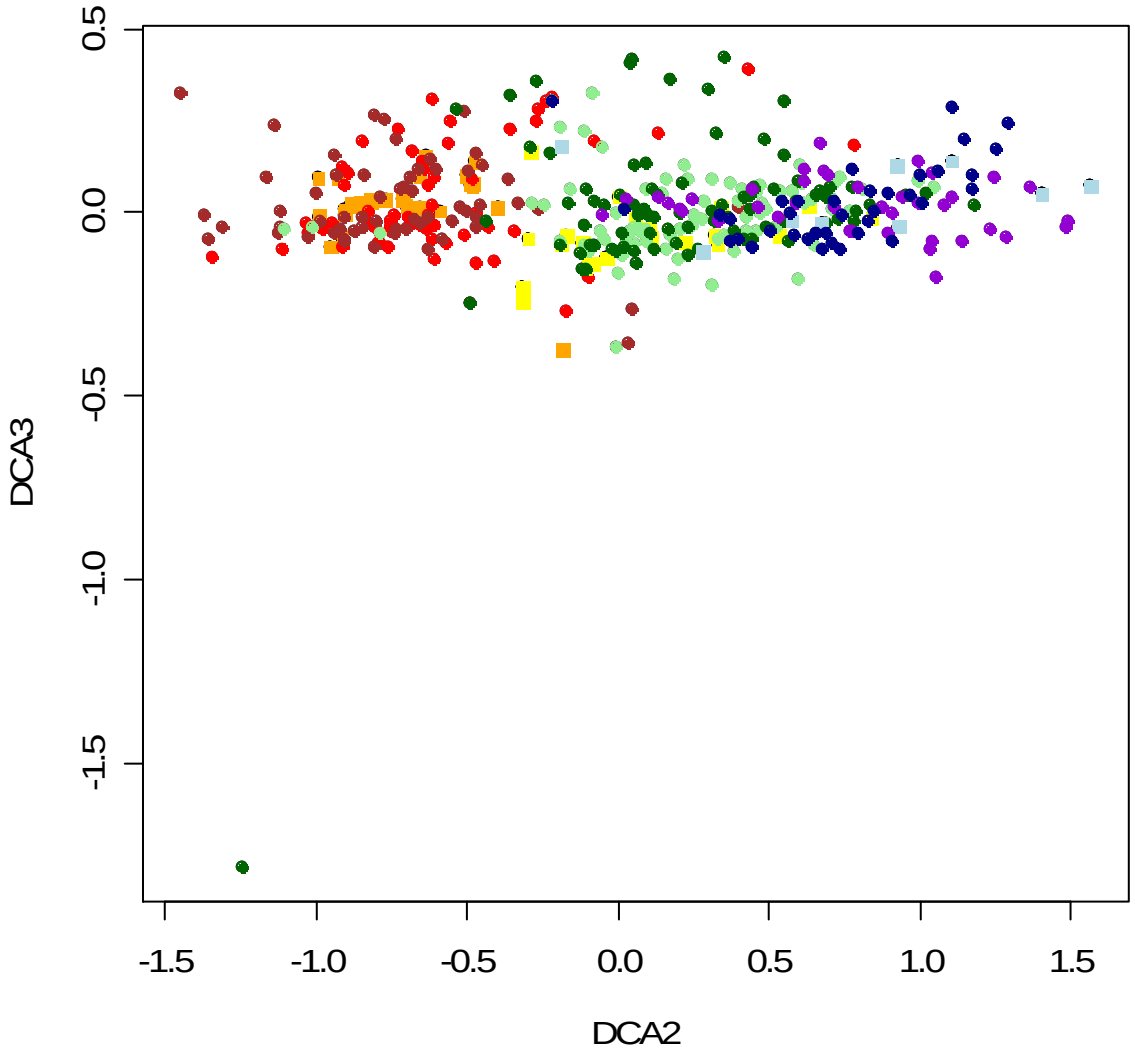

Fig. 3.2 DCA scatter plot of all sample sites in axes 2 and 3 + coloured site plots in nine different shades showing the sites at Åkrasanden, Stavasanden and Sandvesanden. The different shades are explained below. (The excel sheet has been changed by removing the scores for *Alopecurus pratensis* in transect 3A and *Catabrosa aquatica* in transect 3B to give a better spread of the site plots).

¤ Orange squares = Åkrasanden; transect 0C (1981)
¤ Red diamonds= Åkrasanden; transect 1A (2008)
¤ Brown diamonds = Åkrasanden; transect 1B (2008)

¤ Yellow squares = Stavasanden; transect 0D (1981)
¤ Light green diamonds = Stavasanden; transect 2A (2008)
¤ Dark green diamonds = Stavasanden; transect 2B (2008)

¤ Light blue squares = Sandvesanden; transect 0E (1981)
¤ Dark violet diamonds = Sandvesanden; transect 3A (2008)
¤ Dark blue diamonds = Sandvesanden; transect 3B (2008)

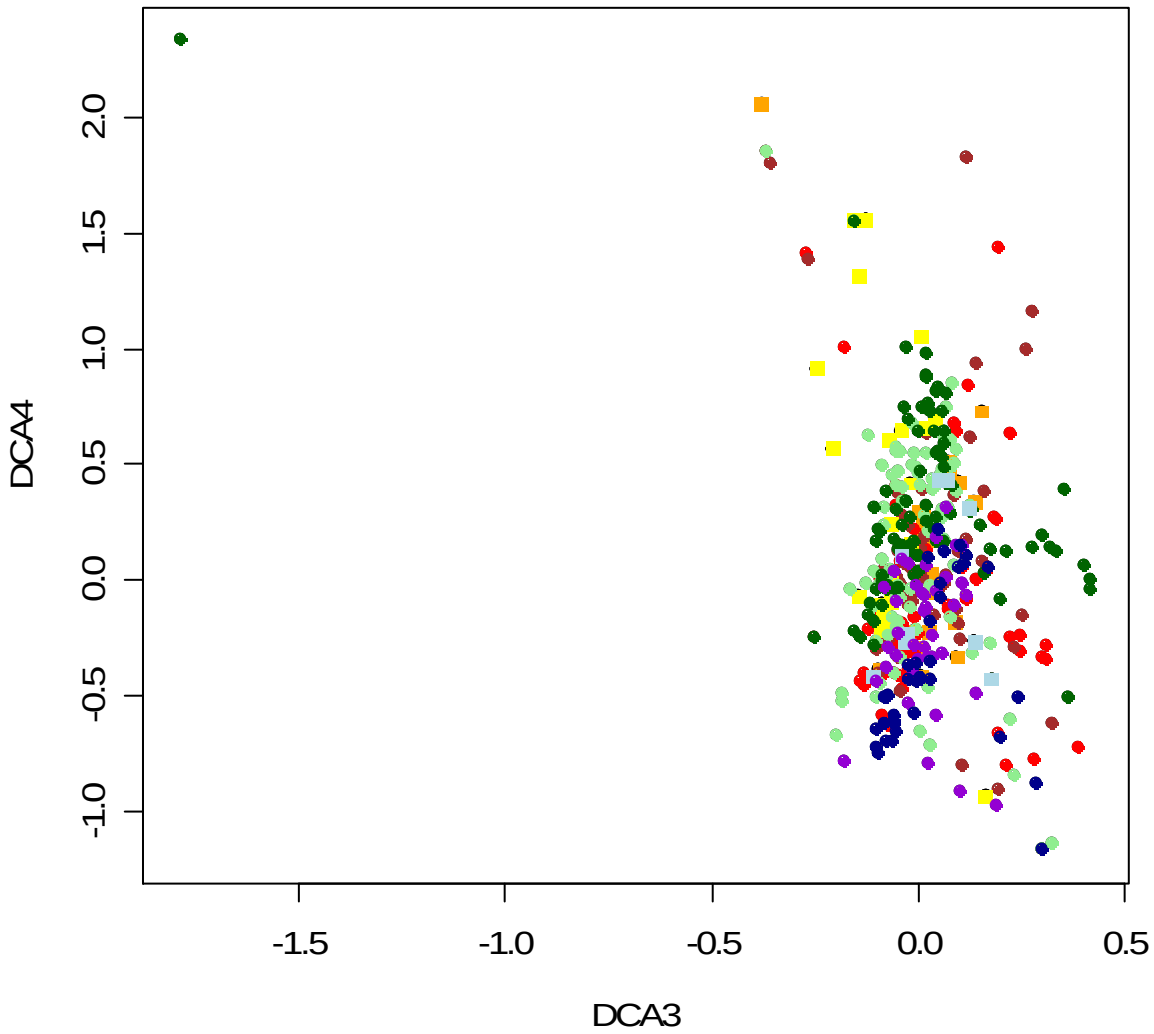

Fig. 3.3 DCA scatter plot of all sample sites in axes 3 and 4 + coloured site plots in nine different shades showing the sites at Åkrasanden, Stavasanden and Sandvesanden. The different shades are explained below. (The excel sheet has been changed by removing the scores for *Alopecurus pratensis* in transect 3A and *Catabrosa aquatica* in transect 3B to give a better spread of the site plots).

¤ Orange squares = Åkrasanden; transect 0C (1981)
¤ Red diamonds= Åkrasanden; transect 1A (2008)
¤ Brown diamonds = Åkrasanden; transect 1B (2008)

¤ Yellow squares = Stavasanden; transect 0D (1981)
¤ Light green diamonds = Stavasanden; transect 2A (2008)
¤ Dark green diamonds = Stavasanden; transect 2B (2008)

¤ Light blue squares = Sandvesanden; transect 0E (1981)
¤ Dark violet diamonds = Sandvesanden; transect 3A (2008)
¤ Dark blue diamonds = Sandvesanden; transect 3B (2008)

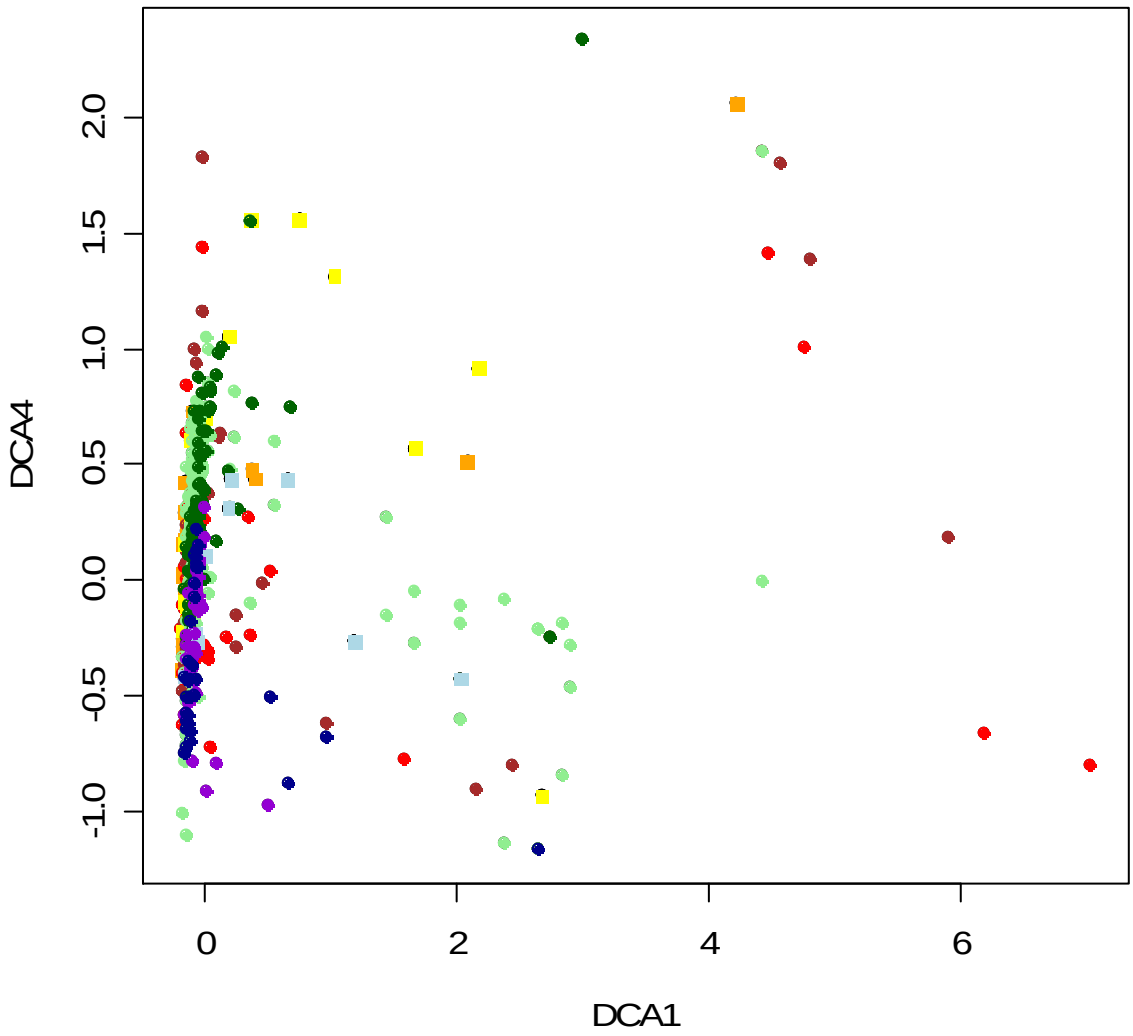

Fig. 3.4 DCA scatter plot of all sample sites in axes 1 and 4 + coloured site plots in nine different shades showing the sites at Åkrasanden, Stavasanden and Sandvesanden. The different shades are explained below. (The excel sheet has been changed by removing the scores for *Alopecurus pratensis* in transect 3A and *Catabrosa aquatica* in transect 3B to give a better spread of the site plots).

¤ Orange squares = Åkrasanden; transect 0C (1981)
¤ Red diamonds= Åkrasanden; transect 1A (2008)
¤ Brown diamonds = Åkrasanden; transect 1B (2008)

¤ Yellow squares = Stavasanden; transect 0D (1981)
¤ Light green diamonds = Stavasanden; transect 2A (2008)
¤ Dark green diamonds = Stavasanden; transect 2B (2008)

¤ Light blue squares = Sandvesanden; transect 0E (1981)
¤ Dark violet diamonds = Sandvesanden; transect 3A (2008)
¤ Dark blue diamonds = Sandvesanden; transect 3B (2008)

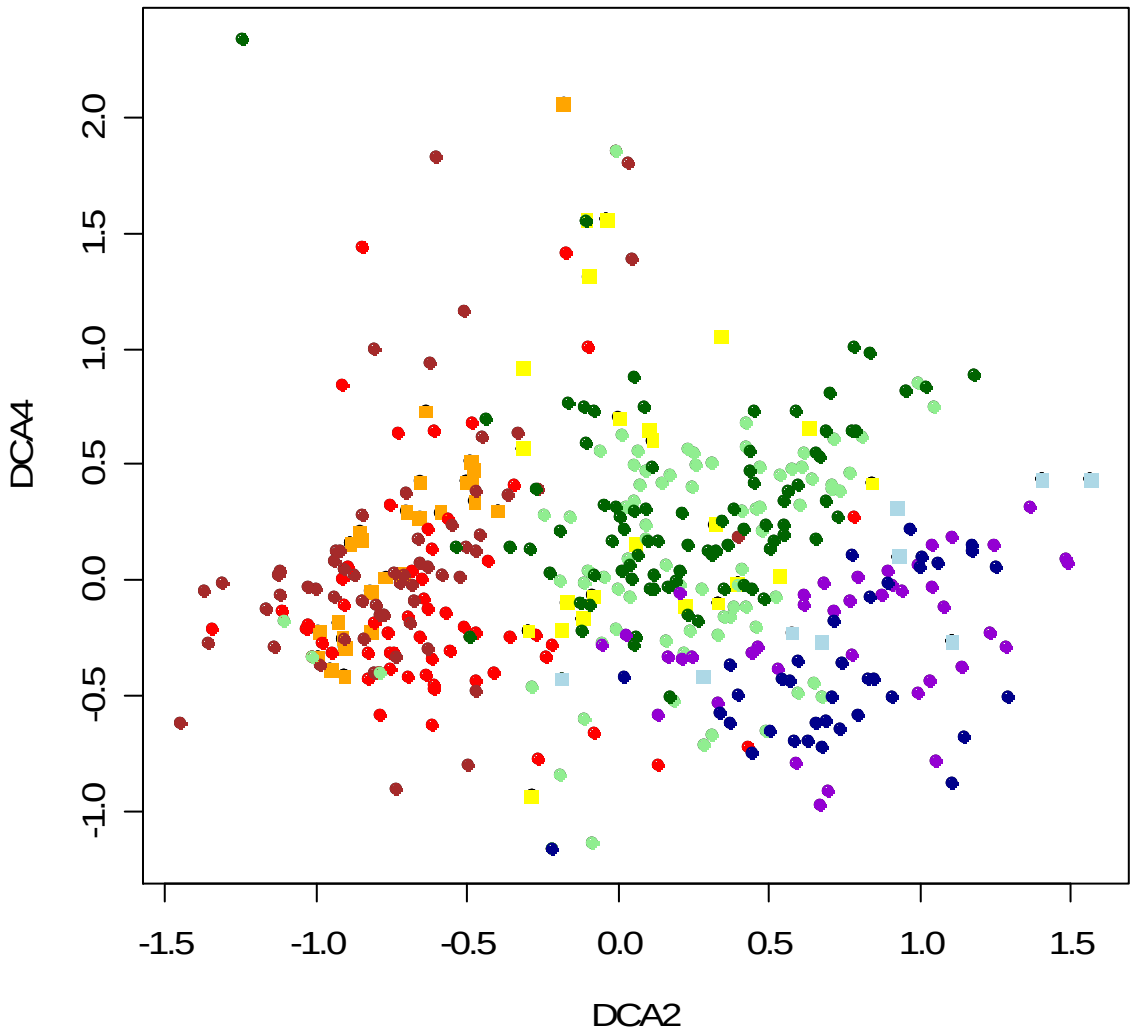

Fig. 3.5 DCA scatter plot of all sample sites in axes 2 and 4 + coloured site plots in nine different shades showing the sites at Åkrasanden, Stavasanden and Sandvesanden. The different shades are explained below. (The excel sheet has been changed by removing the scores for *Alopecurus pratensis* in transect 3A and *Catabrosa aquatica* in transect 3B to give a better spread of the site plots).

¤ Orange squares = Åkrasanden; transect 0C (1981)
¤ Red diamonds= Åkrasanden; transect 1A (2008)
¤ Brown diamonds = Åkrasanden; transect 1B (2008)

¤ Yellow squares = Stavasanden; transect 0D (1981)
¤ Light green diamonds = Stavasanden; transect 2A (2008)
¤ Dark green diamonds = Stavasanden; transect 2B (2008)

¤ Light blue squares = Sandvesanden; transect 0E (1981)
¤ Dark violet diamonds = Sandvesanden; transect 3A (2008)
¤ Dark blue diamonds = Sandvesanden; transect 3B (2008)

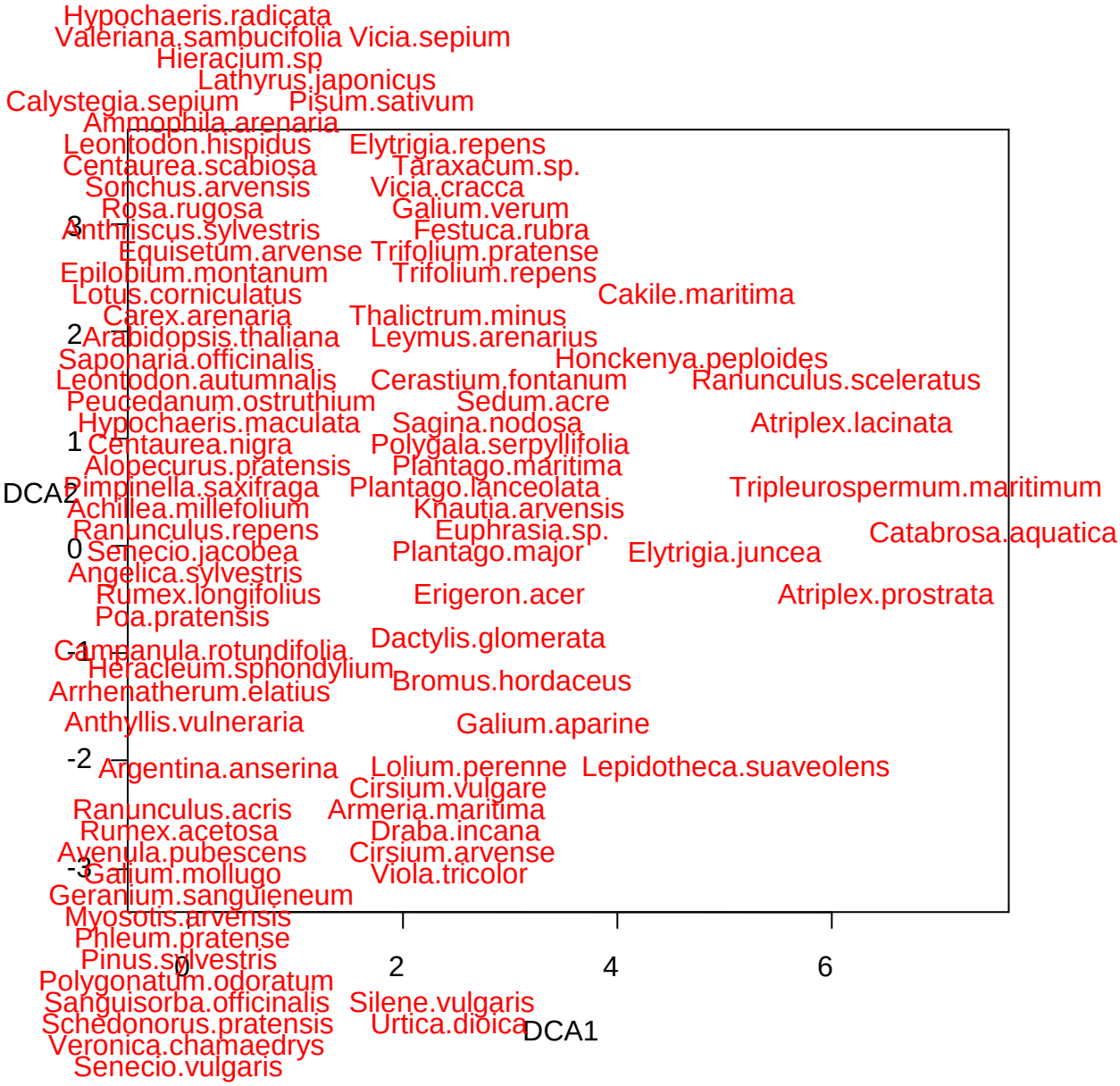

Fig. 3.6 DCA species plot of all species in all transects in axes 1 and 2. The species' names are mainly grouped in three columns. The nine species that makes up the far right and quite scattered 'column' were clearly separated from the remaining species originally. To enhance readability, some of the highly aggregated species' names on the left hand side of the diagram had to be separated and moved to the middle region of the diagram.

In the combined DCA plot (Fig. 3.6), depicting species names from all transects, there was a very profound aggregation of species names at the left hand side of the diagram. As this made the species names unreadable, this clumped aggregation had to be separated.

Due to the number of species names, it was necessary to arrange the names in two different columns. However, originally almost all names, except for the nine species names at the right hand side of the diagram, belonged to the same, main aggregation. Thereby, also this DCA plot illustrates the highly different species composition provided by the samples from the tidal zones at Åkrasanden.

Table 3.2 Summaries of the DCA ordination results for the combined computations based on the surveys of 1981 and 2008 at the three different sampling localities and of all transects together.

Locality/DCA axis	Eigenvalues	Decorana val.	Axis lengths
Åkrasanden DCA1	0.52710	0.82540	7.96300
Åkrasanden DCA2	0.24490	0.28410	2.95530
Åkrasanden DCA3	0.21360	0.18830	4.11880
Åkrasanden DCA4	0.14080	0.14080	2.57920
Stavasanden DCA1	0.51110	0.75510	4.48330
Stavasanden DCA2	0.23490	0.32270	2.87020
Stavasanden DCA3	0.15930	0.14570	2.34460
Stavasanden DCA4	0.15680	0.11720	1.55370
Sandvesanden DCA1	0.53770	0.60770	4.58250
Sandvesanden DCA2	0.15460	0.12570	1.63490
Sandvesanden DCA3	0.11514	0.09124	1.75605
Sandvesanden DCA4	0.13580	0.06794	2.15258
All transects DCA1	0.62360	0.70660	7.23580
All transects DCA2	0.35820	0.34890	3.02030
All transects DCA3	0.17350	0.18430	2.20630
All transects DCA4	0.19700	0.15740	3.50720

Table 3.3 Summaries of the CCA ordination results for the combined computations based on the surveys of 1981 at 2008 at the three different sampling localities and of all transects together.

Locality/CCA axis	Eigenvalues for constrained axes
Åkrasanden CCA1	0.12732
Åkrasanden CCA2	0.03928
Stavasanden CCA1	0.11609
Stavasanden CCA2	0.03450
Sandvesanden CCA1	0.24350
Sandvesanden CCA2	0.04139
All transects CCA1	0.295287
All transects CCA2	0.121915
All transects CCA3	0.097078
All transects CCA4	0.060684

Table 3.4 Inertia rank values for the combined computations based on the surveys of 1981 and 2008 at the three different sampling localities and of all transects together.

Locality	Total	Constrained	Unconstrained
Åkrasanden	4.9292	0.1666 2	4.7626 67
Stavasanden	3.2983	0.1506 2	3.1477 45
Sandvesanden	4.1508	0.2849 2	3.8660 42
All transects	5.45270	0.66350 8	4.78920 83

In his report from 1982 Lundberg further comments on his observation that there were some quite tiny communities of tidal zone species at the very inner part of the beach at this location, where the beach proper is approaching the rise toward the dune heights. Here he recorded specimens of *Atriplex prostrata, Cakile maritima* and *Cirsium arvense.* He points to the fact that *Cirsium arvense* is regarded a nitrophile, but is not ephemeral and has substantial nutrient storage capacities in its roots, contrary to what is the case for the typical tidal zone species. Lundberg considers *Cirsium arvense* at this location to have originated from more sheltered sites farther from the beach. This region of the transect route from 1981 should correspond with transect of 2008 at about a distance of 20 metres from the starting point.

Atriplex prostrata, Cakile maritima, Campanula rotundifolia, Elytrigia repens and Pimpinella saxifraga were all recorded further upward in the dune rise in 1981, but appeared not this close to the beach in the samples of 2008.

Most numerous within this section, from the survey in 2008, were *Elytrigia juncea, Carex arenaria, Cirsium arvense,* and *Ammophila arenaria. Dactylis glomerata, Galium aparine, Honckenya peploides* and *Ranunculus acris* were newcomers in the survey of 2008.
In this case the comparisons are within the same distances from the start of the transect analyses and the topographical features seem to be quite similar. This can be judged by studying the vegetation profile drawings in Lundberg's report from 1982 (appendix; fig 6.1), assisted by experience in the field. However, there has been some degree of alterations in the forefront of the dunes, most probably due to disturbances from surfs and human activities.

The visual impression of this very zone at Åkrasanden was of a quite disturbed one as there were several major erosions of the stretch extending from the inner part of the beach to the top of the dune plateau. Some of these were obviously aggravated by kids jumping from the dune edge (personal observation).
The jumping activities might very well have escalated by the actions from the surfs as these creates tempting and challenging jumping sites with abrupt and steep transitions directed forwardly from the dune plateau.
In the region of 25-28 metres from the transect origin Lundberg has noticed an association of *Carex arenaria, Geranium sanguineum* and *Sedum acre* as

representing the lower stratum of the vegetation cover. In 2008 *Sedum acre* was not recorded at this location.
My impression from this region of the transect route was that the vegetation cover here featured a quite firm and well established community. It was noticed that the major erosion a few metres to the left seriously had altered the front dune profile. However at the site of transect there was no visible impact from this event. It could be that this part of the front dune rise featured a more or less continuous vegetation history since 1981.

At a distance of 30-31 metres Lundberg comments on a path which intersected the transect in 1981. At this site he has recorded some patches without any vegetation. In this segment of transect, the dune plateau was hardly reached in 2008 and this path should be regarded as lost since the first sampling. Compared to the profile drawing made by Lundberg in 1981, I think the present profile is more steep and abrupt at this distance, probably due to several quite severe erosion events during the meantime.

Further, Lundberg comments the sampling results from the dune plateau. The main wear zone was at a distance of 37-40.5 metres. This path was measured to 3.5 metres in breadth (Lundberg 1982).
In this region Lundberg has recorded some *Leymus arenarius* scores together with *Plantago lanceolata.* The specimens appeared as flattened toward the ground due to wear. He has noticed that at the most heavily exposed part of the wear zone there was a community consisting mainly of *Plantago major, Leontodon autumnalis* and *Lolium perenne.*
Lundberg has pointed to the distance of 38-40.5 metres from the start of transect as the heaviest wear zone (Lundberg 1982).
In my field notes I have noticed the distance from 38-39 metres as being in the midst of the most heavy wear zone. This is encouraging as a confirmation that the conditions most probably have remained stabile since 1981 and that the outline of transects probably can be regarded quite accurate and the comparisons relevant.
Neither *Plantago major* nor *Leontodon autumnalis* was recorded in 2008, while *Lolium perenne* was more frequently occurring in 2008 compared to the situation in 1981.
Further inward from the main path Lundberg describes the transition to the dune meadow as abrupt. This is still an adequate description for this transition in the season of 2008. The meadow is characterized as rich with many showy species and harbouring grasses of high stature. He mentions *Pimpinella saxifraga, Galium verum, Achillea millefolium, Ranunculus acris, Vicia cracca* and *Knautia arvensis.*
In the season of 2008 *Geranium sanguineum* also contributed to this showiness, especially somewhat further inward in the meadow. *Schedonorus pratensis* and *Arrhenatherum elatius* together contributed to the visibility of grasses and made this very meadow look well established and developed.

It is interesting to notice the broad similarity between the most common species now and then, though there are some obvious differences.
Festuca rubra, Galium verum, Taraxacum sp. and Geranium sanguineum are all among the most common species both in 1981 and in 2008.

On the other hand *Campanula rotundifolia,* which was one of the very abundant species in 1981, was among the rarest species in 2008. The number of samples that contained this species in 1981 was 45, while it was only recorded within four squares in 2008. This decrease counts to more than 90%.
Contrarily, *Leymus arenarius* has increased substantially since 1981, being registered within 13 samples in 1981 compared to a mean of 45 samples in 2008. This means an increase of 72%.
Other species showing major differences in abundances at the two sampling occasions are *Myosotis arvensis* and *Viola tricolor.* These herbs were not found during sampling in 2008. However, they both occurred relatively sparsely in 1981 as well, with four and ten registered samples respectively.
Silene vulgaris and *Epilobium montanum* as well as *Polygonatum odoratum* were not registered in 1981, but were found moderately occurring in 2008.
Angelica sylvestris occurred richly in 2008, while it was not noticed in 1981.
The detailed recordings can be read from Tables 6.1-6.3 in the appendix.
It is worth noticing that the species regarded as solely occurring in transect 1A, namely *Anthyllis vulneraria, Bromus hordaceus, Erigeron acer, Polygala serpyllifolia* and *Sagina nodosa* all were found at the highest altitude of the dune, close to the main and much used foot path where no high grasses or other dominating herbs thrived.
The CCA diagram in fig 3.7 depicts the differences of the three independent transects. The species most typically associated with the particular transect are positioned more isolated from species of any other transect. While species most in common among the three transects seem to be positioned more or less in the middle of the species' hub. It is very obvious that there have occurred substantial changes within the species' composition during the time since 1981. The species associated with the two surveys are quite much separated from each other, spatially.

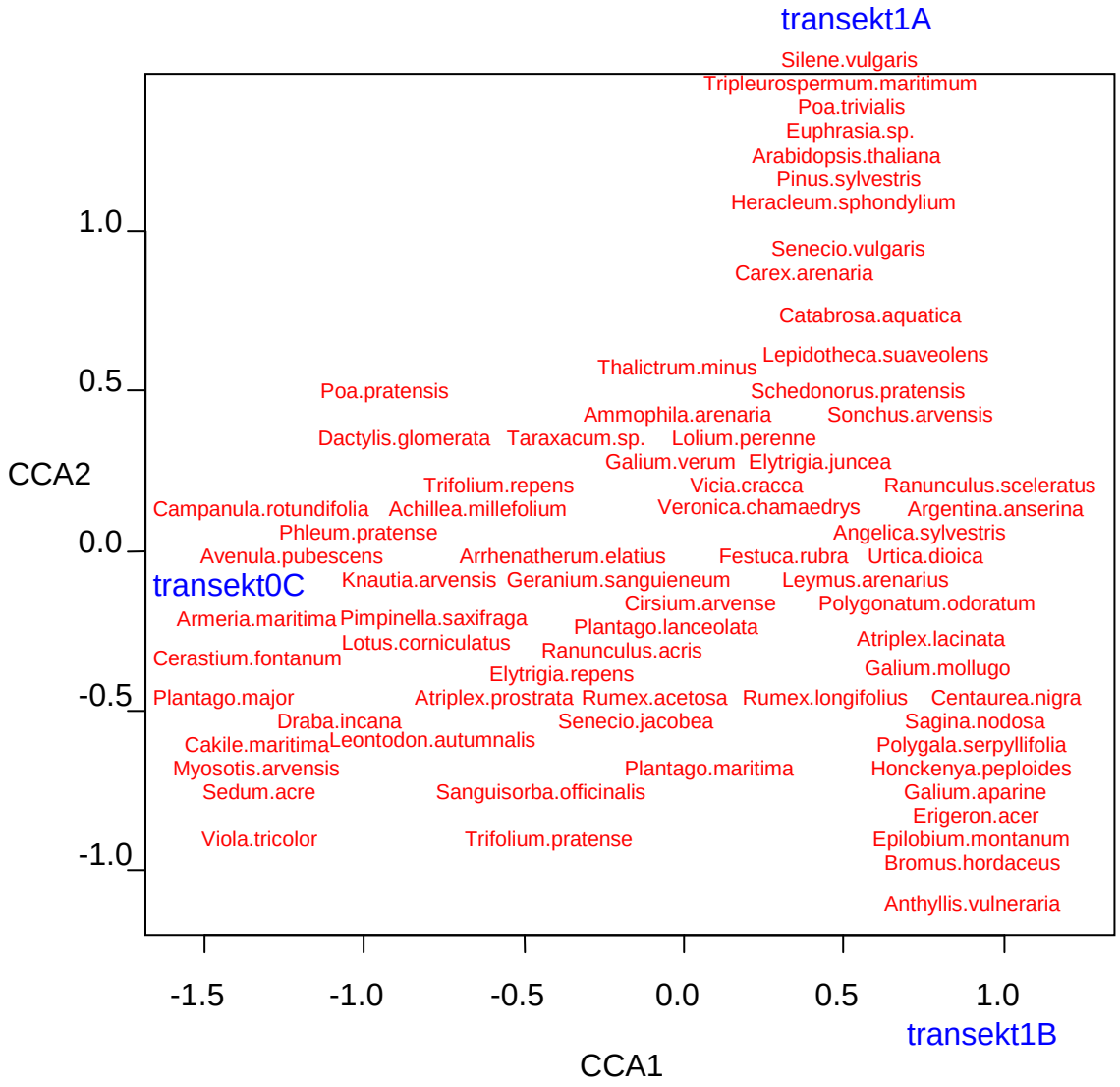

Fig 3.7 CCA diagram with species from all transects at Åkrasanden. Species' names have been separated to enhance readability.

- **Transekt 0C = transect surveyed in 1981**
- **Transekt 1A = transect surveyed in 2008**
- **Transekt 1B = transect surveyed in 2008**

Tables 3.5-3.7 depict some more detailed information about commonness and rareness of species within the different transects at Åkrasanden.

From both transect surveys it is documented that the Åkrasanden area has the highest species diversity. Tables 6.1-6.3 in the Appendix show this clearly. The total amount of species has increased since 1981.

Table 3.5 Rarest and commonest species from the analysis regarding transect 0C, Åkrasanden – 1981. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six commonest species
0	*Plantago maritima*	*Ammophila arenaria*	*Cakile maritima*	*Elytrigia juncea*	*Festuca rubra* (52)
	Schedonorus prat.	*Carex arenaria*	*Myosotis arven.*	*Elytrigia repens*	*Galium verum* (50)
		Leontodon autumnalis			*Campanula rot.* (45)
		Plantago major			*Plantago lanceol.*(47)
		Sedum acre			*Geranium sang.* (44)
					Taraxacum sp. (42)

Table 3.6 Rarest and commonest species from the analysis regarding transect 1A; Åkrasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six commonest species
Ammophila arenaria	*Atriplex prostrata*	*Lepidotheca suav.*	*Campanula rot.*	*Galium mollugo*	*Festuca rubra* (44)
Arabidopsis thaliana	*Catabrosa aquat.*	*Tripleurospermum mar.*		*Poa pratensis*	*Galium verum* (42)
Atriplex lacinata	*Lotus corniculatus*			*Schedonorus prat.*	*Leymus arenarius* (40)
Avenula pubescens	*Pinus sylvestris*			*Senecio jacobea*	*Thalictrum minus* (39)
Centaurea nigra	*Ranunculus scel.*			*Trifolium repens*	*Taraxacum sp.* (37)
Elytrigia repens				*Urtica dioica*	*Vicia cracca* (35)
Euphrasia sp.					
Heracleum sphondylium					
Poa trivialis					
Polygonatum odoratum					
Rumex longifolius					
Senecio vulgaris					
Sonchus arvensis					

Table 3.7 Rarest and commonest species from the analysis regarding transect 1B, Åkrasanden – 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six commonest species
Ammophila arenaria	*Atriplex lacinata*	*Atriplex prostrata*	*Trifolium repens*	*Centaurea nigra*	*Festuca rubra* (50)
Anthyllis vulneraria	*Carex arenaria*	*Bromus hordaceus*		*Galium aparine*	*Leymus aren.* (50)
Avenula pubescens	*Cerastium fontanum*	*Elytrigia repens*		*Lotus corniculatus*	*Geranium sang.* (38)
Catabrosa aquatica	*Polygonatum odor.*	*Honckenya peploid.*			*Ranunculus acris* (37)
Draba incana	*Ranunculus sceler.*	*Poa pratensis*			*Vicia cracca* (37)
Erigeron acer		*Rumex longifolius*			*Galium verum* (36)
Leontodon autumn.					*Taraxacum sp.* (36)
Lepidotheca suaveol.					
Phleum pratensis					
Plantago major					
Polygala serpyllifolia					
Sagina nodosa					
Sonchus arvensis					

3.1.2 Åkrasanden–pH and LOI

From tables 6.15-6.17 in the appendix it is rather obvious that LOI values are high at Åkrasanden, particularly within the dune meadow sub-segment of transects. It became visible during collecting of soil samples that strata dominated by dark humified substances quite abruptly changed with strata containing lighter sandy soils.
Measured soil values from Åkrasanden present quite various and interesting soil properties. It is worth mentioning that the mean pH value from the beach proper sub-segment of the transect measures 8.26 in 3–5 cm depth and 8.46 in 10 cm depth. This segment includes the sandy beach and to some extent the immature dunes/transition zone. The highest measured pH value within the whole survey is from this very transect (9.14) at a distance of twenty meters from the start of transect and was collected from 10 cm depth. This site was inhabited by several specimens of *Elytrigia juncea* (fig 3.8).

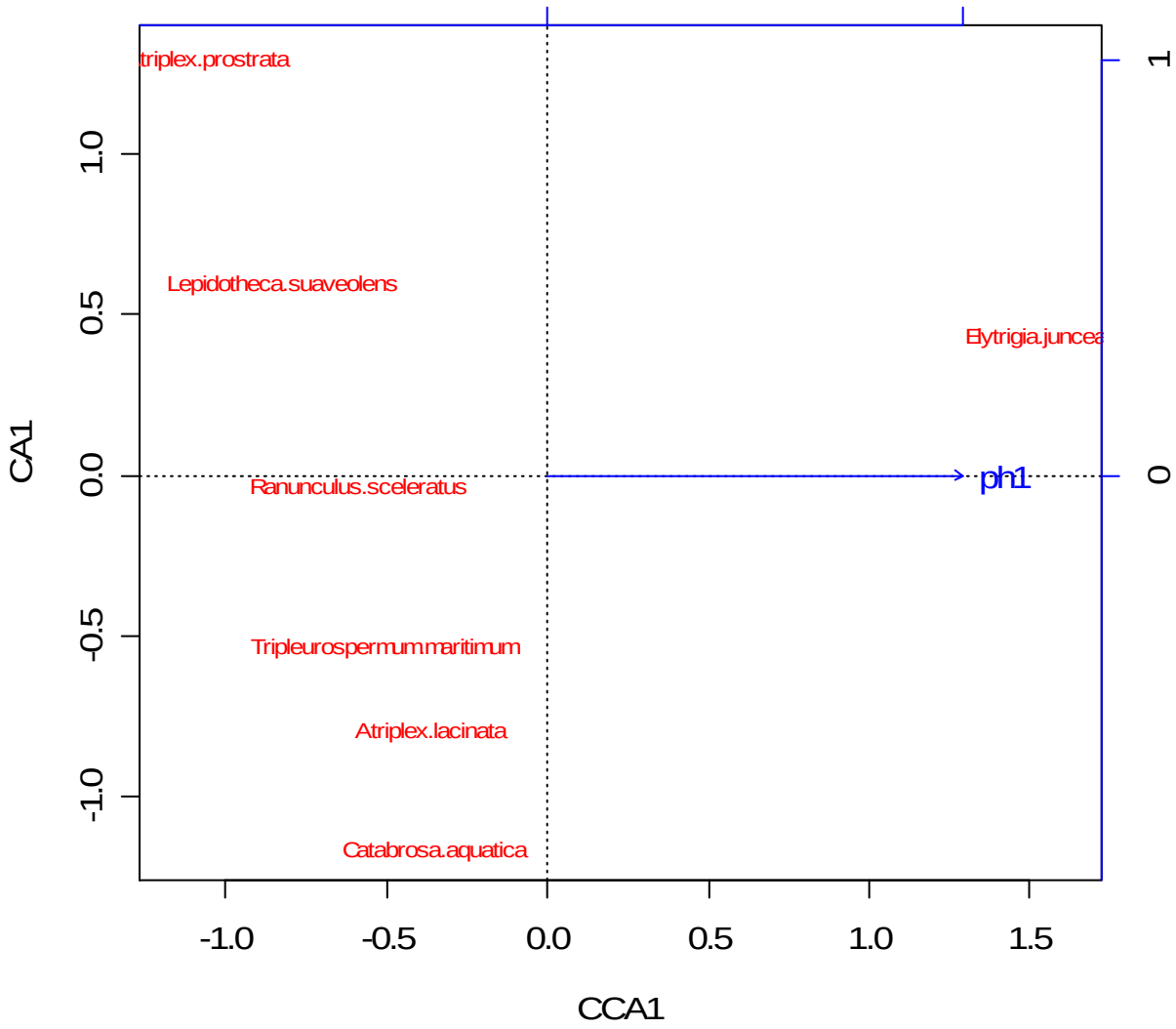

Fig. 3.8 CCA diagram presenting the beach-bound species at Åkrasanden, transect 1A, in relation to the pH-values measured at this location. It is demonstrated that *Elytrigia juncea* has the highest preference (tolerance) for alkalinity. In this computation only samples from the beach proper were included.

3.1.3 Stavasanden–floristic comparisons

The samples regarded as belonging to embryo dune settings from the investigation in 1981 have been estimated from the vegetation profile drawing in Lundberg's report (Appendix; fig. 6.2).
Cakile maritima was not noticed in 2008 and the other species were more scattered and uneven in their appearances compared to the results from 1981. However, the dominating species within these settings at both occasions is *Elytrigia juncea.* Compared to Åkrasanden, the embryo dunes at Stavasanden seem to be much more homogenous and stabile regarding species diversity. The general impression at this site is one of a lesser disturbed. Compared to Åkrasanden, the Stavasanden area is situated substantially more remote from residential areas and presents a less attractive site for swimming activities. The beach as such is nice and clean, but its facing toward north-west makes it exposed to chilly winds and the lack of rocks and islets in the waters outside the beach probably contributes to colder water temperatures. Lundberg also points to the fact that this locality is heavily exposed toward north-west and that the beach is very low and flat. Thereby the high tides influence the sand properties more severely and so make the sand lesser available for the accumulations into immature dunes (Lundberg 1982). He further comments on the fact that *Leymus arenarius* here appears more seaward than *Ammophila arenaria* and that this is a common observation in European beach communities (Lundberg 1982).

