Supporting information

Table S1 Number of families, genera and species for each sexual system of woody plant in China. A total of 157 families, 1,082 genera, and 10,449 species are included in our analysis. Of them 2,193 are dioecious, 1,043 monoecious, and 7,213 hermaphroditic species. The proportions of families, genera and species with each sexual system were estimated at each taxonomic level separately.

Sexual system	Family		Genus		Species	
	No.	Proportion (%)	No.	Proportion (%)	No.	Proportion (%)
Dioecy	73	46.50	206	19.04	2193	20.99
Monoecy	43	27.39	160	14.79	1043	9.98
Hermaphrodite	127	80.89	779	72.00	7213	69.03

Table S2 Loadings of temperature and precipitation variables on the corresponding first principal components (PC). The first PC explained 93.6% and 78.3% of the variance in temperature variables and precipitation variables, respectively.

a) Temperature variables		Loadings on PC1
MAT	Mean Annual Temperature	0.593
Bio11	Mean Temperature of Coldest Quarter	0.564
PET	Annual potential evapotranspiration	0.574
b) Precipitation variables		
MAP	Mean Annual Precipitation	0.582
Bio15	Precipitation Seasonality	-0.523
Bio17	Precipitation of Driest Quarter	0.623

Table S3 R^2 of the relationships between the proportions of sexual systems per grid cell and climate, community mean mature plant height and community mean genus age evaluated by univariate Ordinary Least-Squares (OLS) regressions. The entire study area was divide into a humid region (with annual precipitation > 800 mm) and non-humid region (with annual precipitation < 800 mm). For the OLS regressions were separately conducted for the entire region, humid region and non-humid region. Significance of each regression model was estimated using a modified *t* test (Clifford et al., 1989) to account for the influence of spatial autocorrelation on significance tests. MAT = Mean Annual Temperature, MTCQ = Mean Temperature of Coldest Quarter, PET = annual Potential Evapotranspiration, MAP = Mean Annual Precipitation, PSN = Precipitation Seasonality, PDQ = Precipitation of Driest Quarter. Significance codes: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, ns $P \geq 0.05$.

Predictor	Entire area			Non-humid area			Humid area		
	Dioecy	Monoecy	Hermaphrodite	Dioecy	Monoecy	Hermaphrodite	Dioecy	Monoecy	Hermaphrodite
Temp.PC1	0.002 ns	**0.159** *	0.005 ns	0.036 ns	<0.001 ns	**0.096** *	0.006 ns	0.046 ns	0.015 ns
Prec.PC1	0.023 ns	**0.219** *	0.036 ns	**0.081** *	<0.001 ns	0.044 ns	<0.001 ns	0.103 ns	0.007 ns
Radiation	**0.232** *	**0.126** *	**0.260** *	**0.335** *	0.050 ns	**0.347** *	**0.105** *	0.005 ns	0.092 ns
Plant height	**0.331** *	**0.291** *	**0.344** *	**0.409** *	0.135 ns	**0.371** *	**0.098** *	**0.243** ***	**0.313** ***
Genus age	**0.084** *	0.026 ns	**0.086** *	**0.084** *	0.001 ns	**0.078** *	0.027 ns	0.010 ns	0.019 ns

Table S4 Slopes of the relationships between proportions of sexual systems and climate (temperature, precipitation and solar radiation), community mean mature plant height and community mean genus age evaluated by linear mixed effects models. Bold numbers represent significant slopes. The slopes of community mean genus age are all significant. All errors are lower than 0.001 and three relevant digits were presented for all the numbers.

Variable	Entire area			Non-humid area			Humid area		
	Dioecy	Monoecy	Herma.	Dioecy	Monoecy	Herma.	Dioecy	Monoecy	Herma.
Temp.PC1	-0.0107	0.00451	0.0141	-0.00862	0.00235	0.0129	-0.000301	0.000588	0.00496
Prec.PC1	0.000671	0.00165	-0.00191	0.0108	-0.00275	-0.00803	0.000651	0.00130	-0.00249
Radiation	-0.00604	-0.00180	0.00949	0.0105	0.000985	0.0126	-0.00524	-0.00148	0.00924
MHt	0.02734	0.0116	-0.0430	0.0385	0.0167	-0.0582	0.00666	0.00653	-0.0171
Genus age	**-0.00135**	**0.000114**	**0.00578**	**-0.00540**	**<0.0001**	**0.0105**	**0.00246**	**0.000569**	**-0.000686**

Figure S1 The relationships between the per-grid proportions of different sexual systems in China's woody plants. When the univariate Ordinary Least-Squares regression for each relationship is significant ($P < 0.05$), a black line is drawn and the R^2 of the regression model is shown on the figure.

