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Appendix 1

Table A1. Geographic patterns of stoichiometric ratios of the four base cations of *Artemisia* species and their close relatives across northern China.

Variable	Predictors	Estimate		t-value	MCMC p-value
		REML	MCMC		
K:Na	Intercept	-8.153(3.717)	-8.042(-16.683, -1.238)	-2.193	0.040
	Longitude	4.564(1.492)	4.487(1.497, 7.533)	3.059	0.003
	Latitude	-0.218(1.187)	-0.181(-2.582, 2.191)	-0.184	0.863
	Altitude	0.229(0.180)	0.225(-0.150, 0.538)	1.27	0.209
K:Ca	Intercept	-0.085(1.386)	-0.073(-2.852, 2.680)	-0.061	0.911
	Longitude	0.754(0.563)	0.749(-0.305, 1.985)	1.339	0.163
	Latitude	-0.575(0.439)	-0.572(-1.394, 0.233)	-1.312	0.180
	Altitude	-0.074(0.067)	-0.077(-0.207, 0.060)	-1.11	0.229
K:Mg	Intercept	-1.445(1.758)	-1.402(-4.777, 1.668)	-0.822	0.423
	Longitude	1.381(0.711)	1.357(-0.061, 2.767)	1.942	0.069
	Latitude	-0.402(0.558)	-0.393(-1.490, 0.678)	-0.72	0.463
	Altitude	0.083(0.085)	0.081(-0.077, 0.239)	0.976	0.334
Na:Ca	Intercept	8.315(3.494)	8.544(2.335, 15.885)	2.380	0.014
	Longitude	-3.940(1.405)	-3.999(-6.609, -1.152)	-2.804	0.009
	Latitude	-0.296(1.114)	-0.340(-2.504, 1.832)	-0.266	0.771
	Altitude	-0.329(0.169)	-0.341(-0.655, 0.011)	-1.942	0.051
Na:Mg	Intercept	6.660(3.062)	6.582(0.685, 12.714)	2.175	0.031
	Longitude	-3.120(1.237)	-3.179(-5.635, -0.642)	-2.586	0.014
	Latitude	-0.114(0.973)	-0.085(-2.051, 1.841)	-0.117	0.957
	Altitude	-0.157(0.148)	-0.159(-0.456, 0.114)	-1.062	0.306
Ca:Mg	Intercept	-1.280(1.246)	-1.358(-3.805, 1.028)	0.031	0.317
	Longitude	0.619(0.509)	0.632(-0.429, 1.549)	0.014	0.240
	Latitude	0.134(0.393)	0.158(-0.631, 0.859)	0.957	0.694
	Altitude	0.157(0.060)	0.162(0.046, 0.278)	0.306	0.009

Restricted maximum likelihood (REML, estimate with standard error in parentheses) and Markov chain Monte Carlo (MCMC, estimate with HPD 95% intervals in parentheses) parameter estimates and their statistical significance for the fixed effects. MCMC p-values correspond to twice the proportion of iterations in which the posterior distribution was positive (if posterior mode was negative) or negative (if posterior mode was positive) during 10 000 iterations. The significant or marginally significant pattern is shown in bold. Sample size was 569 for all stoichiometric ratios.

Table A2. Mean concentrations (SD in bracket) of the four base cations of *Artemisia* species and their close relatives across northern China.