Table 3.8 Rarest and commonest species from the analysis regarding transect 0D, Stavasanden - 1981. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
0	0	*Angelica sylvestris*	0	0	*Leymus arenarius* (58)
					Festuca rubra (48)
					Taraxacum sp. (48)
					Vicia cracca (48)
					Achillea millefolium (43)
					Pimpinella saxifraga (43)

Table 3.9 Rarest and commonest species from the analysis regarding transect 2A, Stavasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Centaurea nigra	*Trifolium repens*	*Atriplex prostrata*	*Argentina anserina*	0	*Leymus arenarius* (71)
Elytrigia repens	*Viola tricolor*	*Geranium sang.*	*Rumex acetosa*		*Festuca rubra* (70)
Honckenya peploides		*Knautia arvensis*			*Vicia cracca* (64)
Leontodon autumnalis		*Veronica cham.*			*Taraxacum sp.* (52)
Polygonatum odoratum					*Galium verum* (51)
Saponaria officinalis					*Thalictrum minus* (45)

Table 3.10 Rarest and commonest species from the analysis regarding transect 2B, Stavasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Cirsium vulgare	*Centaurea scab.*	*Galium aparine*	*Argentina anserina*	*Viola tricolor*	*Festuca rubra* (81)
Heracleum sphond.	*Elytrigia repens*		*Rumex acetosa*		*Leymus arenarius* (65)
	Honckenya pepl.		*Sonchus arvensis*		*Ammophila arenaria* (60)
	Leontodon aut.				*Taraxacum sp.*(56)
					Vicia cracca (51)
					Achillea millefolium (48)

As can be seen from the tables 3.8-3.10, there are some major similarities between the two surveys of 1981 and of 2008 regarding the commonest species although some differences should be mentioned. *Leymus arenarius, Festuca rubra, Vicia cracca* and *Taraxacum sp.* are among the most commonly occuring species in 1981 and in 2008, as well. There has been a marked increase in the abundances of *Galium verum* and of *Thalictrum minus.* On the other hand, the abundance of *Pimpinella saxifraga* has suffered a quite substantial decrease.
By consulting tables 6.1-6.3 in the appendix, species registered in 2008 and not in 1981 count to eighteen. These were: *Anthriscus sylvestris, Argentina anserina, Arrhenatherum elatius, Campanula rotundifolia, Carex arenaria, Centaurea nigra, Cerastium fontanum, Dactylis glomerata, Equisetum arvensis, Geranium sanguineum, Heracleum sphondylium, Leontodon autumnalis, Plantago lanceolata, Polygonatum odoratum, Saponaria officinalis, Sonchus arvensis, Trifolium pratensis and Veronica chamaedrys.*
Species found in 1981 and not found in 2008 count to four. These are: *Angelica sylvestris, Cakile maritima, Plantago maritima* and *Poa pratensis.*
This should be interpreted as a substantial increase in species richness over the time span since 1981 even considered the fact that only one transect analysis was performed in 1981. The highest species score recorded from this transect was eighteen. This was partially recorded in a frequently used path (transect 2A, square 94).

3.1.4 Stavasanden–pH and LOI

Compared to the situation at Åkrasanden, the pH values are higher at Stavasanden both from measures of sub-samples of transects and from measures of the two different layers of soil. The pH is generally more alkaline while the LOI values are not at all that high as are displayed from the samples at Åkrasanden.

Also the soil values show a low degree of variability between the different soil layers at this sampling site. There is, in fact, no noticeable variability in either pH- or in LOI values between the two layers from the beach sub-segment of this transect. The pH is markedly higher than at Åkrasanden.

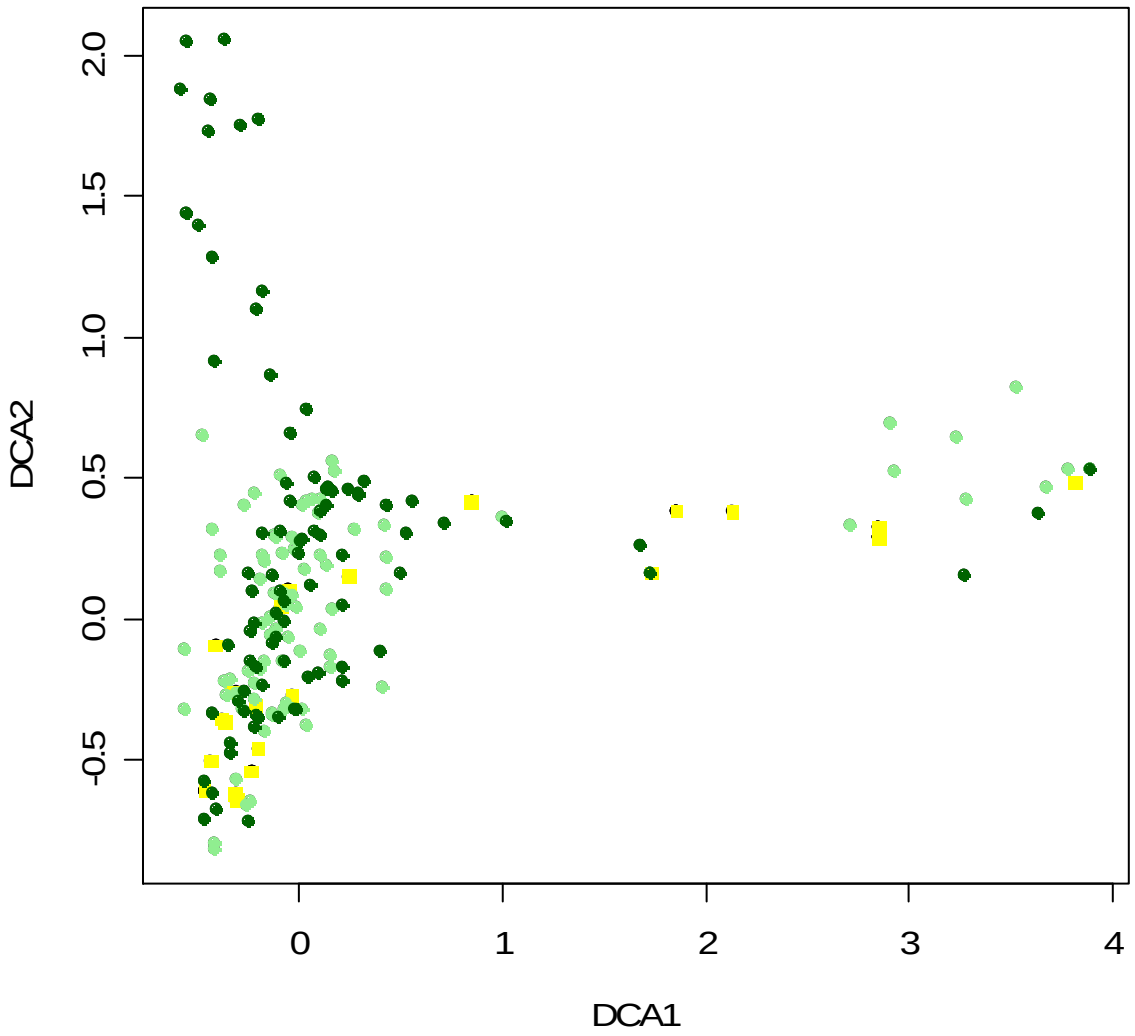

Fig. 3.9 DCA scatter plot with all sites from all three transects: 0D (1981), 2A (2008), and 2B (2008) at Stavasanden.

- **Yellow squares = Stavasanden; transect 0D (1981)**
- **Light green diamonds = Stavasanden; transect 2A (2008)**
- **Dark green diamonds = Stavasanden; transect 2B (2008)**

The DCA scatter plot in fig 3.9 depicts the situation quite well at Stavasanden with separated, pointed site plots of the three transect analyses. About eighteen site plots from the survey in 2008 are scattered very much to the right in the diagram and this corresponds nicely with the transect analyses in the immature dune area of the site (Appendix; tables 6.23 and 6.24). These samples were of few species and of low abundances and differ highly from the other samples of transect.
Further inward in the dune area the samples become substantially more homogenous and tend to be more aggregated on the left hand side of the diagram.

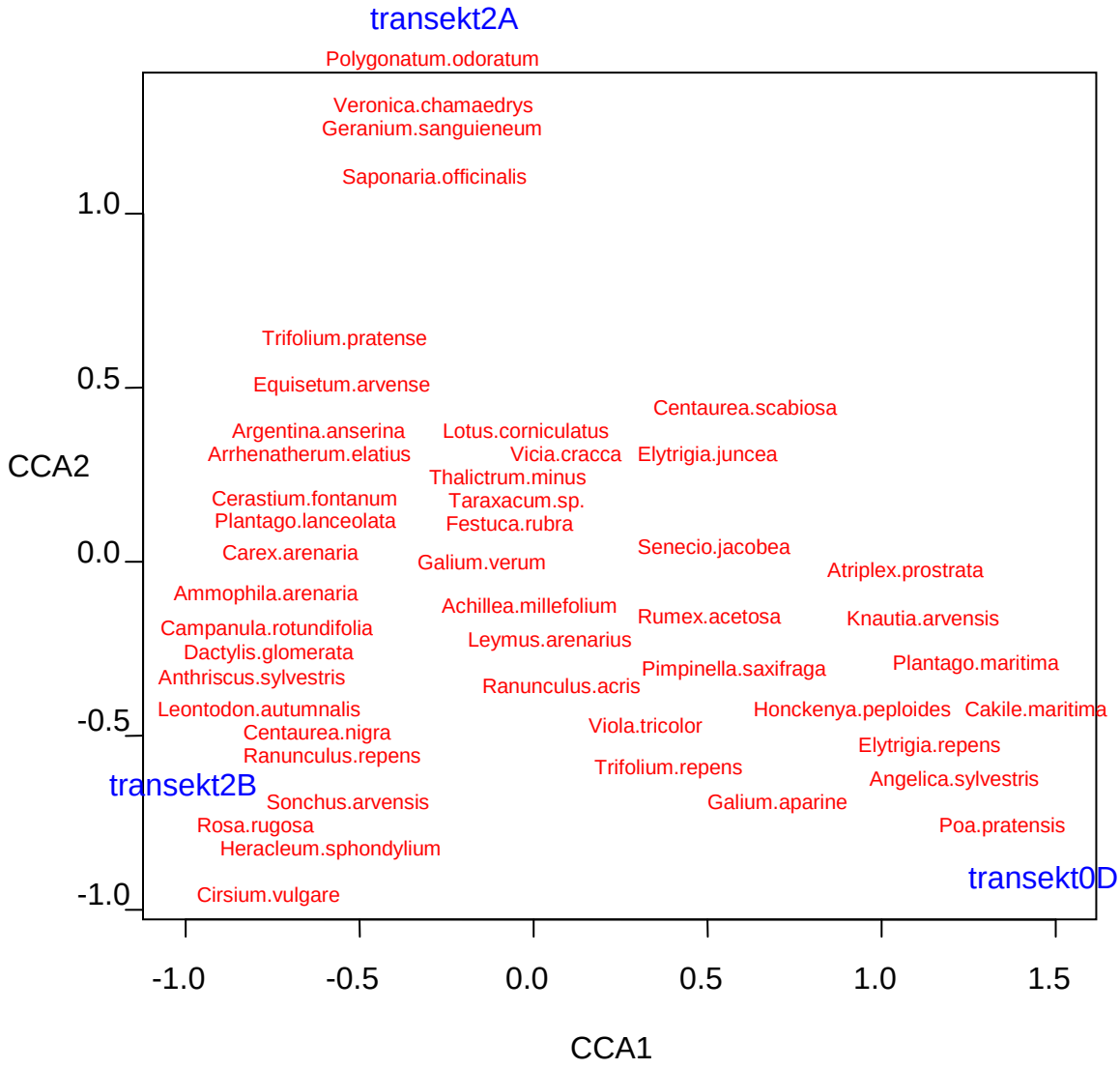

Fig. 3.10 CCA diagram with species from all transects at Stavasanden. Species' names have been separated to enhance readability.

- **Transekt 0D = transect surveyed in 1981**
- **Transekt 2A = transect surveyed in 2008**
- **Transekt 2B = transect surveyed in 2008**

The CCA diagram in fig. 3.10 shows the quite noticeable vegetation change that has occurred also at the Stavasanden locality since 1981. It is visualized by the highly spatially separated species' names from the two main sampling occasions.

3.1.5 Sandvesanden–floristic comparisons

Also at Sandvesanden, the species diversity has increased quite a lot, compared to the results from the survey of 1981. The species count in 1981 was 23, while it was 35 in 2008. 'New' species in 2008 were *Alopecurus pratensis, Angelica sylvestris, Anthriscus sylvestris, Calystegia sepium, Campanula rotundifolia, Cerastium fontanum, Epilobium montanum, Equisetum arvense, Geranium sanguineum, Knautia arvensis, Leontodon autumnalis, Ranunculus acris, Rumex acetosa, Senecio jacobea, Trifolium pratense, Valeriana sambucifolia* and *Vicia sepium.* This counts to seventeen 'new' species. Species found in 1981 and not noticed in 2008 are *Atriplex prostrata, Elytrigia repens, Poa pratensis* and *Poa trivialis.* The net number of newcomers is thereby thirteen, which is noticeable.
Species found exclusively at Sandvesanden are *Alopecurus pratensis, Calystegia sepium, Hypochaeris radicata, Pisum sativum, Leontodon hispidus* and *Vicia sepium.*

The species recorded from the initial parts of transects in 2008 were *Alopecurus pratensis, Catabrosa aquatica, Elytrigia juncea, Pisum sativum, Vicia sepium and Ammophila arnaria. Alopecurus pratensis* as well as some specimens of *Catabrosa aquatica* were collected from the body of the out-let river at this site.
Some distance further upward in the sandy slope there were some more typical immature dune species settings. However, these 'islands' of plant communities could very likely originate from detached turfs at the undercut region of the dune top. This was due to the impression of relatively humus-rich accumulations associated with these scattered 'islets' in the sandy slope.

The DCA scatter plot in fig. 3.11, based on the transect analyses at Sandvesanden, clearly depicts the great differences in species compositions from the initial samples of the two surveys. The highly scattered and diverging site plots to the right in the diagram (light blue) are interpreted as representing the samples from the initial part of the transect 0E, conducted in 1981. The total lack of similarity is well reflected in the diagram as these site plots are visualized very far from the dark blue and dark violet ones, representing the survey in 2008.

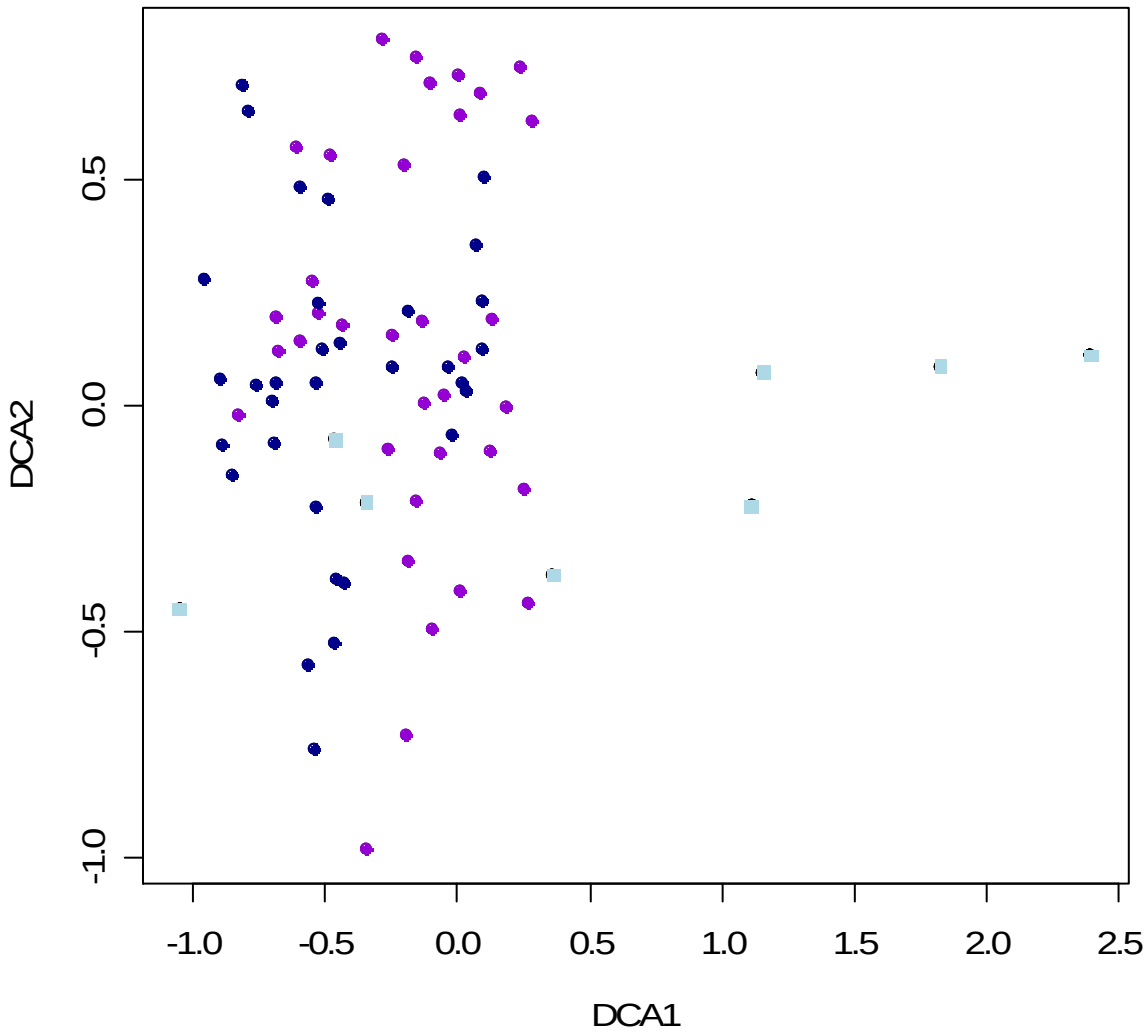

Fig. 3.11 DCA scatter plot with sites from all three transects: 0E (1981), 3A (2008), and 3B (2008) at Sandvesanden.

- **Light blue squares = Sandvesanden; transect 0E (1981)**
- **Dark violet diamonds = Sandvesanden; transect 3A (2008)**
- **Dark blue diamonds = Sandvesanden; transect 3B (2008)**

Table 3.11 Rarest and commonest species from the analysis regarding transect 0E, Sandvesanden – 1981. Numbers in parentheses behind some species' names refer to the count of samples containing the species

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
0	0	0	0	*Atriplex prostrata*	*Ammophila arenaria* (54)
					Leymus arenarius (52)
					Lathyrus japonicus (45)
					Taraxacum sp. (38)
					Elytrigia repens (32)
					Achillea millefolium (30)

Table 3.12 Rarest and commonest species from the analysis regarding transect 3A, Sandvesanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Calystegia sepium	*Alopecurus pratensis*	*Leontodon hispidus*	*Geranium sanguineum*	0	*Ammophila arnaria* (36)
Campanula rot.	*Dactylis glomerata*		*Leymus arenarius*		*Vicia cracca* (32)
Cerastium font.	*Elytrigia juncea*		*Plantago lanceolata*		*Festuca rubra* (30)
Equisetum arvense			*Ranunculus acris*		*Galium verum* (30)
Leontodon aut.			*Senecio jacobea*		*Thalictrum minus* (29)
Pimpinella saxifraga					*Centaurea scabiosa* (26)
Rumex acetosa					

Table 3.13 Rarest and commonest species from the analysis regarding transect 3B, Sandvesanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Catabrosa aquatica	*Hieracium sp.*	*Angelica sylvestris*	*Elytrigia juncea*	*Knautia arvensis*	*Ammophila arenaria* (34)
Hypochaeris radicata	*Lathyrus japonicus*	*Trifolium pratense*		*Leymus arenarius*	*Carex arenaria* (32)
Leontodon aut.	*Pimpinella saxifraga*	*Valeriana sambucifolia*		*Plantago lanceolata*	*Festuca rubra* (32)
Pisum sativum	*Ranunculus acris*				*Galium verum* (32)
Rumex longifolius	*Rumex acetosa*				*Achillea millefolium* (31)
Senecio jacobea					*Vicia cracca* (30)

From tables 3.11-3.13 it is shown that *Ammophila arenaria* and *Achillea millefolium* are among the most commonly occurring species both in 1981 and in 2008, although there is a quite substantial decrease in the abundance of *Ammophila arenaria. Leymus arenarius,* which was very abundant in 1981, has decreased dramatically. Its reduction is ca 90%. *Lathyrus japonicus* also shows a marked decrease, declining with 65%. The most pronounced decline, however, is by *Elytrigia repens*, which were among the most common species in 1981 and was not noticed in 2008. *Taraxacum sp.* shows a moderate decline.
On the contrary, *Carex arenaria* has increased by ca 70%, *Festuca rubra* by 45% and *Galium verum* as well as *Thalictrum minus* has increased more moderately.

Lundberg comments on the prevalence of *Centaurea scabiosa* within the dune meadow and points to the fact that specimens of this species also have mingled with communities dominated by *Leymus arenarius* and by *Ammophila arenaria* (Lundberg 1982). By comparing the survey results of the two investigations it seems that the occurrences of *Centaurea scabiosa* are stabile. Especially when compensating for the minor difference that appeared regarding the distance from the start of the transect 3A to the path (see materials and methods, 2.2.1).

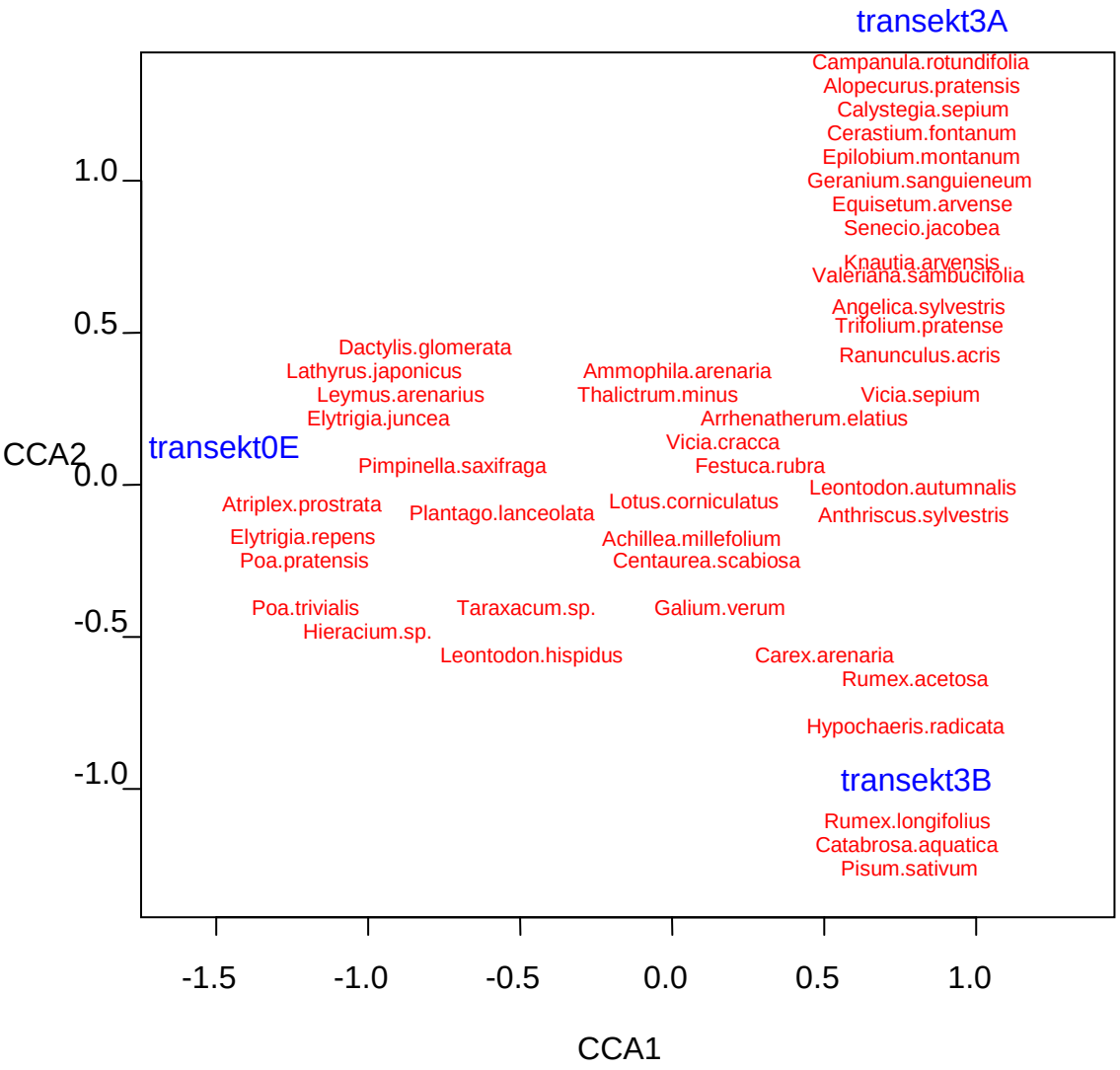

Fig. 3.12 CCA diagram with species from all transects at Sandvesanden. Species' names have been separated to enhance readability.

- **Transekt 0E = transect surveyed in 1981**
- **Transekt 3A = transect surveyed in 2008**
- **Transekt 3B = transect surveyed in 2008**

The CCA diagram in fig. 3.12 shows clearly the differences within species composition from the two sampling occasions. It is visualized as a high degree of separation of species names associated with the transects in the diagram.

3.1.6 Sandvesanden–pH and LOI

The differences in pH values between Stavasanden and Sandvesanden are relatively small. The LOI values at Sandvesanden are even lower here than at Stavasanden.

The mean pH values collected from the outlet river bank through the dune slope is lower than the corresponding values at Stavasanden. The LOI values are, however, not noticeably different.

3.1.7 All localities–pH and LOI

Åkrasanden features generally the lowest pH values both from whole transect analyses and from sub-samples' analyses. One exception is the pH value at Sandvesanden from the beach proper sub-segment at 10 cm depth which reads a slightly lower value.
Regarding LOI values, Åkrasanden features noticeably higher values than at the other sites. However, this should be regarded as a result of the very high LOI values within the dune meadow. In fact, the beach proper at Åkrasanden has a lower LOI compared to the other sites.

The differences in pH and LOI values between Stavasanden and Sandvesanden are more marginal, especially regarding LOI values. The pH values from the beach proper sub-segment at Stavasanden were somewhat higher than at Sandvesanden. However, the substantial degrees of recent disturbances at Sandvesanden make comparisons to this very sub-segment not valid.

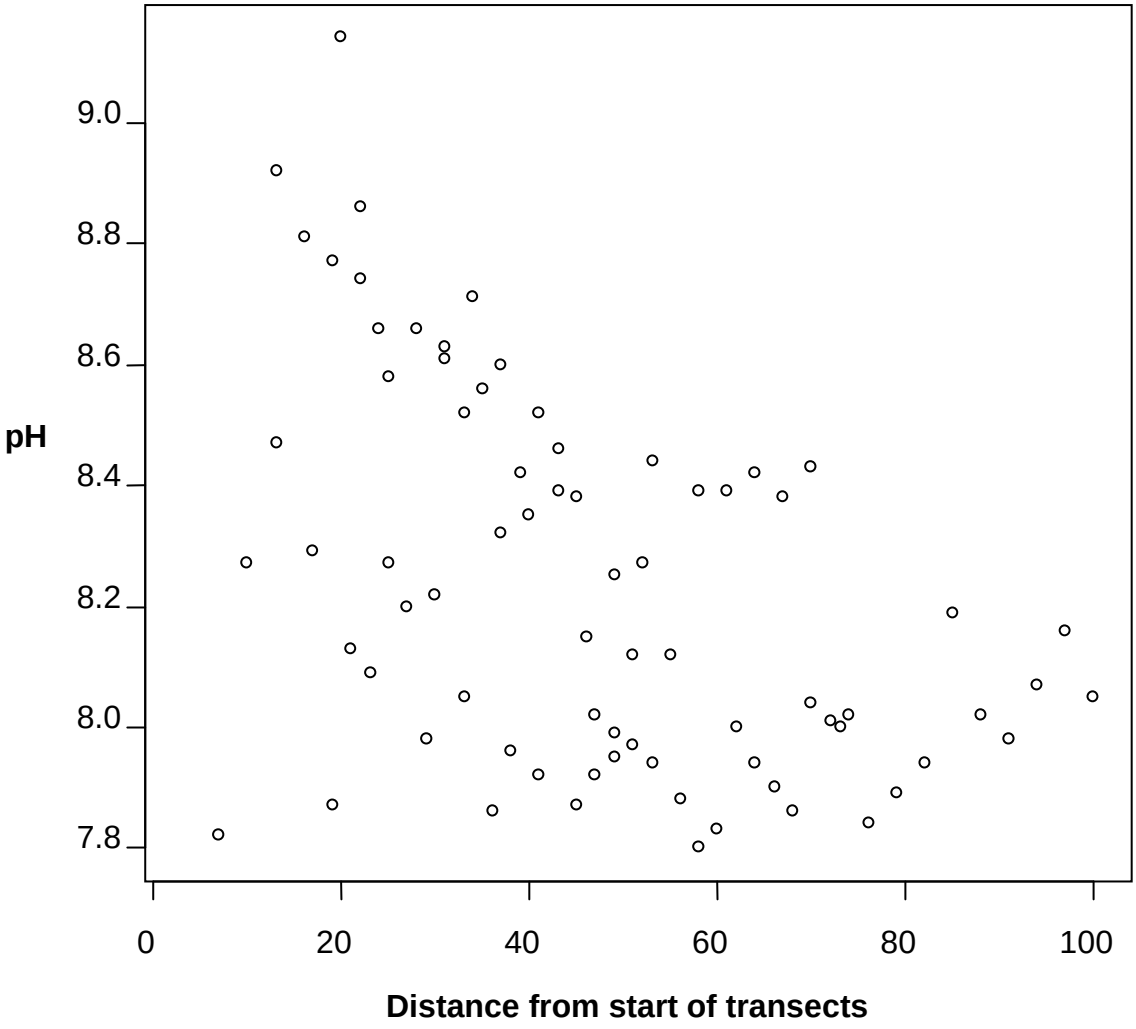

Fig. 3.13 Plot depicting all pH values measures from 10 cm depths (all localities). There is a marked trend toward lowered pH values with increasing distance from the beach proper.

As can be seen from the diagram in fig. 3.13 there is a high degree of variability in the pH values at all levels in this combined site analysis (all sites). However, the variability decreases toward the inner segments of transects. Though the main trend is quite obvious, as lower pH values are associated with increasing distances from the beach. At all localities the beach proper ended at 20-30 metres.

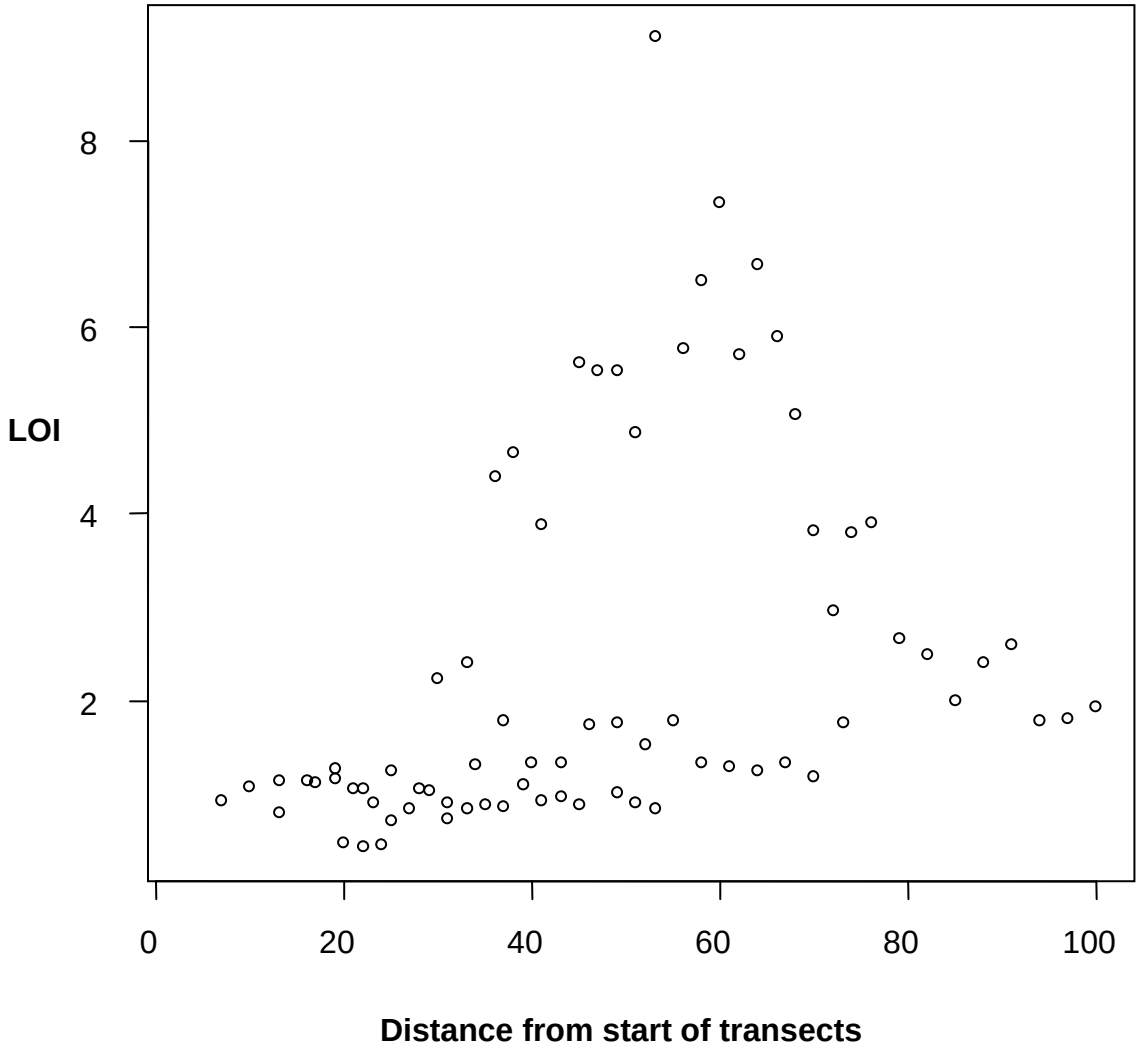

Fig. 3.14 Plot depicting all LOI measures from 10 cm depths (all localities). There is a marked trend toward high LOI values within the middle parts of the dune meadows.
At Åkrasanden the dune meadow spanned from ca 30 metres to 76 metres.
At Stavasanden the dune meadow spanned from ca 30 metres to ca 100 metres.
At Sandvesanden the dune meadow spanned from ca 20 metres to ca 50 metres.

Fig 3.14 shows the association between LOI values and distance from the seaward start of transects. It depicts the recorded high LOI values at the mid dune meadow level. However, there was a high degree of variability also concerning this property. This became visualised during the excavation of soil samples as dark humified layers frequently alternated with light, sandy ones.

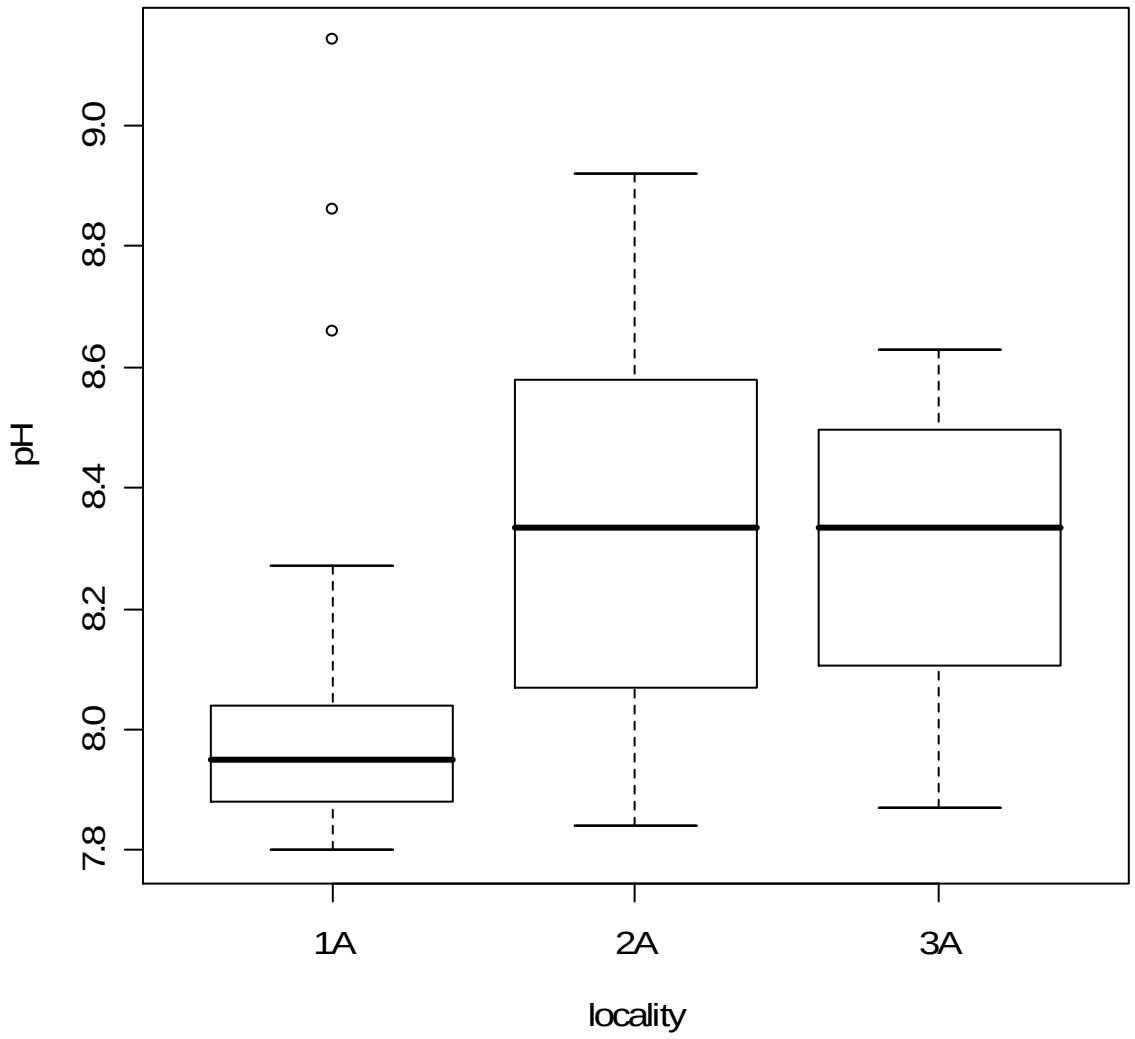

Fig. 3.15 Diagram showing differences in pH values with variances and confidence intervals from 10 cm depths between the sampling sites. 1A=Åkrasanden, 2A=Stavasanden, 3A=Sandvesanden.

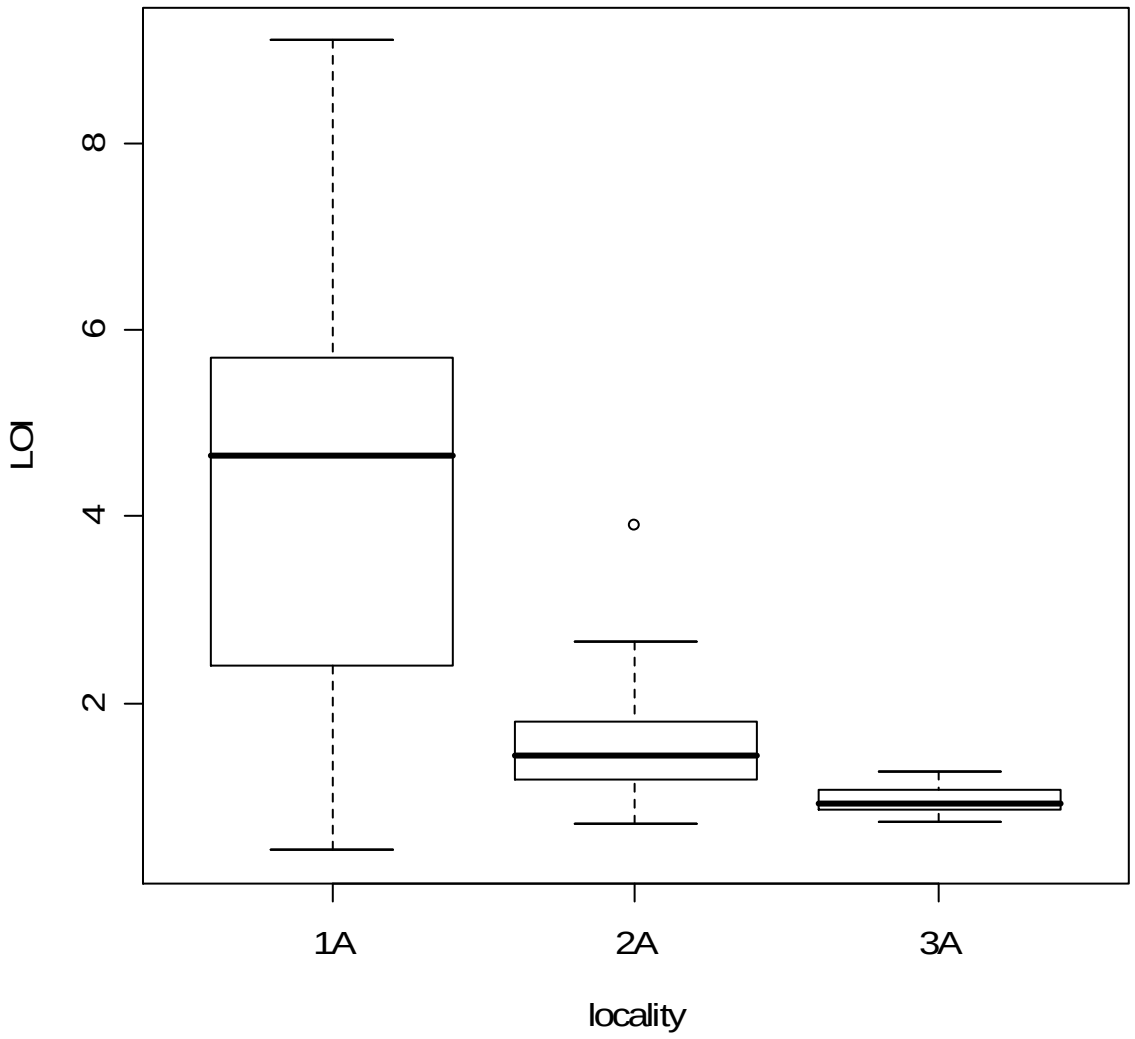

Fig. 3.16 Diagram showing differences in LOI values with variances and confidence intervals from 10 cm depths between the sampling sites. 1A=Åkrasanden, 2A=Stavasanden, 3A=Sandvesanden.