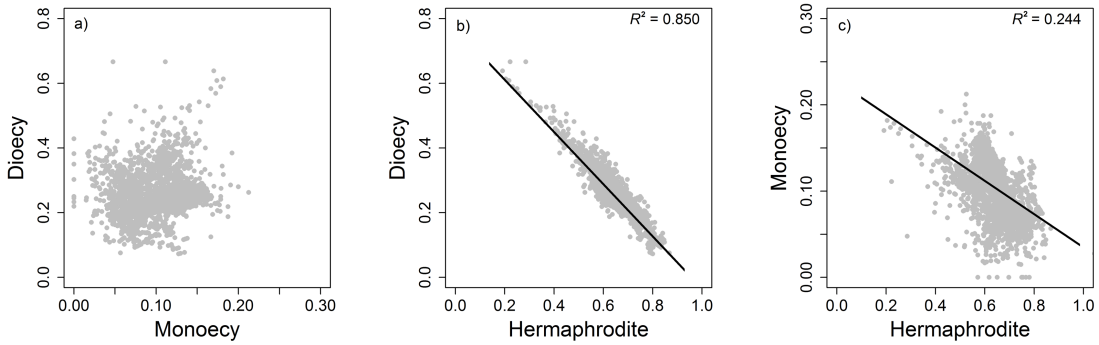

Figure S2 Relationships between the per-grid proportions of angiosperm woody species with different sexual systems and phylogenetic diversity. The y-axes represent the per-grid proportion of woody species with different sexual systems. From top down: Per.D, proportion of dioecy; Per.M, proportion of monoecy; Per.H, proportion of hermaphroditism. The x -axes represent Faith's phylogenetic diversity (PD) and net relatedness index (NRI). Univariate Ordinary Least-Squares regressions suggest that all relationships are not significant ($P > 0.05$).

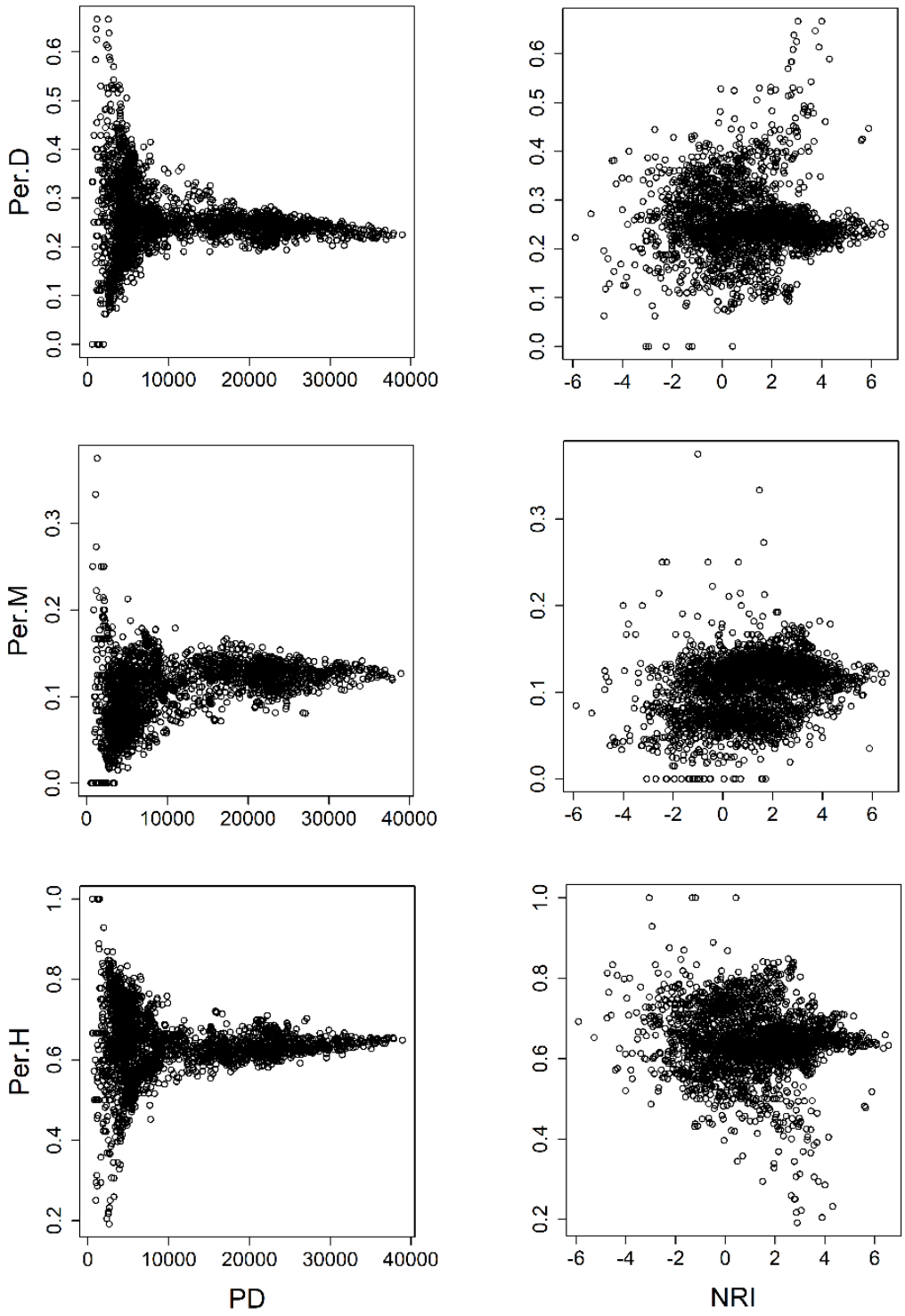

Figure S3 Comparison between the proportions of species with different sexual systems across different groups of plant genus ages. Corresponding genus ages are shown under the x axis. a), the whole study area; b), non-humid region (annual precipitation < 800 mm); and c) humid region (annual precipitation > 800 mm).