Species	K	Na	Ca	Mg
<i>Ajania achilloides</i>	17.200(1.195)	0.525(0.038)	7.918(0.131)	1.894(0.17)
<i>Ajania breviloba</i>	14.554(2.376)	0.803(0.140)	9.598(2.139)	2.07(0.377)
<i>Ajania parviflora</i>	21.551(1.172)	0.578(0.361)	9.763(1.206)	2.042(0.367)
<i>Ajania przewalskii</i>	18.737(2.736)	1.405(0.568)	8.548(0.965)	1.493(0.347)
<i>Artemisia adamsii</i>	13.439(2.221)	0.379(0.043)	7.328(1.08)	1.264(0.236)
<i>Artemisia anethifolia</i>	15.238(1.447)	2.407(1.863)	9.61(2.293)	2.436(1.048)
<i>Artemisia angustissima</i>	24.428(5.721)	0.795(0.481)	9.244(2.781)	1.522(0.31)
<i>Artemisia annua</i>	17.465(4.123)	0.437(0.216)	7.103(2.894)	1.826(0.924)
<i>Artemisia argyi</i>	20.284(5.678)	0.564(0.339)	7.851(1.301)	1.871(0.53)
<i>Artemisia blepharolepis</i>	21.852(4.966)	0.661(0.302)	8.18(4.505)	1.923(0.984)
<i>Artemisia brachyloba</i>	23.653(6.624)	0.455(0.284)	13.612(3.204)	1.697(0.376)
<i>Artemisia capillaris</i>	23.829(9.58)	0.813(0.934)	9.115(2.46)	1.78(0.587)
<i>Artemisia commutata</i>	18.584(3.006)	1.684(1.544)	11.659(2.98)	1.908(0.533)
<i>Artemisia desertorum</i>	18.053(2.559)	3.536(1.45)	7.656(0.207)	1.71(0.321)
<i>Artemisia dubia</i>	12.418(3.774)	1.109(1.072)	7.307(1.96)	1.545(0.342)
<i>Artemisia frigida</i>	16.828(1.909)	0.349(0.085)	8.449(2.393)	1.829(0.317)
<i>Artemisia gansuensis</i>	15.977(1.447)	1.096(0.993)	10.124(1.207)	3.046(0.727)
<i>Artemisia giraldii</i>	13.111(3.72)	0.555(0.45)	9.206(2.045)	1.922(0.69)
<i>Artemisia gmelinii</i>	20.409(1.098)	0.216(0.096)	7.024(0.654)	2.167(0.238)
<i>Artemisia halodendron</i>	16.669(1.163)	0.301(0.041)	7.667(1.217)	1.005(0.196)
<i>Artemisia hedinii</i>	29.12(4.192)	0.555(0.296)	9.341(0.827)	2.748(0.471)
<i>Artemisia igniaria</i>	23.437(1.65)	0.832(0.116)	8.567(1.321)	1.543(0.165)
<i>Artemisia japonica</i>	26.292(10.714)	0.383(0.061)	10.384(1.922)	1.239(0.199)
<i>Artemisia kanashiroi</i>	10.535(2.251)	0.381(0.161)	5.978(0.6)	1.11(0.205)
<i>Artemisia lancea</i>	15.413(1.232)	1.256(1.791)	8.649(0.751)	1.55(0.475)
<i>Artemisia lavandulifolia</i>	16.926(3.338)	0.444(0.29)	9.684(2.624)	2.49(0.705)
<i>Artemisia leucophylla</i>	15.802(2.22)	0.273(0.086)	10.368(1.46)	2.249(0.364)
<i>Artemisia mongolica</i>	24.928(8.454)	0.559(0.495)	8.86(2.966)	2.523(0.923)
<i>Artemisia ordosica</i>	18.032(4.665)	0.503(0.241)	8.379(1.033)	1.341(0.224)
<i>Artemisia palustris</i>	20.906(1.256)	0.395(0.074)	12.376(1.28)	2.072(0.153)
<i>Artemisia phaeolepis</i>	23.651(1.277)	0.699(0.157)	15.717(2.193)	2.804(0.196)
<i>Artemisia pubescens</i>	13.902(1.93)	2.171(1.786)	7.606(2.81)	2.522(0.98)
<i>Artemisia roxburghiana</i>	28.764(3.264)	0.932(0.338)	11.647(0.26)	1.958(0.433)
<i>Artemisia rubripes</i>	19.643(5.095)	0.628(0.641)	9.067(2.326)	2.072(0.713)
<i>Artemisia sacrorum</i>	17.158(4.734)	0.465(0.265)	8.524(2.647)	1.937(0.88)
<i>Artemisia scoparia</i>	16.876(3.788)	0.483(0.263)	9.244(1.903)	1.661(0.599)
<i>Artemisia selengensis</i>	18.887(12.553)	0.548(0.263)	10.763(3.132)	3.569(1.424)
<i>Artemisia sieversiana</i>	24.289(8.938)	0.894(0.985)	10.129(3.078)	2.471(1.045)
<i>Artemisia subulata</i>	20.967(1.008)	0.498(0.087)	11.367(0.758)	2.761(0.276)
<i>Hippolytia trifida</i>	11.491(2.419)	2.591(0.991)	13.872(2.118)	2.769(0.125)

<i>Neopallasia pectinata</i>	15.623(4.056)	0.734(0.537)	11.077(1.885)	2.18(0.676)
<i>Seriphidium finitum</i>	13.055(1.002)	0.336(0.008)	8.155(0.631)	1.385(0.092)
<i>Seriphidium gracilescens</i>	12.324(0.71)	2.826(0.082)	8.807(1.167)	2.164(0.166)
<i>Seriphidium lehmannianum</i>	18.592(3.279)	1.14(0.253)	11.494(1.644)	1.968(0.257)
<i>Seriphidium nitrosum</i>	25.009(7.535)	1.331(0.427)	12.387(4.782)	2.383(0.597)
<i>Seriphidium santolinum</i>	15.732(3.694)	1.12(0.152)	8.369(2.683)	2.818(0.956)
<i>Seriphidium terrae-albae</i>	15.871(6.082)	3.4(3.074)	10.17(3.029)	2.243(1.039)

Table A3. Mean stoichiometric ratios (SD in bracket) of the four base cations of *Artemisia* species and their close relatives across northern China.