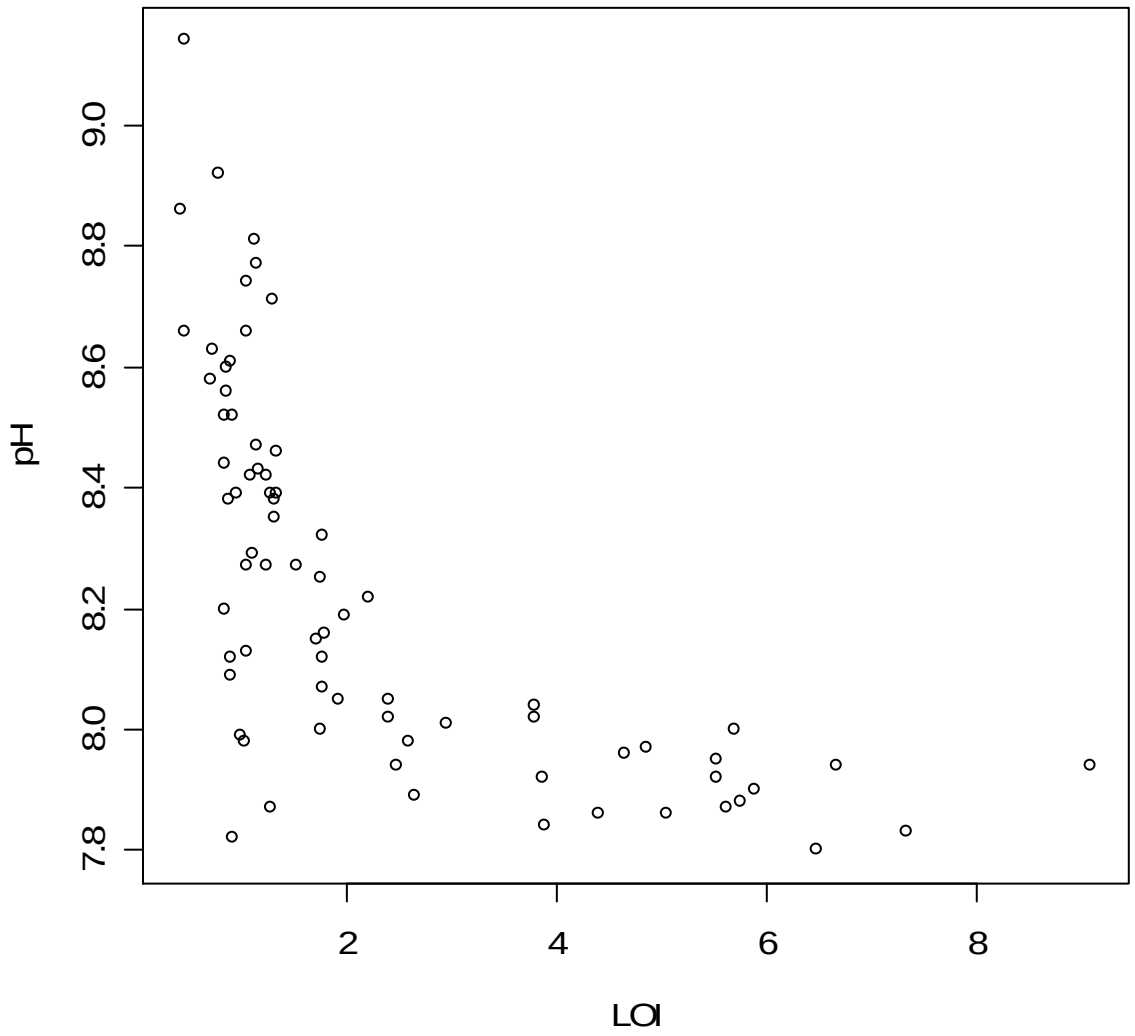

Fig. 3.17 Site plots from all A-transects distributed according to the relation between pH- and LOI-values. There is a very marked trend toward a reciprocal relationship: high pH-value is associated with low LOI-value and vice versa. In this computation missing soil sample values were estimated as means from the values of the neighbouring samples.

3.2 Commuity analysis (square samples)

Table 3.14 Counts of species recorded from commuity surveys in 2008.

Locality	Community	Count of species
Åkrasanden	Lower tidal zone	17
Åkrasanden	Upper tidla zone	16
Åkrasanden	Immature dunes	21
Åkrasanden	Sand dunes	47
Stavasanden	Immature dunes	12
Stavasanden	Sand dunes	30
Sandvesanden	Abrupt transition zone	24
Sandvesanden	Immature dunes	20
Sandvesanden	Sand dunes	48

Table 3.14 features the species counts from community analyses. It is referred to table 6.14 in the Appendix for more detailed information about species recordings as well as sub-sample figures from these recordings.

3.2.1 Åkrasanden–lower tidal zone

Sampling results are presented in the appendix, table 6.5.
The association termed 'Atriplicetum latifolii Nordh. 40' probably also includes this setting at the lower tidal zone (Lundberg 1982). It was recorded 16 species.
Marine tidal zones, marine- or other beach locations, coastal meadow or some other suitable habitats are mentioned as preferential for all of these species in Lid's flora (Lid & Lid 2007). *Taraxacum sp.* should be regarded a generalist and some variant of this cosmopolitan weed are most probably also preferring marine beach locations.

Just a few metres from the end of this very tidal zone, at the next named beach, there were some very viable and well-grown tomato plants with half-ripened fruits in late September. The cross section of the main stem was measured to at least 5 cm. Even the fact that this was an exceptional nice and warm summer, it is reasonable to consider the level, as well as the availability, of nutrients within this kind of substrate as extraordinary.

Table 3.15 Rarest and commonest species from community analysis regarding the lower tidal zone at Åkrasanden – 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Argentina anserina	*Lepidotheca suaveolens*	0	*Atriplex lacinata*	*Puccinellia maritima*	*Atriplex prostrata*
Cirsium arvense			*Catabrosa aquatica*	*Ranunculus sceleratus*	*Taraxacum sp.*
Juncus ranarius					*Tripleurospermum maritimum*
Leontodon autumnalis					*Puccinella maritima*
Polygonum aviculare					*Ranunculus sceleratus*
Rumex longifolius					*Atriplex lacinata*
Spergularia media					
Stellaria media					

3.2.2 Åkrasanden-upper tidal zone

The results from this sampling are presented in the appendix, table 6.6. Also from this setting it was recorded 16 species.

As for the previous community setting, also these species are considered typical for either marine tidal zones or coastal meadows and their likes (Lid & Lid 2007). One exception could be *Epilobium glandulosum* which is not considered a plant quite as exclusively adapted for this kind of substrate as most other species mentioned. As for the lower tidal zone, the upper tidal zone displayed a rich and lush vegetation and developed later to merge with the lower tidal zone and thereby to make the beach almost look like a cabbage field by mid to late August. This comes as a consequence of the somewhat succulent appearance provided by the dominating *Atriplex spp.*

The tidal zone plant communities are fascinating by their rich abundances and their capacity to develop rapidly and likewise to deteriorate surprisingly swiftly later in the autumn.

Table 3.16 Rarest and commonest species from community analysis regarding the upper tidal zone at Åkrasanden – 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Epilobium glandulosum	*Plantago maritima*	*Agrostis stolonifera*	*Atriplex lacinata*	0	*Taraxacun sp.* (19)
Juncus bufonius	*Rumex lonifolius*				*Atriplex prostrata* (15)
Juncus ranarius					*Catabrosa aquatica* (10)
Leontodon autumnalis					*Ranunculus sceleratus* (8)
Plantago major					*Tripleurospermum maritimum* (8)
Polygonum aviculare					*Puccinella maritima* (6)

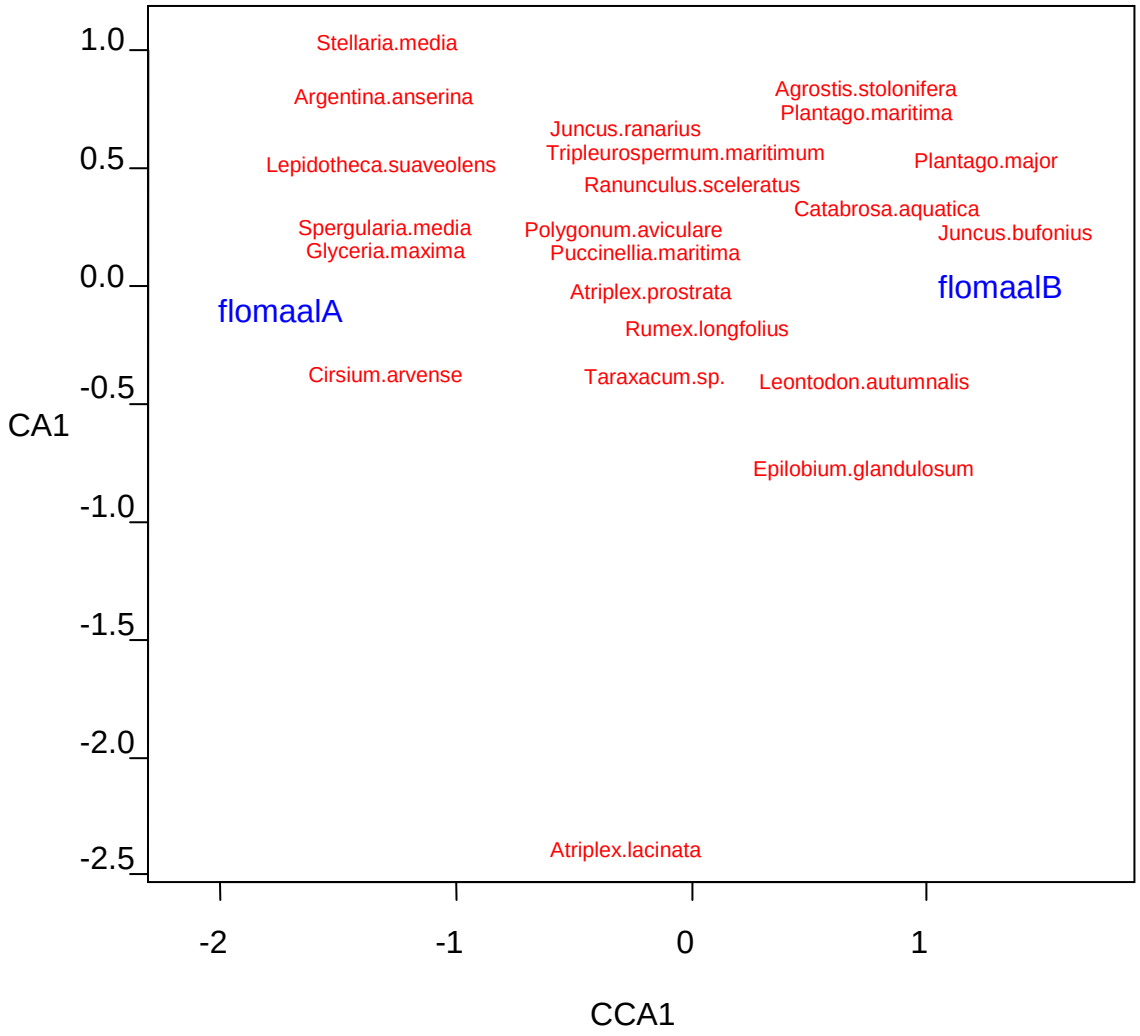

Fig. 3.18 CCA diagram presenting species from the two tidal zones at Åkrasanden, 'flomaal A' and 'flomaal B'. The species in the middle of the diagram should be regarded as more or less common between the two communities while the species found solely in one of the two settings are depicted to the left and to the right of the middle. ('flomaal' A represents the lower tidal zone vegetation and 'flomaal B' represents the upper tidal zone vegetation.

3.2.3 Åkrasanden-immature dunes

Table 6.7 presents the species and their scores from the immature dune setting at Åkrasanden. The species count was 21.
In addition to some of the species from the tidal zones, it was recorded *Ammophila arenaria, Arrhenatherum elatius, Carex arenaria, Elytrigia juncea, Festuca rubra, Galium verum, Geranium sanguineum, Honckenya peploides, Leymus arenarius, Lotus corniculatus, Sanguisorba officinalis, Sonchus arvensis, Thalictrum minus* and *Tripleurospermum inodorum.* The majority of these species are characterized as belonging to either tidal zones, immature dunes or sand dunes (Lid & Lid 2007). However, *Geranium sanguineum, Lotus corniculatus, Sanguisorba officinalis, Thalictrum minus* and *Tripleurospermum inodorum* are not primarily or necessarily associated with this kind of substrate. Their preferred abiotic circumstances are nevertheless not very different from the dry and alkaline conditions offered by immature dunes. One exception is though *Sanguisorba officinalis,* which has preference for humid meadows.
The rather disturbed appearance of the immature dune societies at this locality has been commented on earlier from the transect results. At several instances the setting termed 'immature dunes' at this site could probably and preferably be characterized as a transition zone between the beach proper and the dune forefront.

Table 3.17 Rarest and commonest species from community analysis regarding immature dunes at Åkrasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Galium verum	*Atriplex lacinata*	0	*Arrhenatherum elatius*	*Geranium sanguineum*	*Elytrigia juncea* (20)
Rumex longfolius	*Lotus corniculatus*		*Sonchus arvensis*	*Honckenya peploides*	*Leymus arenarius* (19)
Sanguisorba officinalis	*Taraxacum sp.*				*Carex arenaria* (11)
Thalictrum minus	*Tripleurospermum inodorum*				*Ammophila arenaria* (9)
Tripleurospermum maritimum					*Atriplex prostrata* (9)
					Festuca rubra (8)

3.2.4 Åkrasanden–sand dunes

All together 47 different species were found. It is referred to table 6.8 in the appendix for a full overview of species. It was recorded some species not found at any other locality by community analyses. These were: *Carum carvi, Draba incana, Gentianella campestris, Hypochaeris radicata, Sedum acre, Succisa pratensis* and *Veronica chamaedrys*.
Table 6.14 presents some details and figures of comparisons between the different sites as a result of sampling in communities. Few other dune sites could compete with this locality with regard to floristic versatility and beauty. It is pointed to in Lid's

Flora that, for instance, *Gentianella campestris*, is regarded relatively rare at low altitudes in southern Norway.
Also within this dune area there is great variability from very dry sun-exposed slopes with an extremely low vegetation field-height to quite humid low-lying areas dominated by coarse grasses and herbs of high stature.

Table 3.18 Rarest and commonest species from community analysis regarding sand dunes at Åkrasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	**Species reg. in two squares**	**Species reg. in three squares**	**Species reg. in four squares**	**Species reg. in five squares**	**The six most common species**
Argentina anserina	*Draba incana*	*Polygonatum odoratum*	*Anthyllis vulneraria*	*Cerastium fontanum*	*Festuca rubra* (19)
Armeria maritima	*Gentianella campestris*	*Senecio jacobea*	*Succisa pratensis*	*Euphrasia sp.*	*Achillea millefolium* (18)
Carum carvi		*Veronica chamaedrys*		*Sanguisorba officinalis*	*Lotus corniculatus* (18)
Cirsium arvense					*Pimpinella saxifraga* (18)
Convallaria majalis					*Plantago lanceolata* (17)
Dactylis glomerata					*Galium verum* (16)
Elytrigia repens					*Geranium sanguineum* (16)
Equisetum arvense					*Knautia arvensis* (16)
Hypochaeris radicata					
Leontodon autumnalis					
Leontodon hispidus					
Sedum acre					
Trifolium repens					

3.2.5 Stavasanden–immature dunes

Sampling results are presented in the appendix, table 6.9. The association existing at Stavasanden is by Lundberg termed 'Elymo-Ammophiletum typicum *Elymus* var. (Lundberg 1981). The count of species was 12.
From Lid & Lid it can be judged that, except for *Avena sativa,* all of the species found are prefering marine tidal zones or beaches.
The overall impression from this site is one of a less species-rich and concerning the beach proper, including the immature dunes, the visual appearance is contrasting to the one at Åkrasanden. *Elytrigia juncea, Leymus arenarius* and *Ammophila arenaria* are the dominating species in the sequence of mentioning. They are all regarded as very important stabilizers of sand and thereby paramount in the creation of sand dunes (Lundberg 1982).
At this site there were some samples containing *Cakile maritima* and *Atriplex prostrata.* Otherwise the physiognomy of the vegetation was homogenous and 'clean'.

3.2.6 Stavasanden–sand dunes

Sampling results are presented in the appendix, table 6.10.
The species count of thirty from sand dunes at Stavasanden was clearly the lowest compared to the other sand dune localities. Very few species were found solely at this locality (3). This dune site was substantially more dominated by large and coarse grasses than was the situation at Åkrasanden. *Ammophila arenaria, Festuca rubra* and *Leymus arenarius* all are very common species within this sand dune site. In addition *Achillea millefolium, Thalictrum minus* and *Vicia cracca* were also very abundant. These species could be charachterized as dominating the visual appearance at this locality. *Centaurea scabiosa, Centaurea nigra* as well as *Lotus corniculatus* provided the floristic showiness at this place.

Table 3.19 Rarest and commonest species from community analysis regarding sand dunes at Stavasanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	**Species reg. in two squares**	**Species reg. in three squares**	**Species reg. in four squares**	**Species reg. in five squares**	**The six most common species**
Galium aparine	*Campanula rotundifolia*	*Angelica archangelica*	*Arrhenatherum elatius*	0	*Festuca rubra* (20)
Knautia arvensis	*Elytrigia repens*	*Centaurea nigra*	*Plnatago lanceolata*		*Achillea millefolium* (17)
Trifolium repens	*Senecio jacobea*	*Cerastium fontanum*			*Thalictrum minus* (17)
		Dactylis glomerata			*Vicia cracca* (17)
		Geranium sanguineum			*Leymus arenarius* (16)
		Pimpinella saxifraga			*Lotus corniculatus* (15)
		Rumex acetosa			*Taraxacum sp.* (15)

3.2.7 Sandvesanden-abrupt transition zone between beach and dune

Sampling results are presented in the appendix, table 6.11. Species count was 24. This was a setting in which the visual appearance did not resemble the floristic physiognomy demonstrated by immature dunes. It was, however, a very concentrated and narrow strip of vegetation at the inner part of the sandy beach, but still not typical for any kind of dune community.
Due to the low count of samples from this setting (5), it was not regarded sensible to split the result into sub-samples of any kind.

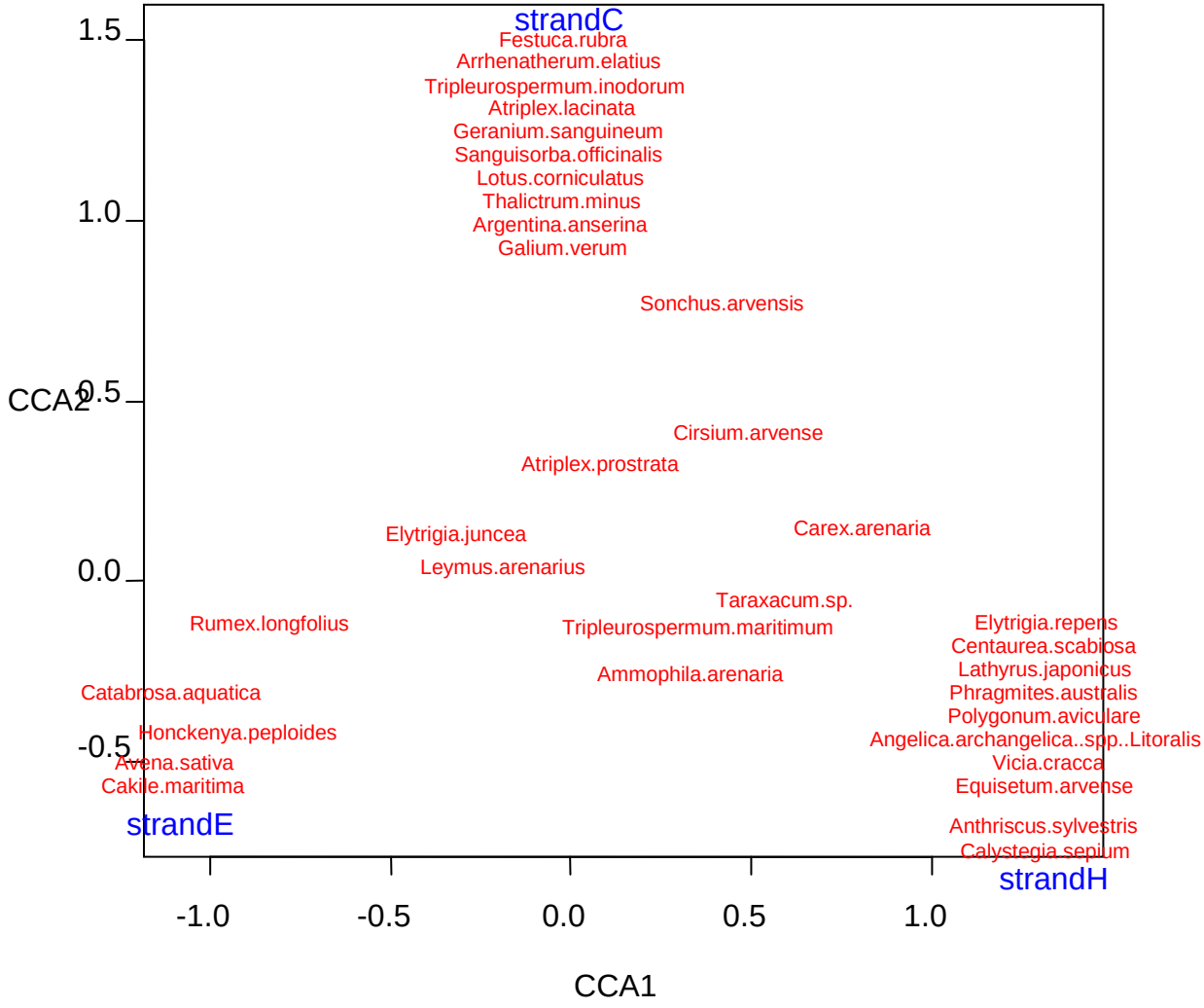

Fig 3.19 CCA diagram presenting species from the three immature dune settings. Strand C=Åkrasanden, Strand E=Stavasanden, Strand H=Sandvesanden. The species in the middle of the diagram should be regarded as more or less common between the three sites, while the species found solely at the different beaches are clustered together toward the corners or edges of the diagram.

3.2.8 Sandvesanden–immature dunes

Sampling results are presented in the appendix, table 6.12.
Altogether there was a count of 20 species from sampling within immature dunes at Sandvesanden. *Phragmites australis* and *Calystegia sepium* were not noticed at any other immature dune site in this survey. Another species associated with these immature dunes is *Lathyrus japonicus* which also was not registered in any other immature dune setting. However, this species was recorded in sand dune samples from this locality. The association in this particular immature dune locality is likely to be termed 'Elymo-Ammophiletum typicum *Ammophila*-var. med *Lathyrus maritimus'* (Lundberg 1982). This association was rich in *Ammophila arenaria, Carex arenaria,*

Elytrigia juncea and *Leymus arenarius.* These immature dune settings displayed a very noble blend of grasses and *Lathyrus japonicus* and did not present any impression of disturbed circumstances. The occurrence of *Phragmites australis* here is associated with the outlet river banks which are saturated by this tall grass and some specimens have spread, to a certain extent, into the immature dune setting. Though there are few sites of immature dunes at Sandvesanden, the locality with this setting is very well developed.

Table 3.20 Rarest and commonest species from community analysis regarding immature dunes at Sandvesanden – 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	Species reg. in two squares	Species reg. in three squares	Species reg. in four squares	Species reg. in five squares	The six most common species
Angelica archangelica	*Anthriscus sylvestris*	*Phragmites aurstralis*	*Atriplex prostrata*	0	*Ammophila arenaria* (17)
Centaurea scabiosa	*Calystegia sepium*	*Sonchus arvensis*	*Vicia cracca*		*Carex arenaria* (14)
Honckenya peploides	*Elytrigia repens*	*Taraxacum sp.*			*Leymus arenarius* (12)
Polygonum aviculare	*Tripleurospermum maritimum*				*Elytrigia juncea* (11)
					Lathyrus japonicus (8)
					Cirsium arevens (7)
					Equisetum arvense (6)

3.2.9 Sandvesanden–sand dunes

Sampling results are presents in the appendix, table 6.13. The samplings from dune sites at Sandvesanden were collected from a wide area surrounding this beach location. This beach is surrounded by several hills, both sandy hills and rock formations. There are sand dune settings in all of the three landward directions. The highest species diversity was registered not far from the site of sampling within transects. This was in steep dune slopes that featured a very dry soil and communities of a very low field height. One relatively surprising feature at this very site is the great abundances of *Convallaria majalis* that cover some quite large areas of certain dune slopes. It is beyond the expected to find this floristic dominance of *Convallaria majalis* at such seaward exposed localities.
The total count of species within squares from this dune setting was 48 and as such this was the community which harboured the highest species diversity recorded from these analyses. Species that were exclusively recorded from dunes at Sandvesanden are: *Angelica sylvestris, Juniperus communis, Lolium perenne, Polygala serpyllifolia, Rosa sp., Solidago virgaurea, Valeriana sambucifolia, Vicia sepium, Viola canina.*
The high scores of *Geranium sanguineum* as well as of *Galium verum* also make these dunes very showy at the peak of the flowering season.

Table 3.21 Rarest and commonest species from community analysis regarding sand dunes at Sandvesanden - 2008. Numbers in parentheses behind some species' names refer to the count of samples containing the species.

Species reg. in one square	**Species reg. in two squares**	**Species reg. in three squares**	**Species reg. in four squares**	**Species reg. in five squares**	**The six most common species**
Briza media	*Anthriscus sylvestris*	*Angelica sylvestris*	*Cerastium fontanum*	*Convallaria majalis*	*Festuca rubra* (20)
Centaurea nigra	*Hieracium sp.*	*Armeria maritima*	*Ranunculus acris*	*Taraxacum sp.*	*Ammophila arenaria* (19)
Cotoneaster scandinavicus	*Lathyrus japonicus*	*Arrhenatherum elatius*			*Galium verum* (17)
Elytrigia juncea	*Pimpinella saxifraga*	*Dactylis glomerata*			*Geranium sanguineum* (17)
Epilobium montanum	*Rumex acetosa*	*Euphrasia sp.*			*Lotus corniculatus* (16)
Juniperus communis	*Silene vulgaris*				*Achillea millefolium* (14)
Lolium perenne					*Plantago lanceolata* (14)
Polygala serpyllifolia					*Thalictrum minus* (14)
Polygonatum odoratum					
Rosa sp.					
Sagina nodosa					
Solidago virgaurea					
Valeriana sambucifolia					
Viola canina					

4. Discussion

4.1 The areas of interest

The main aim of the study is to compare biotic and abiotic results from the survey conducted by Anders Lundberg in 1981 with those of the recently conducted survey in 2008 and thereby to provide data for possible ecological interpretations of changes that might be unveiled.

As a local resident it has been obvious that some of the beach- and dune locations have suffered a substantial increase in wear. This is evident for the interested observer, but can also be visualized by the comparing of photos taken at different times.
The more direct and severe kinds of impacts from large scale developments seem though not to have occurred during the time span since 1981. Such considerations could certainly be evaluated by the local authorities. However, a frequent surveillance of the area over many years should be sufficient as reference regarding this aspect. As the areas of this study are though already very limited and the fact that some very valuable localities were devastated due to developmental needs as late as in the 1970s, it is of interest to focus on these vulnerable and highly exposed semi-natural settings that remains. It is a matter of fact that sand dune systems are rare in Norway (Lundberg 1987).

Also, climatic change considerations should be mentioned, even the fact that these kinds of studies are preferred in remote alpine regions which provide a minimum of disturbances except for the potential climatic changes. On the other hand, it is interesting to notice changes indicating that nemoral species might seem to conquer new land.

4.2 The methods

4.2.1 Transect surveys

Strictly determined in space, both local and more general patterns of change can be detected from recordings within transects. This is dependent on the quality and quantity of recorded data. One major advantage by comparing results from re-sampling transects is though the quite accurate and minute scale at which the recordings are subjected to.
In materials and methods some problems associated with relocation of the transect routes are debated and points to the importance of providing adequate positioning data. Both at Stavasanden, and to a lesser degree at Sandvesanden, failures in re-locating the former transects has had implications for the interpretations of, for instance, wear-developments.

4.2.2 Community surveys

Besides conducting transect surveys, there were also made recordings from stabile communities at different levels. Although 'stabile' is a somewhat dubious expression for characterizing certain plant communities at, or in the vicinity of, marine beaches. These community samples were not subjected to statistical comparisons as there were no kinds of preparative calibrations toward a consistent and commonly shared interpretation of the community definitions by the investigators. In addition, Lundberg's report is mainly concentrated on plant sociological relations.

4.3 The locations

Generally, it can be claimed that the three picked locations for these re-samplings feature some relatively interesting differences due to wear from leisure activities, former agriculture and more recent housing projects as well as more severe impacts from developments.

4.3.1 Åkrasanden

From personal observations through several years it has become quite evident that the Åkrasanden area is suffering a substantial increase in wear from the public. It is a common impression that people are utilizing the beach and dunes for hiking and other purposes. It also seems that local residents make shortcuts crossing the dunes to reach different destinations. Another observation within this context is the escalation of different kinds of wind- and wave sporting activities. A couple of decades ago, people surfing or kiting was a rather rare sight. Now, however, it has more or less become commonplace.
Besides human caused wear, considerations of influences from nearby housings and gardens could be of interest. Although it might be confirmed that the beach- and dune areas have not diminished noteworthy due to developments during the last decades, the bordering residential areas in the Åkrasanden region have very much expanded. By comparing older photos to new ones, this is quite astonishing. It becomes obvious that both buildings as well as some plantations have altered the visual impression a lot since 1981.
For the purpose of this study the surveys could very well be conducted at other sites within the Åkrasanden region, since it provides some very aggravated examples of wear developments. Not only seem the foot trails to have widened, but several more tracks have been added in the course of recent years. In the most heavily traversed regions intersections of several tracks make an impression of severe erosions.
This locality also showed some quite extensive dune-front erosions due to former storm surfs. One such main erosion was very close to the transect route. It was observed that this acute and steep cut into the dune front challenged the young as they preferred to jump from these sites. Thereby it is reasonable to imagine that this kinds of naturally created erosions will persist and develop, rather than recover with new and stabile plant communities. Earlier, this kinds of activities might not have had pronounced effects except for some minor disturbances well within the limits of

what should be expected in a semi-natural setting so close to habitations and so much prized and valued by the public. However, with increasing population and more spare-time for leisure activities erosions might rather be maintained or even aggravated.

4.3.2 Stavasanden

This locality has altered little since the survey of 1981 (personal observation). The main and large-scale permanent distortion to this area occurred during the time of constructing the nearby and partial artificial harbour. Later, it was constructed a sports arena in the back dune area. A traversing road further contributes to the physical isolation of the remaining dune meadow at this locality.
The site is a lot more quiet compared to the Åkrasanden area, even in the peaked swimming season. I have occasionally noticed some degree of surfing at this beach. There are some major wear due to commonly used tracks and paths, but not at all to the extent seen at Åkrasanden. One of the major differences is that this locality is not subjected to daily traversing by local people. The area is scantily populated and there are no direct bordering of housings and gardens.

4.3.3 Sandvesanden

This beach region is probably lesser visited than Åkrasanden, but substantially more than Stavasanden (personal observation and opinion). Though, during warm conditions this beach is extremely popular. On the other hand this beach locality has not at all the same densely populated residential areas in its vicinity as Åkrasanden. Sandvesanden has preferences both for surfers and for volley-ball players.
Also, jumping activities seem to be popular here, at least in the peaked season. There is continuity between the dune meadow and the surrounding pastures or meadows.

Since former agricultural practices are so frequently sited for the interpretations of floral compositions at all of these localities, it is topical to mention the observed fact that there are no signs of such usages any more. As far as can be remembered, there have not been performed farming procedures of any kind during the last decades. However, Lundberg reports that the dunes at Sandvesanden were grazed as late as in 1981 (Lundberg 1982).

4.4 Climate

The climatic conditions of the area in question is regarded typical oceanic with quite mild winter temperatures and relatively cool summer temperatures (Lundberg 1982). The results of calculating mean normal temperatures for this region reflecting the situation in the time spanning from 1961 to 1990 show a noticeable increase in the mean normal temperature for February which was considered the coldest month.

The increase is in the range of 0.5˚C. At the same time it seems to have occurred a corresponding lowering of the mean normal temperature regarding August which was considered the warmest month. Regrettably, it was not possible to get temperature records form the very recent decades from the station closest to the sampling sites. I have not collected data regarding precipitation.

The relatively recent observations of plant species that seem to conquer new frontiers from more nemoral regions could possibly be explained by this increase in winter mean temperatures. In the case of *Atriplex lacinata*, this species was recorded already in the 1950s (Lundberg 1982).
It is obvious that this survey has not presented detailed and adequate meteorological data to draw any conclusions regarding ecological considerations. However, recent climatic research is very much debated in the media and it is a matter of fact that changes have been rapid during the last decades of the twentieth century and also during the first part of this very century.

4.5 The sampling results and their interpretations

Generally, it should be pointed to the fact that for all comparisons between the results of the survey in 1981 with the recent survey of 2008 it is of utmost importance to be aware that the study in 1981 included one single transect route at each locality, while the results of the recent study in 2008 are from two parallel transect routes at each site. This fact alone should explain some of the increase in species richness that might seem rather substantial in the following comparison. Also, since Lundberg was mainly concerned about plant sociological matters, it could be regarded that some species were missed from the surveys of 1981. Lastly, it is probably also a fact that I spent a rather long time in the field for this study. This has probably also a potential effect to increase species richness recorded.

4.5.1 Åkrasanden-transect sampling

The main reason for the huge differences in plant species recordings between the two surveys of 1981 and of 2008 within the beach proper region at Åkrasanden should be regarded a consequence of changes in beach management procedures as these are highly interfering with the substrate and most probably disturb early establishing seedlings. In addition, the observation that most people avoided this beach for swimming purposes can probably also to some extent explain the relatively undisturbed development of tidal zone communities.
The most interesting observation at this level in 2008 is the relatively rich occurrence of *Atriplex lacinata.* This species' late history at Åkrasanden is thoroughly debated by A. Lundberg in his report (Lundberg, 1982) and is also mentioned briefly in the introduction of this report. It was first recorded at the Åkrasanden region in the 1950s and this has since been regarded the northernmost location for the species on a world scale. Lundberg notifies in his report of 1982 that there were no traces of this plant at Åkrasanden, then most probably due to preparations of the beach for

the summer season. It is interesting that this species was recorded abundantly during the season of 2008. Though this species has not been observed officially further north, it is quite profoundly established at the Åkrasanden and its very existence here gives no immediate impression of being at the fringes of its occurrence.

As the sampling procedure approached the inner part of the beach it became quite obvious that the terrain of the uphill dune front was rugged and featured some very steep steps. In addition there were some coarse grasses (*Ammophila arenaria*) which made a metre-by-metre comparison approach difficult and not very accurate due to problems positioning the metre band firmly to the ground. Thereby, the source of errors should be regarded substantial and these kinds of close comparisons are not necessarily fully valid.
However, the general vegetation profile from the dune rise should be regarded appropriate for comparisons.

At the level of the main foot-paths on the dune plateau it is interesting to compare the results regarding floristic features from the two occasions. Although some obvious changes in species composition, a mere transect analysis through these tiny sites should be subjected to a very careful interpretation. What seem to be surprising though, is the strong indications for stability both regarding the wear pattern and the sheer extent of wear at this dune height. Compared to the nearby wears which seem to have escalated profoundly, this could be considered as strange.
My personal opinion is that people are mostly sticking to an already established path, especially when it traverses within well developed vegetation. It could probably be regarded a certain constraint imposed by the path itself and the visual impression from its surroundings.

Regarding the dune meadow it seems that some large herbs of more dominating stature and a large grass (*Leymus arenarius)* have increased their abundances during the time span between the two surveys. It is reasonable to think that the changes could be characterized as a trend toward a more coarse meadow.
At the inner, landward part of transects both *Galium mollugo* and *Urtica dioica* were registered in 2008. At least *Urtica dioica* is a well known nitrophile and its occurrence at this location could very well be an indicator of run-offs from the nearby gardens. The profile of the terrain facilitates a weak, downwardly directed slope from the housings toward the path that crossed these few last squares of transects and which represented the lowest level in the back dune area. Neither *Galium mollugo* nor *Urtica dioica* are mentioned from the investigation in 1981. On the other hand Lundberg had many more recordings of *Avenula pubescens* from this part of the transect in 1981 compared to the survey of 2008. This is, personally judged, as mainly being due to lack of experience and to some degree of botanical knowledge at the early stage of sampling in 2008.
From both surveys it is documented that the Åkrasanden area has the highest species diversity. Tables 6.1-6.3 in the Appendix show this clearly. The total amount of species has increased since 1981 and my suggestion for an explanation is that this site is most exposed to human activities and has probably been so for memorable times. Lundberg debates different postglacial sea level changes as well as prehistoric

agriculture in some of his publications and it seems a fact that the Åkrehamn area has been a preferred place for development of agriculture probably due to vast dune areas which offered a less laborious conversion of the substrate into farmable land. The area has thereby a long and continuous history of human population and agriculture. Adding to this are the observed increase of leisure activities and possibly a climatic change in the direction of enhancing species of a more nemoral origin.

From tables 6.15-6.17 it is obvious that LOI values are high at Åkrasanden, particularly within the dune meadow sub-segment of transects. This is probably due to more intensively performed agricultural practises at this site compared to the other locations. Earlier, dune areas were regularly used for meadows or pastures and farmers even fertilized the substrate which gradually converted parts of the dunes into farmable areas (Lundberg 1987).
It was visible during collecting of soil samples that strata dominated by dark humified substance quite abruptly changed with strata dominated by lighter sandy soils.
The high values of LOI can be regarded as beneficial for several nitrophilic and phosphorous demanding herbs while the still high content of lime due to sand in the same vicinity provides other valuable substances and thereby makes the soil more versatile for a number of species.

4.5.2 Stavasanden-transect sampling

The kind of more or less direct comparisons of the floristic features from the two surveys of 1981 and of 2008 that was possible for Åkrasanden can not be conducted with regard to the sampling results for Stavasanden. This is due to a major failure in the relocation of the original transects. Details about this are treated in materials and methods, 2.2.1.
Thereby it can not be commented on the results from Lundberg's report which are concerning floral compositions in paths or at other very small scales. However, the broad and general features from the two surveys should be apt for comparisons. The distance between the two transects has been estimated to ca 35 metres. This is relatively substantial. Though, the visual appearance from this dune meadow setting is a quite homogenous one. The site has not the immediate floral showiness that can be observed at the other two locations.

It should be pointed to the fact that both pH and LOI display higher values within the immature dune region at Stavasanden compared to the situation at Åkrasanden. This high pH, especially in the upper layers, could be regarded as a certain constraint to seedling's ability to establish and that the somewhat higher LOI thereby not would be exploited by several plants not adapted to such alkalinity.
The quite large increase in species richness recorded also at this site is thereby not straightforwardly explained. Based on the several mentioned constraints that seem to exist for this site, it seems as a least controversial suggestion that the increase is due to the general impact caused by leisure activities.

4.5.3 Sandvesanden-transect sampling

There could be no registrations from immature dunes at Sandvesanden in 2008 as the area in front of the dune at the sampling site had been seriously damaged by surfs some years earlier. The front profile of the dune had thereby suffered a major erosion and it was also observed that this very site was much used for jumping activities. In addition, the outlet river had altered its drainage pattern and intersected the transect route.
Thereby, there was now a quite steep and long slope of sand extending from the river bank itself, all the way to the dune plateau. This has to be considered a highly disturbed substrate and can not be compared to any of the established and recognized vegetation settings so far described in this survey.

The explanation for the great differences regarding immature dunes should thereby be quite simple and straightforward as a consequence of natural erosion by sea surfs caused by storms and further aggravated damages and disturbances by jumping activities from the dune plateau. It has to be underlined, though, that the erosion was told by locals as stemming from relative recent storm surfs. However, the altered drainage pattern of the river has been observed by the author.

It is of a certain interest that some of the immature dunes at Sandvesanden are much inhabited by *Lathyrus japonicus.* The kind of association is termed 'Elytrigetum boreoatlanticum lathyrus maritimum–var.' (Lundberg, 1982).

As there were some minor inconsistencies concerning the relocation of the original transect route (materials and methods, 2.2.1) and the fact that there had been severe changes in the dune front profile, it can not be expected a direct comparison as to a metre-by-metre approach between the two surveys. It is, however, quite rewarding that the path which Lundberg has positioned at a distance of 52.5-53.0 metres from the start of transect in fact seems to appear at a distance of 50.0-51.0 metres in the survey of 2008 (transect 3A). The path at this very site is well established and firmly positioned. In cases like this it should be regarded an advantage to know the sampling area as a local resident. This path must be considered very old and has kept to its present route for as long as people can remember (personal opinion and based on local people's judgements).

When it comes to the detailed description of the vegetation within a narrow segment of the transect in Lundberg's analysis, as when a path is intersecting the transect route, the problem by comparison is due to the fact that the survey of 2008 was conducted strictly on a metre by metre approach while Lundberg has increased the resolution of his survey at such points of interest within his study. However, the analysis of 2008 contains fully available species registrations and a coarse comparison should be quite valid.
It is noticed that the same pattern of species increasing and decreasing is similar between the two surveys at this level.

When it comes to debating the increase in species richness at the Sandvesanden area, my suggestion is that these changes in floristic compositions are mainly due to

human-caused disturbances. As already mentioned, it was observed that a quite frequent jumping activity took place from the relatively newly created steep dune front. This might have been a long-lasting activity going on for several years. A personal contribution to this interpretation could be the memorable jumping from dunes in my own early youth which was very popular at this particular dune site. As this is the only dune suitable for jumping at Sandvesanden, it is probably not of any surprise that this very site is heavily subjected to disturbances.

4.5.4 Åkrasanden-community sampling

In addition to sampling within transects it was conducted floristic recordings from several seemingly stabile communities. At Åkrasanden it was observed a viable and lush vegetation developing at the beach during the season of 2008. At the start of sampling it was just visible some scarce indications of plant communities while it later in August developed an almost totally dominating and continuous vegetation at this beach.
Tidal zone plant communities reside between the highest tidal level and the normal tidal level and are nourished by degrading remnants of particularly *Fucus spp., Laminaria hyperborea* and *Laminaria saccarina* (Lundberg, 1982). Influence from salt, sand accumulations and highly variable conditions regarding nutrients and fresh water supplies make growing conditions extremely challenging and requires plants - with adaptive specializations to cope with such environmental constraints. However, as Lundberg points to in his report, the tidal zone communities might present a high abundance of specimens, though a rather poor diversity of species. This fact became quite obvious at Åkrasanden during the sampling of 2008. The relatively sparse plant cover at the tidal zones in early to mid summer developed into a dominating physiognomy of the beach later on in August and September. This was highly contrasting the situation back in 1981, as Lundberg in his report confirms that there was no vegetation in the tidal zones then. This was most probably due to management of the beach as a means of preparing for the summer season. This kind of activities is regularly performed at the most popular beaches in the region. Lundberg states that there had been such management procedures preceding his surveys in 1981 (Lundberg 1982).
The observation that several tomato plants obviously thrived in the nearby tidal zone and also managed to develop half-ripened fruit, should be dwelt with. When I first came across the plants, due to guidance from some by-passers, they were seemingly very much naturalised and well blended into the indigenous vegetation. Although the summer of 2008 was exceptional warm, it is most likely that this very substrate provides high nutrient levels as the plants were surprising regarding their stature and lushness. Wheather this observation could be an indication of recent climatic changes is not debated in this study. However, from a general impression and from reliable sources it is documented that there has been a marked trend toward a warmer climate during the very recent years.

Community sampling within immature dunes at Åkrasanden has to some extent been commented on in the result chapter. As the degree of disturbance here was quite pronounced, it became doubtful weather the communities at the level between the

dune rise and the beach proper really belongs to a more or less strict category. It was decided to term these settings a transition zone between the beach and the dune rise.

The dune meadows depicted a quite high species diversity at Åkrasanden. Especially in a crater-like formation with very low field height facing southward, there was an highly interesting and nice blend of floral diversity. Here, it was recorded *Gentianella campestris* which today is considered relatively rare in low residing areas of southern Norway (Lid and Lid 2007). Some of the samples from this site counted about 24 species from one square analysis. From the sheer fashion of this crater-like landscape depression it is highly probable that there once was excavating of sand at this site. Lundberg mentions a similar site at Hemnessanden, where he conducted some of his surveys for his cand. scient degree (Lundberg 1982).
Thereby it is likely that a former and major disturbance has created opportunities for expanding species diversity.

4.5.5 Stavasanden-community sampling

There were no traces of tidal zone vegetation at Stavasanden. The beach as such is nice and clean, but its facing toward north-west makes it exposed to chilly winds and the lack of rocks and islets in the waters outside the beach probably contributes to colder water temperatures. Lundberg points to the fact that this beach is very low and is thereby much influenced by sea water (Lundberg, 1982).

From the immature dune setting at Stavasanden it was collected and recorded a substantially more expected array of species compared to what was found at Åkrasanden. The species composition was within the expected from this setting except for the occurrence of *Avena sativa* which should be regarded a result of the close vicinity to farming at this site. *Cakile maritima* was here a part of the immature dune composition. There were few immature dunes, but those subjected to sampling were quite well developed.

Regarding the fixed dunes at Stavasanden, the overall sampling result was very much reflected by the results of the samplings within transects. There were not as large differences between certain areas of these dunes as at Åkrasanden. The dunes here displayed the lowest diversity compared to the other localities. However, it could be notified a quite prominent increase in species counts since 1981. This has already been treated in the discussion concerning transect analyses and need not be repeated.

4.5.6 Sandvesanden-community sampling

The first site at Sandvesanden subjected to community sampling was a very narrow transition zone at the very inner part of the beach. The lack of immature dune formations at this part of the beach may be due to several circumstances. It has already been mentioned that the outlet river at this beach site obviously has

changed its path during the last years. Earlier, it had its course alongside the back region of the beach and thereby prevented communities from establishing. It is also possible that wind conditions are responsible for this somewhat strange feature as the beach of Sandvesanden is visually more enclosed by hills compared to the situation at the other locations.

The main area of immature dunes at Sandvesanden is relatively close to the outlet river. Along this river, at the inner part of the beach, there is a stand of *Phragmites communis* – not observed at any other of the localities. The immature dunes here have a nice blend of the most common beach-bound grasses, some herbs and *Lathyrus japonicus.* This species was not noticed at any other main locality. However, it was also numerous within the dune community at Sandvesanden.

As for the dunes at Åkrasanden, the dunes at Sandvesanden presented a very noble blend of many species. The most interesting area was within some very steep and dry dune slopes not far from the area subjected to transect sampling. Some of the samples from this vicinity counted more than twenty species. It is probable that several annuals thrive at these conditions where more demanding species can not cope with the very dry and rather meagre soil. Sandy soil of quite low LOI values (this very site was relatively close to transect which was subjected to soil analyses) should be regarded as quite constraining for several species.

4.5.7 Åkrasanden-soil properties

The soil survey documented high LOI values at Åkrasanden, particularly from the dune meadow sub-segment. This is probably due to more intensively agricultural practises at this site compared to the other locations, as Åkra has a longer history of settlements and farming (Lundberg 1998). Earlier, dune areas were regularly used for meadows or pastures and farmers even fertilized outskirts of sand dunes which gradually converted the dunes into more farmable areas (Lundberg 1993).
It was visible during collecting of soil samples that strata dominated by dark humified substance quite abruptly changed with strata dominated by lighter sandy soils either upward or downward from the level of excavation.
The high values of LOI can be regarded as beneficial for several nitrophilic and phosphorous demanding herbs while the still high content of lime due to sand in the same vicinity should provide other valuable substances and thereby make the soil more versatile for a number of species. It is regarded that both *Cirsium arvense* and *Arrhenatherum elatius* are good indicators of former agriculture (Lundberg 1993). Both of these species occurred frequently within this dune meadow.

4.5.8 Stavasanden-soil properties

The pH values are higher at Stavasanden, both by omparing the subsamples as the dune meadows, or by comparing values from the whole transects. Also this holds by comparing the two different layers of soil. The pH is generally more alkaline while the LOI values are not at all that high as is displayed from the samples at

Åkrasanden. This should explain some of the background for the lower species diversity at this location compared to what was found at Åkrasanden. It means that the soil at this site features a substantially lower degree of variabilty both in pH values and in the amount of humified matter in the ground substrate. The plants thriving here should thereby have a stronger ecological alkalinity in their preferences or tolerances. Species demanding high nitrogen values would not be that much expected. As Lundberg points to in his study from 1982, there is a viable community of *Centaurea scabiosa* within the dune meadow at Stavasanden (Lundberg 1982). This was a prominent feature also during the sampling of 2008. Tgether with *Centaurea nigra* this plant is regarded a good indicator of former grazing and mowing (Lundberg 1982).
As shown to in the results, the highest species diversity at this locality was recorded from a sample which included a part of a quite busy foot path. From this sample it was noticed eighteen species. It is probably a good indication that human activities do enhance species diversity.

4.5.9 Sandvesanden-soil properties

The mean pH value based on samples from the outlet river bank through the dune slope is lower than the corresponding value from the beach proper at Stavasanden. The LOI values are, however, not noticeably different. The differences in pH at this part of transects could be due to the merging of substrates that has occurred during the quite traumatic sequences of damaging erosions that apparently have taken place during the recent years. By such action from sea surfs the substrate will experience a high degree of mixing and it is probable that a certain lowering of pH values will occur as an influence from the scarce, but though existing humic layers. The erosions are confirmed by local people and are not documented further in this report as it is an officially well known fact documented by local newspapers etc. During sampling there appeared some degree of remnants from turfs mixed with the sand. These observations most probably indicate that humus-rich parts of the dune plant cover are torn away during impacts to the dune front. Thereby the sand beneath is influenced by these sources of organic material.
From the dune segment of the transect 3A it was recorded low mean LOI-values and rather high pH-values.

By comparing mean soil sample values at all localities, both between whole transects as well as between subamples like beach subsegments and dune meadow subsegments, Åkrasanden features generally the lowest pH values. One exception is the pH value at Stavasanden from the beach proper subsegment at 10 cm depth which reads a slightly lower value.
The differences in pH and LOI values between Stavasanden and Sandvesanden are quite marginal, especially regarding LOI values.

4.6 Ordinations

The different DCA- and CCA-diagrams that are depicted in the result chapter are illustrating mainly two different features regarding the sampling results. The DCA-diagrams, whether for combined analyses of all localities or just for one single locality, are displaying the samples due to their similarities regarding species composition (Leps and Smilauer 2003). It is quite obvious that the highly differing samples from the outskirts of transects are scattered far from the main bulk of plots. Especially, this is visible for the sample plots representing records from the tidal zones and immature dunes.
The CCA-diagrams provide the ability to study changes in vegetation over time. For all localities it is very obvious that there have been relatively profound changes in both species diversity and composition.

4.7 Conclusions

It is shown that species diversity resulting form analyses of transects surveys has increased. This can easily be verified by comparing corresponding results from the samplings of 1981 and of 2008. Most other sampling results are not directly comparable. Changes in biota are most probably due to several influences working in concert. Abiotic, as well as biotic parameters should be regarded.

Climatic measures and wear-patterns are available for comparisons. Escalated wear has to a certain extent been noticed form the comparing of photos. As abiotic parameters these should be regarded a possible explanation for species increase. The most obvious changes from the time span between these surveys seem to be caused by wear of the ground, especially in the Åkrasanden region. This is based on observations during several years. There has seemingly also been an increase in leisure activities of many kinds.
Alterations due to climatic change are substantially more difficult to consider, at least from this survey. However, no signs of retreats by nemoral species have been noticed, rather contrarily. In this context it is interesting to notice the solid establishment of *Atriplex sabulosa* which has been documented at Åkrasanden. From the records concerning abiotc parameters it should be a relatively reliable conclusion that disturbances due to human activities are responsible for some degree of increase in species.

Biotc influences are more complicated as there are numerous interactions working simultaneously within communities or ecosystems. Lundberg refers to many interesting features concerning successions within beach- and dune communities (Lundberg 1987, 1993). Several species are regarded as indicators of former land use. Further, some species are much associated with the succession after agriculture has ceased. Though some details are known about these mechanisms, there still seem to be a certain lack of knowledge about successions within these biotopes. Successions are dynamic processes and should also be regarded as highly sensible to influences from human activities. Thereby they are even more difficult to predict in these semi-natural settings and continuous data from species compositions and diversities are needed.

So far, I think that the most consistent result from this survey is that wear to these very limited and rather fragile areas has markedly increased and that human activities most probably has a potential of causing impacts to species compositions. It might seem somewhat contradictory that increase in human activities both imply the development of barren areas as well as an increase in species diversity, at least observed at a very small scale.
As it hardly is either possible or desirable to impose strict regulations for the usage of these very popular beach- and dune localities, it is quite obvious that more and better means for protection of dune meadow vegetation are required. There have been improvements during the recent years as wooden covers protecting the ground have been supplied by the local authorities. It should be recommended to make extensive protective facilities, especially in the areas of most visible wear patterns.

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6. Appendix

Table 6.1 Total species' overview resulting from transect analyses in 1981 by Anders Lundberg.

Åkrasanden	Stavasanden	Sandvesanden
Achillea millefolium	*Achillea millefolium*	*Achillea millefolium*
Ammophila arenaria	*Ammophila arenaria*	*Ammophila arenaria*
Armeria maritima	*Angelica sylvestris*	*Arrhenatherum elatius*
Arrhenatherum elatius	*Atriplex prostrata*	*Atriplex prostrata*
Atriplex prostrata	*Cakile maritima*	*Carex arenaria*
Avenula pubescens	*Centaurea scabiosa*	*Centaurea scabiosa*
Cakile maritima	*Elytrigia jincea*	*Dactylis glomerata*
Campanula rotundifolia	*Elytrigia repens*	*Elytrigia juncea*
Carex arenaria	*Festuca rubra*	*Elytrigia repens*
Cerastium fontanum	*Galium aparine*	*Festuca rubra*
Cirsium arvense	*Galium verum*	*Galium verum*
Dactylis glomerata	*Honckenya peploides*	*Hieracium sp.*
Draba incana	*Knautia arvensis*	*Lathyrus japonicus*
Elytrigia juncea	*Leymus arenariis*	*Leontodon hispidus*
Elytrigia repens	*Lotus corniculatus*	*Leymus arenarius*
Festuca rubra	*Pimpinella saxifraga*	*Lotus corniculatus*
Galium verum	*Plantago maritima*	*Pimpinella saxifraga*
Geranium sanguineum	*Poa pratensis*	*Plantago lanceolata*
Knautia arvensis	*Ranunculus acris*	*Poa pratensis*
Leontodon autumnalis	*Rumex acetosa*	*Poa trivialis*
Leymus arenarius	*Senecio jacobea*	*Taraxacujm sp.*
Lolium perenne	*Taraxacum sp.*	*Thalictrum minus*
Lotus corniculatus	*Thalictrum minus*	*Vicia cracca*
Myosotis arvensis	*Trifolium repens*	
Phleum pratense	*Vicia cracca*	
Pimpinella saxifraga	*Vicia tricolor*	
Plantago lanceolata		
Plantago major		
Plantago maritima		
Poa pratensis		
Ranunculus acris		
Rumex acetos		
Sanguisorba officinalis		
Schdonorus pratensis		
Sedum acre		
Senecio jacobea		
Silene vulgaris		
Taraxacum sp.		
Thalictrum minus		
Trifolium pratense		
Trifolium repens		
Veronica chamaedrys		
Vicia cracca		
Viola tricolor		
Total: 44	Total: 26	Total: 23

Table 6.2 Total species' overview resulting from the individual transects at the three survey sites, 2008 (continues on next page).

Åkrasanden 1A / 1B	Stavasanden 2A / 2B	Sandvesanden 3A / 3B

Transect 1 A	Transect 1 B	Transect 2 A	Transect 2 B	Transect 3 A	Transect 3 B
Achillea millefolium	*Achillea millefolium*	*Achillea millefolium*	*Achillea millefolium*	*Achillea millefolium*	*Achillea millefolium*
Ammophila arenaria	*Ammophila arenaria*	*Ammophila arenaria*	*Ammophila arenaria*	*Alopecurus pratensis*	*Ammophila arenaria*
Angelica sylvestris	*Angelica sylvestris*	*Anthriscus sylvestris*	*Anthriscus sylvestris*	*Ammophila arenaria*	*Angelica sylvestris*
Arabidopsis thaliana	*Anthyllis vulneraria*	*Argentina anserina*	*Argentin anserina*	*Angelica sylvestris*	*Anthriscus sylvestris*
Argentina anserina	*Argentina anserina*	*Arrhenatherum elatius*	*Arrhenatherum elatius*	*Anthriscus sylvestris*	*Arrhenatherum elatius*
Arrhenatherum elatius	*Arrhenatherum elatius*	*Atriplex prostrata*	*Campanula rotundifolia*	*Arrhenatherum elatius*	Carex arenaria
Atriplex lacinata	*Atriplex lacinata*	*Campanula rotundifolia*	*Carex arenaria*	*Calystegia sepium*	*Catabrosa aquatica*
Atriplex prostrata	*Atriplex prostrata*	*Carex arenaria*	*Centaurea nigra*	*Campanula rotundifolia*	*Centaurea scabiosa*
Avenula pubescens	*Avenula pubescens*	*Centaurea nigra*	*Centaurea scabiosa*	*Carex arenaria*	*Dactylis glomerata*
Campanula rotundifolia	*Bromus hordaceus*	*Centaurea scabiosa*	*Cerastium fontanum*	*Centaurea scabiosa*	*Elytrigia juncea*
Carex arenaria	*Carex arenaria*	*Cerastium fontanum*	*Cirsium vulgare*	*Cerastium fontanum*	*Festuca rubra*
Catabrosa aquatica	*Catabrosa aquatica*	*Dactylis glomerata*	*Dactylis glomerata*	*Dactylis glomerata*	*Galium verum*
Centaurea nigra	*Centaurea nigra*	*Elytrigia juncea*	*Elytrigia juncea*	*Elytrigia juncea*	*Hieracium sp.*
Cirsium arvense	*Cerastium fontanum*	*Elytrigia repens*	*Elytrigia repens*	*Epilobium montanum*	*Hypochaeris radicata*
Dactylis glomerata	*Cirsium arvense*	*Equisetum arvense*	*Equisetum arvense*	*Equisetum arvense*	*Knautia arvensis*
Elytrigia juncea	*Dactylis glomerata*	*Festuca rubra*	*Festuca arvense*	*Festuca rubra*	*Lathyrus japonicus*
Elytrigia repens	*Draba incana*	*Galium verum*	*Galium aparine*	*Galium verum*	*Leontodon autumnalis*
Euphrasia sp.	*Elytrigia juncea*	*Geranium sanguineum*	*Galium verum*	*Geranium sanguineum*	*Leontodon hispidus*
Festuca rubra	*Elytrigia repens*	*Honckenya peploides*	*Heracleum sphondylium*	*Knautia arvensis*	*Leymus arenarius*
Galium mollugo	*Epilobium mantanum*	*Knautia arvensis*	*Honckenya peploides*	*Lathyrus japonicus*	*Lotus corniculatus*
Galium verum	*Erigeron acer*	*Leontodon autumnalis*	*Leontodon autumnalis*	*Leontodon autumnalis*	*Pimpinella saxifraga*
Geranium sanguineum	*Festuca rubra*	*Leymus arenarius*	*Leymus arenarius*	*Leontodon hispidus*	*Pisum sativum*
Heracleum sphondyleum	*Galium aparine*	*Lotus corniculatus*	*Lotus corniculatus*	*Leymus arenarius*	*Plantago lanceolata*
Hypochaeris maculata	*Galium mollugo*	*Pimpinella saxifraga*	*Pimpinella saxifraga*	*Lotus corniculatus*	*Ranunculus acris*
Knautia arvensis	*Galium verum*	*Plantago lanceolata*	*Plantago lanceolata*	*Pimpinella saxifraga*	*Rumex acetosa*
Lepidotheca suaveolens	*Geranium sanguineum*	*Polygonatum odoratum*	*Ranunculus acris*	*Plantago lanceolata*	*Rumex longifolius*
Leymus arenarius	*Honckenya peploides*	*Ranunculus acris*	*Ranunculus repens*	*Ranunculus acris*	*Senecio jacobea*
Lolium perenne	*Knautia arvensis*	*Rumex acetosa*	*Rosa rugosa*	*Rumex acetosa*	*Taraxacum sp.*
Lotus corniculatus	*Leontodon autumnalis*	*Saponaria officinalis*	*Rumex acetosa*	*Senecio jacobea*	*Thalictrum minus*
Pimpinella saxifraga	*Lepidotheca suaveolens*	*Senecio jacobea*	*Senecio jacobea*	*Taraxacum sp.*	*Trifolium pratense*
Pinus sylvestris	*Leymus arenarius*	*Taraxacum sp.*	*Sonchus arvensis*	*Thalictrum minus*	*Valeriana sambucifolia*
Plantago lanceolata	*Lolium perenne*	*Thalictrum minus*	*Taraxacum sp.*	*Trifolium pratense*	*Vicia cracca*
Poa pratensis	*Lotus corniculatus*	*Trifolium pratense*	*Thalictrum minus*	*Valeriana sambucifolia*	*Vicia sepium*
Poa trivialis	*Phleum pratense*	*Trifolium repens*	*Trifolium repens*	*Vicia cracca*	
Polygonatum odoratum	*Pimpinella saxifraga*	*Veronica chamaedrys*	*Trifolium pratense*	*Vicia sepium*	
Ranunculus acris	*Plantago lanceolata*	*Vicia cracca*	*Vicia cracca*		
Ranunculus sceleratus	*Taraxacum sp.*				
Rumex acetosa	*Plantago major*	*Vicia tricolor*	*Vicia tricolor*		
Rumex longifolius	*Plantago maritima*				
Sanguisorba officinalis	*Poa pratensis*				
Schedonorus pratensis	*Polygala serpyllifolia*				
Senecio jacobea	*Polygonatum odoratum*				
Senecio vulgaris	*Ranunculus acris*				
Silene vulgaris	*Ranunculus sceleratus*				
Sonchus arvensis	*Rumex acetosa*				

Transect 1 A	**Transect 1 B**	**Transect 2 A**	**Transect 2 B**	**Transect 3 A**	**Transect 3 B**
Taraxacum sp.	*Rumex longifolius*				
Thalictrum minus	*Sagina nodosa*				
Trifolium repens	*Sanguisorba officinalis*				
Tripleurospermum maritimum	*Schedonorus pratensis*				
Urtica dioica	*Senecio jacobea*				
Veronica chamaedrys	*Silene vulgaris*				
Vicia cracca	*Sonchus arvensis*				
	Thalictrum minus				
	Trifolium pratense				
	Trifolium repens				
	Urtica dioica				
	Veronica chamaedrys				
	Vicia cracca				
Total: 52	Total: 58	Total: 37	Total: 37	Total: 35	Total: 33

Table 6.3 Total Species' overview resulting from combined transects' analysis at all locations; 2008 (continues on next page).

Åkrasanden	Stavasanden	Sandvesanden
Achillea millefolium	*Achillea millefolium*	*Achillea millefolium*
Agrostis stolonifera	*Ammophila arenaria*	*Agrostis stolonifera*
Ammophila arenaria	*Angelica archangelica*	*Ammophila arenaria*
Angelica archangelica	*Anthriscus sylvestris*	*Angelica archangelica*
Anthyllis vulneraria	*Arrhenatherum elatius*	*Angelica sylvestris*
Argentina anserina	*Atriplex prostrata*	*Anthriscus sylvestris*
Armeria maritima	*Avena sativa*	*Anthyllis vulneraria*
Arrhenatherum elatius	*Cakile maritima*	*Argentina anserina*
Atriplex lacinata	*Campanula rotundifolia*	*Armeria maritima; maritima*
Atriplex prostrata	*Catabrosa aquatica*	*Arrhenatherum elatius*
Briza media	*Centaurea nigra*	*Atriplex prostrata*
Campanula rotundifolia	*Centaurea scabiosa*	*Briza media*
Carex arenaria	*Cerastium fontanum*	*Calystegia sepium*
Carum carvi	*Cirsium arvense*	*Campanula rotundifolia*
Catabrosa aquatica	*Dactylis glomerata*	*Carex arenaria*
Cerastium fontanum	*Elytrigia juncea*	*Centaurea nigra*
Cirsium arvense	*Elytrigia repens*	*Centaurea scabiosa*
Convallaria majalis	*Equisetum arvense*	*Cerastium fontanum*
Dactylis glomerata	*Festuca rubra*	*Cirsium arvense*
Draba incana	*Galium aparine*	*Cirsium vulgare*
Elyrigia juncea	*Galium verum*	*Convallaria majalis*
Elytrigia repens	*Geranium sanguineum*	*Cotoneaster scandinavicus*
Epilobium glandulosum	*Honckenya peploides*	*Dacylis glomerata*
Equisetum arvense	*Knautia arvensis*	*Elytrigia juncea*
Euphrasia sp.	*Leymus arenarius*	*Elytrigia repens*
Festuca rubra	*Lotus corniculatus*	*Epilobium montanum*
Galium verum	*Pimpinella saxifraga*	*Equisetum arvense*
Gentianella campestris	*Plantago lanceolata*	*Euphrasia sp.*
Geranium sanguineum	*Ranunculus acris*	*Festuca rubra*
Glyceria maxima	*Rumex acetosa*	*Galium verum*
Hieracium sp.	*Rumex longifolius*	*Geranium sanguineum*
Honckenya peploides	*Senecio jacobea*	*Hieracium sp.*
Hypochaeris radicata	*Taraxacum sp.*	*Honckenya peploides*
Juncus bufonius	*Thalictrum minus*	*Juniperus communis*
Juncus ranarius	*Trifolium pratense*	*Knautia arvensis*
Knautia arvensis	*Trifolium repens*	*Lathyrus japonicus*
Leontodon autumnalis	*Tripleurospermum maritimum*	*Leontodon hispidus*
Leontodon hispidus	*Vicia cracca*	*Leymus arenarius*
Lepidotheca suaveolens		*Lolium perenne*
Leymus arenarius		*Lotus corniculatus*
Lotus corniculatus		*Phragmites australis*
Pimpinella saxifraga		*Pimpinella saxifraga*
Plantago lanceolata		*Plantago lanceolata*
Plantago major		*Polygala serpyllifolia*
Plantago maritima		*Polygonatum odoratum*
Polygonatum odoratum		*Polygonum aviculare*
Polygonum aviculare		*Ranunculus acris*
Puccinellia maritima		*Rosa mollis*
Ranunculus acris		*Rumex acetosa*
Ranunculus sceleratus		*Rumex longifolius*

Åkrasanden	Stavasanden	Sandvesanden
Rumex acetosa		*Sagina nodosa*
Rumex longifolius		*Salix repens*
Sagina nodosa		*Silene vulgaris*
Sanguisorba officinalis		*Solidago virgaurea*
Sedum acre		*Sonchus arvensis*
Senecio jacobea		*Taraxacum sp.*
Silene vulgaris		*Thalictrum minus*
Sonchus arvensis		*Trifolium pratense*
Spergularia media		*Trifolium repens*
Stellaria media		*Tripleurospermum maritimum*
Succisa pratensis		*Tussilago farfara*
Taraxacum sp.		*Valeriana sambucifolia*
Thalictrum minus		*Vicia cracca*
Trifolium pratense		*Vicia sepium*
Trifolium repens		*Viola canina*
Tripleurospermum inodorum		
Tripleurospermum maritimum		
Veronica chamaedrys		
Vicia cracca		
Total : 69	**Total: 38**	**Total: 65**

Table 6.4 Species counts and some sub-samples' figures from the transect surveys of 1981 and 2008. 'AL'=Anders Lundberg, 1981. 'ØL'=Øystein Langåker, 2008. (Continues on next page).

Site	**Count of species**	**Species found exclusively in:**	**Species found once in:**	**Species found twice in:**	**Species found thrice in:**
Åkrasanden–transect 1A (ØL-2008)	52	*Arabidopsis thaliana* *Euphrasia sp.* *Hypochaeris maculata* *Pinus sylvestris* *Senecio vulgaris* *Tripleurospermum maritimum*	*Ammopohila arenaria* *Arabidopsis thaliana* *Atriplex lacinata* *Avenula pubescens* *Centaurea nigra* *Elytrigia repens* *Euphrasia sp.* *Heracleum sphondylium* *Poa trivialis* *Polygonatum odoratum* *Rumex longifolius* *Senecio vulgaris* *Sonchus arvensis*	*Atriplex prostrata* *Catabrosa aquatica* *Lotus corniculatus* *Pinus sylvestris* *Ranunculus sceleratus*	*Lepidotheca suaveolens* *Tripleurospermum maritimum*
Åkrasanden–transect 1B (ØL-2008)	59	*Anthyllis vulneraria* *Bromus horaceus* *Erigeron acer* *Polygala serpyllifolia* *Sagina nodosa*	*Ammophila arenaria* *Anthyllis vulneraria* *Avenula pubescens* *Catabrosa aquatica* *Draba incana* *Erigeron acer* *Leontodon autumnalis* *Lepidotheca suaveolens* *Phleum pratensis* *Plantago major* *Polygala serpyllifolia* *Sagina nodosa* *Sonchus arvensis*	*Atriplex lacinata* *Carex arenaria* *Cerastium fontanum* *Polgonatum odoratum* *Ranunculus sceleratus*	*Atriplex prostrata* *Bromus hordaceus* *Elytrigia repens* *Honckenya peploides* *Poa pratensis* *Rumex longifolius*
Åkrasanden–transect 0C (AL-1981)	44	*Armeria maritima* *Myosotis arvensis* *Sedum acre*	0	*Plantago maritima* *Schedonorus pratensis*	*Ammophila arenaria* *Carex arenaria* *Leontodon autumnalis* *Plantago major* *Sedum acre*
Åkrasanden–total (ØL+AL)	72	*Anthyllis vulneraria* *Arabidopsis thaliana* *Armeria maritima* *Bromus horaceus* *Erigeron acer* *Euphrasia sp.* *Hypochaeris maculata* *Myosotis arvensis* *Pinus sylvestris* *Polygala serpyllifolia* *Sagina nodosa* *Sedum acre* *Senecio vulgaris* *Tripleurospermum maritimum*	*Anthyllis vulneraria* *Arabidopsis thaliana* *Erigeron acer* *Euphrasia sp.* *Heracleum sphondylium* *Poa trivialis* *Polygala serpyllifolia* *Sagina nodosa* *Senecio vulgaris*	*Pinus sylvestris* *Sonchus arvensis*	*Atriplex lacinata* *Bromus hordaceus* *Catabrosa aquatica* *Honckenya peploides* *Polygonatum odoratum* *Sedum acre* *Tripleurospermum maritimum*
Stavasanden–transect 2A (ØL–2008)	37	*Saponaria officinalis*	*Centaurea nigra* *Elytrigia repens* *Honckenya peploides* *Leontodon autumnalis* *Polgonatum odoratum* *Saponaria officinalis*	*Trifolium repens* *Viola tricolor*	*Atriplex prostrata* *Geranium sanguineum* *Knautia arvensis* *Veronica chamaedrys*
Stavasanden–transect 2B (ØL–2008)	37	*Cirsium vulgare* *Ranunculus repens* *Rosa rugosa*	*Cirsium vulgare* *Heracleum sphondylium*	*Centaurea scabiosa* *Elytrigia repens* *Honckenya peploides* *Leontodon autumnalis*	*Galium aparine*
Stavasanden–transect 0D (AL–1981)	26	0	0	0	*Angelica sylvestris*
Stavasanden–total (ØL+AL)		*Saponaria officinalis* *Cirsium vulgare* *Ranunculus repens* *Rosa rugosa*	*Cirsium vulgare* *Heracleum sphondylium* *Polygonatum odoratum* *Saponaria officinalis*	0	*Angelica sylvestris* *Geranium sanguineum* *Leontodon autumnalis* *Veronica chamaedrys*

Site	**Count of species**	**Species found exclusively in:**	**Species found once in:**	**Species found twice in:**	**Species found thrice in:**
Sandvesanden–transect 3A (ØL–2008)	35	*Alopecurus pratensis* *Calystegia sepium* *Leontodon hispidus*	*Calystegia sepium* *Campanula rotundifolia* *Cerastium fontanum* *Equisetum arvense* *Leontodon autumnalis* *Pimpinella saxifraga* *Rumex acetosa*	*Alopecurus pratensis* *Dactylis glomerata* *Elytrigia juncea*	*Leontodon hispidus*
Sandvesanden–transect 3B (ØL–2008)	33	*Hypochaeris radicata* *Pisum sativum*	*Catabrosa aquatica* *Hypochaeris radicata* *Leontodon autumnalis* *Pisum sativum* *Rumex longifolius* *Senecio jacobea*	*Hieracium sp.* *Lathyrus japonicus* *Pimpinella saxifraga* *Ranunculus acris* *Rumex acetosa*	*Angelica sylvestris* *Trifolium pratense* *Valeriana sambucifolia*
Sandvesanden–transect 0E (AL-1981)	23	0	0	0	0
Sandvesanden–total (ØL+AL)		*Alopecurus pratensis* *Calystegia sepium* *Hypochaeris radicata* *Pisum sativum* *Leontodon hispidus* *Vicia sepium*	*Calystegia sepium* *Campanula rotundifolia* *Catabrosa aquatica* *Cerastium fontanum* *Equisetum arvense* *Hypochaeris radicata* *Pisum sativum* *Rumex longifolius*	*Alopecurus pratensis* *Leontodon autumnalis*	*Rumex acetosa*

Table 6.5 Community analyses from the lower tidal zone, Åkrasanden. Count of species: 16.

square / species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Argentina anserina																		1		
Atriplex lacinata		1								3	2					1				
Atriplex prostrata	2	1	4	1	2	1			2	4	1	1	1	1	4	4	2	2	4	2
Catabrosa aquatica						1							1	2			1			
Cirsium arvense																1				
Juncus ranarius																		1		
Leontodon autumnalis																1				
Lepidotheca suaveolens					1												1			
Polygonum aviculare								1												
Puccinellia maritima												1	1			1	1		1	
Ranunculus sceleratus				1			1	1									1		1	
Rumex longifolius																			1	
Spergularia media																			1	
Stellaria media								1												
Taraxacum sp.	1	1	1	4		1	1	1		1	1			1		1	1		1	3
Tripleurospermum marit.						1	1	1					1		1	1	1	1	1	

Table 6.6 Community analyses from the upper tidal zone, Åkrasanden. Count of species: 16.

square / species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Agrostis stolonifera		1	1			3														
Atriplex lacinata					1						4		1			1				
Atriplex prostrata	5	5	2	3			5	3	4			3	2	2	3	4	3	3		1
Catabrosa aquatica			3		3	1		3		3		2		2		3		1	3	
Epilobium glandulosum													1							
Juncus bufonius																				1
Juncus ranarius			1																	
Leontodon autumnalis							1													
Plantago major																				1
Plantago maritima												3						2		
Polygonum aviculare		1																		
Puccinellia maritima	1			1					1				1	1			1			1
Ranunculus sceleratus			2		1	1							1	1			1	1		1
Rumex longifolius		1											1							
Taraxacum sp.		1	1	1	1	1	1	2	1	3	1	2	2	1	1	1	1	1	1	1
Tripleurospermum marit.	1				2	3				4				1	2			1	2	

6.7 Community analyses from immature dunes, Åkrasanden. Count of species: 21.

species \ square	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ammophila arenaria				2			2	2				3	4	1	3			1	3	
Argentina anserina	1			1								1			1				1	1
Arrhenatherum elatius	1					1	1				1									
Atriplex lacinata		1	1																	
Atriplex prostrata	3	2	1	3	1		1				1				1					3
Carex arenaria				1	1	1	1	1	1		1				1	1	1			1
Cirsium arvense												1	1	1	1	1	3			
Elytrigia juncea	2	4	4	2	4	1	2	3	2	2	3	1	2	2	2	1	3	2	3	3
Festuca rubra					1	2	1		2		1		1	1					1	
Galium verum														1						
Geranium sanguineum					1	1	1							1					1	
Honckenya peploides		1	1	1						1								4		
Leymus arenarius	4	1	1	2	1	2	2	2	3		2	1	1	1	1	2	2	2	2	1
Lotus corniculatus						1	1													
Rumex longifolius																				1
Sanguisorba officinalis																			1	
Sonchus arvensis											3		1	1		1				
Taraxacum sp.			1											1						
Thalictrum minus							1													
Tripleurospermum inodorum																	1			1
Tripleurospermum maritimum																			1	

Table 6.8 Community analyses from sand dunes, Åkrasanden. Count of species: 47.

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Achillea millefolium	2	1	1	1	1		1	1	1	2	3	1	1	1	1	2		1	1	1
Angelica archangelica; ssp. litoralis		3	1	1	2					1		1	3	1						
Anthyllis vulneraria						1		1							1	1				
Argentina anserina	1																			
Armeria maritima									1											
Arrhenatherum elatius	2		1	1	1					2	1				1	1				2
Briza media		1	1	1		1			1			1		1	1	1		1		
Campanula rotundifolia		1	1	1		1	1			1	1	1	1	1	1	1	1	1	1	
Carex arenaria	1	1					1			1							1	1		
Carum carvi		1																		
Cerastium fontanum	1					1								1			1	1		
Cirsium arvense										1										
Convallaria majalis														1						
Dactylis glomerata																			1	
Draba incana						1			1											
Elytrigia repens	1																			
Equisetum arvense													1							
Euphrasia sp.						1		1						1			1	1		
Festuca rubra	1	4	2	4	1	1	2		4	4	1	1	1	1	2	2	5	2	4	4
Galium verum			2	2	1		1	1	1	1	1	3	3	2		1	1	1	1	2
Gentianella campestris; ssp. campestris							1										1			
Geranium sanguineum				1	1	4	4	3	4	3	1	1	2	2	2		1	2	3	2
Hieracium sp.				1		3	1	1	1			1		2	1		1	1	1	
Hypochaeris radicata					1															
Knautia arvensis			4	1	1	1		2	1		1	1	1	2	1	1	1	1	1	1
Leontodon autumnalis; var. autumnalis																1				
Leontodon hispidus																	1			
Leymus arenarius	1	1	1		3				1		1		1	2						2
Lotus corniculatus	1		1	1		1	1	1	2	1	1	1	1	1	2	4	2	2	1	1
Pimpinella saxifraga		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Plantago lanceolata	2			2	3	1	2	1	1	2	2	1		1	2	1	1	1	1	1
Plantago maritima		2	1	1		1	1	1	1		1	2	2	1	1	1	1	1		
Polygonatum odoratum									1	1			1							
Ranunculus acris	1	1	1	1			1				1					1		1	1	
Rumex acetosa	1			1							1	1	1		1	1		1		
Sagina nodosa; ssp. nodosa						1	2	1	1			1			1	1	1	2	1	
Sanguisorba officinalis					3						2	1	2							2
Sedum acre														1						
Senecio jacobea				1	1													1		
Silene vulgaris					1	1					3	1	1					1	1	
Succusia pratensis						1						1	1			1				
Taraxacum sp.	1			1	1	1		1	1		1	1	1	1			1		1	
Thalictrum minus		2		1	1	1	1	1			1			2	1		1	1	1	1
Trifolium pratense	1	2				1	1	1		1	1	1	1	1	2	2	1	1	1	
Trifolium repens	3																			
Veronica chamaedrys		1								1										1
Vicia cracca		1	1	1	1					1	1	3	3	2	2	1				2
Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**

Table 6.9 Community analyses from immature dunes, Stavasanden. Count of species: 12.

species \ square	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ammophila arenaria							4			4	5		3	5	4	2					1			5
Atriplex prostrata	3								2		1	3												
Avena sativa																			1					
Cakile maritima					1		2									3						1		
Catabrosa aquatica																			1					
Cirsium arvense																							1	
Elytrigia juncea	3	4	2	4	3	5	3	2	4	2	1	5	2	3	1	2	1	5			2	4	4	
Honckenya peploides		1	1	4	1				1	1				1			1		1					
Leymus arenarius			4		4			5	1		2	3	4	2	4	3				6	5	2		
Rumex longifolius		1												2										
Taraxacum sp.																			1					
Tripleurospermum maritimum																			1					

Table 6.10 Community analyses from sand dunes, Stavasanden. Count of species: 30.

species \ square	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Achillea millefolium	1	1		1	2		1	1	2	2	1	1		1	2	1	1	1	1	1
Ammophila arenaria	1	1	1				2				2	2	3	2	4	2		3	3	4
Angelica archangelica; spp. litoralis				1	1		2													
Anthriscus sylvestris			1	2								1		1	1	1	1			
Arrhenatherum elatius		1		1				2							1					
Campanula rotundifolia															1		1			
Centaurea nigra			2	3			1													
Centaurea scabiosa		4	1			3				4		1		1		1	3	3		
Cerastium fontanum												1		1			1			
Cirsium arvense	1		1	1	2	1	1							1						
Dactylis glomerata					2	1									1					
Elytrigia repens						1	1													
Equisetum arvense	2		1	1	5	2				1										
Festuca rubra	3	3	4	4	1	5	1	4	4	4	4	3	4	1	2	4	1	1	1	1
Galium aparine					1															
Galium verum						1	3	3		2	1		1	5	1	3	4	3	1	2
Geranium sanguineum										1	4	1								
Knautia arvensis								1												
Leymus arenarius	3		3		2	1	2		1		1	2	3	2	1	1	1	1	3	1
Lotus corniculatus	3			4		1	2	1	4	1	1			1	2	3	2	1	1	1
Pimpinella saxifraga							1					1					1			
Plantago lanceolata	1						1		1											1
Ranunculus acris	1						1	1	1									2	2	1
Rumex acetosa				1								1								1
Senecio jacobea	1						1													
Taraxacum sp.	1	1	1		1		1	1	1	1		2		1	1	1	2	1		1
Thalictrum minus		1	3			1	2	2	1	1	1	2	4	4	3	2	3	3	4	4
Trifolium pratense	1	1		1		1											1		1	
Trifolium repens							1													
Vicia cracca	3	4	1	2	1	1	1	1		1		4	1	1	2		1	1	1	1

Table 6.11 Community analyses from abrupt transition zone between beach and dune, Sandvesanden. Count of species: 24.

species	1	2	3	4	5
Agrostis solonifera	1	2			
Ammophila arenaria			2	2	3
Anthriscus sylvestris				1	1
Argentina anserina		1	1		
Armeria maritima	1		1		
Arrhenatherum elatius		2	2	1	
Calystegia sepium		2		1	
Carex arenaria	1			1	
Centaurea scabiosa	1				4
Cirsium vulgare				1	
Cotoneaster scandinavicus				5	1
Elytrigia juncea	2				
Equisetum arvense		1			1
Festuca rubra	1				1
Galium verum				1	
Geranium sanguineum				1	1
Leymus arenarius		1		1	1
Lotus corniculatus	1				
Plantago lanceolata	1				
Rumex longifolius	1				
Salix repens; var. argentea		1	1	1	
Taraxacum sp.	1				
Tussilago farfara	1				
Vicia cracca					1

Table 6.12 Community analyses from immature dunes, Sandvesanden. Count of species: 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ammophila arenaria	4	3	2	2		4	2	3	4	4	5	4	4	4	4	4	2	1		
Angelica archangelica; spp litoralis												2								
Anthriscus sylvestris											1	1								
Atriplex prostrata								5							1	1		3		
Calystegia sepium											1	2								
Carex arenaria	1	2	2		2		1		1	1	1	1	1	1	1		2	1		
Centaurea scabiosa																1				
Cirsium arvense				1						1		1	1	1	1	1				
Elytrigia juncea			2	2	2	2			1	1				2	2		2	1	4	
Elytrigia repens	1							2												
Equisetum arvense	4	3	2								1			1	1					
Honckenya peploides						2														
Lathyrus japonicus							1		3	4	1		1	1	3		3			
Leymus arenarius	3	1	3	5	2		4		1	1					1	1	1	1		
Phragmites australis		2																	3	4
Polygonum aviculare																		1		
Sonchus arvensis													1	1	1					
Taraxacum sp.											1		2	1						
Tripleurospermum maritimum														1				1		
Vicia cracca											1	2	1	1						

Table 6.13 Community analyses from sand dunes at Sandvesanden. Count of species: 48.

species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Achillea millefolium		1	1					2	2	1	1	1	1	1	1		1	2	1	2
Ammophila arenaria	1	3	4	3	3	3	2	3		1	1	2	1	1	2	3	2	2	2	1
Angelica sylvestris																		1	1	1
Anthriscus sylvestris									1		1									
Anthyllis vulneraria; ssp. vulneraria	1					2	1						1	1				1		3
Armeria maritima; ssp. maritima	1		1													1				
Arrhenatherum elatius				1							1									1
Briza media															1					
Campanula rotundifolia						1		1	1					1	1		1	1		
Centaurea nigra																				1
Carex arenaria							1	1	1	1		1		1				1	1	1
Centaurea scabiosa							3		3	1	4		3	1		2		1		
Cerastium fontanum						1	1						1			1				
Convallaria majalis													4	3	3	5	4			
Cotoneaster scandinavicus										4										
Dactylis glomerata										2						1				1
Elytrigia juncea																		1		
Epilobium montanum																				1
Euphrasia sp.													1	1	1					
Festuca rubra	4	3	3	4	4	2	1	1	1	1	1	3	1	1	1	1	1	1	1	1
Galium verum	2	1	1			1	2	1	3	2	1	2	1	2		1	1	2	3	2
Geranium sanguineum	4	4	3	3	2	2	3	4	1	2	2	1	2	4	3	2	4			
Hieracium sp.			1																	
Juniperus communis; ssp. communis															1					
Knautia arvensis				3					1	1	1	2	1	1		1	1			
Latyrus japonicus																		1	1	
Leontodon hispidus		2	1			1	1		1	1		2	1		1	1	1	2	3	
Leymus arenarius	1	2			1	1	1				3							1	3	
Lolium perenne												1								
Lotus corniculatus	1	1	1			2	2	1	2	1	1	1	1	1	1	1	1		3	
Pimpinella saxifraga	1																		1	
Plantago lanceolata	2		1		1	1	1	1	1	1	1	1	1	1		1			1	
Polygala serpyllifolia							1													
Polygonatum odoratum																	1			
Ranunculus acris				1		1							1		1					
Rosa mollis											3									
Rumex acetosa															1				1	
Sagina nodosa																1				
Silene vulgaris														1			1			
Solidago virgaurea; ssp. virgaurea																				1
Taraxacum sp.					1	1												1	1	1
Thalictrum minus		2	1	1	1			1		1		1	1	1	1	1	1	2	1	
Trifolium pratense							1		1	1			1	1	1	1	2			
Trifolium repens						1	1					2	1	1						3
Valeriana sambucifolia; ssp. procurrens																				1
Vicia cracca	1				4				1		1	1	1		1			1	1	1
Vicia sepium									1		1	1	1	1	1	1	1			
Viola canina; spp. canina			1																	

Table 6.14 Species counts and some sub-samples' figures from the community surveys of 2008 (continues on next page).

Site	**Count of species from squares**	**Species found exclusively in:**	**Species found once in:**	**Species found twice in:**	**Species found thrice in:**
Åkrasanden–lower tidal zone	17	*Glyceria maxima* *Lepidotheca suaveolens* *Spergularia media* *Stellaria media*	*Argentina anserina* *Cirsium arvense* *Glyceria maxima* *Jincus ranarius* *Leontodon autumnalis* *Polygonum aviculare* *Rumex lnogifolius* *Spergularia media*	*Lepidotheca suaveolens*	0
Åkrasanden–higher tidal zone	16	*Epilobium glandulosum* *Juncus bufonius* *Plantago major*	*Epilobium glandulosum* *Juncus bufonius* *Juncus ranarius* *Leontodon autumnalis* *Plantago major* *Polygonum aviculare*	*Plantago maritima* *Rumex longfolius*	*Agrostis stolonifera*
Åkrasanden–immature dunes	21	*Tripleurospermum inodorum*	*Galium verum* *Rumex longifolius* *Sanguisorba offcinalis* *Thalictrum minus* *Tripleurospermum maritimum*	*Atriplex lacinata* *Lotus corniculatus* *Taraxacum sp.* *Tripleurospermum inodorum*	0
Åkrasanden–sand dunes	47	*Carum carvi* *Draba incana* *Gentianella campestris* *Hypochaeris radicata* *Sedum acre* *Succisa pratensis* *Veronica chamaedrys*	*Argentina anserina* *Armeria maritima* *Carum carvi* *Cirsium arvense* *Convallaria majalis* *Dactylis glomerata* *Elytrigia repens* *Equisetum arvense* *Hypochaeris radicata* *Leontodon autumnalis* *Leontodon hispidus* *Sedum acre* *Trifolium repens*	*Draba incana* *Gentianella campestris*	*Polygonatum odoratum* *Senecio jacobea* *Veronica chamaedrys*
Åkrasanden–total area	**69**	*Atriplex lacinata* *Carum carvi* *Draba incana* *Epilobium glandulosum* *Gentianella campestris* *Glyceria maxima* *Juncus bufonius* *Juncus ranarius* *Leontodon autumnalis* *Lepidotheca suaveolens* *Plantago major* *Plantago maritima* *Puccinellia maritima* *Ranunculus sceleratus* *Sanguisorba officinalis* *Sedum acre* *Spergularia media* *Stellaria media* *Succisa pratensis* *Tripleurospermum inodorum* *Veronica chamaedrys*	*Armeria maritima* *Carum carvi* *Convallaria majalis* *Dactylis glomerata* *Elytrigia repens* *Epilobium glandulosum* *Equisetum arvense* *Glyceria maxima* *Hypochaeris radicata* *Juncus bufolius* *Leontodon hispidus* *Plantago major* *Sedum acre* *Spergularia media* *Stellaria media* *Trifolium repens*	*Draba incana* *Gentianella campestris* *Juncus ranarius* *Leontodon autumnalis* *Lepidotheca suaveolens* *Polygonum aviculare* *Tripleurosermum inodorum*	*Agrostis stolonifera* *Polygonatum odoratum* *Senecio jacobea* *Veronica chamaedrys*

Site	Sp. count	Spp.Found excl. in:	Spp. found once in:	Spp. found twice in	Spp. found thrice
Stavasanden–immature dunes	12	*Avena sativa* *Cakile maritima*	*Avena sativa* *Catabrosa aquatica* *Cirsium arvense* *Taraxacum sp.* *Tripleurospermum.marit.*	*Rumex longifolius*	0
Stavasanden–sand dunes	30	*Galium aparine*	*Galium aparine* *Knautia arvensis* *Trifolium repens*	*Campanula rotundifolia* *Elytrigia repens* *Senecio jacobea*	*Angelica archangelica* *Centaurea nigra* *Cerastium fontanum* *Dactylis glomerata* *Geranium sanguineum* *Pimpinella saxifraga* *Rumex acetosa*
Stavasanden–total area	**38**	*Avena sativa* *Cakile maritima* *Galium aparine*	*Avena sativa* *Catabrosa aquatica* *Galium aparine* *Knautia arvensis* *Trifolium repens* *Tripleurospermum maritimum*	*Campanula rotundifolia* *Elytrigia repens* *Rumex longifolius* *Senecio jacobea*	*Angelica archangelica; ssp. litoralis* *Centaurea nigra* *Cerastium fontanum* *Dactylis glomerata* *Geranium sanguineum* *Pimpinella saxifraga* *Rumex acetosa*
Sandvesanden–abrupt transition zone between beach and sand dune	24	*Cirsium vulgare* *Salix repens* *Tussilago farfara*	*Cirsium vulgare* *Elytrigia juncea* *Galium verum* *Lotus corniculatus* *Plantago lanceolata* *Rumex longifolius* *Taraxacum sp.* *Tussilago farfara* *Vicia cracca*	*Agrostis stolonifera* *Anthriscus sylvestris* *Argentina anserina* *Armeria maritima* *Calystegia sepium* *Carex arenaria* *Centaurea scabiosa* *Cotoneaster scandinavicus* *Equisetum arvense* *Festuca rubra* *Geranium sanguineum*	*Ammophila arenaria* *Arrhenatherum elatius* *Leymus arenarius* *Salix repens*
Sandvesanden–immature dunes	20	*Phragmites australis* *Calystegia sepium*	*Angelica archangelica* *Centaurea scabiosa* *Honckenya peploides* *Polygonum aviculare*	*Anthriscus sylvestris* *Calystegia sepium* *Elytrigia repens* *Tripleurospermum maritimum*	*Phragmites australis* *Sonchus arvensis* *Taraxacum sp.*
Sandvesanden–sand dunes	48	*Angelica sylvestris* *Juniperus communis* *Lolium perenne* *Polygala serpyllifolia* *Rosa mollis* *Solidago virgaurea* *Valeriana sambucifolia* *Vicia sepium* *Viola canina*	*Briza media* *Centaurea nigra* *Cotoneaster scancinavicus* *Elytrigia jincea* *Epilobium montanum* *Juniperus communis* *Lolium perenne* *Polygala serpyllifolia* *Polygonatum odoratum* *Rosa mollis* *Sagina nodosa* *Solidago virgaurea* *Valeriana sambucifolia* *Viola canina*	*Anthriscus sylvestris* *Hieracium sp.* *Lathyrus japonicus* *Pimpinella saxifraga* *Rumex acetosa* *Silene vulgaris*	*Angelica sylvestris* *Armeria maritima* *Arrhenatherum elatius* *Dactylis glomerata* *Euphrasia sp.*
Sandvesanden–total area	**65**	*Angelica sylvestris* *Calystegia sepium* *Cotoneaster scandinavicus* *Cirsium vulgare* *Juniperus communis* *Lolium perenne* *Phragmites australis* *Polygala serpyllifolia* *Rosa mollis* *Salix repens* *Solidago virgaurea* *Tussilago farfara* *Valeriana sambucifolia* *Vicia sepium* *Viola canina*	*Angelica archangelica* *Briza media* *Centaurea nigra* *Cirsium vulgare* *Epilobium montanum* *Honckenya peploides* *Juniperus communis* *Lolium perenne* *Polygala serpyllifolia* *Polygonatum odoratum* *Polygonum aviculare* *Rosa mollis* *Rumex longifolius* *Sagina nodosa* *Solidago virgaurea* *Tussilago farfara* *Valeriana sambucifolia* *Viola canina*	*Agrostis stolonifera* *Argentina anserina* *Calystegia sepium* *Elytrigia repens* *Hieracium sp.* *Pimpinella saxifraga* *Rumex acetosa* *Silene vulgaris* *Tripleurospermum maritimum*	*Angelica sylvestris* *Cotoneaster scandinavicus* *Dactylis glomerata* *Euphrasia sp.* *Phragmites australis* *Salix repens* *Sonchus arvensis*

Table 6.15 LOI values for Åkrasanden, 2008 (continues on next page).

Beach locality: **Åkrasanden**

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	**LOI:**
1a-1	3-5	1	9.3826	16.6785	15.1299	15.0756	1.5486	0.0543	21.2256	**0.9448**
1a-3	3-5	2	9,0745	16.6841	14.9638	14.9153	1.7203	0.0485	22.6070	**0.8235**
1a-5	3-5	3	8.9882	16.2721	14.3067	14.2398	1.9654	0.0669	26.9828	**1.2579**
1a-7	3-5	4	9.1404	17.1721	15.2425	15.1824	1.9296	0.0601	24.0248	**0.9849**
1a-10	3-5	5	9.1717	16.7142	14.9339	14.8818	1.7803	0.0521	23.6036	**0.9042**
1a-12	3-5	6	9.0246	16.1796	14.7220	14.6535	1.4576	0.0685	20.3718	**1.2023**
1a-14	3-5	7	8.9475	16.1596	14.7964	14.7336	1.3632	0.0628	18.9016	**1.0737**
1a-16	3-5	8	9.0257	16.1355	15.5827	15.5354	0.5528	0.0473	7.7752	**0.7214**
1a-18	3-5	9	8.9026	16.1552	15.7445	15.7052	0.4107	0.0393	5.6628	**0.5744**
1a-20	3-5	10	9.0332	15.7174	15.4166	15.3834	0.3008	0.0332	4.5002	**0.5201**
1a-22	3-5	11	9.4349	16.1883	15.8046	15.7730	0.3837	0.0316	5.6819	**0.4961**
1a-24	3-5	12	9.0006	15.6904	15.3592	15.3328	0.3312	0.0264	4.9508	**0.4152**
1a-30	3-5	13	9.1194	14.7241	14.2744	14.1554	0.4437	0.1190	7.9166	**2.3058**
1a-33	3-5	14	9.0051	14.8710	14.4856	14.3152	0.3854	0.1704	6.5702	**3.1092**
1a-36	3-5	15	8.9672	14.1236	13.4345	13.2855	0.6891	0.1490	13.3640	**3.3353**
1a-38	3-5	16	9.0471	13.4913	12.7748	12.6003	0.7165	0.1745	16.1221	**4.6812**
1a-41	3-5	17	8.9696	13.9365	12.9733	12.7524	0.9632	0.2209	19.3928	**5.5174**
1a-45	3-5	18	9.2292	14.8317	13.5510	13.2711	1.2807	0.2799	22.8594	**6.4765**
1a-47	3-5	19	9.2665	14.5170	13.3948	13.1674	1.1222	0.2274	21.3732	**5.5083**
1a-49	3-5	20	8.8975	14.3484	12.8534	12.5272	1.4950	0.3262	27.4267	**8.2459**
1a-51	3-5	21	8.9462	14.0302	12.7827	12.5150	1.2475	0.2677	24.5378	**6.9777**
1a-53	3-5	22	8.9422	13.9728	12.6937	12.4296	1.2791	0.2641	25.4264	**7.0399**
1a-56	3-5	23	8.9882	13.3506	12.1646	11.8964	1.1860	0.2682	27.1869	**8.4435**
1a-58	3-5	24	9.0011	14.5277	13.0106	12.6188	1.5171	0.3918	27.4509	**9.7718**
1a-60	3-5	25	8.9931	13.3310	11.9542	11.5741	1.3768	0.3801	31.7389	**12.8364**
1a-62	3-5	26	8.9313	13.9754	12.3988	11.9971	1.5766	0.4017	31.2563	**11.5847**
1a-64	3-5	27	8.7940	14.1495	12.5996	12.2187	1.5499	0.3809	28.9403	**10.0089**
1a-66	3-5	29	8.9628	13.6634	12.2712	11.9254	1.3922	0.3458	29.617	**10.4522**
1a-68	3-5	30	9.2078	13.8434	12.5123	12.1789	1.3311	0.3334	28.7126	**10.0893**
1a-70	3-5	31	9.1541	13.9965	12.5187	12.1511	1.4778	0.3676	30.5179	**10.9255**
1a-72	3-5	32	9.2564	14.1205	12.9195	12.5933	1.2010	0.3262	24.6911	**8.9050**
1a-74	3-5	33	8.9632	13.8041	12.6640	12.3766	1.1401	0.2874	23.5514	**7.7659**
1a-1	10	34	9.0819	17.2669	15.5531	15.5129	1.7138	0.0402	20.9383	**0.6212**
1a-3	10	35	9.4791	18.3214	16.4725	16.4333	1.8489	0.0392	20.9097	**0.5605**
1a-5	10	36	8.7321	18.6806	16.3660	16.3185	2.3146	0.0475	23.2658	**0.6222**
1a-7	10	37	9.0846	18.3571	16.1567	16.0918	2.2004	0.0649	23.7303	**0.9177**
1a-10	10	39	8.8160	19.2172	16.8783	16.7926	2.3389	0.0857	22.4868	**1.0630**
1a-12	10	40	9.1853	17.1142	15.2216	15.1498	1.8926	0.0718	23.8696	**1.1895**
1a-14	10	41	9.1423	17.8154	15.8112	15.7447	2.0042	0.0665	23.1082	**0.9972**
1a-16	10	42	9.2166	17.6730	16.4628	16.4243	1.2102	0.0385	14.3111	**0.5313**
1a-18	10	43	8.9868	16.6984	16.0810	16.0446	0.6174	0.0364	8.0061	**0.5131**
1a-20	10	44	8.6966	15.8918	15.3719	15.3409	0.5199	0.0310	7.2257	**0.4644**
1a-22	10	45	8.9088	16.3952	16.1081	16.0779	0.2871	0.0302	3.8350	**0.4195**

Beach locality: **Åkrasanden**

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	LOI:
1a-24	10	46	9,0508	15.1791	14.7428	14.7165	0.4363	0.0263	7.1194	**0.4621**
1a-30	10	47	9.0176	14.3180	13.8480	13.7455	0.4700	0.1025	8.8673	**2.2255**
1a-33	10	48	9.1096	13.9392	13.6255	13.5171	0.3137	0.1084	6.4954	**2.4004**
1a-36	10	49	8.9429	13.7747	13.0486	12.8679	0.7261	0.1807	15.0275	**4.4012**
1a-38	10	50	9.0566	14.8086	14.0770	13.8436	0.7316	0.2334	12.7191	**4.6490**
1a-41	10	51	9.0203	14.5071	13.7563	13.5726	0.7508	0.1837	13.6838	**3.8788**
1a-45	10	52	8.8215	13.9269	12.9728	12.7395	0.9541	0.2333	18.6881	**5.6199**
1a-47	10	53	9.0281	14.5286	13.4023	13.1607	1.1263	0.2416	20.4763	**5.5233**
1a-49	10	55	9.1140	15.1476	13.9329	13.6669	1.2147	0.2660	20.1323	**5.5199**
1a-51	10	56	9.2535	14.9420	13.9055	13.6791	1.0365	0.2264	18.2210	**4.8667**
1a-53	10	58	9.2372	15.3494	14.0904	13.8491	1.2590	0.4413	20.5981	**9.0930**
1a-56	10	60	8.6245	14.4423	13.2884	13.0201	1.1539	0.2683	19.8340	**5.7527**
1a-58	10	62	8.6703	16.1264	14.4438	14.0695	1.6826	0.3743	22.5668	**6.4831**
1a-60	10	63	9.0421	14.7203	13.5724	13.2405	1.1479	0.3319	20.2159	**7.3262**
1a-62	10	65	8.4548	14.8519	13.5798	13.2876	1.2721	0.2922	19.8856	**5.7015**
1a-64	10	66	8.5887	14.4016	13.1379	12.8344	1.2637	0.3035	21.7396	**6.6715**
1a-66	10	67	8.3247	14.6802	13.4065	13.1074	1.2737	0.2991	20.0409	**5.8857**
1a-68	10	68	8.7261	14.5081	13.4876	13.2464	1.0205	0.2408	17.6496	**5.0572**
1a-70	10	69	8.4947	15.8378	14.7314	14.4942	1.1064	0.2372	15.0672	**3.8033**
1a-72	10	70	8.6086	14.9933	14.2441	14.0769	0.7492	0.1672	11.7343	**2.9669**
1a-74	10	72	8.4769	13.9173	13.1162	12.9402	0.8011	0.1760	14.7250	**3.7937**

Table 6.16 LOI values for Stavasanden, 2008 (continues on next page).

Beach locality: **Stavasanden**

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	**LOI:**
2a-1	3-5	47	9.0179	16.2846	16.0923	16.0212	0.1923	0.0711	2.6463	**1.0050**
2a-4	3-5	35	9.4799	17.2069	16.8539	16.7836	0.3530	0.0703	4.5684	**0.9533**
2a-7	3-5	68	8.7259	15.7537	15.3575	15.2769	0.3962	0.0806	5.6376	**1.2154**
2a-10	3-5	5	9.1725	15.5427	15.0657	14.9927	0.4770	0.0730	7.4880	**1.2387**
2a-13	3-5	42	9.2162	16.7735	16.3466	16.2743	0.4269	0.0723	5.6488	**1.0140**
2a-16	3-5	22	8.9435	16.4277	16.0405	15.9569	0.3872	0.0836	5.1736	**1.1780**
2a-19	3-5	35	9.4838	17.5323	17.0396	16.9588	0.4927	0.0808	6.1216	**1.1069**
2a-22	3-5	66	8.5884	15.4385	15.0416	14.9774	0.3969	0.0642	5.7941	**0.9949**
2a-25	3-5	32	9.2563	16.4058	15.8753	15.8100	0.5305	0.0653	5.7312	**0.7484**
2a-28	3-5	2	9.0740	16.4489	15.8975	15.8247	0.5514	0.0728	7.4767	**1.0670**
2a-31	3-5	20	8.8980	15.7291	15.3272	15.2630	0.4019	0.0642	5.8834	**0.9986**
2a-34	3-5	3	8.9890	15.6920	15.3226	15.2321	0.3694	0.0905	5.5110	**1.4289**
2a-37	3-5	51	9.0202	14.8398	14.0894	13.9346	0.7504	0.1548	12.8944	**3.0537**
2a-40	3-5	27	8.7876	16.0010	15.5514	15.4497	0.4496	0.1017	6.2328	**1.5036**
2a-43	3-5	72	8.4761	14.5927	14.1544	14.0442	0.5485	0.1102	7.6039	**1.6293**
2a-46	3-5	41	9.1420	14.9684	14.4353	14.2727	0.5331	0.1626	9.1497	**3.0718**
2a-49	3-5	11	9.4350	15.9175	15.4619	15.3877	0.4556	0.0742	7.0282	**1.2311**
2a-52	3-5	36	8.7333	16.3195	16.1970	16.0964	0.1225	0.1006	1.6148	**1.3479**
2a-55	3-5	29	8.9626	15.6440	15.0992	15.0133	0.5448	0.0859	8.1540	**1.3998**
2a-58	3-5	44	8.6964	16.2544	15.8057	15.7260	0.4487	0.0737	5.9410	**1.0367**
2a-61	3-5	17	8.9695	16.3220	16.0159	15.9334	0.3061	0.0825	4.2489	**1.1903**
2a-64	3-5	53	9.0281	15.9695	15.6571	15.5733	0.3124	0.0838	4.5005	**1.2641**
2a-67	3-5	7	8.9476	16.0485	15.6129	15.5426	0.4356	0.0703	6.1344	**1.0547**
2a-70	3-5	14	9.0052	16.2280	15.7935	15.7303	0.4345	0.0632	6.0157	**0.9310**
2a-73	3-5	69	8.4948	15.9238	15.4269	15.3538	0.4969	0.0731	6.6887	**1.0545**
2a-76	3-5	60	8.6244	15.4079	14.6913	14.5867	0.7166	0.1046	10.5639	**1.7241**
2a-79	3-5	14	9.0084	16.8579	15.8814	15.7187	0.9765	0.1627	12.4403	**2.3672**
2a-82	3-5	23	8.9883	15.6797	14.9365	14.7853	0.7432	0.1512	11.1068	**2.5419**
2a-85	3-5	50	9.0564	15.8897	15.4016	15.2950	0.4881	0.1066	7.1430	**1.6800**
2a-88	3-5	9	8.9030	15.3050	14.5845	14.3795	0.7205	0.2050	11.2543	**3.6082**
2a-91	3-5	25	8.9928	15.1383	14.4648	14.2726	0.6735	0.1922	10.9592	**3.5124**
2a-94	3-5	30	9.2076	15.9767	14.9312	14.7073	1.0455	0.2239	15.4452	**3.9119**
2a-97	3-5	46	9.0505	15.7336	14.9326	14.7247	0.8010	0.2079	11.9855	**3.5345**
2a-100	3-5	65	8.4554	15.2627	14.0484	14.0111	1.2143	0.0373	17.8382	**0.6669**
2a-1	10	15	8.9674	15.5277	15.1775	15.1097	0.3502	0.0678	5.3382	**1.0918**
2a-4	10	58	9.2372	16.9979	16.5867	16.5173	0.4112	0.0694	5.2985	**0.9443**
2a-7	10	55	9.1143	16.7539	16.2410	16.1564	0.5129	0.0846	6.7137	**1.1871**
2a-10	10	18	9.2292	17.4216	16.8458	16.7388	0.5758	0.1070	7.0285	**1.4048**
2a-13	10	50	9.0596	17.3941	16.8777	16.8159	0.5164	0.0618	6.1959	**0.7905**
2a-16	10	52	8.8212	16.5517	16.0656	15.9835	0.4861	0.0821	6.2881	**1.1333**
2a-19	10	24	9.0013	17.0770	16.6174	16.5297	0.4596	0.0877	5.6911	**1.1515**
2a-22	10	26	8.9303	16.8841	16.3562	16.2774	0.5279	0.0788	6.6371	**1.0612**
2a-25	10	67	8.3246	16.0346	15.5270	15.4753	0.5076	0.0517	6.5837	**0.7178**
2a-28	10	4	9.1414	16.4287	16.1465	16.0724	0.2822	0.0741	3.8725	**1.0578**
2a-31	10	73	9.4640	17.6449	17.3357	17.2650	0.3092	0.0707	3.7795	**0.8982**
2a-34	10	74	8.3377	15.7666	15.3854	15.2937	0.3812	0.0917	5.1313	**1.3011**
2a-37	10	75	8.5782	15.7953	15.3170	15.2015	0.4783	0.1155	6.6273	**1.7829**
2a-40	10	76	8.2606	15.6919	15.2942	15.2026	0.4893	0.0916	6.5843	**1.3195**

Beach locality: Stavasanden

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	**LOI:**
2a-43	10	78	8.9297	17.0217	16.6461	16.5430	0.3756	0.1031	4.6416	**1.3361**
2a-46	10	79	8.4137	16.5396	16.3562	16.2188	0.1834	0.1374	2.2570	**1.7299**
2a-49	10	74	8.3406	15.6910	15.1959	15.0756	0.4951	0.1203	6.7357	**1.7547**
2a-52	10	82	8.6913	17.2217	17.0863	16.9580	0.1354	0.1283	1.5873	**1.5283**
2a-55	10	83	8.9653	16.4197	15.9512	15.8268	0.4685	0.1244	6.2849	**1.7807**
2a-58	10	84	8.3286	15.8856	15.6384	15.5410	0.2472	0.0974	3.2711	**1.3325**
2a-61	10	85	8.4636	16.3080	15.8671	15.7722	0.4409	0.0949	5.6206	**1.2818**
2a-64	10	86	9.2839	16.3989	16.0630	15.9782	0.3359	0.0848	4.7210	**1.2509**
2a-67	10	87	8.4510	15.7199	15.4192	15.3266	0.3007	0.0926	4.1368	**1.3289**
2a-70	10	89	8.4357	17.5859	17.4310	17.3252	0.1543	0.1058	1.6852	**1.1761**
2a-73	10	90	7.8398	15.3995	14.9101	14.7859	0.4894	0.1242	6.4738	**1.7566**
2a-76	10	92	8.3444	14.2752	13.4370	13.2387	0.8382	0.1983	14.1330	**3.8939**
2a-79	10	93	8.7598	15.6541	14.8664	14.7038	0.7877	0.1626	11.4254	**2.6627**
2a-82	10	94	8.6293	15.5551	14.9924	14.8345	0.5627	0.1579	8.1247	**2.4815**
2a-85	10	95	8.6485	16.3480	16.0531	15.9062	0.2949	0.1469	3.8301	**1.9839**
2a-88	10	96	8.3917	15.4065	14.8237	14.6687	0.5828	0.1550	8.3081	**2.4098**
2a-91	10	97	8.9473	15.7144	15.1859	15.0235	0.5285	0.1624	7.8098	**2.6031**
2a-94	10	98	8.7558	15.6990	15.2581	15.1427	0.4409	0.1154	6.3501	**1.7748**
2a-97	10	99	8.3423	15.4146	15.0874	14.9662	0.3272	0.1212	4.6265	**1.7969**
2a-100	10	100	8.4457	15.0735	14.5147	14.3975	0.5588	0.1172	8.4312	**1.9311**

Table 6.17 LOI values for Sandvesanden, 2008(continues on next page).

Beach locality: **Sandvesanden**

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	LOI:
3a-5	3-5	62	8.6703	19.0540	17.0039	16.9047	2.0501	0.0992	19.7434	**1.1904**
3a-7	3-5	19	9.2665	17.3037	16.8330	16.7399	0.4707	0.0931	5.8565	**1.2304**
3a-9	3-5	88	8.4600	17.9754	17.4697	17.3677	0.5057	0.1020	5.3145	**1.1321**
3a-11	3-5	78	8.9256	17.1324	16.6186	16.5301	0.5138	0.0885	6.2607	**1.1504**
3a-13	3-5	18	9.2301	17.1950	16.6167	16.5268	0.5783	0.0899	7.2611	**1.2171**
3a-15	3-5	4	9.1415	17.6069	16.9512	16.8588	0.6557	0.0924	7.7456	**1.1831**
3a-17	3-5	44	8.6971	16.3070	15.7338	15.6554	0.5732	0.0784	7.5323	**1.1142**
3a-19	3-5	73	9.4647	17.5270	17.2080	17.1275	0.3190	0.0805	3.9557	**1.0396**
3a-21	3-5	41	9.1453	17.3268	16.7767	16.6922	0.5501	0.0845	6.7237	**1.1073**
3a-23	3-5	83	8.9659	16.5775	16.0768	15.9921	0.5007	0.0847	6.5782	**1.1911**
3a-25	3-5	99	8.3428	16.3585	15.7278	15.6516	0.6307	0.0762	7.8683	**1.0318**
3a-27	3-5	1	9.3827	17.5869	17.1195	17.0422	0.4674	0.0773	5.6971	**0.9991**
3a-29	3-5	6	9.0251	17.8040	17.1517	17.0778	0.6523	0.0739	7.4303	**0.9094**
3a-31	3-5	49	8.9431	14.4989	16.9655	16.8854	-2.4666	0.0801	-	- *
3a-33	3-5	50	9.0569	17.5636	17.1206	17.0422	0.4430	0.0784	5.2077	**0.9723**
3a-35	3-5	58	9.2378	17.1346	16.7025	16.6234	0.4321	0.0791	5.4718	**1.0597**
3a-37	3-5	51	9.0209	18.1551	17.6351	17.5346	0.5200	0.1005	5.6929	**1.1669**
3a-39	3-5	29	8.9634	18.6679	18.0292	17.9247	0.6387	0.1045	6.5814	**1.1527**
3a-41	3-5	27	8.7900	17.9079	17.2704	17.1628	0.6375	0.1076	6.9917	**1.2688**
3a-43	3-5	53	9.0286	18.5258	18.8122	17.7125	-0.2864	1.0997	-	- *
3a-45	3-5	67	8.3250	17.4662	16.7613	16.6570	0.7049	0.1043	7.7112	**1.2363**
3a-47	-	-	-	-	-	-	-	-	-	-----
3a-49	3-5	40	9.1858	16.7777	16.3209	16.1914	0.4568	0.1295	6.0169	**1.8164**
3a-51	3-5	91	8.5527	17.2391	16.7412	16.6312	0.4979	0.1100	5.7319	**1.3433**
3a-53	3-5	81	8.3811	17.0035	16.4982	16.3924	0.5053	0.1058	5.8603	**1.3034**
3a-55	3-5	79	8.4144	17.9946	17.2842	17.1478	0.7104	0.1364	7.4153	**1.5378**
3a-57	3-5	41	9.1428	16.0697	15.3615	15.2247	0.7082	0.1368	10.2239	**2.1998**
3a-59	3-5	35	9.4806	16.6341	15.6077	15.4084	1.0264	0.1993	14.3482	**3.2528**
3a-5	10	14	9.0054	22.3992	19.4427	19.3430	2.9565	0.0997	22.0736	**0.9552**
3a-7	10	47	9.0185	17.6858	17.1357	17.0417	0.5501	0.0940	6.3468	**1.1580**
3a-9	10	25	8.9936	16.7540	16.3046	16.2257	0.4494	0.0789	5.7909	**1.0792**
3a-11	10	74	8.3379	16.0634	15.6095	15.5337	0.4539	0.0758	5.8753	**1.0424**
3a-13	10	68	8.7265	17.3362	16.6751	16.5839	0.6611	0.0912	7.6785	**1.1474**
3a-15	10	89	8.4367	16.6763	16.1241	16.0348	0.5522	0.0893	6.7018	**1.1616**
3a-17	10	34	9.0822	17.7970	17.1319	17.0422	0.6651	0.0897	7.6318	**1.1143**
3a-19	10	94	8.6299	17.1314	16.8904	16.7850	0.2410	0.1054	2.8348	**1.2760**
3a-21	10	87	8.4516	17.1060	16.6574	16.5707	0.4486	0.0867	5.1835	**1.0566**
3a-23	10	24	9.0014	18.4968	17.9754	17.8940	0.5214	0.0814	5.4911	**0.9071**
3a-25	10	95	8.6494	16.4967	15.8935	15.8037	0.6032	0.0898	7.6867	**1.2396**
3a-27	10	17	8.9694	17.7185	17.1794	17.1104	0.5391	0.0690	6.1618	**0.8404**
3a-29	10	2	9.0749	17.3019	16.7443	16.6653	0.5576	0.0790	6.7777	**1.0301**
3a-31	10	92	8.3449	17.1096	16.7162	16.6550	0.3934	0.0612	4.4885	**0.7311**
3a-33	10	75	8.5791	16.7691	16.3073	16.2423	0.4618	0.0650	5.6386	**0.8411**
3a-35	10	55	9.1150	17.7548	17.3489	17.2773	0.4059	0.0716	4.6980	**0.8696**

Beach locality: **Sandvesanden**

Square:	Depth:	Crusible no:	Weight of crusible:	Weight of crusible + soil:	Weight after drying:	Weight after burning:	Weight loss after drying:	Weight loss after burning:	% weight loss after drying:	**LOI:**
3a-37	10	52	8.8220	18.0067	17.4279	17.3535	0.5788	0.0744	6.3018	**0.8645**
3a-39	10	7	8.9479	16.7808	16.2257	16.1462	0.5551	0.0795	7.0868	**1.0924**
3a-41	10	22	8.9427	17.5306	16.9432	16.8695	0.5874	0.0737	6.8399	**0.9212**
31-43	10	66	8.5890	16.5609	15.9291	15.8585	0.6318	0.0706	7.9253	**0.9618**
3a-45	10	3	8.9905	17.7835	17.2231	17.1507	0.5604	0.0724	6.3733	**0.8794**
3a-47	10	-	-	-	-	-	-	-	----------	----------
3a-49	10	36	8.7334	16.9759	16.5253	16.4474	0.4506	0.0779	5.4668	**0.9998**
3a-51	1	80	8.7340	17.2003	16.7877	16.7156	0.4126	0.0721	4.8734	**0.8952**
3a-53	0	20	8.8985	17.4928	17.0758	17.0068	0.4170	0.0690	4.8521	**0.8438**
3a-55	10	76	8.2610	16.8056	15.4834	15.2695	1.3222	0.2139	15.4741	**2.9616**
3a-57	10	60	8.6251	16.0528	15.0333	14.8439	1.0195	0.1894	13.7256	**2.9556**
3a-59	10	32	9.2572	16.0548	14.9664	14.7241	1.0884	0.2423	15.7794	**4.1755**

Table 6.18 pH values for all localities in two different soil depths (continues on next page).

Åkrasanden				Stavasanden				Sandvesanden			
Sample no:	Square:	Depth:	pH:	Sample no:	Square:	Depth:	pH:	Sample no:	Square:	Depth:	pH:
1	1a-1	3–5 cm	8.05	65	2a-1	3–5 cm	8.88	133	3a-5	3-5 cm	8.23
2	1a-3	3–5 cm	8.09	66	2a-4	3-5 cm	8.63	134	3a-7	3-5 cm	8.53
3	1a-5	3–5 cm	7.89	67	2a-7	3-5 cm	8.91	135	3a-9	3-5 cm	8.63
4	1a-7	3–5 cm	7.87	68	2a-10	3-5 cm	8.92	136	3a-11	3-5 cm	8.63
5	1a-1	3–5 cm	8.11	69	2a-13	3-5 cm	8.91	137	3a-13	3-5 cm	8.78
6	1a-12	3–5 cm	8.14	70	2a-16	3-5 cm	8.86	138	3a-15	3-5 cm	8.59
7	1a-14	3–5 cm	8.67	71	2a-19	3-5 cm	8.89	139	3a-17	3-5 cm	8.60
8	1a-16	3–5 cm	8.86	72	2a-22	3-5 cm	8.79	140	3a-19	3-5 cm	8.12
9	1a-18	3–5 cm	8.94	73	2a-25	3-5 cm	8.45	141	3a-21	3-5 cm	7.93
10	1a-20	3–5 cm	8.01	74	2a-28	3-5 cm	8.22	142	3a-23	3-5 cm	8.07
11	1a-22	3–5 cm	8.75	75	2a-31	3-5 cm	8.22	143	3a-25	3-5 cm	8.21
12	1a-24	3–5 cm	8.43	76	2a-34	3-5 cm	8.26	144	3a-27	3-5 cm	8.19
13	1a-30	3–5 cm	7.92	77	2a-37	3-5 cm	7.71	145	3a-29	3-5 cm	7.98
14	1a-33	3–5 cm	7.91	78	2a-40	3-5 cm	7.83	146	3a-31	3-5 cm	8.22
15	1a-36	3–5 cm	7.78	79	2a-43	3-5 cm	7.77	147	3a-33	3-5 cm	8.02
16	1a-38	3–5 cm	7.68	80	2a-46	3-5 cm	7.72	148	3a-35	3-5 cm	8.00
17	1a-41	3–5 cm	7.65	81	2a-49	3-5 cm	8.01	149	3a-37	3-5 cm	8.16
18	1a-45	3–5 cm	7.66	82	2a-52	3-5 cm	8.01	150	3a-39	3-5 cm	8.23
19	1a-47	3–5 cm	7.69	83	2a-55	3-5 cm	7.93	151	3a-41	3-5 cm	7.87
20	1a-49	3–5 cm	7.65	84	2a-58	3-5 cm	8.00	152	3a-43	3-5 cm	8.04
21	1a-51	3–5 cm	7.64	85	2a-61	3-5 cm	8.13	153	3a-45	3-5 cm	7.77
22	1a-53	3–5 cm	7.66	86	2a-64	3-5 cm	8.44	154	3a-47	3-5 cm	7.86
23	1a-56	3–5 cm	7.66	87	2a-67	3-5 cm	8.38	155	3a-49	3-5 cm	7.86
24	1a-58	3–5 cm	7.55	88	2a-70	3-5 cm	8.28	156	3a-51	3-5 cm	7.88
25	1a-60	3–5 cm	7.52	89	2a-73	3-5 cm	8.37	157	3a-53	3-5 cm	7.70
26	1a-62	3–5 cm	7.57	90	2a-76	3-5 cm	8.06	158	3a-55	3-5 cm	7.67
27	1a-64	3–5 cm	7.60	91	2a-79	3-5 cm	7.84	159	3a-57	3-5 cm	7.55
28	1a-66	3–5 cm	7.57	92	2a-82	3-5 cm	7.96	160	3a-5	10 cm	8.00
29	1a-68	3–5 cm	7.61	93	2a-85	3-5 cm	8.17	161	3a-7	10 cm	8.51
30	1a-70	3–5 cm	7.58	94	2a-88	3-5 cm	7.92	162	3a-9	10 cm	8.43
31	1a-72	3–5 cm	7.57	95	2a-91	3-5 cm	7.87	163	3a-11	10 cm	8.43
32	1a-74	3–5 cm	7.64	96	2a-94	3-5 cm	7.83	164	3a-13	10 cm	8.47
33	1a-1	10 cm	8.16	97	2a-97	3-5 cm	7.88	165	3a-15	10 cm	8.50
34	1a-3	10cm	8.30	98	2a-100	3-5 cm	7.90	166	3a-17	10cm	8.29
35	1a-5	10 cm	8.01	99	2a-1	10 cm	9.00	167	3a-19	10 cm	7.87
36	1a-7	10 cm	7.82	100	2a-4	10 cm	8.87	168	3a-21	10 cm	8.13
37	1a-10	10 cm	8.27	101	2a-7	10 cm	8.82	169	3a-23	10 cm	8.09
38	1a-12	10 cm	8.25	102	2a-10	10 cm	8.77	170	3a-25	10 cm	8.27
39	1a-14	10 cm	8.52	103	2a-13	10 cm	8.92	171	3a-27	10 cm	8.20
40	1a-16	10 cm	9.04	104	2a-16	10 cm	8.81	172	3a-29	10 cm	7.98
41	1a-18	10 cm	9.13	105	2a-19	10 cm	8.77	173	3a-31	10 cm	8.63
42	1a-20	10 cm	9.14	106	2a-22	10 cm	8.74	174	3a-33	10cm	8.52
43	1a-22	10 cm	8.86	107	2a-25	10 cm	8.58	175	3a-35	10 cm	8.56
44	1a-24	10 cm	8.66	108	2a-28	10 cm	8.66	176	3a-37	10 cm	8.60
45	1a-30	10 cm	8.22	109	2a-31	10 cm	8.61	177	3a-39	10 cm	8.42
46	1a-33	10 cm	8.05	110	2a-34	10 cm	8.71	178	3a-41	10 cm	8.52
47	1a-36	10 cm	7.86	111	2a-37	10 cm	8.32	179	3a-43	10 cm	8.39
48	1a-38	10 cm	7.96	112	2a-40	10 cm	8.35	180	3a-45	10 cm	8.38
49	1a-41	10 cm	7.92	113	2a-43	10 cm	8.46	181	3a-47	10 cm	8.02
50	1a-45	10 cm	7.87	114	2a-46	10 cm	8.16	182	3a-49	10 cm	7.99
51	1a-47	10 cm	7.92	115	2a-49	10 cm	8.25	183	3a-51	10 cm	8.12
52	1a-49	10 cm	7.95	116	2a-52	10 cm	8.27	184	3a-53	10 cm	8.44**

Beach locality: **Åkrasanden**	Beach locality: **Stavasanden**	Beach locality: **Sandvesanden**

Sample no:	Square:	Depth:	pH:	Sample no:	Square:	Depth:	pH:	Sample no:	Square:	Depth:	pH:
53	**1a-51**	**10 cm**	**7.97**	**117**	**2a-55**	**10 cm**	**8.12**	**185**	**3a-55**	**10 cm**	**7.77**
54	**1a-53**	**10 cm**	**7.94**	**118**	**2a-58**	**10 cm**	**8.39**	**186**	**3a-57**	**10 cm**	**7.64**
55	**1a-56**	**10 cm**	**7.88**	**119**	**2a-61**	**10 cm**	**8.39**				
56	**1a-58**	**10 cm**	**7.80**	**120**	**2a-64**	**10 cm**	**8.42**				
57	**1a-60**	**10 cm**	**7.83**	**121**	**2a-67**	**10 cm**	**8.38**				
58	**1a-62**	**10 cm**	**8.00**	**122**	**2a-70**	**10 cm**	**8.43**				
59	**1a-64**	**10 cm**	**7.94**	**123**	**2a-73**	**10 cm**	**8.00**				
60	**1a-66**	**10 cm**	**7.90**	**124**	**2a-76**	**10 cm**	**7.84**				
61	**1a-68**	**10 cm**	**7.86**	**125**	**2a-79**	**10 cm**	**7.89**				
62	**1a-70**	**10 cm**	**8.04**	**126**	**2a-82**	**10 cm**	**7.94**				
63	**1a-72**	**10 cm**	**8.01**	**127**	**2a-85**	**10 cm**	**8.19**				
64	**1a-74**	**10 cm**	**8.02**	**128**	**2a-88**	**10 cm**	**8.02**				
				129	**2a-91**	**10 cm**	**7.98**				
				130	**2a-94**	**10 cm**	**8.07**				
				131	**2a-97**	**10 cm**	**8.16**				
				132	**2a-100**	**10 cm**	**8.05***				

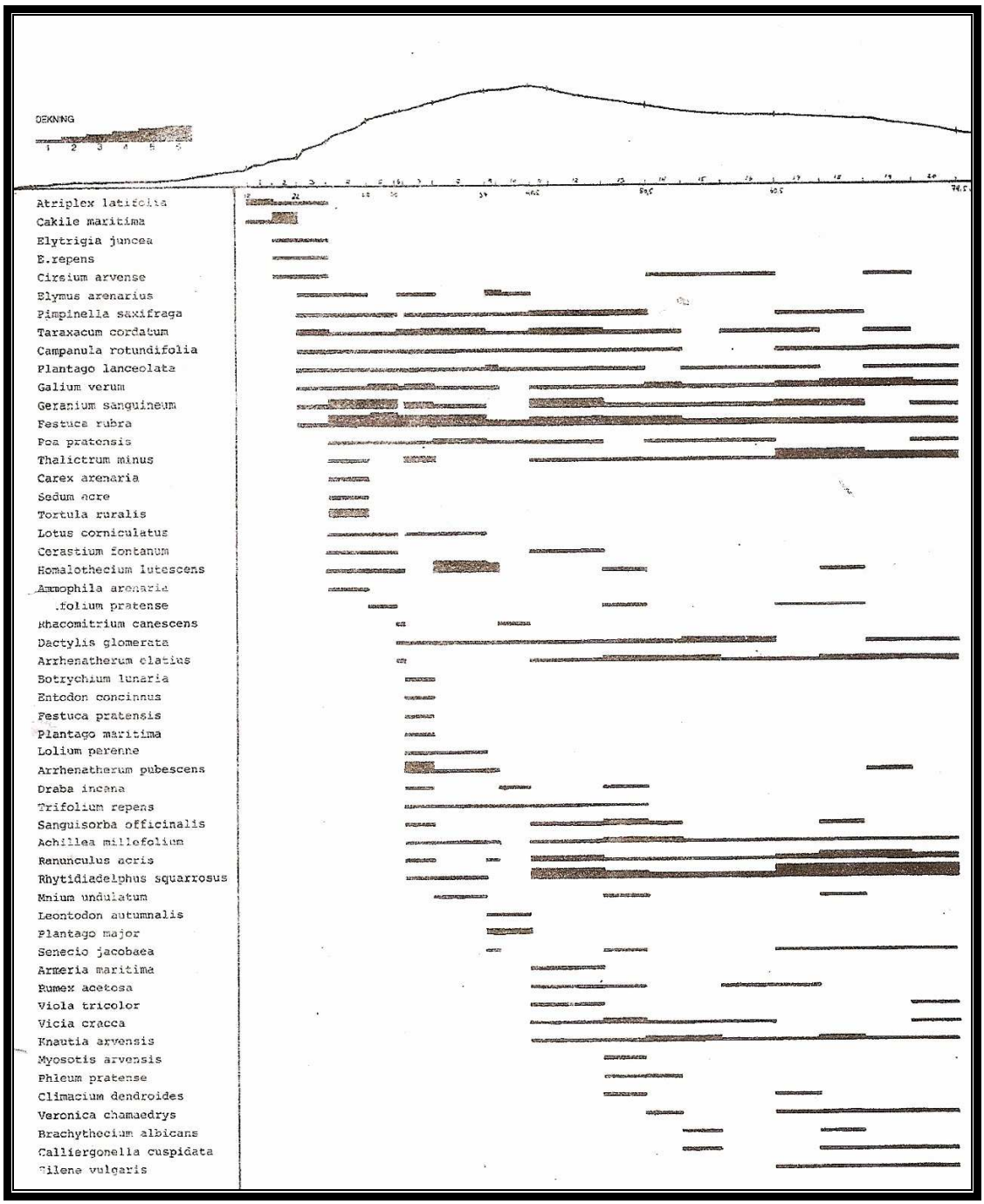

Fig 6.1 Vegetation profile from Åkrasanden made by Anders Lundberg, 1982 (A. Lundberg 1982)

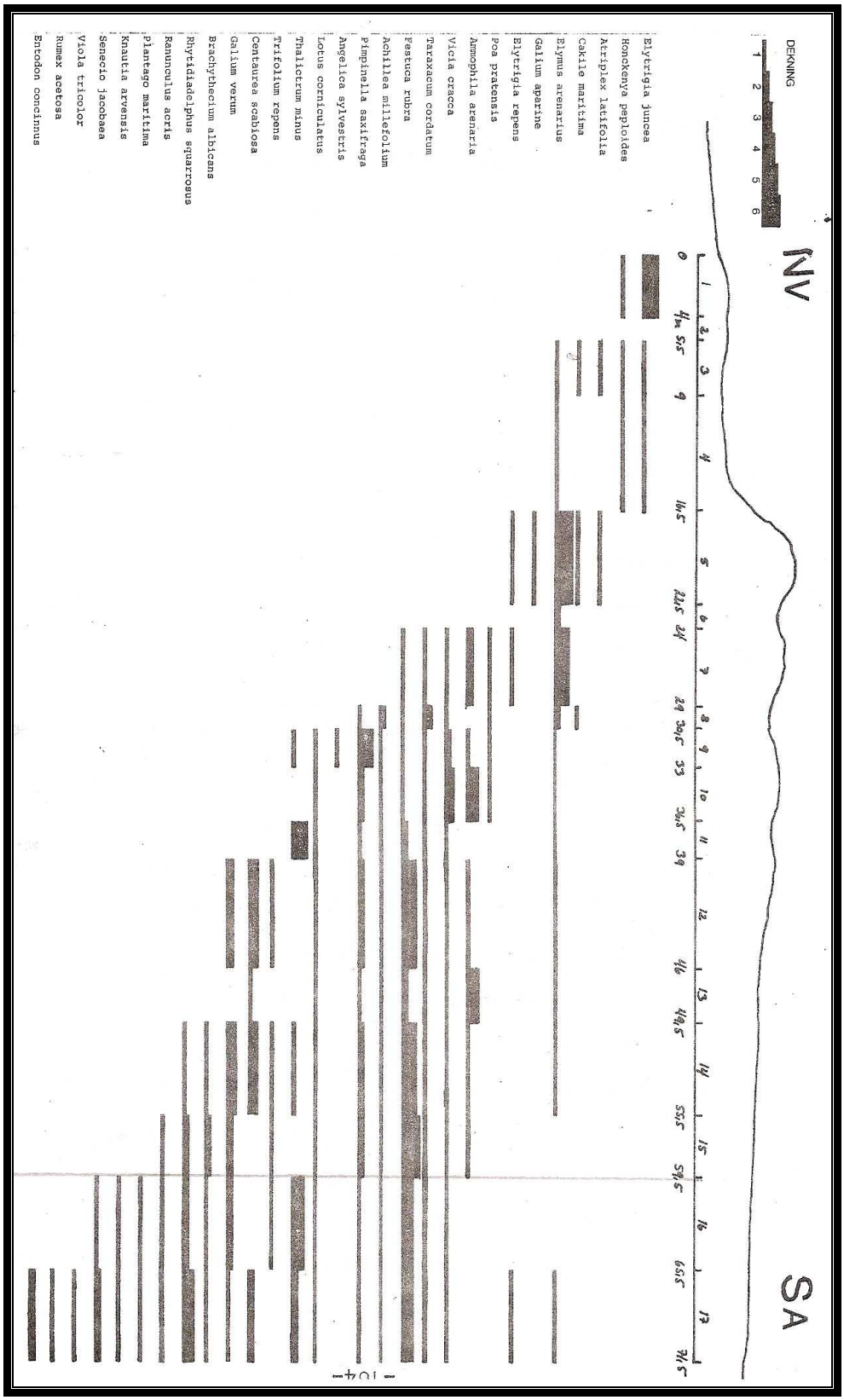

Fig 6.2 Vegetation profile from Stavasanden made by Anders Lundberg, 1982 (A. Lundberg 1982)

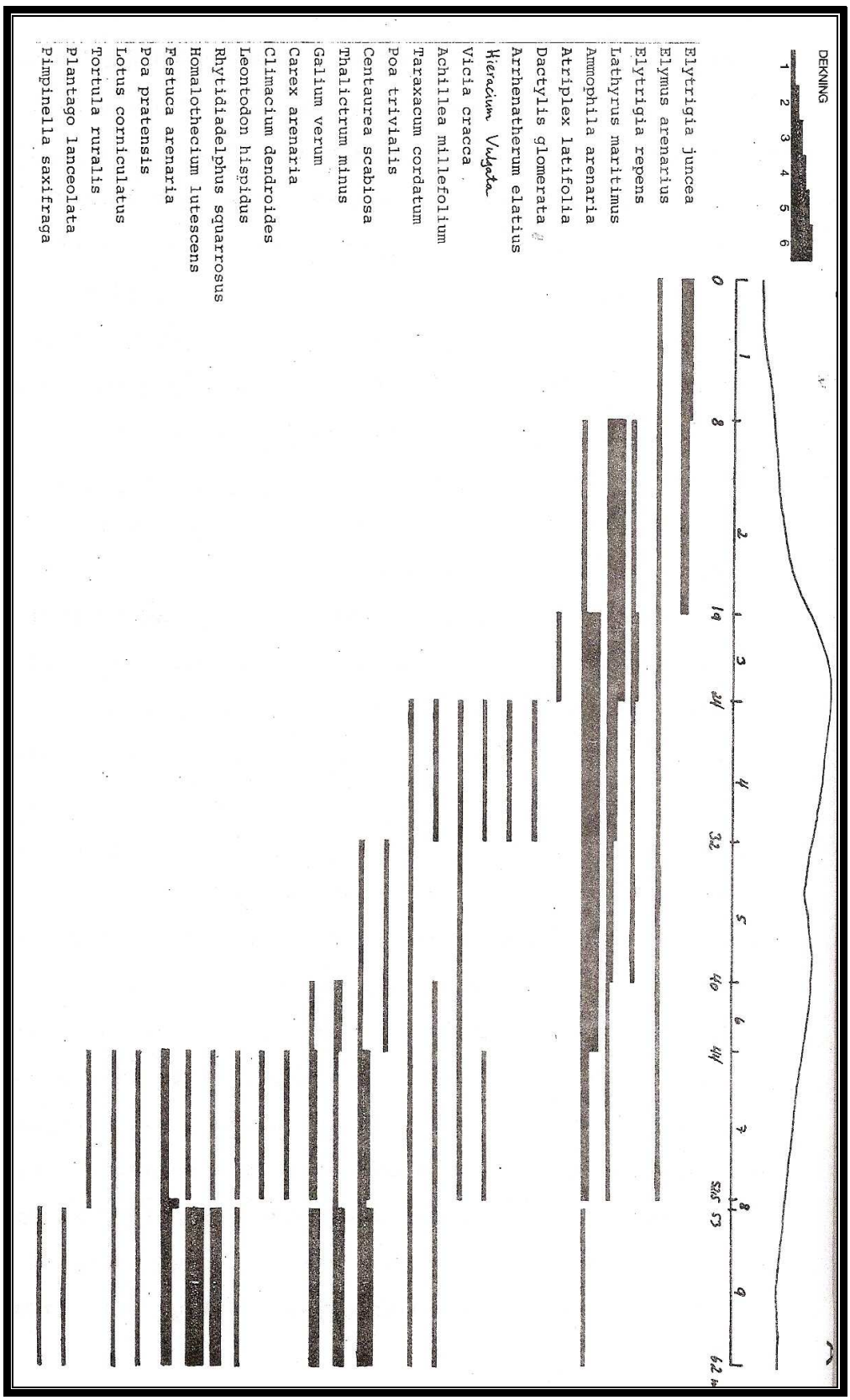

Fig 6.3 Vegetation profile from Sandvesanden made by Anders Lundberg, 1982 (A. Lundberg 1982)

Table 6.19 Floristic scores from transect survey at Åkrasanden, transect 0C-1981 (AL).

Transekt	0C	0C	0C	0C	0C	0C
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia						
Leymus arenarius						
Festuca rubra						
Galium verum						
Geranium sanguieneum						
Pimpinella saxifraga						
Plantago lanceolata						
Taraxacum sp.						
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis						
Thalictrum minus						
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius						
Dactylis glomerata						
Achillea millefolium						
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris						
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	OC	OC	0C	0C
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia						
Leymus arenarius						
Festuca rubra						
Galium verum						
Geranium sanguieneum						
Pimpinella saxifraga						
Plantago lanceolata						
Taraxacum sp.						
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis						
Thalictrum minus						
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius						
Dactylis glomerata						
Achillea millefolium						
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris						
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia						
Leymus arenarius						
Festuca rubra						
Galium verum						
Geranium sanguieneum						
Pimpinella saxifraga						
Plantago lanceolata						
Taraxacum sp.						
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis						
Thalictrum minus						
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius						
Dactylis glomerata						
Achillea millefolium						
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris						
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Atriplex prostrata	2	2	1	1	1	1
Cakile maritima	1	1	4	4		
Cirsium arvense			1	1	1	1
Elytrigia juncea			1	1	1	1
Elytrigia repens			1	1	1	1
Campanula rotundifolia					1	1
Leymus arenarius					1	1
Festuca rubra					1	1
Galium verum					1	1
Geranium sanguieneum					1	1
Pimpinella saxifraga					1	1
Plantago lanceolata					1	1
Taraxacum sp.					2	2
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis						
Thalictrum minus						
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius						
Dactylis glomerata						
Achillea millefolium						
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris						
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Atriplex prostrata	1					
Cakile maritima						
Cirsium arvense	1					
Elytrigia juncea	1					
Elytrigia repens	1					
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius	1	1	1	1		
Festuca rubra	1	4	4	4	5	5
Galium verum	1	1	1	1	2	2
Geranium sanguieneum	1	3	3	3	3	3
Pimpinella saxifraga	1	1	1	1	1	1
Plantago lanceolata	1	1	1	1	1	1
Taraxacum sp.	2	1	1	1	1	1
Cerastium fontanum	1	1	1	1	1	1
Ammophila arenaria		1	1	1		
Carex arenaria		1	1	1		
Lotus corniculatus		1	1	1	1	1
Poa pratensis		1	1	1	1	1
Thalictrum minus		1	1	1		
Sedum acre		1	1	1		
Trifolium pratense					1	1
Arrhenatherum elatius						
Dactylis glomerata						
Achillea millefolium						
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris						
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius	1	1	1			
Festuca rubra	4	4	4	4	4	4
Galium verum	1	2	2	1	1	1
Geranium sanguieneum		2	2	1	1	1
Pimpinella saxifraga		1	1	1	1	1
Plantago lanceolata	1	1	1	1	1	1
Taraxacum sp.	2	2	1	2	2	2
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus		1	1	1	1	1
Poa pratensis	1	1	1	2	2	2
Thalictrum minus		2	1			
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius	1					
Dactylis glomerata	1	1	1	1	1	1
Achillea millefolium		1	1	1	1	1
Avenula pubescens		4	4	1	1	1
Draba incana		1	1			
Schedonorus pratensis		1	1			
Lolium perenne		1	1	1	1	1
Plantago maritima		1	1			
Ranunculus acris		1	1			
Sanguisorba officinalis		1	1			
Trifrolium repens		1	1	1	1	1
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis						
Rumex acetosa						
Viola tricolor						
Vicia cracca						
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	OC	0C	0C	0C	0C	0C
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius		2	1	1	1	
Festuca rubra	4	2	2	2	3	3
Galium verum	1	1			1	1
Geranium sanguieneum	1				3	3
Pimpinella saxifraga	1	1	1	1	2	2
Plantago lanceolata	1	2	1	1	1	1
Taraxacum sp.	2	1	1	1	2	2
Cerastium fontanum					1	1
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus	1					
Poa pratensis	2	1	1	1	1	1
Thalictrum minus					1	1
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius					1	1
Dactylis glomerata	1	1	1	1	1	1
Achillea millefolium	1	1			1	1
Avenula pubescens	1	1				
Draba incana			1	1		
Schedonorus pratensis						
Lolium perenne	1					
Plantago maritima						
Ranunculus acris		1			2	2
Sanguisorba officinalis					1	1
Trifrolium repens	1	1	1	1	1	1
Leontodon autumnalis		1	1	1		
Plantago major		2	2	2		
Senecio jacobea		1				
Armeria maritima					1	1
Knautua arvensis					1	1
Rumex acetosa					1	1
Viola tricolor					1	1
Vicia cracca					1	1
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Atriplex prostrata						
Cakile maritima						
Cirsium arvense						
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius						
Festuca rubra	3	3	3	3	3	3
Galium verum	1	1	1	1	1	1
Geranium sanguieneum	3	3	3	3	3	1
Pimpinella saxifraga	2	2	2	2	2	2
Plantago lanceolata	1	1	1	1	1	1
Taraxacum sp.	2	2	2	2	2	1
Cerastium fontanum	1	1	1	1	1	
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis	1	1	1	1	1	
Thalictrum minus	1	1	1	1	1	1
Sedum acre						
Trifolium pratense						1
Arrhenatherum elatius	1	1	1	1	1	2
Dactylis glomerata	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	2
Avenula pubescens						
Draba incana						1
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris	2	2	2	2	2	1
Sanguisorba officinalis	1	1	1	1	1	2
Trifrolium repens	1	1	1	1	1	1
Leontodon autumnalis						
Plantago major						
Senecio jacobea						1
Armeria maritima	1	1	1	1	1	
Knautua arvensis	1	1	1	1	1	1
Rumex acetosa		1	1	1	1	1
Viola tricolor	1	1	1	1	1	
Vicia cracca	1	1	1	1	1	2
Myosotis arvensis						1
Phleum pratense						1
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Atriplex prostrata						
Cakile maritima						
Cirsium arvense			1	1	1	1
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	
Leymus arenarius						
Festuca rubra	3	3	3	3	3	2
Galium verum	1	1	2	2	2	1
Geranium sanguieneum	1	1	1	1	1	1
Pimpinella saxifraga	2	2	2			
Plantago lanceolata	1	1	1			1
Taraxacum sp.	1	1	1	1	1	
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis			1	1	1	1
Thalictrum minus	1	1	1	1	1	1
Sedum acre						
Trifolium pratense	1	1	1			
Arrhenatherum elatius	2	2	2	2	2	2
Dactylis glomerata	1	1	1	1	1	2
Achillea millefolium	2	2	2	2	2	1
Avenula pubescens						
Draba incana	1	1	1			
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris	1	1	1	1	1	1
Sanguisorba officinalis	2	2	2	1	1	
Trifrolium repens	1	1	1			
Leontodon autumnalis						
Plantago major						
Senecio jacobea	1	1	1			
Armeria maritima						
Knautua arvensis	1	1	2	2	2	2
Rumex acetosa	1	1	1			
Viola tricolor						
Vicia cracca	1	2	2	1	1	1
Myosotis arvensis	1	1	1			
Phleum pratense	1	1	1	1	1	
Veronica chamaedrys			1	1	1	
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	55	56	57	58	59	60
Lengste avstand fra 0	55	56	57	58	59	60
Atriplex prostrata						
Cakile maritima						
Cirsium arvense	1	1	1	1	1	1
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia						
Leymus arenarius						
Festuca rubra	2	2	2	2	2	2
Galium verum	1	1	1	1	1	1
Geranium sanguieneum	1	1	1	1	1	1
Pimpinella saxifraga						
Plantago lanceolata	1	1	1	1	1	1
Taraxacum sp.			1	1	1	1
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis	1	1	1	1	1	1
Thalictrum minus	1	1	1	1	1	1
Sedum acre						
Trifolium pratense						
Arrhenatherum elatius	2	2	1	1	1	1
Dactylis glomerata	2	2	2	2	2	2
Achillea millefolium	1	1	1	1	1	1
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris	1	1	1	1	1	1
Sanguisorba officinalis						
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea						
Armeria maritima						
Knautua arvensis	2	2	1	1	1	1
Rumex acetosa			1	1	1	1
Viola tricolor						
Vicia cracca	1	1	1	1	1	1
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys						
Silene vulgaris						

Transekt	0C	0C	0C	0C	0C	0C
Rute	61	62	63	64	65	66
Lengste avstand fra 0	61	62	63	64	65	66
Atriplex prostrata						
Cakile maritima						
Cirsium arvense	1					
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius						
Festuca rubra	2	2	2	2	2	2
Galium verum	2	2	2	2	3	3
Geranium sanguieneum	2	2	2	2	2	2
Pimpinella saxifraga	1	1	1	1	1	1
Plantago lanceolata	1	1	1	1		
Taraxacum sp.		1	1	1		
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis	1					
Thalictrum minus	4	4	4	4	4	4
Sedum acre						
Trifolium pratense	1	1	1	1	1	1
Arrhenatherum elatius	1	1	1	1	2	2
Dactylis glomerata	2					
Achillea millefolium	1	1	1	1	1	1
Avenula pubescens						
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris	2	2	2	2	3	3
Sanguisorba officinalis					1	1
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea	1	1	1	1	1	1
Armeria maritima						
Knautua arvensis	1	1	1	1	2	2
Rumex acetosa	1	1	1	1		
Viola tricolor						
Vicia cracca	1					
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys	1	1	1	1	1	1
Silene vulgaris	1	1	1	1	1	1

Transekt	0C	0C	0C	0C	0C	0C
Rute	67	68	69	70	71	72
Lengste avstand fra 0	67	68	69	70	71	72
Atriplex prostrata						
Cakile maritima						
Cirsium arvense		1	1	1	1	
Elytrigia juncea						
Elytrigia repens						
Campanula rotundifolia	1	1	1	1	1	1
Leymus arenarius						
Festuca rubra	2	2	2	2	2	2
Galium verum	3	3	3	3	3	2
Geranium sanguieneum	2					1
Pimpinella saxifraga	1					
Plantago lanceolata		1	1	1	1	1
Taraxacum sp.		1	1	1	1	
Cerastium fontanum						
Ammophila arenaria						
Carex arenaria						
Lotus corniculatus						
Poa pratensis						1
Thalictrum minus	4	3	3	3	3	3
Sedum acre						
Trifolium pratense	1					
Arrhenatherum elatius	2	2	2	2	2	2
Dactylis glomerata		1	1	1	1	1
Achillea millefolium	1	1	1	1	1	1
Avenula pubescens		1	1	1	1	
Draba incana						
Schedonorus pratensis						
Lolium perenne						
Plantago maritima						
Ranunculus acris	3	3	3	3	3	2
Sanguisorba officinalis	1					
Trifrolium repens						
Leontodon autumnalis						
Plantago major						
Senecio jacobea	1	1	1	1	1	1
Armeria maritima						
Knautua arvensis	2	1	1	1	1	1
Rumex acetosa						
Viola tricolor						1
Vicia cracca						1
Myosotis arvensis						
Phleum pratense						
Veronica chamaedrys	1	1	1	1	1	1
Silene vulgaris	1	1	1	1	1	1

Transekt	0C	0C
Rute	73	74
Lengste avstand fra 0	73	74
Atriplex prostrata		
Cakile maritima		
Cirsium arvense		
Elytrigia juncea		
Elytrigia repens		
Campanula rotundifolia	1	1
Leymus arenarius		
Festuca rubra	2	2
Galium verum	2	2
Geranium sanguieneum	1	1
Pimpinella saxifraga		
Plantago lanceolata	1	1
Taraxacum sp.		
Cerastium fontanum		
Ammophila arenaria		
Carex arenaria		
Lotus corniculatus		
Poa pratensis	1	1
Thalictrum minus	3	3
Sedum acre		
Trifolium pratense		
Arrhenatherum elatius	2	2
Dactylis glomerata	1	1
Achillea millefolium	1	1
Avenula pubescens		
Draba incana		
Schedonorus pratensis		
Lolium perenne		
Plantago maritima		
Ranunculus acris	2	2
Sanguisorba officinalis		
Trifrolium repens		
Leontodon autumnalis		
Plantago major		
Senecio jacobea	1	1
Armeria maritima		
Knautua arvensis	1	1
Rumex acetosa		
Viola tricolor	1	1
Vicia cracca	1	1
Myosotis arvensis		
Phleum pratense		
Veronica chamaedrys	1	1
Silene vulgaris	1	1

Table 6.20 Floristic scores from transect survey at Åkrasanden, transect 1A-2008 (ØL).

Transekt	1A	1A	1A	1A	1A	1A
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense						
Leymus arenarius						
Ammophila arenaria						
Taraxacum sp.						
Plantago lanceolata						
Galium verum						
Festuca rubra						
.10Dactylis glomerata						
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum						
Centaurea nigra						
Thalictrum minus						
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris						
Lolium perenne						
Euprasia sp.						
Achillea millefolium						
Poa pratensis						
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Atriplex prostrata	1	1				
Lepidotheca suaveolens	1	1			1	
Tripleurospermum marit.		1		1	1	
Ranunculus sceleratus		1			1	
Catabrosa aquatica				2	2	
Atriplex lacinata					1	
Elytrigia juncea						
Carex arenaria						
Cirsium arvense						
Leymus arenarius						
Ammophila arenaria						
Taraxacum sp.						
Plantago lanceolata						
Galium verum						
Festuca rubra						
Dactylis glomerata						
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum						
Centaurea nigra						
Thalictrum minus						
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris						
Lolium perenne						
Euprasia sp.						
Achillea millefolium						
Poa pratensis						
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense						
Leymus arenarius						
Ammophila arenaria						
Taraxacum sp.						
Plantago lanceolata						
Galium verum						
Festuca rubra						
Dactylis glomerata						
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum						
Centaurea nigra						
Thalictrum minus						
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris						
Lolium perenne						
Euprasia sp.						
Achillea millefolium						
Poa pratensis						
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea	2	4	4	1		
Carex arenaria			1	1	2	3
Cirsium arvense			1	1	3	4
Leymus arenarius			1	1	1	1
Ammophila arenaria				4		
Taraxacum sp.				1	2	2
Plantago lanceolata					2	2
Galium verum					2	1
Festuca rubra						1
Dactylis glomerata						1
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum						
Centaurea nigra						
Thalictrum minus						
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris						
Lolium perenne						
Euprasia sp.						
Achillea millefolium						
Poa pratensis						
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea					1	2
Carex arenaria	3	5	5	1	2	2
Cirsium arvense	1	1	1		1	1
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria						
Taraxacum sp.	1	1	1	2	2	2
Plantago lanceolata	2		1	2	1	
Galium verum			1	1	1	
Festuca rubra	1					2
Dactylis glomerata			1	1	1	1
Rumex longifolius	1					
Arabidopsis thaliana		1				
Senecio jacobea			2	1	1	2
Elytrigia repens				1		
Geranium sanguineum				1		
Centaurea nigra					1	
Thalictrum minus					1	
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris						
Lolium perenne						
Euprasia sp.						
Achillea millefolium						
Poa pratensis			2	1		
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea	4					
Carex arenaria			1		1	
Cirsium arvense	1					
Leymus arenarius	2	2	2	4	2	1
Ammophila arenaria						
Taraxacum sp.	2	2	1	1	2	1
Plantago lanceolata	1		1	1	2	1
Galium verum		3	2	1		
Festuca rubra	2	4	4	4	2	
Dactylis glomerata	3	1	1			
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum	1	2	3		1	
Centaurea nigra						
Thalictrum minus	1	2	1	1		
Pimpinella saxifraga	1			1	2	
Hypochaeris maculata						
Campanula rotundifolia			1	1	1	1
Knautia arvensis				1		
Lotus corniculatus				1		
Ranunculus acris				1		
Lolium perenne					2	4
Euprasia sp.					1	
Achillea millefolium						
Poa pratensis						
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa						
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis						
Vicia cracca						
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis		1				
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense						
Leymus arenarius			1			1
Ammophila arenaria						
Taraxacum sp.	1	1	2			
Plantago lanceolata	1	1	1	2		1
Galium verum				1	1	1
Festuca rubra	2			2		2
Dactylis glomerata	1			2		
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea			1			
Elytrigia repens						
Geranium sanguineum		1			1	1
Centaurea nigra						
Thalictrum minus				1	1	1
Pimpinella saxifraga		1	1			
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis				1	1	
Lotus corniculatus				1		
Ranunculus acris			1	1	1	1
Lolium perenne	4	4	3	2	1	
Euprasia sp.						
Achillea millefolium	1	1	1	1	1	1
Poa pratensis	2	1				
Trifolium repens				1	1	
Veronica chamaedrys				1	1	1
Rumex acetosa					1	1
Sanguisorba officinalis					1	1
Arrhenatherum elatius						
Schedonorus pratensis					4	5
Vicia cracca						1
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense			1			
Leymus arenarius	1	2	2	1	1	1
Ammophila arenaria						
Taraxacum sp.	2	2				
Plantago lanceolata	1	1	1	1		1
Galium verum	1	1	3	2	1	2
Festuca rubra		4	2	2	2	3
Dactylis glomerata						
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum	1	3	2	4	5	4
Centaurea nigra						
Thalictrum minus	1	1	3	4	2	2
Pimpinella saxifraga	2					
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus						
Ranunculus acris	1	1		1	1	1
Lolium perenne	2					
Euprasia sp.						
Achillea millefolium	1	1	1	1	1	
Poa pratensis						
Trifolium repens		1				
Veronica chamaedrys	1				1	2
Rumex acetosa	1		1			1
Sanguisorba officinalis					1	
Arrhenatherum elatius				1	1	2
Schedonorus pratensis	3	2	1			
Vicia cracca	1	1	2	2	1	2
Argentina anserina					1	1
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria			1	1		
Cirsium arvense			1	1	1	1
Leymus arenarius				1		
Ammophila arenaria						
Taraxacum sp.	1	1	2	2		1
Plantago lanceolata		1				
Galium verum	3	3	4	3	2	2
Festuca rubra	3	2	1	2	1	1
Dactylis glomerata	1	1		1	1	1
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum	1	4	2	2		4
Centaurea nigra						
Thalictrum minus	4	4	4	4	5	2
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis					1	
Lotus corniculatus						
Ranunculus acris	2	1	1	1	1	1
Lolium perenne						
Euprasia sp.						
Achillea millefolium			1		2	3
Poa pratensis						
Trifolium repens						
Veronica chamaedrys	1	1	1	1	1	1
Rumex acetosa	1	1		1	1	
Sanguisorba officinalis					1	
Arrhenatherum elatius	1	2	1	1	1	1
Schedonorus pratensis						
Vicia cracca	1	1	1	1	1	1
Argentina anserina	2	1	1	2		1
Polygonatum odoratum	1					
Pinus sylvestris				1		3
Silene vulgaris						
Angelica sylvestris						
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A	
Rute	55	56	57	58	59	60	
Lengste avstand fra 0	55	56	57	58	59	60	
Atriplex prostrata							
Lepidotheca suaveolens							
Tripleurospermum marit.							
Ranunculus sceleratus							
Catabrosa aquatica							
Atriplex lacinata							
Elytrigia juncea							
Carex arenaria							
Cirsium arvense	1	1	1		1		
Leymus arenarius	1		1		1	1	
Ammophila arenaria							
Taraxacum sp.		1					
Plantago lanceolata		1	1	1			
Galium verum	2	2	1	1	3	3	
Festuca rubra	3	2	4	4	3	3	
Dactylis glomerata		1			1	1	
Rumex longifolius							
Arabidopsis thaliana							
Senecio jacobea							
Elytrigia repens							
Geranium sanguineum	4	2		1	2	1	
Centaurea nigra							
Thalictrum minus	1	3	3	4	3	3	
Pimpinella saxifraga							
Hypochaeris maculata							
Campanula rotundifolia							
Knautia arvensis	1	2	1	1		1	
Lotus corniculatus							
Ranunculus acris	1	1	2	1		1	
Lolium perenne							
Euprasia sp.							
Achillea millefolium	2	2	1	1	1	1	
Poa pratensis							
Trifolium repens							
Veronica chamaedrys	1		1	1	1	1	
Rumex acetosa				1			
Sanguisorba officinalis	1			1	1		
Arrhenatherum elatius	2	2	2	1	2	3	
Schedonorus pratensis							
Vicia cracca	1	1	1	1	1	1	
Argentina anserina	1						
Polygonatum odoratum							
Pinus sylvestris							
Silene vulgaris	1	1					
Angelica sylvestris						1	
Senecio vulgaris							
Urtica dioica							
Galium mollugo							
Poa trivialis							
Avenula pubescens							
Sonchus arvensis							
Heracleum sphondyleum				1			

Transekt	1A	1A	1A	1A	1A	1A
Rute	61	62	63	64	65	66
Lengste avstand fra 0	61	62	63	64	65	66
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense					1	1
Leymus arenarius		1	1	1	1	1
Ammophila arenaria						
Taraxacum sp.					1	3
Plantago lanceolata	1				1	
Galium verum	3	3	3	1	2	1
Festuca rubra	1	2	2	3	4	4
Dactylis glomerata						
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum		1	1		1	1
Centaurea nigra						
Thalictrum minus	4	4	5	5	3	2
Pimpinella saxifraga						
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis		1	1			1
Lotus corniculatus						
Ranunculus acris	2	1			1	2
Lolium perenne						
Euprasia sp.						
Achillea millefolium	1	1	1	1	1	1
Poa pratensis						
Trifolium repens						
Veronica chamaedrys		1		1	1	1
Rumex acetosa						1
Sanguisorba officinalis			1		1	
Arrhenatherum elatius	2	1	1	1	1	1
Schedonorus pratensis						
Vicia cracca	1	1	1	1	1	1
Argentina anserina						
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris	1			1		1
Angelica sylvestris	2	1			2	1
Senecio vulgaris						
Urtica dioica						
Galium mollugo						
Poa trivialis						
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A	1A	1A
Rute	67	68	69	70	71	72
Lengste avstand fra 0	67	68	69	70	71	72
Atriplex prostrata						
Lepidotheca suaveolens						
Tripleurospermum marit.						
Ranunculus sceleratus						
Catabrosa aquatica						
Atriplex lacinata						
Elytrigia juncea						
Carex arenaria						
Cirsium arvense						
Leymus arenarius	1		1	1	1	1
Ammophila arenaria	1	1	1			1
Taraxacum sp.						
Plantago lanceolata		2	1	1	1	2
Galium verum						1
Festuca rubra	2	1	2	1	2	3
Dactylis glomerata	5	5	4	3	3	4
Rumex longifolius						
Arabidopsis thaliana						
Senecio jacobea						
Elytrigia repens						
Geranium sanguineum						
Centaurea nigra		1	3	5	3	
Thalictrum minus						
Pimpinella saxifraga	3	4	1	1	2	2
Hypochaeris maculata						
Campanula rotundifolia						
Knautia arvensis						
Lotus corniculatus	1	1	1	1		
Ranunculus acris						
Lolium perenne	2	1	1	1	1	1
Euprasia sp.						
Achillea millefolium						
Poa pratensis	1	1	1	1		2
Trifolium repens						
Veronica chamaedrys						
Rumex acetosa	1	1	1			1
Sanguisorba officinalis						
Arrhenatherum elatius						
Schedonorus pratensis	2	1	1	1	1	1
Vicia cracca						
Argentina anserina	1	1	1	1	1	1
Polygonatum odoratum						
Pinus sylvestris						
Silene vulgaris						
Angelica sylvestris			1	1	1	1
Senecio vulgaris					3	1
Urtica dioica				1		
Galium mollugo					1	1
Poa trivialis						1
Avenula pubescens						
Sonchus arvensis						
Heracleum sphondyleum						

Transekt	1A	1A	1A	1A
Rute	73	74	75	76
Lengste avstand fra 0	73	74	75	76
Atriplex prostrata				
Lepidotheca suaveolens				
Tripleurospermum marit.				
Ranunculus sceleratus				
Catabrosa aquatica				
Atriplex lacinata				
Elytrigia juncea				
Carex arenaria				
Cirsium arvense				
Leymus arenarius				
Ammophila arenaria			1	1
Taraxacum sp.				
Plantago lanceolata	2	1	1	2
Galium verum				
Festuca rubra	2			
Dactylis glomerata	1	4	4	3
Rumex longifolius	2	1		
Arabidopsis thaliana				
Senecio jacobea				
Elytrigia repens				
Geranium sanguineum				
Centaurea nigra		1		
Thalictrum minus				
Pimpinella saxifraga	3			
Hypochaeris maculata				
Campanula rotundifolia				
Knautia arvensis				
Lotus corniculatus				
Ranunculus acris				
Lolium perenne	1	1		
Euphrasia sp.				
Achillea millefolium				
Poa pratensis	1			
Trifolium repens	1			
Veronica chamaedrys	3	1		
Rumex acetosa		1	1	1
Sanguisorba officinalis	1			
Arrhenatherum elatius				
Schedonorus pratensis	1	1	4	4
Vicia cracca				
Argentina anserina	1	1	1	1
Polygonatum odoratum				
Pinus sylvestris				
Silene vulgaris				
Angelica sylvestris				
Senecio vulgaris	1			
Urtica dioica				
Galium mollugo		1	2	1
Poa trivialis	1	3	2	4
Avenula pubescens	1			
Sonchus arvensis		3		
Heracleum sphondyleum				

Table 6.21 Floristic scores from transect survey at Åkrasanden, transect 1B-2008 (ØL).

Transekt	1B	1B	1B	1B	1B	1B
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea						
Honckenya peploides						
Argentina anserina						
Cirsium arvense						
Ammophila arenaria						
Leymus arenarius						
Galium aparine						
Carex arenaria						
Festuca rubra						
Geranium sanguineum						
Lepidotheca suaveolens						
Plantago lanceolata						
Ranunculus acris						
Taraxacum sp.						
Galium verum						
Pimpinella saxifraga						
Thalictrum minus						
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata						
Elytrigia repens						
Rumex longifolius						
Silene vulgaris						
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense						
Erigeron acer						
Achillea millefolium						
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis						
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys						
Knautia arvensis						
Schedonorus pratensis						
Vicia cracca						
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius						
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Atriplex prostrata		1	1	1		
Atriplex lacinata		1			1	
Catabrosa aquatica				1		
Ranunculus sceleratus				1	1	
Elytrigia juncea						
Honckenya peploides						
Argentina anserina						
Cirsium arvense						
Ammophila arenaria						
Leymus arenarius						
Galium aparine						
Carex arenaria						
Festuca rubra						
Geranium sanguineum						
Lepidotheca suaveolens						
Plantago lanceolata						
Ranunculus acris						
Taraxacum sp.						
Galium verum						
Pimpinella saxifraga						
Thalictrum minus						
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata						
Elytrigia repens						
Rumex longifolius						
Silene vulgaris						
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense						
Erigeron acer						
Achillea millefolium						
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis						
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys						
Knautia arvensis						
Schedonorus pratensis						
Vicia cracca						
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius						
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea						1
Honckenya peploides						
Argentina anserina						
Cirsium arvense						
Ammophila arenaria						
Leymus arenarius						
Galium aparine						
Carex arenaria						
Festuca rubra						
Geranium sanguineum						
Lepidotheca suaveolens						
Plantago lanceolata						
Ranunculus acris						
Taraxacum sp.						
Galium verum						
Pimpinella saxifraga						
Thalictrum minus						
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata						
Elytrigia repens						
Rumex longifolius						
Silene vulgaris						
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense						
Erigeron acer						
Achillea millefolium						
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis						
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys						
Knautia arvensis						
Schedonorus pratensis						
Vicia cracca						
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius						
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea	1	3	4		2	1
Honckenya peploides	1	1	1			
Argentina anserina		1	1			
Cirsium arvense			1	5	5	5
Ammophila arenaria				2		
Leymus arenarius				1	1	1
Galium aparine					1	1
Carex arenaria						1
Festuca rubra						2
Geranium sanguineum						1
Lepidotheca suaveolens						1
Plantago lanceolata						2
Ranunculus acris						1
Taraxacum sp.						1
Galium verum						
Pimpinella saxifraga						
Thalictrum minus						
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata						
Elytrigia repens						
Rumex longifolius						
Silene vulgaris						
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense						
Erigeron acer						
Achillea millefolium						
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis						
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys						
Knautia arvensis						
Schedonorus pratensis						
Vicia cracca						
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius						
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B	1B	
Rute	25	26	27	28	29	30	31	
Lengste avstand fra 0	25	26	27	28	29	30	31	
Atriplex prostrata								
Atriplex lacinata								
Catabrosa aquatica								
Ranunculus sceleratus								
Elytrigia juncea			3					
Honckenya peploides								
Argentina anserina								
Cirsium arvense	2		2	1	1			
Ammophila arenaria								
Leymus arenarius	1	1	4	4	5	5	3	
Galium aparine					1	1		
Carex arenaria			1					
Festuca rubra	3	3	1	1	1	1	2	
Geranium sanguineum	2	1	3		3			
Lepidotheca suaveolens								
Plantago lanceolata	4	1	1	2	1	2	1	
Ranunculus acris	1					1	1	
Taraxacum sp.	1	1	1	3	2	2	1	
Galium verum	1	1	1		2	2	3	
Pimpinella saxifraga	1						1	
Thalictrum minus	2	1	1	1	2			
Sonchus arvensis		1						
Centaurea nigra				1			4	
Dactylis glomerata				1				
Elytrigia repens				1		1		
Rumex longifolius				1	1	1		
Silene vulgaris					1			
Anthyllis vulneraria								
Draba incana								
Leontodon autumnalis								
Lotus corniculatus								
Plantago maritima								
Polygala serpyllifolia								
Sagina nodosa								
Trifolium pratense								
Erigeron acer								
Achillea millefolium								
Bromus hordaceus								
Cerastium fontanum								
Lolium perenne								
Sanguisorba officinalis								
Trifolium repens								
Plantago major								
Poa pratensis								
Veronica chamaedrys								
Knautia arvensis								
Schedonorus pratensis								
Vicia cracca								
Rumex acetosa								
Polygonatum odoratum								
Arrhenatherum elatius								
Epilobium montanum								
Senecio jacobea								
Angelica sylvestris								
Galium mollugo								
Urtica dioica								
Avenula pubescens								
Phleum pratense				1				

Transekt	1B	1B	1B	1B	1B	1B
Rute	32	33	34	35	36	37
Lengste avstand fra 0	32	33	34	35	36	37
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea						
Honckenya peploides						
Argentina anserina						
Cirsium arvense						
Ammophila arenaria						
Leymus arenarius	1	1	1	1	1	1
Galium aparine						
Carex arenaria						
Festuca rubra	3	1				1
Geranium sanguineum	1					
Lepidotheca suaveolens						
Plantago lanceolata	1	2		1		1
Ranunculus acris	1					
Taraxacum sp.	1	2	2	3	1	1
Galium verum	2	2				1
Pimpinella saxifraga					1	
Thalictrum minus						
Sonchus arvensis						
Centaurea nigra	1	2	1			
Dactylis glomerata		1	1	1		
Elytrigia repens						
Rumex longifolius						
Silene vulgaris						
Anthyllis vulneraria	1					
Draba incana	1					
Leontodon autumnalis	1					
Lotus corniculatus	1					
Plantago maritima	1	2	1	3	1	1
Polygala serpyllifolia	1					
Sagina nodosa	1					
Trifolium pratense	1			1		
Erigeron acer	1					
Achillea millefolium		1				
Bromus hordaceus		1				
Cerastium fontanum		1				
Lolium perenne		1	2	3	5	5
Sanguisorba officinalis				1		
Trifolium repens				1		
Plantago major					1	
Poa pratensis						
Veronica chamaedrys						
Knautia arvensis						
Schedonorus pratensis						
Vicia cracca						
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius						
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B	
Rute		38	39	40	41	42	43
Lengste avstand fra 0		38	39	40	41	42	43
Atriplex prostrata							
Atriplex lacinata							
Catabrosa aquatica							
Ranunculus sceleratus							
Elytrigia juncea							
Honckenya peploides							
Argentina anserina							
Cirsium arvense							
Ammophila arenaria							
Leymus arenarius		1	1	1	1	1	1
Galium aparine							
Carex arenaria							
Festuca rubra		5	5	4	4	3	4
Geranium sanguineum		1	1	2	2	2	3
Lepidotheca suaveolens							
Plantago lanceolata			1	1	2	1	1
Ranunculus acris		1	1	1	1		1
Taraxacum sp.		1	1	1	2	1	1
Galium verum			1	1	1	4	1
Pimpinella saxifraga		1	1	1	1		
Thalictrum minus		2	1	1	1	1	
Sonchus arvensis							
Centaurea nigra							
Dactylis glomerata							
Elytrigia repens							
Rumex longifolius							
Silene vulgaris				1	1	1	1
Anthyllis vulneraria							
Draba incana							
Leontodon autumnalis							
Lotus corniculatus		1					
Plantago maritima		2	1	1			
Polygala serpyllifolia							
Sagina nodosa							
Trifolium pratense		1	1	1			
Erigeron acer							
Achillea millefolium		1	1	1	2	1	1
Bromus hordaceus		1	1				
Cerastium fontanum				1			
Lolium perenne		1					
Sanguisorba officinalis						4	1
Trifolium repens		1	1				
Plantago major							
Poa pratensis		1					
Veronica chamaedrys		1					1
Knautia arvensis				2	1		
Schedonorus pratensis				2	2	2	4
Vicia cracca				1	1	1	1
Rumex acetosa					1		1
Polygonatum odoratum							1
Arrhenatherum elatius							
Epilobium montanum							
Senecio jacobea							
Angelica sylvestris							
Galium mollugo							
Urtica dioica							
Avenula pubescens							
Phleum pratense							

Transekt	1B	1B	1B	1B	1B	1B
Rute	44	45	46	47	48	49
Lengste avstand fra 0	44	45	46	47	48	49
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea						
Honckenya peploides						
Argentina anserina				1		1
Cirsium arvense	1	1	1	1	1	1
Ammophila arenaria						
Leymus arenarius	3	2	2	2	3	1
Galium aparine						
Carex arenaria						
Festuca rubra	4	4	2	4	4	1
Geranium sanguineum	2	4	5	3	2	1
Lepidotheca suaveolens						
Plantago lanceolata	1	1	1			
Ranunculus acris	2	1		1	1	1
Taraxacum sp.	1		1		1	
Galium verum	1	1	1	2	3	1
Pimpinella saxifraga	1					
Thalictrum minus		1		1	1	
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata			1			
Elytrigia repens						
Rumex longifolius						
Silene vulgaris	1		1	1		
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense	1					
Erigeron acer						
Achillea millefolium	1	1	1			
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis	4	1		1	2	5
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys	1	1	1	1	1	1
Knautia arvensis		1	1			
Schedonorus pratensis	2	1				
Vicia cracca	1	1	1	1	1	1
Rumex acetosa		1	1	1	1	1
Polygonatum odoratum		1				
Arrhenatherum elatius			1	1	1	1
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris						
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B	
Rute	50	51	52	53	54	55	
Lengste avstand fra 0	50	51	52	53	54	55	
Atriplex prostrata							
Atriplex lacinata							
Catabrosa aquatica							
Ranunculus sceleratus							
Elytrigia juncea							
Honckenya peploides							
Argentina anserina	1	2	1				
Cirsium arvense		1	1	1	1	1	
Ammophila arenaria							
Leymus arenarius	1	1	2	3	2	1	
Galium aparine				1			
Carex arenaria							
Festuca rubra	3	4	4	4	4	2	
Geranium sanguineum	1				1	6	
Lepidotheca suaveolens							
Plantago lanceolata							
Ranunculus acris		1	1	1	1		
Taraxacum sp.		1			3		
Galium verum	1			1			
Pimpinella saxifraga							
Thalictrum minus		1	1	1	1		
Sonchus arvensis							
Centaurea nigra							
Dactylis glomerata		1					
Elytrigia repens							
Rumex longifolius							
Silene vulgaris							
Anthyllis vulneraria							
Draba incana							
Leontodon autumnalis							
Lotus corniculatus							
Plantago maritima							
Polygala serpyllifolia							
Sagina nodosa							
Trifolium pratense							
Erigeron acer							
Achillea millefolium							
Bromus hordaceus							
Cerastium fontanum							
Lolium perenne							
Sanguisorba officinalis	5						
Trifolium repens							
Plantago major							
Poa pratensis							
Veronica chamaedrys	1	1	1	1	1		
Knautia arvensis		1			1	1	
Schedonorus pratensis							
Vicia cracca	1	1	1	2	2	1	
Rumex acetosa			1		1		
Polygonatum odoratum							
Arrhenatherum elatius	2	3	2	2	3	2	
Epilobium montanum	1	1	1	1	1		
Senecio jacobea		3	4	1	2		
Angelica sylvestris							
Galium mollugo							
Urtica dioica							
Avenula pubescens							
Phleum pratense							

Transekt	1B	1B	1B	1B	1B	1B	
Rute	56	57	58	59	60	61	
Lengste avstand fra 0	56	57	58	59	60	61	
Atriplex prostrata							
Atriplex lacinata							
Catabrosa aquatica							
Ranunculus sceleratus							
Elytrigia juncea							
Honckenya peploides							
Argentina anserina							
Cirsium arvense	1	1		1	1	1	
Ammophila arenaria							
Leymus arenarius	2	2	1	1	3	2	
Galium aparine							
Carex arenaria							
Festuca rubra	3	4	2	3	2	4	
Geranium sanguineum	5	1	2	1	1	4	
Lepidotheca suaveolens							
Plantago lanceolata	1	2	1		2		
Ranunculus acris	1	1	3	2	1	1	
Taraxacum sp.				1		1	
Galium verum	1	1	2	1	2	1	
Pimpinella saxifraga		1					
Thalictrum minus	1	1	2	4	2	1	
Sonchus arvensis							
Centaurea nigra							
Dactylis glomerata							
Elytrigia repens							
Rumex longifolius							
Silene vulgaris		1	1	1			
Anthyllis vulneraria							
Draba incana							
Leontodon autumnalis							
Lotus corniculatus					1	1	
Plantago maritima							
Polygala serpyllifolia							
Sagina nodosa							
Trifolium pratense							
Erigeron acer							
Achillea millefolium			1	1	1		
Bromus hordaceus							
Cerastium fontanum							
Lolium perenne							
Sanguisorba officinalis						1	
Trifolium repens							
Plantago major							
Poa pratensis							
Veronica chamaedrys		1	1	1	1	1	
Knautia arvensis	1	1				1	
Schedonorus pratensis							
Vicia cracca	1	1	1	1	2	1	
Rumex acetosa	1	1	1		1		
Polygonatum odoratum							
Arrhenatherum elatius	1	1	4	2	2	1	
Epilobium montanum							
Senecio jacobea					1		
Angelica sylvestris	1	3	1				
Galium mollugo							
Urtica dioica							
Avenula pubescens							
Phleum pratense							

Transekt	1B	1B	1B	1B	1B	1B
Rute	62	63	64	65	66	67
Lengste avstand fra 0	62	63	64	65	66	67
Atriplex prostrata						
Atriplex lacinata						
Catabrosa aquatica						
Ranunculus sceleratus						
Elytrigia juncea						
Honckenya peploides						
Argentina anserina						
Cirsium arvense	1		1	1	1	
Ammophila arenaria						
Leymus arenarius	2	3	1			1
Galium aparine						
Carex arenaria						
Festuca rubra	1	1	4	1	4	3
Geranium sanguineum	4	4	4	6	4	3
Lepidotheca suaveolens						
Plantago lanceolata						
Ranunculus acris	1	1	1		1	1
Taraxacum sp.	1	1				
Galium verum	1	1	2	1	1	4
Pimpinella saxifraga						
Thalictrum minus	1	1	2	1	5	2
Sonchus arvensis						
Centaurea nigra						
Dactylis glomerata						
Elytrigia repens						
Rumex longifolius						
Silene vulgaris			1		1	2
Anthyllis vulneraria						
Draba incana						
Leontodon autumnalis						
Lotus corniculatus						
Plantago maritima						
Polygala serpyllifolia						
Sagina nodosa						
Trifolium pratense						
Erigeron acer						
Achillea millefolium		1	1	1	3	2
Bromus hordaceus						
Cerastium fontanum						
Lolium perenne						
Sanguisorba officinalis	2					1
Trifolium repens						
Plantago major						
Poa pratensis						
Veronica chamaedrys	1	1	1	1	1	
Knautia arvensis		1	1	1		1
Schedonorus pratensis						
Vicia cracca	1	1	1	1	1	1
Rumex acetosa						
Polygonatum odoratum						
Arrhenatherum elatius	1	1	1	1	1	1
Epilobium montanum						
Senecio jacobea						
Angelica sylvestris	3	2			1	
Galium mollugo						
Urtica dioica						
Avenula pubescens						
Phleum pratense						

Transekt	1B	1B	1B	1B	1B	1B	
Rute	68	69	70	71	72	73	
Lengste avstand fra 0	68	69	70	71	72	73	
Atriplex prostrata							
Atriplex lacinata							
Catabrosa aquatica							
Ranunculus sceleratus							
Elytrigia juncea							
Honckenya peploides							
Argentina anserina				1	1		
Cirsium arvense			1	1		1	
Ammophila arenaria							
Leymus arenarius				1	2	1	
Galium aparine							
Carex arenaria							
Festuca rubra	4	3	2	4	4	1	
Geranium sanguineum			1	1		1	
Lepidotheca suaveolens							
Plantago lanceolata	2	3	2				
Ranunculus acris	1	1	1	1			
Taraxacum sp.		1	1	1	3	2	
Galium verum	4	3					
Pimpinella saxifraga							
Thalictrum minus	3	1					
Sonchus arvensis							
Centaurea nigra							
Dactylis glomerata		1	1				
Elytrigia repens				1			
Rumex longifolius							
Silene vulgaris	1						
Anthyllis vulneraria							
Draba incana							
Leontodon autumnalis							
Lotus corniculatus							
Plantago maritima							
Polygala serpyllifolia							
Sagina nodosa							
Trifolium pratense			3				
Erigeron acer							
Achillea millefolium	1	1	1	1			
Bromus hordaceus							
Cerastium fontanum							
Lolium perenne							
Sanguisorba officinalis							
Trifolium repens		2					
Plantago major							
Poa pratensis		1	1				
Veronica chamaedrys				1	1	1	
Knautia arvensis	1	1					
Schedonorus pratensis							
Vicia cracca	1	1	1	1	1	1	
Rumex acetosa						1	
Polygonatum odoratum							
Arrhenatherum elatius	1	1		1	1	1	
Epilobium montanum						1	
Senecio jacobea				1		1	
Angelica sylvestris	1	3	2				
Galium mollugo		1	4	4	3	5	
Urtica dioica		1	1	2	1	1	
Avenula pubescens							
Phleum pratense							

Transekt	1B	1B	1B
Rute	74	75	76
Lengste avstand fra 0	74	75	76
Atriplex prostrata			
Atriplex lacinata			
Catabrosa aquatica			
Ranunculus sceleratus			
Elytrigia juncea			
Honckenya peploides			
Argentina anserina			
Cirsium arvense	1	1	
Ammophila arenaria			
Leymus arenarius	2	1	1
Galium aparine			
Carex arenaria			
Festuca rubra	1	1	3
Geranium sanguineum		1	1
Lepidotheca suaveolens			
Plantago lanceolata		1	2
Ranunculus acris	1	3	1
Taraxacum sp.	3	1	
Galium verum			
Pimpinella saxifraga			
Thalictrum minus			2
Sonchus arvensis			
Centaurea nigra			
Dactylis glomerata			
Elytrigia repens			
Rumex longifolius			
Silene vulgaris			
Anthyllis vulneraria			
Draba incana			
Leontodon autumnalis			
Lotus corniculatus			1
Plantago maritima			
Polygala serpyllifolia			
Sagina nodosa			
Trifolium pratense			
Erigeron acer			
Achillea millefolium			1
Bromus hordaceus			
Cerastium fontanum			
Lolium perenne			
Sanguisorba officinalis			
Trifolium repens			
Plantago major			
Poa pratensis			
Veronica chamaedrys	1	1	1
Knautia arvensis			1
Schedonorus pratensis			
Vicia cracca	1	1	1
Rumex acetosa			1
Polygonatum odoratum			
Arrhenatherum elatius	2	2	
Epilobium montanum	1	1	1
Senecio jacobea	1	2	1
Angelica sylvestris			
Galium mollugo	1	4	4
Urtica dioica	1	1	1
Avenula pubescens			1
Phleum pratense			

Table 6.22 Floristic scores from transect survey at Stavasanden, transect 0D-1981 (AL).

Transekt	0D	0D	0D	0D	0D	0D
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Elytrigia juncea	5	5	5	5		1
Honckenya peploides	1	1	1	1		1
Atriplex prostrata						1
Cakile maritima						1
Leymus arenarius						1
Elytrigia repens						
Galium aparine						
Ammophila arenaria						
Festuca rubra						
Poa pratensis						
Taraxacum sp.						
Vicia cracca						
Achillea millefolium						
Pimpinella saxifraga						
Angelica sylvestris						
Lotus corniculatus						
Thalictrum minus						
Centaurea scabiosa						
Galium verum						
Trifolium repens						
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Elytrigia juncea	1	1	1	1	1	1
Honckenya peploides	1	1	1	1	1	1
Atriplex prostrata	1	1	1			
Cakile maritima	1	1	1			
Leymus arenarius	1	1	1	1	1	1
Elytrigia repens						
Galium aparine						
Ammophila arenaria						
Festuca rubra						
Poa pratensis						
Taraxacum sp.						
Vicia cracca						
Achillea millefolium						
Pimpinella saxifraga						
Angelica sylvestris						
Lotus corniculatus						
Thalictrum minus						
Centaurea scabiosa						
Galium verum						
Trifolium repens						
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Elytrigia juncea	1	1	1	1	1	
Honckenya peploides	1	1	1	1	1	
Atriplex prostrata					1	1
Cakile maritima					1	1
Leymus arenarius	1	1	1	1	6	6
Elytrigia repens					1	1
Galium aparine					1	1
Ammophila arenaria						
Festuca rubra						
Poa pratensis						
Taraxacum sp.						
Vicia cracca						
Achillea millefolium						
Pimpinella saxifraga						
Angelica sylvestris						
Lotus corniculatus						
Thalictrum minus						
Centaurea scabiosa						
Galium verum						
Trifolium repens						
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D	
Rute	19	20	21	22	23	24	
Lengste avstand fra 0	19	20	21	22	23	24	
Elytrigia juncea							
Honckenya peploides							
Atriplex prostrata	1	1	1	1	1		
Cakile maritima	1	1	1	1	1		
Leymus arenarius	6	6	6	6	6	2	
Elytrigia repens	1	1	1	1	1		
Galium aparine	1	1	1	1	1		
Ammophila arenaria							
Festuca rubra							
Poa pratensis							
Taraxacum sp.							
Vicia cracca							
Achillea millefolium							
Pimpinella saxifraga							
Angelica sylvestris							
Lotus corniculatus							
Thalictrum minus							
Centaurea scabiosa							
Galium verum							
Trifolium repens							
Ranunculus acris							
Knautia arvensis							
Plantago maritima							
Senecio jacobea							
Rumex acetosa							
Viola tricolor							

Transekt	0D	0D	0D	0D	0D	0D
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima						1
Leymus arenarius	5	5	5	5	5	2
Elytrigia repens	1	1	1	1	1	
Galium aparine						
Ammophila arenaria	2	2	2	2	2	
Festuca rubra	1	1	1	1	1	1
Poa pratensis	1	1	1	1	1	1
Taraxacum sp.	1	1	1	1	1	3
Vicia cracca	1	1	1	1	1	1
Achillea millefolium						2
Pimpinella saxifraga						1
Angelica sylvestris						
Lotus corniculatus						
Thalictrum minus						
Centaurea scabiosa						
Galium verum						
Trifolium repens						
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima	1					
Leymus arenarius	2	1	1	1	1	1
Elytrigia repens						
Galium aparine						
Ammophila arenaria	1	1	1	4	4	4
Festuca rubra	1	1	1	1	1	1
Poa pratensis	1	1	1	1	1	1
Taraxacum sp.	3	1	1	1	1	1
Vicia cracca	2	2	2	3	3	3
Achillea millefolium	2	1	1	1	1	1
Pimpinella saxifraga	5	5	5	2	2	2
Angelica sylvestris	1	1	1			
Lotus corniculatus	1	1	1	1	1	1
Thalictrum minus	1	1	1			
Centaurea scabiosa						
Galium verum						
Trifolium repens						
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D	
Rute		37	38	39	40	41	42
Lengste avstand fra 0		37	38	39	40	41	42
Elytrigia juncea							
Honckenya peploides							
Atriplex prostrata							
Cakile maritima							
Leymus arenarius		1	1	1	1	1	1
Elytrigia repens							
Galium aparine							
Ammophila arenaria		4			1	1	1
Festuca rubra		2	2	2	5	5	5
Poa pratensis		1					
Taraxacum sp.		1	1	1	1	1	1
Vicia cracca		3	1	1	1	1	1
Achillea millefolium		1	1	1	1	1	1
Pimpinella saxifraga		2	1	1	2	2	2
Angelica sylvestris							
Lotus corniculatus		1	1	1	1	1	1
Thalictrum minus		5	5	5			
Centaurea scabiosa					3	3	3
Galium verum					2	2	2
Trifolium repens					1	1	1
Ranunculus acris							
Knautia arvensis							
Plantago maritima							
Senecio jacobea							
Rumex acetosa							
Viola tricolor							

Transekt	0D	0D	0D	0D	0D	0D
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima						
Leymus arenarius	1	1	1	1	1	1
Elytrigia repens						
Galium aparine						
Ammophila arenaria	1	1	1	1	4	4
Festuca rubra	5	5	5	5	2	2
Poa pratensis						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	1
Pimpinella saxifraga	2	2	2	2	1	1
Angelica sylvestris						
Lotus corniculatus	1	1	1	1	1	1
Thalictrum minus						
Centaurea scabiosa	3	3	3	3	1	1
Galium verum	2	2	2	2		
Trifolium repens	1	1	1	1		
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima						
Leymus arenarius	1	1	1	1	1	1
Elytrigia repens						
Galium aparine						
Ammophila arenaria	4	4	1	1	1	1
Festuca rubra	2	5	5	5	5	5
Poa pratensis						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	1
Pimpinella saxifraga	1	2	2	2	2	2
Angelica sylvestris						
Lotus corniculatus	1	1	1	1	1	1
Thalictrum minus		1	1	1	1	1
Centaurea scabiosa	1	3	3	3	3	3
Galium verum		3	3	3	3	3
Trifolium repens		1	1	1	1	1
Ranunculus acris						
Knautia arvensis						
Plantago maritima						
Senecio jacobea						
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D
Rute	55	56	57	58	59	60
Lengste avstand fra 0	55	56	57	58	59	60
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima						
Leymus arenarius	1	1				
Elytrigia repens						
Galium aparine						
Ammophila arenaria	1	1	1	1	1	1
Festuca rubra	5	6	6	6	6	6
Poa pratensis						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	1
Pimpinella saxifraga	2	2	2	2	2	2
Angelica sylvestris						
Lotus corniculatus	1	1	1	1	1	1
Thalictrum minus	1	1				4
Centaurea scabiosa	3	3				
Galium verum	3	3	2	2	2	2
Trifolium repens	1	1	1	1	1	1
Ranunculus acris		1	1	1	1	1
Knautia arvensis						1
Plantago maritima						1
Senecio jacobea						1
Rumex acetosa						
Viola tricolor						

Transekt	0D	0D	0D	0D	0D	0D	
Rute		61	62	63	64	65	66
Lengste avstand fra 0		61	62	63	64	65	66
Elytrigia juncea							
Honckenya peploides							
Atriplex prostrata							
Cakile maritima							
Leymus arenarius							1
Elytrigia repens							1
Galium aparine							
Ammophila arenaria							
Festuca rubra		4	4	4	4	4	4
Poa pratensis							
Taraxacum sp.		1	1	1	1	1	1
Vicia cracca		1	1	1	1	1	1
Achillea millefolium		1	1	1	1	1	1
Pimpinella saxifraga		1	1	1	1	1	1
Angelica sylvestris							
Lotus corniculatus		1	1	1	1	1	1
Thalictrum minus		4	4	4	4	4	4
Centaurea scabiosa							2
Galium verum		2	2	2	2	2	2
Trifolium repens		1	1	1	1	1	1
Ranunculus acris		1	1	1	1	1	1
Knautia arvensis		1	1	1	1	1	1
Plantago maritima		1	1	1	1	1	1
Senecio jacobea		1	1	1	1	1	2
Rumex acetosa							1
Viola tricolor							1

Transekt	0D	0D	0D	0D	0D	0D
Rute	67	68	69	70	71	72
Lengste avstand fra 0	67	68	69	70	71	72
Elytrigia juncea						
Honckenya peploides						
Atriplex prostrata						
Cakile maritima						
Leymus arenarius	1	1	1	1	1	1
Elytrigia repens	1	1	1	1	1	1
Galium aparine						
Ammophila arenaria						
Festuca rubra	4	4	4	4	4	4
Poa pratensis						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	1
Pimpinella saxifraga	1	1	1	1	1	1
Angelica sylvestris						
Lotus corniculatus	1	1	1	1	1	1
Thalictrum minus	2	2	2	2	2	2
Centaurea scabiosa	2	2	2	2	2	2
Galium verum	1	1	1	1	1	1
Trifolium repens						
Ranunculus acris	1	1	1	1	1	1
Knautia arvensis	1	1	1	1	1	1
Plantago maritima						
Senecio jacobea	2	2	2	2	2	2
Rumex acetosa	1	1	1	1	1	1
Viola tricolor	1	1	1	1	1	1

Table 6.23 Floristic scores from transect survey at Stavasanden, transect 2A-2008 (ØL).

Transekt	2A	2A	2A	2A	2A	2A
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Atriplex prostrata			1			
Leymus arenarius						
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria						
Senecio jacobea						
Taraxacum sp.						
Vicia cracca						
Festuca rubra						
Pimpinella saxifraga						
Galium verum						
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus						
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Atriplex prostrata						
Leymus arenarius		1			1	
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria						
Senecio jacobea						
Taraxacum sp.						
Vicia cracca						
Festuca rubra						
Pimpinella saxifraga						
Galium verum						
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus						
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Atriplex prostrata			1	1		
Leymus arenarius						
Elytrigia juncea	1	2	3	4		2
Honckenya peploides			1			
Equisetum arvense						
Ammophila arenaria						
Senecio jacobea						
Taraxacum sp.						
Vicia cracca						
Festuca rubra						
Pimpinella saxifraga						
Galium verum						
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus						
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Atriplex prostrata						
Leymus arenarius					1	1
Elytrigia juncea	1	2	2	3	4	3
Honckenya peploides						
Equisetum arvense				1	1	
Ammophila arenaria						
Senecio jacobea						
Taraxacum sp.						
Vicia cracca						
Festuca rubra						
Pimpinella saxifraga						
Galium verum						
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus						
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Atriplex prostrata						
Leymus arenarius	1		1	1	1	1
Elytrigia juncea	2	1	1	2	1	1
Honckenya peploides						
Equisetum arvense	1					
Ammophila arenaria				3	4	3
Senecio jacobea				1		1
Taraxacum sp.				1	1	1
Vicia cracca				1	1	1
Festuca rubra					1	1
Pimpinella saxifraga					1	
Galium verum						1
Trifolium pratense						1
Dactylis glomerata						
Thalictrum minus						
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Atriplex prostrata						
Leymus arenarius	1	1	1	1	1	1
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria	2	3	4	5	5	6
Senecio jacobea	1	1		1	1	1
Taraxacum sp.	2	1	1	1	1	1
Vicia cracca	1	1	1			
Festuca rubra	3	1	1	1		
Pimpinella saxifraga						
Galium verum		1				
Trifolium pratense	1	1				
Dactylis glomerata				1		
Thalictrum minus				1	1	
Anthriscus sylvestris					1	
Arrhenatherum elatius					1	
Campanula rotundifolia						1
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Atriplex prostrata						
Leymus arenarius	1	1	2	2	2	2
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria	5	3	4	2	2	
Senecio jacobea	1				1	1
Taraxacum sp.	1	1	2	2	3	1
Vicia cracca	1	1	1	1	1	1
Festuca rubra	2	5	4	5	4	5
Pimpinella saxifraga						
Galium verum	1		1	1		
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus						1
Anthriscus sylvestris			1		1	
Arrhenatherum elatius	1	1		1		1
Campanula rotundifolia				1	1	1
Ranunculus acris	1					
Achillea millefolium		1	1	1	1	1
Cerastium fontanum			1	1	1	1
Leontodon autumnalis					1	
Viola tricolor						1
Lotus corniculatus						
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A	
Rute	43	44	45	46	47	48	
Lengste avstand fra 0	43	44	45	46	47	48	
Atriplex prostrata							
Leymus arenarius	1	2	1	1		1	
Elytrigia juncea							
Honckenya peploides							
Equisetum arvense							
Ammophila arenaria	5	5	4	4	5		
Senecio jacobea					1		
Taraxacum sp.	1	2	1				
Vicia cracca	1	1		1	1	1	
Festuca rubra	4	1	2	4	4	3	
Pimpinella saxifraga				1			
Galium verum			2	1	1	1	
Trifolium pratense			1	1			
Dactylis glomerata							
Thalictrum minus	1				1	2	
Anthriscus sylvestris							
Arrhenatherum elatius		1			1	2	
Campanula rotundifolia	1			1	1		
Ranunculus acris						1	
Achillea millefolium		1		1			
Cerastium fontanum	1			1			
Leontodon autumnalis							
Viola tricolor							
Lotus corniculatus	1		1	1	1		
Argentina anserina						1	
Geranium sanguineum						4	
Plantago lanceolata						1	
Rumex acetosa						1	
Veronica chamaedrys						1	
Polygonatum odoratum							
Centaurea scabiosa							
Carex arenaria							
Knautia arvensis							
Elytrigia repens							
Trifolium repens							
Centaurea nigra							
Saponaria officinalis							

Transekt	2A	2A	2A	2A	2A	2A
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Atriplex prostrata						
Leymus arenarius			1		1	1
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria			4	5	4	1
Senecio jacobea						
Taraxacum sp.	1	1	1	1		1
Vicia cracca	1	1	1	1	1	1
Festuca rubra	3	2	5	4	5	5
Pimpinella saxifraga			1			1
Galium verum	3	3		1		
Trifolium pratense						
Dactylis glomerata	1	1				
Thalictrum minus	4	4				
Anthriscus sylvestris			1			
Arrhenatherum elatius	1	2				
Campanula rotundifolia				1		1
Ranunculus acris	2	1				
Achillea millefolium			1	1		
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus			1	1	2	2
Argentina anserina	2	1				
Geranium sanguineum	1	4				
Plantago lanceolata		1				
Rumex acetosa	1	1				
Veronica chamaedrys	1	1				
Polygonatum odoratum	1					
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	55	56	57	58	59	60
Lengste avstand fra 0	55	56	57	58	59	60
Atriplex prostrata						
Leymus arenarius	1	2	2	1	3	3
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria	1	1	1	1		
Senecio jacobea						
Taraxacum sp.	3	1	1	2	1	1
Vicia cracca	1	1	1	1	1	1
Festuca rubra	2	4	5	5	5	5
Pimpinella saxifraga	1	1	1	2	1	1
Galium verum			1	1	2	2
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus			1			
Anthriscus sylvestris			1			
Arrhenatherum elatius						1
Campanula rotundifolia	1		1			
Ranunculus acris						
Achillea millefolium						
Cerastium fontanum				1	1	
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus	5	4	3	2	3	2
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa						
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	61	62	63	64	65	66
Lengste avstand fra 0	61	62	63	64	65	66
Atriplex prostrata						
Leymus arenarius	2	1	2	1	1	2
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria						
Senecio jacobea						
Taraxacum sp.	1			1		
Vicia cracca	1	1	1		1	1
Festuca rubra	3	2	4	3	3	2
Pimpinella saxifraga	1	1	2			
Galium verum	5	5		2	2	2
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus			5	5	4	1
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia	1					
Ranunculus acris						
Achillea millefolium			1			1
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus	2	2	1	1		1
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata						
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa			1	3	4	5
Carex arenaria						
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A	
Rute		67	68	69	70	71	72
Lengste avstand fra 0		67	68	69	70	71	72
Atriplex prostrata							
Leymus arenarius		3	4	3	4	5	4
Elytrigia juncea							
Honckenya peploides							
Equisetum arvense							
Ammophila arenaria							
Senecio jacobea			1	1			
Taraxacum sp.		1	1	2	2	1	1
Vicia cracca		1	1	1	1	1	
Festuca rubra		3	2	1	3	1	5
Pimpinella saxifraga				1	1	1	1
Galium verum		2	3	2			1
Trifolium pratense							
Dactylis glomerata		1	1	1			
Thalictrum minus		1	2	1	1	2	1
Anthriscus sylvestris							
Arrhenatherum elatius							
Campanula rotundifolia							
Ranunculus acris							
Achillea millefolium		1	1		1	1	
Cerastium fontanum							
Leontodon autumnalis							
Viola tricolor							
Lotus corniculatus		3	2	4	3	1	2
Argentina anserina							
Geranium sanguineum							
Plantago lanceolata					1		
Rumex acetosa							
Veronica chamaedrys							
Polygonatum odoratum							
Centaurea scabiosa		4	1				
Carex arenaria							
Knautia arvensis							
Elytrigia repens							
Trifolium repens							
Centaurea nigra							
Saponaria officinalis							

Transekt	2A	2A	2A	2A	2A	2A	
Rute		73	74	75	76	77	78
Lengste avstand fra 0		73	74	75	76	77	78
Atriplex prostrata							
Leymus arenarius		4	5	3	3	3	4
Elytrigia juncea							
Honckenya peploides							
Equisetum arvense							
Ammophila arenaria							
Senecio jacobea							
Taraxacum sp.		1	1	1	1		1
Vicia cracca		1	1		1	1	1
Festuca rubra		4	4	4	4	5	5
Pimpinella saxifraga							
Galium verum		1	1	3	3	3	1
Trifolium pratense			1				1
Dactylis glomerata							
Thalictrum minus		2	1	3	4	2	
Anthriscus sylvestris							
Arrhenatherum elatius							
Campanula rotundifolia							
Ranunculus acris						1	
Achillea millefolium		1		1	1		1
Cerastium fontanum							
Leontodon autumnalis							
Viola tricolor							1
Lotus corniculatus		1			1	1	2
Argentina anserina							
Geranium sanguineum							
Plantago lanceolata				1	1		
Rumex acetosa							
Veronica chamaedrys							
Polygonatum odoratum							
Centaurea scabiosa							
Carex arenaria							
Knautia arvensis							
Elytrigia repens							
Trifolium repens							
Centaurea nigra							
Saponaria officinalis							

Transekt	2A	2A	2A	2A	2A	2A
Rute	79	80	81	82	83	84
Lengste avstand fra 0	79	80	81	82	83	84
Atriplex prostrata						
Leymus arenarius	2	1	2	2	1	1
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense						
Ammophila arenaria				1	1	2
Senecio jacobea						
Taraxacum sp.		1	1	2		1
Vicia cracca		1	1	1	1	
Festuca rubra	6	4	3	2	4	4
Pimpinella saxifraga						
Galium verum	2	4	1	3	1	3
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus	1	2	1	3	1	3
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia						
Ranunculus acris						
Achillea millefolium	1	2	1	1	2	1
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus		1	4	2	4	1
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata				1	1	1
Rumex acetosa					1	
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa		1	1	3	2	1
Carex arenaria			1	1	1	1
Knautia arvensis						
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	85	86	87	88	89	90
Lengste avstand fra 0	85	86	87	88	89	90
Atriplex prostrata						
Leymus arenarius	1	1	1	1	1	1
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense			1	1	1	
Ammophila arenaria	2	4	4	4	4	1
Senecio jacobea						
Taraxacum sp.	1			1		
Vicia cracca	1	1	1	1	1	1
Festuca rubra	4	3	4	2	3	4
Pimpinella saxifraga					1	
Galium verum	3	2	1	2	2	1
Trifolium pratense						
Dactylis glomerata						
Thalictrum minus	3	3	1	2	1	1
Anthriscus sylvestris						
Arrhenatherum elatius						
Campanula rotundifolia			1	1	1	
Ranunculus acris	1	1	1	1		
Achillea millefolium	1	1	1	2	2	1
Cerastium fontanum						
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus	1			1	1	1
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata	1	1				
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa			2	3	2	4
Carex arenaria			1	1	1	1
Knautia arvensis			1	1	1	
Elytrigia repens						
Trifolium repens						
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A	2A	2A
Rute	91	92	93	94	95	96
Lengste avstand fra 0	91	92	93	94	95	96
Atriplex prostrata						
Leymus arenarius	1	2	1	1	1	
Elytrigia juncea						
Honckenya peploides						
Equisetum arvense	1	1	1	2	1	1
Ammophila arenaria		1	3	2	2	3
Senecio jacobea				1		
Taraxacum sp.		1		1	1	1
Vicia cracca	1	1	1	1	1	1
Festuca rubra	2	5	4	4	4	4
Pimpinella saxifraga				1		
Galium verum	1	1	1	1	1	1
Trifolium pratense		1	1	1	1	
Dactylis glomerata				1	1	
Thalictrum minus		2	1	1	1	1
Anthriscus sylvestris					1	
Arrhenatherum elatius			1		1	1
Campanula rotundifolia				1		
Ranunculus acris	1					1
Achillea millefolium	1	1	2	2	1	1
Cerastium fontanum				1		
Leontodon autumnalis						
Viola tricolor						
Lotus corniculatus	2	1	1	1	3	1
Argentina anserina						
Geranium sanguineum						
Plantago lanceolata					1	
Rumex acetosa						
Veronica chamaedrys						
Polygonatum odoratum						
Centaurea scabiosa	5	1				
Carex arenaria	1	1	1	1	1	2
Knautia arvensis						
Elytrigia repens	1					
Trifolium repens				1	1	
Centaurea nigra						
Saponaria officinalis						

Transekt	2A	2A	2A	2A
Rute	97	98	99	100
Lengste avstand fra 0	97	98	99	100
Atriplex prostrata				
Leymus arenarius	1			
Elytrigia juncea				
Honckenya peploides				
Equisetum arvense	1	1	1	
Ammophila arenaria	1	1		1
Senecio jacobea				
Taraxacum sp.				
Vicia cracca	1	1	1	1
Festuca rubra	5	4	4	4
Pimpinella saxifraga				
Galium verum	3			1
Trifolium pratense				
Dactylis glomerata				
Thalictrum minus	1	1	1	1
Anthriscus sylvestris		1	1	1
Arrhenatherum elatius	2	2	2	
Campanula rotundifolia				
Ranunculus acris				
Achillea millefolium	1	2	1	1
Cerastium fontanum				
Leontodon autumnalis				
Viola tricolor				
Lotus corniculatus				
Argentina anserina				1
Geranium sanguineum				
Plantago lanceolata			1	1
Rumex acetosa				
Veronica chamaedrys				
Polygonatum odoratum				
Centaurea scabiosa		4	4	
Carex arenaria		1	1	2
Knautia arvensis				
Elytrigia repens				
Trifolium repens				
Centaurea nigra				1
Saponaria officinalis				4

Table 6.24 Floristic scores from transect survey at Stavasanden, transect 2B-2008 (ØL).

Transekt	2B	2B	2B	2B	2B	2B
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius						
Cirsium vulgare						
Festuca rubra						
Campanula rotundifolia						
Taraxacum sp.						
Ammophila arenaria						
Vicia cracca						
Achillea millefolium						
Cerastium fontanum						
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius						
Cirsium vulgare						
Festuca rubra						
Campanula rotundifolia						
Taraxacum sp.						
Ammophila arenaria						
Vicia cracca						
Achillea millefolium						
Cerastium fontanum						
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Honckenya peploides			1		1	
Elytrigia juncea					1	3
Leymus arenarius						
Cirsium vulgare						
Festuca rubra						
Campanula rotundifolia						
Taraxacum sp.						
Ammophila arenaria						
Vicia cracca						
Achillea millefolium						
Cerastium fontanum						
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Honckenya peploides						
Elytrigia juncea						1
Leymus arenarius					1	3
Cirsium vulgare						1
Festuca rubra						1
Campanula rotundifolia						
Taraxacum sp.						
Ammophila arenaria						
Vicia cracca						
Achillea millefolium						
Cerastium fontanum						
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B	
Rute	25	26	27	28	29	30	
Lengste avstand fra 0	25	26	27	28	29	30	
Honckenya peploides							
Elytrigia juncea	1		1				
Leymus arenarius	3	1		1	2	2	
Cirsium vulgare							
Festuca rubra	2	2	4	3	1	5	
Campanula rotundifolia	1	1				1	
Taraxacum sp.	1	1	1	3	1	1	
Ammophila arenaria		2	3	5	1	1	
Vicia cracca		1	1	1	1	1	
Achillea millefolium			1	1			
Cerastium fontanum			1				
Galium verum			1	1	1		
Leontodon autumnalis				1	1		
Arrhenatherum elatius				1			
Anthriscus sylvestris					1	1	
Senecio jacobea						1	
Dactylis glomerata							
Pimpinella saxifraga							
Heracleum tromoensis							
Thalictrum minus							
Trifolium pratense							
Viola tricolor							
Centaurea nigra							
Sonchus arvensis							
Lotus corniculatus							
Rumex acetosa							
Ranunculus acris							
Centaurea scabiosa							
Plantago lanceolata							
Carex arenaria							
Equisetum arvense							
Trfolium repens							
Rosa rugosa							
Elytrigia repens							
Galium aparine							
Ranunculus repens							
Argentina anserina							

Transekt	2B	2B	2B	2B	2B	2B
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Honckenya peploides						
Elytrigia juncea			1	1		
Leymus arenarius	3	2		1	2	1
Cirsium vulgare						
Festuca rubra	1	2	1		1	1
Campanula rotundifolia	1	1	1	1	3	3
Taraxacum sp.	1	1	1		1	
Ammophila arenaria	1		1	4		2
Vicia cracca	1	1	1			1
Achillea millefolium	1	1		1	1	
Cerastium fontanum				1		
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris		1				
Senecio jacobea	1		1	1	1	1
Dactylis glomerata		1				
Pimpinella saxifraga		1		1	1	1
Heracleum tromoensis			2			
Thalictrum minus				1	1	
Trifolium pratense					1	
Viola tricolor					1	
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	1	1	2	3	3	2
Cirsium vulgare						
Festuca rubra	5	4	5	1	1	1
Campanula rotundifolia	3	1	1			
Taraxacum sp.	1	1	1		1	
Ammophila arenaria	1	1	1	3	4	5
Vicia cracca	1	1				
Achillea millefolium		1	1			
Cerastium fontanum	1	1				
Galium verum		2	1			
Leontodon autumnalis						
Arrhenatherum elatius		1	1			
Anthriscus sylvestris		1				
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1	1				
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense		1				
Viola tricolor	1	1	1			
Centaurea nigra		1				
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	2	2	2	3	1	1
Cirsium vulgare						
Festuca rubra	1	2	4	4	3	2
Campanula rotundifolia						
Taraxacum sp.	1	1	1	1	1	1
Ammophila arenaria	5	5	4	4	4	4
Vicia cracca	1		1	1	1	1
Achillea millefolium						1
Cerastium fontanum				1	1	1
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						1
Dactylis glomerata						
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis		1	1			1
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	1	2	1	1	1	1
Cirsium vulgare						
Festuca rubra	2	1	2	1	1	3
Campanula rotundifolia	2	1	1			
Taraxacum sp.	1		2	1	1	1
Ammophila arenaria	5	5	5	5	4	3
Vicia cracca	1	1	1	1	1	1
Achillea millefolium		1	1	1	1	1
Cerastium fontanum						
Galium verum		1		1	4	3
Leontodon autumnalis						
Arrhenatherum elatius						2
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga						1
Heracleum tromoensis						
Thalictrum minus			1	2	3	1
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis		1				
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	55	56	57	58	59	60
Lengste avstand fra 0	55	56	57	58	59	60
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	1	2	1	1	1	2
Cirsium vulgare						
Festuca rubra	1	2	3	1	4	4
Campanula rotundifolia						
Taraxacum sp.	1		1	1	1	1
Ammophila arenaria	5	4	3	4	3	3
Vicia cracca	1		1	1	1	
Achillea millefolium	1		1		1	1
Cerastium fontanum						
Galium verum	1	1	3	4	3	2
Leontodon autumnalis						
Arrhenatherum elatius		1			1	
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga					1	1
Heracleum tromoensis						
Thalictrum minus	1	1	1	1	1	1
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus	2	1	2	2	1	1
Rumex acetosa	1					
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	61	62	63	64	65	66
Lengste avstand fra 0	61	62	63	64	65	66
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius		3	3	4	4	3
Cirsium vulgare						
Festuca rubra	4	4	5	5	4	4
Campanula rotundifolia						
Taraxacum sp.	1	1				
Ammophila arenaria						
Vicia cracca						
Achillea millefolium	1	1	1		1	1
Cerastium fontanum						
Galium verum	3	3	3	2	2	3
Leontodon autumnalis						
Arrhenatherum elatius					1	1
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1	1	1		1	
Heracleum tromoensis						
Thalictrum minus		1	1	1	1	3
Trifolium pratense			1			
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus	1	1	1	1	1	1
Rumex acetosa						
Ranunculus acris					1	
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	67	68	69	70	71	72
Lengste avstand fra 0	67	68	69	70	71	72
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	2	1				1
Cirsium vulgare						
Festuca rubra	5	4	1		1	4
Campanula rotundifolia						
Taraxacum sp.	1	2	1	2	2	1
Ammophila arenaria			3	4	3	2
Vicia cracca				1		1
Achillea millefolium	1	1	1	1	1	1
Cerastium fontanum						
Galium verum	4	4	3	3	3	3
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1	1	1	1	1	1
Heracleum tromoensis						
Thalictrum minus	1	1	5	4	4	4
Trifolium pratense		1	1			
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus	1	1	1		1	2
Rumex acetosa						
Ranunculus acris	1				1	1
Centaurea scabiosa					1	
Plantago lanceolata						
Carex arenaria						
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	73	74	75	76	77	78
Lengste avstand fra 0	73	74	75	76	77	78
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius			2	2	1	1
Cirsium vulgare						
Festuca rubra	2	2	1	2	4	3
Campanula rotundifolia					1	1
Taraxacum sp.						1
Ammophila arenaria	2	3	1	4	4	4
Vicia cracca	1		1	1		
Achillea millefolium	1	1	1	1	1	1
Cerastium fontanum						
Galium verum	2	2	4	3	1	2
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1					
Heracleum tromoensis						
Thalictrum minus	5	5	4	4	2	4
Trifolium pratense						
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus	1	1	1	1	1	1
Rumex acetosa			1			1
Ranunculus acris	1	1	1	1	1	1
Centaurea scabiosa						
Plantago lanceolata		1		1	2	
Carex arenaria						1
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	79	80	81	82	83	84
Lengste avstand fra 0	79	80	81	82	83	84
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius			1	3	1	2
Cirsium vulgare						
Festuca rubra	3	4	4	1	4	4
Campanula rotundifolia	1	1			1	1
Taraxacum sp.	1	1	1			
Ammophila arenaria	5	3	3	5	4	4
Vicia cracca	1		1	1		1
Achillea millefolium	1		1	1	1	2
Cerastium fontanum	1	1				
Galium verum	1	1	1	2	2	2
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris						
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1	1	1	1		
Heracleum tromoensis						
Thalictrum minus	2	3	3	2	1	1
Trifolium pratense						
Viola tricolor		1				
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus		1	1		1	1
Rumex acetosa		1				
Ranunculus acris						1
Centaurea scabiosa						
Plantago lanceolata	1	1	1			
Carex arenaria	1	1				1
Equisetum arvense						
Trfolium repens						
Rosa rugosa						
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	85	86	87	88	89	90
Lengste avstand fra 0	85	86	87	88	89	90
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	1	2	2	2	1	2
Cirsium vulgare						
Festuca rubra	5	4	4	5	4	4
Campanula rotundifolia						
Taraxacum sp.		1	1	1	3	1
Ammophila arenaria		3	4		1	1
Vicia cracca	1	1	1			1
Achillea millefolium	1	1	1	1	1	2
Cerastium fontanum						
Galium verum	1	1	2	1		1
Leontodon autumnalis						
Arrhenatherum elatius						
Anthriscus sylvestris				1		
Senecio jacobea					1	
Dactylis glomerata					1	1
Pimpinella saxifraga		1	1	1	1	1
Heracleum tromoensis						
Thalictrum minus	2	1		2		1
Trifolium pratense					1	
Viola tricolor						
Centaurea nigra						
Sonchus arvensis						
Lotus corniculatus	1	1	1	1	1	1
Rumex acetosa						
Ranunculus acris	1	1	1			
Centaurea scabiosa		1				
Plantago lanceolata		1	1			
Carex arenaria		1	1	1	1	1
Equisetum arvense		1		1	1	1
Trfolium repens					1	1
Rosa rugosa						2
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	91	92	93	94	95	96
Lengste avstand fra 0	91	92	93	94	95	96
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius	2	2	1	1		
Cirsium vulgare						
Festuca rubra	4	3	4	2	1	1
Campanula rotundifolia						
Taraxacum sp.	1					
Ammophila arenaria	1	3	2	1	1	1
Vicia cracca	1	1	1	1		1
Achillea millefolium						
Cerastium fontanum						
Galium verum			1	1	1	
Leontodon autumnalis						
Arrhenatherum elatius	1	1	1		1	1
Anthriscus sylvestris						1
Senecio jacobea						
Dactylis glomerata						
Pimpinella saxifraga	1					
Heracleum tromoensis						
Thalictrum minus	1	1				
Trifolium pratense						
Viola tricolor						
Centaurea nigra	2	3	3	1	1	1
Sonchus arvensis						
Lotus corniculatus	1	1				
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata						
Carex arenaria	1		3	1		
Equisetum arvense	1	1	1			1
Trfolium repens						
Rosa rugosa	3	3	3	6	6	6
Elytrigia repens						
Galium aparine						
Ranunculus repens						
Argentina anserina						

Transekt	2B	2B	2B	2B	2B	2B
Rute	97	98	99	100	101	102
Lengste avstand fra 0	97	98	99	100	101	102
Honckenya peploides						
Elytrigia juncea						
Leymus arenarius						
Cirsium vulgare						
Festuca rubra	1	1	1	1	1	1
Campanula rotundifolia						
Taraxacum sp.	1		1	1	2	1
Ammophila arenaria			1			
Vicia cracca			1		1	1
Achillea millefolium						
Cerastium fontanum						
Galium verum						
Leontodon autumnalis						
Arrhenatherum elatius	1	1	1	1		
Anthriscus sylvestris	2	1	1	2	3	2
Senecio jacobea						
Dactylis glomerata			1	2	2	2
Pimpinella saxifraga						
Heracleum tromoensis						
Thalictrum minus						
Trifolium pratense						
Viola tricolor						
Centaurea nigra	2	1	1	3	3	3
Sonchus arvensis						
Lotus corniculatus						
Rumex acetosa						
Ranunculus acris						
Centaurea scabiosa						
Plantago lanceolata					1	1
Carex arenaria	1	1	1	2	2	
Equisetum arvense						
Trfolium repens						1
Rosa rugosa	5	1	6	4	2	
Elytrigia repens				1		1
Galium aparine				1	1	1
Ranunculus repens				1	2	3
Argentina anserina						

Transekt	2B	2B	2B	2B
Rute	103	104	105	106
Lengste avstand fra 0	103	104	105	106
Honckenya peploides				
Elytrigia juncea				
Leymus arenarius		1	1	2
Cirsium vulgare				
Festuca rubra	3	1	4	3
Campanula rotundifolia				
Taraxacum sp.	1	1		1
Ammophila arenaria				
Vicia cracca	1	1	1	1
Achillea millefolium			1	2
Cerastium fontanum				
Galium verum				
Leontodon autumnalis				
Arrhenatherum elatius		1	1	
Anthriscus sylvestris	1	1	1	1
Senecio jacobea				
Dactylis glomerata	2	1		1
Pimpinella saxifraga				
Heracleum tromoensis				
Thalictrum minus				
Trifolium pratense				
Viola tricolor				
Centaurea nigra	2	1	3	1
Sonchus arvensis				
Lotus corniculatus			1	
Rumex acetosa				
Ranunculus acris		1	1	1
Centaurea scabiosa				
Plantago lanceolata			1	1
Carex arenaria	1	1	1	1
Equisetum arvense				1
Trfolium repens	4	5	2	3
Rosa rugosa				
Elytrigia repens				
Galium aparine				
Ranunculus repens	1		1	1
Argentina anserina	1	1	1	1

Table 6.25 Floristic scores from transect survey at Sandvesanden, transect 0E-1981 (AL).

Transekt	0E	0E	0E	0E	0E	0E
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Elytrigia juncea	3	3	3	3	3	3
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria						
Elytrigia repens						
Lathyrus japonicus						
Atriplex prostrata						
Achillea millefolium						
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.						
Vicia cracca						
Centaurea scabiosa						
Poa triviialis						
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Elytrigia juncea	3	3	2	2	2	2
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria			1	1	1	1
Elytrigia repens			1	1	1	1
Lathyrus japonicus			5	5	5	5
Atriplex prostrata						
Achillea millefolium						
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.						
Vicia cracca						
Centaurea scabiosa						
Poa triviialis						
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Elytrigia juncea	2	2	2	2	2	2
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	1	1	1	1	1	1
Elytrigia repens	1	1	1	1	1	1
Lathyrus japonicus	5	5	5	5	5	5
Atriplex prostrata						
Achillea millefolium						
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.						
Vicia cracca						
Centaurea scabiosa						
Poa triviialis						
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Elytrigia juncea	2					
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	1	5	5	5	5	5
Elytrigia repens	1	2	2	2	2	2
Lathyrus japonicus	5	5	5	5	5	5
Atriplex prostrata		1	1	1	1	1
Achillea millefolium						
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.						
Vicia cracca						
Centaurea scabiosa						
Poa triviialis						
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Elytrigia juncea						
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	5	5	5	5	5	5
Elytrigia repens	1	1	1	1	1	1
Lathyrus japonicus	3	3	3	3	3	3
Atriplex prostrata						
Achillea millefolium	1	1	1	1	1	1
Arrhenatherum elatius	1	1	1	1	1	1
Dactylis glomerata	1	1	1	1	1	1
Hieracium vulgata	1	1	1	1	1	1
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Centaurea scabiosa						
Poa triviialis						
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Elytrigia juncea						
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	5	5	5	5	5	5
Elytrigia repens	1	1	1	1	1	1
Lathyrus japonicus	3	3	2	2	2	2
Atriplex prostrata						
Achillea millefolium	1	1				
Arrhenatherum elatius	1	1				
Dactylis glomerata	1	1				
Hieracium vulgata	1	1				
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Centaurea scabiosa			1	1	1	1
Poa triviialis			1	1	1	1
Galium verum						
Thalictrum minus						
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Elytrigia juncea						
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	5	5	5	5	5	5
Elytrigia repens	1	1	1	1		
Lathyrus japonicus	2	2	2	2	1	1
Atriplex prostrata						
Achillea millefolium					1	1
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Centaurea scabiosa	1	1	1	1	1	1
Poa triviialis	1	1	1	1	1	1
Galium verum					1	1
Thalictrum minus					2	2
Carex arenaria						
Festuca rubra						
Leontodon hispidus						
Lotus corniculatus						
Poa pratensis						
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Elytrigia juncea						
Leymus arenarius	1	1	1	1	1	1
Ammophila arenaria	5	5	2	2	2	2
Elytrigia repens						
Lathyrus japonicus	1	1	1	1	1	1
Atriplex prostrata						
Achillea millefolium	1	1	1	1	1	1
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata			1	1	1	1
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	1
Centaurea scabiosa	1	1	3	3	3	3
Poa triviialis	1	1				
Galium verum	1	1	2	2	2	2
Thalictrum minus	2	2	1	1	1	1
Carex arenaria			1	1	1	1
Festuca rubra			2	2	2	2
Leontodon hispidus			1	1	1	1
Lotus corniculatus			1	1	1	1
Poa pratensis			1	1	1	1
Pimpinella saxifraga						
Plantago lanceolata						

Transekt	0E	0E	0E	0E	0E	0E
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Elytrigia juncea						
Leymus arenarius	1	1	1	1	1	
Ammophila arenaria	2	2	2	2	2	1
Elytrigia repens						
Lathyrus japonicus	1	1	1	1	1	
Atriplex prostrata						
Achillea millefolium	1	1	1	1	1	1
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata	1	1	1	1	1	
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca	1	1	1	1	1	
Centaurea scabiosa	3	3	3	3	3	4
Poa triviialis						
Galium verum	2	2	2	2	2	3
Thalictrum minus	1	1	1	1	1	3
Carex arenaria	1	1	1	1	1	
Festuca rubra	2	2	2	2	5	3
Leontodon hispidus	1	1	1	1	1	1
Lotus corniculatus	1	1	1	1	1	1
Poa pratensis	1	1	1	1	1	1
Pimpinella saxifraga						1
Plantago lanceolata						1

Transekt	0E	0E	0E	0E	0E	0E
Rute	55	56	57	58	59	60
Lengste avstand fra 0	55	56	57	58	59	60
Elytrigia juncea						
Leymus arenarius						
Ammophila arenaria	1	1	1	1	1	1
Elytrigia repens						
Lathyrus japonicus						
Atriplex prostrata						
Achillea millefolium	1	1	1	1	1	1
Arrhenatherum elatius						
Dactylis glomerata						
Hieracium vulgata						
Taraxacum sp.	1	1	1	1	1	1
Vicia cracca						
Centaurea scabiosa	4	4	4	4	4	4
Poa triviialis						
Galium verum	3	3	3	3	3	3
Thalictrum minus	3	3	3	3	3	3
Carex arenaria						
Festuca rubra	3	3	3	3	3	3
Leontodon hispidus	1	1	1	1	1	1
Lotus corniculatus	1	1	1	1	1	1
Poa pratensis	1	1	1	1	1	1
Pimpinella saxifraga	1	1	1	1	1	1
Plantago lanceolata	1	1	1	1	1	1

Transekt	0E	0E	
Rute		61	62
Lengste avstand fra 0		61	62
Elytrigia juncea			
Leymus arenarius			
Ammophila arenaria		1	1
Elytrigia repens			
Lathyrus japonicus			
Atriplex prostrata			
Achillea millefolium		1	1
Arrhenatherum elatius			
Dactylis glomerata			
Hieracium vulgata			
Taraxacum sp.		1	1
Vicia cracca			
Centaurea scabiosa		4	4
Poa triviialis			
Galium verum		3	3
Thalictrum minus		3	3
Carex arenaria			
Festuca rubra		3	3
Leontodon hispidus		1	1
Lotus corniculatus		1	1
Poa pratensis		1	1
Pimpinella saxifraga		1	1
Plantago lanceolata		1	1

Table 6.26 Floristic scores from transect survey at Sandvesanden, transect 3A-2008 (ØL).

Transekt	3A	3A	3A	3A	3A	3A
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Alopecurus pratensis			1	1		
Achillea millefolium						
Carex arenaria						
Festuca rubra						
Galium verum						
Lathyrus japonicus						
Vicia sepium						
Elytrigia juncea						
Ammophila arenaria						
Centaurea scabiosa						
Angelica sylvestris						
Valeriana sambucifolia						
Ranunculus acris						
Taraxacum sp.						
Thalictrum minus						
Trifolium pratense						
Vicia cracca						
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						
Anthriscus sylvestris						
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum						
Lotus corniculatus						
Senecio jacobea						
Knautia arvensis						
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Alopecurus pratensis						
Achillea millefolium						1
Carex arenaria						1
Festuca rubra						1
Galium verum						1
Lathyrus japonicus						1
Vicia sepium						1
Elytrigia juncea						
Ammophila arenaria						
Centaurea scabiosa						
Angelica sylvestris						
Valeriana sambucifolia						
Ranunculus acris						
Taraxacum sp.						
Thalictrum minus						
Trifolium pratense						
Vicia cracca						
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						
Anthriscus sylvestris						
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum						
Lotus corniculatus						
Senecio jacobea						
Knautia arvensis						
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Alopecurus pratensis						
Achillea millefolium	1					1
Carex arenaria	1				1	2
Festuca rubra	1					5
Galium verum					1	1
Lathyrus japonicus	1					1
Vicia sepium	1					
Elytrigia juncea	1					1
Ammophila arenaria					1	
Centaurea scabiosa						3
Angelica sylvestris						
Valeriana sambucifolia						
Ranunculus acris						
Taraxacum sp.						
Thalictrum minus						
Trifolium pratense						
Vicia cracca						
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						
Anthriscus sylvestris						
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum						
Lotus corniculatus						
Senecio jacobea						
Knautia arvensis						
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Alopecurus pratensis						
Achillea millefolium	1	1	1	1	1	1
Carex arenaria	1	1	1	1	1	
Festuca rubra	4	4	4	3	4	3
Galium verum	2	4	1	1	1	1
Lathyrus japonicus	1	1	1	1	1	1
Vicia sepium	1	1	1			1
Elytrigia juncea						
Ammophila arenaria	1	1	4	5	4	4
Centaurea scabiosa				1		
Angelica sylvestris	1	1	1	2	2	1
Valeriana sambucifolia	1					1
Ranunculus acris	1	1				
Taraxacum sp.	1	2	2	1	1	2
Thalictrum minus	1	1			1	
Trifolium pratense	1	1	1			
Vicia cracca	1		1	1	1	1
Leontodon autumnalis		1				
Equisetum arvense			1			
Leontodon hispidus			1		1	1
Arrhenatherum elatius			1		1	1
Anthriscus sylvestris				1	2	2
Calystegia sepium				1		
Cerastium fontanum				1		
Epilobium montanum				1	1	1
Lotus corniculatus				1	1	1
Senecio jacobea				1		1
Knautia arvensis						
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	25	26	27	28	29	30
Lengste avstand fra 0	25	26	27	28	29	30
Alopecurus pratensis						
Achillea millefolium	1					
Carex arenaria	1				1	
Festuca rubra	1	1	1	1	1	1
Galium verum	1	1	1	1	1	1
Lathyrus japonicus	1	1	1	1	1	1
Vicia sepium				1	1	1
Elytrigia juncea						
Ammophila arenaria	5	6	6	5	4	6
Centaurea scabiosa						1
Angelica sylvestris			1	2		
Valeriana sambucifolia	1	1			1	
Ranunculus acris						
Taraxacum sp.	1				1	
Thalictrum minus				1	1	1
Trifolium pratense	1					
Vicia cracca	1	1		1	1	1
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						
Anthriscus sylvestris	1	1	1	1	1	1
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum	1	1		1	1	
Lotus corniculatus	1	1	1	1		
Senecio jacobea						
Knautia arvensis			1	2	4	1
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	31	32	33	34	35	36
Lengste avstand fra 0	31	32	33	34	35	36
Alopecurus pratensis						
Achillea millefolium			1	1	1	
Carex arenaria						
Festuca rubra	2	2	3		3	
Galium verum	1	1				
Lathyrus japonicus			1			
Vicia sepium				1	1	1
Elytrigia juncea						
Ammophila arenaria	5	5	4	1	5	5
Centaurea scabiosa	2	3	3	5	3	3
Angelica sylvestris	2					
Valeriana sambucifolia		1				
Ranunculus acris						
Taraxacum sp.			1			
Thalictrum minus	1	1	1	1	1	3
Trifolium pratense						
Vicia cracca	1	1	1	1	1	
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						
Anthriscus sylvestris						
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum	1					
Lotus corniculatus	1	1	1			
Senecio jacobea						1
Knautia arvensis			1		2	
Leymus arenarius	1	1	1	1		
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	37	38	39	40	41	42
Lengste avstand fra 0	37	38	39	40	41	42
Alopecurus pratensis						
Achillea millefolium						
Carex arenaria				1		
Festuca rubra	2					
Galium verum						1
Lathyrus japonicus						
Vicia sepium	1					
Elytrigia juncea						
Ammophila arenaria	5	5	6	4	6	6
Centaurea scabiosa	3	4	2		2	1
Angelica sylvestris						
Valeriana sambucifolia		1			1	1
Ranunculus acris						
Taraxacum sp.						
Thalictrum minus	1	1	1	1	1	1
Trifolium pratense						
Vicia cracca	1	1	1	1	1	1
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius						1
Anthriscus sylvestris						
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum		1		1	1	
Lotus corniculatus						
Senecio jacobea		1				
Knautia arvensis						1
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Lengste avstand fra 0	43	44	45	46	47	48
Alopecurus pratensis						
Achillea millefolium				1	1	1
Carex arenaria						
Festuca rubra	1			2	1	4
Galium verum	1	1	1	1	1	1
Lathyrus japonicus						
Vicia sepium	1	1		1	1	1
Elytrigia juncea						
Ammophila arenaria	6	6	5	4	5	1
Centaurea scabiosa	1	1	4	3	2	2
Angelica sylvestris						
Valeriana sambucifolia	1	1				
Ranunculus acris						
Taraxacum sp.						
Thalictrum minus	1	1	1		1	1
Trifolium pratense						
Vicia cracca	1	1	1	1	1	1
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius	1	1	1	2	2	4
Anthriscus sylvestris						1
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum	1					
Lotus corniculatus						
Senecio jacobea						
Knautia arvensis				4	2	
Leymus arenarius						
Rumex acetosa	1					
Campanula rotundifolia		1				
Dactylis glomerata						
Geranium sanguineum						
Plantago lanceolata						
Pimpinella saxifraga						

Transekt	3A	3A	3A	3A	3A	3A
Rute	49	50	51	52	53	54
Lengste avstand fra 0	49	50	51	52	53	54
Alopecurus pratensis						
Achillea millefolium	1	1	1	1	1	
Carex arenaria			1	1	1	1
Festuca rubra	3	4	1	3	3	1
Galium verum	2	2	1	1	1	1
Lathyrus japonicus						
Vicia sepium	1	1			1	1
Elytrigia juncea						
Ammophila arenaria	2		1	4	4	6
Centaurea scabiosa	2	3	1	1	2	1
Angelica sylvestris						
Valeriana sambucifolia						
Ranunculus acris				1		1
Taraxacum sp.		3	1			1
Thalictrum minus	1	1	1	1	1	1
Trifolium pratense			1	1	1	
Vicia cracca	1		1	1	1	1
Leontodon autumnalis						
Equisetum arvense						
Leontodon hispidus						
Arrhenatherum elatius	1		1	1	2	
Anthriscus sylvestris	1					
Calystegia sepium						
Cerastium fontanum						
Epilobium montanum						
Lotus corniculatus	1	1	1	1	1	
Senecio jacobea						
Knautia arvensis						
Leymus arenarius						
Rumex acetosa						
Campanula rotundifolia						
Dactylis glomerata	1	1				
Geranium sanguineum	3		1	1	1	
Plantago lanceolata	1	1	1	1		
Pimpinella saxifraga				1		

Table 6.27 Floristic scores from transect survey at Sandvesanden, transect 3B-2008 (ØL).

Transekt	3B	3B	3B	3B	3B	3B
Rute	1	2	3	4	5	6
Lengste avstand fra 0	1	2	3	4	5	6
Catabrosa aquatica					1	
Elytrigia juncea						
Ammophila arenaria						
Vicia sepium						
Dactylis glomerata						
Pisum sativum						
Carex arenaria						
Leontodon autumnalis						
Hypochaeris radicata						
Lotus corniculatus						
Taraxacum sp.						
Achillea millefolium						
Festuca rubra						
Lathyrus japonicus						
Vicia cracca						
Anthriscus sylvestris						
Ranunculus acris						
Arrhenatherum elatius						
Centaurea scabiosa						
Thalictrum minus						
Galium verum						
Hieracium sp.						
Pimpinella saxifraga						
Valeriana sambucifolia						
Leontodon hispidus						
Plantago lanceolata						
Rumex acetosa						
Knautia arvensis						
Angelica sylvestris						
Senecio jacobea						
Leymus arenarius						
Trifolium pratense						
Rumex longifolius						

Transekt	3B	3B	3B	3B	3B	3B
Rute	7	8	9	10	11	12
Lengste avstand fra 0	7	8	9	10	11	12
Catabrosa aquatica						
Elytrigia juncea	1	1				1
Ammophila arenaria		1			2	1
Vicia sepium		1			1	1
Dactylis glomerata						
Pisum sativum		1				
Carex arenaria					1	1
Leontodon autumnalis					1	
Hypochaeris radicata					1	
Lotus corniculatus					1	
Taraxacum sp.					1	
Achillea millefolium						
Festuca rubra						
Lathyrus japonicus						
Vicia cracca						
Anthriscus sylvestris						
Ranunculus acris						
Arrhenatherum elatius						
Centaurea scabiosa						
Thalictrum minus						
Galium verum						
Hieracium sp.						
Pimpinella saxifraga						
Valeriana sambucifolia						
Leontodon hispidus						
Plantago lanceolata						
Rumex acetosa						
Knautia arvensis						
Angelica sylvestris						
Senecio jacobea						
Leymus arenarius						
Trifolium pratense						
Rumex longifolius						

Transekt	3B	3B	3B	3B	3B	3B
Rute	13	14	15	16	17	18
Lengste avstand fra 0	13	14	15	16	17	18
Catabrosa aquatica						
Elytrigia juncea	1					
Ammophila arenaria	2				1	6
Vicia sepium	1					1
Dactylis glomerata						
Pisum sativum						
Carex arenaria	1				1	1
Leontodon autumnalis						
Hypochaeris radicata						
Lotus corniculatus					1	
Taraxacum sp.						1
Achillea millefolium					1	1
Festuca rubra					5	1
Lathyrus japonicus					1	
Vicia cracca						1
Anthriscus sylvestris						
Ranunculus acris						
Arrhenatherum elatius						
Centaurea scabiosa						
Thalictrum minus						
Galium verum						
Hieracium sp.						
Pimpinella saxifraga						
Valeriana sambucifolia						
Leontodon hispidus						
Plantago lanceolata						
Rumex acetosa						
Knautia arvensis						
Angelica sylvestris						
Senecio jacobea						
Leymus arenarius						
Trifolium pratense						
Rumex longifolius						

Transekt	3B	3B	3B	3B	3B	3B
Rute	19	20	21	22	23	24
Lengste avstand fra 0	19	20	21	22	23	24
Catabrosa aquatica						
Elytrigia juncea						
Ammophila arenaria	6	6	6	6	6	6
Vicia sepium						
Dactylis glomerata						
Pisum sativum						
Carex arenaria	1	1	1	1	1	1
Leontodon autumnalis						
Hypochaeris radicata						
Lotus corniculatus						
Taraxacum sp.	1	1	1	1	1	1
Achillea millefolium	1	1	1	1	1	
Festuca rubra	1	1	1	1	1	1
Lathyrus japonicus						
Vicia cracca	1	1	1	1	1	1
Anthriscus sylvestris	1					1
Ranunculus acris	1					
Arrhenatherum elatius	1		1			1
Centaurea scabiosa		1	1	1		1
Thalictrum minus			1	1	1	
Galium verum				1	1	1
Hieracium sp.				1	1	
Pimpinella saxifraga				1	1	
Valeriana sambucifolia				1	1	
Leontodon hispidus						
Plantago lanceolata						
Rumex acetosa						
Knautia arvensis						
Angelica sylvestris						
Senecio jacobea						
Leymus arenarius						
Trifolium pratense						
Rumex longifolius						

Transekt	3B	3B	3B	3B	3B	3B	
Rute	25	26	27	28	29	30	
Lengste avstand fra 0	25	26	27	28	29	30	
Catabrosa aquatica							
Elytrigia juncea							
Ammophila arenaria	6	4	3	1	2	4	
Vicia sepium						1	
Dactylis glomerata							
Pisum sativum							
Carex arenaria	1	1	2	3		1	
Leontodon autumnalis							
Hypochaeris radicata							
Lotus corniculatus		1	2	3	1		
Taraxacum sp.	1	1	1	1	1	1	
Achillea millefolium	1	1	1	1	1	1	
Festuca rubra	1	2	3	4	2	2	
Lathyrus japonicus						1	
Vicia cracca	1	1	1	1	1	1	
Anthriscus sylvestris	1	2	1	2		1	
Ranunculus acris							
Arrhenatherum elatius			1		1		
Centaurea scabiosa	1	1	2	2	5	4	
Thalictrum minus		1					
Galium verum	2	1	1	1	1		
Hieracium sp.							
Pimpinella saxifraga							
Valeriana sambucifolia							
Leontodon hispidus	1	2	1				
Plantago lanceolata	1						
Rumex acetosa		1				1	
Knautia arvensis			1	1			
Angelica sylvestris					2		
Senecio jacobea						1	
Leymus arenarius							
Trifolium pratense							
Rumex longifolius							

Transekt	3B	3B	3B	3B	3B	3B	
Rute	31	32	33	34	35	36	
Lengste avstand fra 0	31	32	33	34	35	36	
Catabrosa aquatica							
Elytrigia juncea							
Ammophila arenaria	4	2	2	4	2	1	
Vicia sepium			1	1	1	1	
Dactylis glomerata							
Pisum sativum							
Carex arenaria	1	1	1	1	1	1	
Leontodon autumnalis							
Hypochaeris radicata							
Lotus corniculatus		1	1		1	1	
Taraxacum sp.	1		1	1	1		
Achillea millefolium	1	1	1	1	1	1	
Festuca rubra	2	3	3	4	3	4	
Lathyrus japonicus							
Vicia cracca	1	1	1	1	1	1	
Anthriscus sylvestris	2		1	1	1		
Ranunculus acris							
Arrhenatherum elatius				1			
Centaurea scabiosa	4	5	5	3	5	5	
Thalictrum minus	2	1	1	1	1	1	
Galium verum	1	1	1	2	1	1	
Hieracium sp.							
Pimpinella saxifraga							
Valeriana sambucifolia							
Leontodon hispidus		1					
Plantago lanceolata							
Rumex acetosa							
Knautia arvensis			1	1			
Angelica sylvestris	1	2					
Senecio jacobea							
Leymus arenarius							
Trifolium pratense							
Rumex longifolius							

Transekt	3B	3B	3B	3B	3B	3B	
Rute		37	38	39	40	41	42
Lengste avstand fra 0		37	38	39	40	41	42
Catabrosa aquatica							
Elytrigia juncea							
Ammophila arenaria		2	4	1	1	1	1
Vicia sepium			1	1	1	1	1
Dactylis glomerata							
Pisum sativum							
Carex arenaria		1	1	1	1	1	
Leontodon autumnalis							
Hypochaeris radicata							
Lotus corniculatus			1	1			
Taraxacum sp.		1			1	1	
Achillea millefolium		1	1	1	1	1	1
Festuca rubra		1	2	3	1	1	1
Lathyrus japonicus							
Vicia cracca		1	1	1	1	1	1
Anthriscus sylvestris				1			
Ranunculus acris				1			
Arrhenatherum elatius		1		1	1	1	1
Centaurea scabiosa		4	4	4	5	5	5
Thalictrum minus		2	2	3	2	2	1
Galium verum		1	2	1	1	1	1
Hieracium sp.							
Pimpinella saxifraga							
Valeriana sambucifolia							
Leontodon hispidus							
Plantago lanceolata						1	2
Rumex acetosa							
Knautia arvensis							
Angelica sylvestris							
Senecio jacobea							
Leymus arenarius				1	1	1	2
Trifolium pratense							
Rumex longifolius							

Transekt	3B	3B	3B	3B	3B	3B
Rute	43	44	45	46	47	48
Lengste avstand fra 0	43	44	45	46	47	48
Catabrosa aquatica						
Elytrigia juncea						
Ammophila arenaria	1			1	4	5
Vicia sepium	1	1		1	1	
Dactylis glomerata						
Pisum sativum						
Carex arenaria	1		1	1	1	1
Leontodon autumnalis						
Hypochaeris radicata						
Lotus corniculatus			1		1	
Taraxacum sp.	1	1	1	1		1
Achillea millefolium	1	1	2	1	1	1
Festuca rubra	1	4	3	4	2	1
Lathyrus japonicus						
Vicia cracca	1	1		1	1	1
Anthriscus sylvestris						
Ranunculus acris						
Arrhenatherum elatius	1	1	1	1	1	1
Centaurea scabiosa	5	5	1	3	2	1
Thalictrum minus	1	1	1	1	1	1
Galium verum	1	1		2	4	2
Hieracium sp.						
Pimpinella saxifraga						
Valeriana sambucifolia						1
Leontodon hispidus				2	1	
Plantago lanceolata			1	1		
Rumex acetosa						
Knautia arvensis	1					
Angelica sylvestris						
Senecio jacobea						
Leymus arenarius	1					
Trifolium pratense			1	1	1	
Rumex longifolius						1

Table 6.28 Temperatures recorded from 1961-1990 at the weather station in Skudenes.

DÃ˜GNVERDIER(MÃ…NEDSVIS)

Stasjoner

Stnr	Navn	I drift fra	I drift til	Hoh	Kommune	Fylke	Region
47200	SKUDENES II	des.38	nov.05	2	KARMÃ˜Y	ROGALAND	VESTLANDET

Elementer

Kode	Navn	Enhet
TAM	Middeltemperatur	ÂºC
TAN	Minimumstemperatur	ÂºC
TAX	Maksimumstemperatur	ÂºC

********** MELDING **********
Dataverdi merket x betyr manglende tilgang eller at kvaliteten er 'SvÃ¦rt usikker, modelldata' (NivÃ¥ 6 eller mer).
****

year	month	TAM	TAN	TAX
1961	Januar	1,45806452	-0,53870968	3,09354839
1961	Februar	3,71428571	2,02857143	5,06071429
1961	Mars	4,81935484	2,87096774	6,69032258
1961	April	6,52333333	3,84666667	9,34333333
1961	Mai	9,10322581	6,49354839	11,6677419
1961	Juni	11,95	9,69666667	14,4466667
1961	Juli	13,1387097	11	15,5451613
1961	August	13,6322581	11,0903226	16,1709677
1961	September	13,4833333	11,36	15,36
1961	Oktober	11,7451613	10,0903226	13,316129
1961	November	6,77333333	4,72	8,46666667
1961	Desember	2,61290323	0,67096774	4,51290323
1962	Januar	3,79677419	1,69354839	5,47096774
1962	Februar	2,83571429	0,52857143	5,41428571
1962	Mars	0,46451613	-2,32258065	3,20645161
1962	April	5,53333333	2,54	8,31
1962	Mai	8,19032258	5,82580645	10,8
1962	Juni	10,36	7,76666667	13,1066667
1962	Juli	12,9483871	10,516129	15,8548387
1962	August	12,8451613	10,6419355	15,2870968
1962	September	11,52	9,30333333	13,54
1962	Oktober	9,76451613	7,81290323	11,8677419
1962	November	4,89	2,40333333	7,09
1962	Desember	2,32258065	0,30967742	4,10645161
1963	Januar	-2,20322581	-4,86774194	0,4483871
1963	Februar	-2,46785714	-5,13571429	-0,08571429
1963	Mars	2,22258065	0,16451613	4,52903226
1963	April	5,18333333	2,48	8,00666667
1963	Mai	8,7	6,25806452	11,6483871
1963	Juni	13,6933333	10,76	16,9366667
1963	Juli	13,1935484	10,3516129	15,8806452

1963	August	15,0193548	12,5	17,5677419
1963	September	12,5766667	10,5633333	14,9966667
1963	Oktober	9,49354839	7,41612903	11,4258065
1963	November	6,46333333	4,52666667	7,99666667
1963	Desember	2,53225806	0,18064516	4,56451613
1964	Januar	3,72580645	1,66774194	5,36129032
1964	Februar	2,45862069	0,19310345	4,46896552
1964	Mars	3,13870968	0,22903226	5,79032258
1964	April	6,27	3,75666667	8,98666667
1964	Mai	9,86129032	7,61612903	12,5354839
1964	Juni	11,3466667	9,12	14,6533333
1964	Juli	12,4096774	10,3903226	15,6
1964	August	12,8645161	10,6870968	16,8225806
1964	September	11,1666667	8,81	14,6666667
1964	Oktober	8,67741935	6,38387097	10,8096774
1964	November	6,61666667	4,63333333	8,71
1964	Desember	3,72903226	1,59677419	5,93870968
1965	Januar	2,31935484	0,44516129	4,46451613
1965	Februar	6,99887136	4,68759493	9,4924241
1965	Mars	2,2	0,00967742	4,98387097
1965	April	5,89	3,75333333	8,62333333
1965	Mai	8,54516129	6,23225806	11,2129032
1965	Juni	12,1966667	10,2633333	14,9433333
1965	Juli	12,7580645	10,2032258	15,7903226
1965	August	13,2967742	10,8774194	15,9096774
1965	September	13,51	11,31	15,6566667
1965	Oktober	10,2612903	8,32580645	12,2645161
1965	November	2,84	1,03333333	5,02
1965	Desember	1,38387097	-0,61612903	3,51935484
1966	Januar	-0,58064516	-2,40322581	1,41935484
1966	Februar	-1,30714286	-3,38214286	1,24285714
1966	Mars	2,61935484	0,93548387	5,43870968
1966	April	3,69333333	0,7	7,19
1966	Mai	8,27096774	5,80967742	10,7322581
1966	Juni	13,9866667	11,15	17,36
1966	Juli	12,9225806	10,6870968	15,483871
1966	August	13,7419355	11,0290323	16,2903226
1966	September	11,5466667	9,47	13,4133333
1966	Oktober	9,12258065	7,15483871	11,2064516
1966	November	5,09	3,33	6,72
1966	Desember	2,89677419	0,86129032	4,60645161
1967	Januar	-1,52258065	-0,23870968	3,13548387
1967	Februar	3,04285714	1,35714286	4,49285714
1967	Mars	4,08064516	2,1483871	5,78709677
1967	April	5,13666667	2,97333333	7,62
1967	Mai	8,53870968	6,4516129	11,1354839
1967	Juni	10,7466667	8,45666667	13,1766667
1967	Juli	14,3096774	12,0322581	16,7
1967	August	14,4806452	12,2032258	16,7967742
1967	September	13,3366667	10,91	15,76
1967	Oktober	9,57096774	7,46451613	11,4096774

1967	November	7,53666667	5,95333333	9,01333333
1967	Desember	3,08387097	0,81935484	5,46774194
1968	Januar	0,89677419	-1,42258065	2,96774194
1968	Februar	0,71724138	-1,57241379	2,80689655
1968	Mars	3,53225806	1,91612903	5,36129032
1968	April	5,71666667	2,84333333	8,8
1968	Mai	8,48709677	5,77096774	11,1741935
1968	Juni	13,2766667	10,65	16,4433333
1968	Juli	13,7225806	10,9064516	16,7645161
1968	August	13,5387097	10,2419355	16,5806452
1968	September	14,0433333	11,34	16,7833333
1968	Oktober	8,91935484	6,74193548	11,3129032
1968	November	4,10333333	2,28666667	5,68
1968	Desember	2,44193548	0,44193548	4,08387097
1969	Januar	2,86774194	-1,14516129	4,2
1969	Februar	-2,23928571	-5,17857143	0,2
1969	Mars	-0,76129032	-2,45483871	3,50645161
1969	April	5,49333333	2,99	8,12666667
1969	Mai	8,82580645	6,10967742	11,7483871
1969	Juni	13,1666667	9,59666667	16,5466667
1969	Juli	13,8741935	11,6419355	16,2483871
1969	August	17,2290323	14,3580645	20,4322581
1969	September	11,9333333	9,42	14,4166667
1969	Oktober	9,76129032	7,67741935	11,5129032
1969	November	3,44	1,04333333	5,68
1969	Desember	-1,70645161	-0,17419355	3,23225806
1970	Januar	0,36129032	-1,8516129	2,07096774
1970	Februar	-1,82857143	-4,04285714	0,125
1970	Mars	-0,95483871	-1,39032258	3,01290323
1970	April	3,52666667	0,66	6,11666667
1970	Mai	9,6	6,95483871	12,5096774
1970	Juni	13,6933333	10,2766667	17,4633333
1970	Juli	12,9064516	10,7225806	15,1806452
1970	August	15,2032258	12,5258065	17,7290323
1970	September	11,6	9,15666667	13,89
1970	Oktober	8,87096774	6,88064516	10,9419355
1970	November	5,32333333	3,10333333	7,28666667
1970	Desember	3,54516129	1,57096774	5,41935484
1971	Januar	3,44516129	1,38064516	5,0516129
1971	Februar	3,31428571	1,61071429	4,92857143
1971	Mars	-2,11935484	-0,06129032	4,13548387
1971	April	5,59	3,09666667	8,25666667
1971	Mai	9,82580645	7,07096774	12,6290323
1971	Juni	11,5566667	8,93	14,2
1971	Juli	13,516129	10,7516129	16,2193548
1971	August	14,5612903	11,9129032	17,0451613
1971	September	14,5612903	11,9129032	17,0451613
1971	Oktober	9,11612903	6,72903226	10,9677419

1971	November	4,54666667	2,01333333	6,90666667
1971	Desember	5,83225806	3,83870968	7,27419355
1972	Januar	0,76451613	-1,00645161	2,29354839
1972	Februar	1,62068966	-0,07241379	3,07241379
1972	Mars	3,76451613	1,54193548	5,65806452
1972	April	5,56666667	3,41	7,68
1972	Mai	10,4258065	7,74516129	13,2064516
1972	Juni	11,7866667	9,45	14,33
1972	Juli	14,6322581	11,6967742	17,2129032
1972	August	13,2533	10,6935484	15,5258065
1972	September	10,5733333	7,91666667	13,0266667
1972	Oktober	8,96451613	6,94193548	10,6709677
1972	November	5,51	3,42	7,11333333
1972	Desember	6,2483871	4,72903226	7,29354839
1973	Januar	4,50645161	2,85483871	5,68387097
1973	Februar	2,71785714	0,38928571	4,79285714
1973	Mars	5,2483871	3,27419355	7,1
1973	April	4,67333333	1,77	7,24333333
1973	Mai	7,28971569	5,01598873	9,36165707
1973	Juni	12,0133333	9,03	14,7166667
1973	Juli	15,1483871	12,3709677	18,2129032
1973	August	13,27	10,4548387	15,4741935
1973	September	12	10,02	13,9433333
1973	Oktober	6,81612903	4,60645161	8,91290323
1973	November	3,93333333	1,59	6,12666667
1973	Desember	3,10645161	0,59354839	5,26129032
1974	Januar	4,88064516	3,42903226	5,9483871
1974	Februar	3,87857143	2,51071429	4,93571429
1974	Mars	4,5	1,56774194	7,1516129
1974	April	6,85	3,35	9,93
1974	Mai	10,5548387	7,10322581	13,4645161
1974	Juni	13,0233333	9,48666667	16,08
1974	Juli	12,6806452	9,99677419	14,9774194
1974	August	14,4193548	11,3774194	16,8
1974	September	12,3833333	10,5933333	14,4533333
1974	Oktober	7,61612903	5,16451613	10,016129
1974	November	6,01666667	4,08666667	7,35333333
1974	Desember	5,56774194	3,22580645	6,97096774
1975	Januar	5,22580645	3,19032258	6,6
1975	Februar	2,97857143	1,38214286	4,52142857
1975	Mars	3,01935484	0,40967742	5,32258065
1975	April	4,93333333	2,54333333	7,00666667
1975	Mai	9,26129032	6,11612903	12,0451613
1975	Juni	11,2933333	8,41	13,96
1975	Juli	13,9516129	11,4709677	16,5064516
1975	August	17,1870968	14,3	19,8258065
1975	September	12,23	9,98666667	14,2566667
1975	Oktober	9,19032258	7,28387097	11,0451613
1975	November	6,66	5,02666667	8,07333333
1975	Desember	5,18064516	2,71290323	7,26129032
1976	Januar	1,57096774	-0,80967742	3,73870968
1976	Februar	2,07931034	0,36896552	3,57586207

1976	Mars	1,1483871	-1,30322581	3,50322581
1976	April	5,05666667	2,50333333	7,25333333
1976	Mai	9,81935484	7,08064516	12,7225806
1976	Juni	12,6266667	10,2266667	15,14
1976	Juli	15,2709677	12,6354839	17,6935484
1976	August	14,4935484	10,9387097	17,5516129
1976	September	10,98	8,32333333	13,6466667
1976	Oktober	9,28709677	7,43870968	10,8709677
1976	November	6,23	4,41666667	7,61666667
1976	Desember	1,07096774	-1,64516129	3,1
1977	Januar	1,23225806	-0,75483871	2,80645161
1977	Februar	0,69642857	-1,31071429	2,45
1977	Mars	3,85806452	1,90967742	5,58064516
1977	April	3,68333333	0,85333333	5,91666667
1977	Mai	8,93548387	5,77741935	11,916129
1977	Juni	10,6133333	8,20333333	13,47
1977	Juli	12,2032258	9,70967742	14,8
1977	August	14,3258065	11,5419355	16,6967742
1977	September	10,8066667	8,94	12,8933333
1977	Oktober	10,316129	8,6516129	11,5129032
1977	November	4,98333333	3,03	6,63666667
1977	Desember	5,05806452	2,9516129	6,5
1978	Januar	3,18709677	0,80322581	4,7483871
1978	Februar	7,1630045	4,83943447	9,24003271
1978	Mars	2,24193548	0,36774194	4,08709677
1978	April	4,56666667	1,47333333	7,37666667
1978	Mai	10,5290323	6,82258065	13,7290323
1978	Juni	13	10,1566667	15,7066667
1978	Juli	13,2225806	11,0580645	15,4032258
1978	August	14,5096774	12,2677419	16,8193548
1978	September	10,6833333	8,58666667	12,8566667
1978	Oktober	9,51290323	7,62903226	10,9064516
1978	November	6,61	4,75666667	8,40666667
1978	Desember	1,12258065	-0,51935484	2,49677419
1979	Januar	1,47419355	-3,98387097	0,16129032
1979	Februar	1,24642857	-3,53214286	0,7
1979	Mars	2,11290323	0,23548387	3,88709677
1979	April	4,93666667	2,87666667	6,94333333
1979	Mai	6,76774194	4,50967742	9,13225806
1979	Juni	11,8466667	9,75666667	14,8366667
1979	Juli	11,916129	9,67096774	13,9290323
1979	August	13,516129	11,3677419	15,5064516
1979	September	11,1	9,06	13,04
1979	Oktober	9,12580645	7,09354839	10,5806452
1979	November	5,08666667	3,04333333	6,62666667
1979	Desember	2,60322581	0,7483871	4,35483871
1980	Januar	0,59354839	-1,10967742	1,97419355
1980	Februar	0,1862069	-	1,70689655

			-1,73103448	
1980	Mars	1,53870968	0,50322581	3,26129032
1980	April	5,50333333	2,57666667	8,11333333
1980	Mai	9,48709677	6,10322581	12,3935484
1980	Juni	13,8	11,1466667	16,5666667
1980	Juli	15,6225806	12,6483871	18,4419355
1980	August	14,6548387	12,383871	16,5387097
1980	September	13,02	11,1033333	14,6133333
1980	Oktober	7,38709677	5,11935484	9,23548387
1980	November	3,95	1,6	6,12333333
1980	Desember	0	0	0
1981	Januar	0	0	0
1981	Februar	0	0	0
1981	Mars	0	0	0
1981	April	0	0	0
1981	Mai	10,7516129	8,21290323	13,783871
1981	Juni	11,0066667	9,32	12,8766667
1981	Juli	13,7064516	11,9096774	15,7903226
1981	August	13,22	4,50408412	8,10057627
1981	September	13,7033333	11,96	15,37
1981	Oktober	8,70322581	6,70645161	10,3354839
1981	November	6,08666667	-3,73333333	7,70333333
1981	Desember	-1,60967742	-3,97741935	0,13225806
1982	Januar	-0,33225806	-1,63225806	2,25483871
1982	Februar	2,21428571	0,92857143	3,49285714
1982	Mars	3,76451613	2,13225806	5,36774194
1982	April	5,20333333	3,13	7,58333333
1982	Mai	8,58387097	6,37741935	11,1129032
1982	Juni	12,8366667	9,68666667	16,03
1982	Juli	14,583871	12,0645161	17,0677419
1982	August	15,6451613	13,0612903	18,3193548
1982	September	12,2666667	10,31	13,9766667
1982	Oktober	10,4709677	8,52903226	11,8354839
1982	November	7,97971633	5,90204551	9,50154814
1982	Desember	4,63225806	2,73548387	6
1983	Januar	5,41290323	3,6516129	6,64193548
1983	Februar	1,42857143	-0,58214286	3,10714286
1983	Mars	3,94193548	1,84193548	5,57419355
1983	April	5,88	3,41666667	8,34333333
1983	Mai	9,2516129	7,31935484	11,4290323
1983	Juni	11,5466667	9,34333333	14,1466667
1983	Juli	14,2967742	11,7612903	16,9677419
1983	August	13,0387097	10,5548387	15,5548387
1983	September	12,0533333	10,0066667	14,1033333
1983	Oktober	9,28709677	7,2	10,8580645
1983	November	6	3,70333333	7,92
1983	Desember	4,50645161	2,18709677	6,04193548
1984	Januar	1,51935484	-0,52258065	2,83225806
1984	Februar	1,96206897	0,38275862	3,13448276
1984	Mars	1,92258065	-0,3	4,08064516

1984	April	5,53666667	2,74333333	8,11
1984	Mai	10,7290323	7,39032258	14,1193548
1984	Juni	12,6266667	10,2766667	15,56
1984	Juli	12,6483871	10,4032258	15,3580645
1984	August	15,1387097	12,0354839	17,9612903
1984	September	11,82	9,48333333	13,95
1984	Oktober	10,3387097	8,45483871	11,7
1984	November	8,31	6,74	9,42333333
1984	Desember	5,54516129	4,22903226	6,68709677
1985	Januar	-1,50645161	-3,79354839	0,50967742
1985	Februar	-0,22857143	-1,59285714	2,08571429
1985	Mars	2,75806452	0,77096774	4,53548387
1985	April	4,81333333	2,47333333	7,04333333
1985	Mai	10,3612903	7,27741935	13,8870968
1985	Juni	11,46	8,69333333	14,3466667
1985	Juli	14,516129	12,2419355	17,3193548
1985	August	14,5935484	12,6322581	16,4
1985	September	10,7066667	8,63	12,69
1985	Oktober	10,3290323	8,56451613	11,7354839
1985	November	2,68	0,11333333	4,75666667
1985	Desember	2,85806452	0,78387097	4,6
1986	Januar	-0,11935484	-2,19354839	1,33225806
1986	Februar	-1,26071429	-3,79642857	1,11428571
1986	Mars	3,50645161	1,81290323	4,89032258
1986	April	4,21666667	0,78333333	7,04
1986	Mai	8,89032258	6,82258065	11,2677419
1986	Juni	12,62	9,87666667	15,87
1986	Juli	12,9451613	10,5	15,3258065
1986	August	13,416129	10,816129	15,9612903
1986	September	9,43	7,14333333	11,65
1986	Oktober	9,23548387	7,56129032	10,6935484
1986	November	7,46333333	5,47666667	8,92666667
1986	Desember	4,17741935	2,08709677	5,63870968
1987	Januar	-1,46129032	-4,00322581	0,47741935
1987	Februar	-1,89285714	-0,03571429	3,875
1987	Mars	-0,75483871	-1,36451613	2,6516129
1987	April	5,65333333	3,32666667	8,21333333
1987	Mai	8,23870968	5,52903226	11,1709677
1987	Juni	10,51	8,27666667	13,1266667
1987	Juli	14,1032258	11,8709677	16,8129032
1987	August	13,1677419	10,9322581	15,6
1987	September	11,6366667	9,40333333	13,7933333
1987	Oktober	10,3064516	8,46774194	11,9064516
1987	November	6,10666667	4,38666667	7,62
1987	Desember	4,6516129	2,75806452	6,2516129
1988	Januar	4,44193548	2,91935484	5,75806452
1988	Februar	3,17931034	1,32758621	5,03793103
1988	Mars	2,40322581	0,10645161	4,80645161
1988	April	4,26	1,86333333	7,08333333
1988	Mai	10,7516129	7,79354839	14,416129

1988	Juni	12,4066667	9,93333333	15,7566667
1988	Juli	15,2580645	13,0322581	18,1032258
1988	August	14,3354839	12,3290323	16,7580645
1988	September	12,7133333	11,2133333	14,6133333
1988	Oktober	9,0516129	6,2	11,2677419
1988	November	5,38	3,2	7,51333333
1988	Desember	5,03225806	2,75483871	6,83548387
1989	Januar	6,39354839	4,59677419	7,58064516
1989	Februar	4,81785714	3,05357143	6,57142857
1989	Mars	5,06774194	3,06774194	7,18709677
1989	April	5,90666667	2,97666667	9,15
1989	Mai	9,00322581	6,42903226	11,4354839
1989	Juni	12,6466667	9,32666667	15,6433333
1989	Juli	13,516129	10,5709677	16,4419355
1989	August	13,0451613	11,0193548	15,2548387
1989	September	12,3266667	9,93333333	14,82
1989	Oktober	9,52903226	7,45806452	11,6290323
1989	November	6,61	4,71666667	8,51666667
1989	Desember	4,60322581	2,62903226	6,4
1990	Januar	5,77741935	4,28387097	6,97419355
1990	Februar	5,85714286	4,32142857	7,24642857
1990	Mars	5,75806452	3,60322581	7,68709677
1990	April	6,66333333	4,32333333	9,29666667
1990	Mai	10,6612903	7,43548387	14,1354839
1990	Juni	12,8333333	10,63	15,5266667
1990	Juli	14,2322581	11,6129032	17,1741935
1990	August	14,8580645	12,7516129	17,2290323
1990	September	11,1966667	8,73	13,7933333
1990	Oktober	9,96451613	7,53225806	12,4774194
1990	November	5,95	3,74	7,95666667
1990	Desember	4,85806452	2,88064516	6,68709677