Species	K:Na	K:Ca	K:Mg	Na:Ca	Na:Mg	Ca:Mg
<i>Ajania achilloides</i>	32.978(4.518)	2.174(0.182)	9.16(1.338)	0.066(0.004)	0.278(0.026)	4.2(0.321)
<i>Ajania breviloba</i>	18.752(5.897)	1.543(0.289)	7.126(1.415)	0.085(0.02)	0.391(0.068)	4.618(0.242)
<i>Ajania parviflora</i>	50.788(35.523)	2.221(0.178)	10.713(1.354)	0.057(0.03)	0.272(0.131)	4.812(0.248)
<i>Ajania przewalskii</i>	15.09(6.97)	2.215(0.454)	12.866(2.368)	0.17(0.081)	1.004(0.499)	5.899(1.238)
<i>Artemisia adamsii</i>	35.977(8.783)	1.831(0.092)	10.679(0.551)	0.053(0.011)	0.308(0.071)	5.851(0.59)
<i>Artemisia anethifolia</i>	17.513(18.764)	1.676(0.481)	7.586(4.005)	0.223(0.156)	0.84(0.483)	4.328(1.252)
<i>Artemisia angustissima</i>	37.675(14.642)	2.702(0.297)	16.101(2.207)	0.097(0.082)	0.58(0.491)	6.06(1.275)
<i>Artemisia annua</i>	50.05(26.345)	2.713(0.781)	11.217(3.923)	0.073(0.048)	0.312(0.239)	4.176(1.085)
<i>Artemisia argyi</i>	41.842(13.11)	2.575(0.428)	11.067(2.027)	0.074(0.052)	0.316(0.214)	4.303(0.504)
<i>Artemisia blepharolepis</i>	36.243(10.79)	3.364(1.919)	13.988(7.854)	0.105(0.07)	0.433(0.281)	4.206(0.173)
<i>Artemisia brachyloba</i>	62.924(25.09)	1.813(0.649)	14.998(6.266)	0.032(0.016)	0.277(0.166)	8.145(1.697)
<i>Artemisia capillaris</i>	55.063(53.07)	2.699(0.975)	14.124(5.372)	0.119(0.206)	0.531(0.743)	5.565(2.238)
<i>Artemisia commutata</i>	34.832(34.484)	1.659(0.382)	10.226(2.58)	0.181(0.196)	1.156(1.241)	6.17(0.514)
<i>Artemisia desertorum</i>	6.171(3.986)	2.363(0.379)	10.939(3.107)	0.459(0.179)	2.098(0.962)	4.574(0.791)
<i>Artemisia dubia</i>	24.089(26.682)	1.691(0.063)	7.964(0.679)	0.178(0.194)	0.815(0.874)	4.705(0.227)
<i>Artemisia frigida</i>	50.519(11.653)	2.113(0.541)	9.44(1.814)	0.042(0.007)	0.194(0.045)	4.634(0.936)
<i>Artemisia gansuensis</i>	25.923(21.356)	1.602(0.326)	5.364(0.756)	0.117(0.118)	0.324(0.229)	3.492(1.064)
<i>Artemisia giraldii</i>	32.66(16.166)	1.516(0.719)	7.566(3.876)	0.064(0.052)	0.303(0.197)	5.115(1.243)
<i>Artemisia gmelinii</i>	103.741(41.254)	2.911(0.115)	9.502(1.549)	0.03(0.011)	0.103(0.056)	3.277(0.661)
<i>Artemisia halodendron</i>	55.658(4.259)	2.209(0.379)	17.04(3.846)	0.04(0.006)	0.306(0.064)	7.67(0.397)
<i>Artemisia hedinii</i>	62.905(24.493)	3.162(0.715)	10.744(1.652)	0.061(0.037)	0.197(0.092)	3.479(0.637)
<i>Artemisia igniaria</i>	28.673(5.035)	2.795(0.513)	15.336(1.952)	0.098(0.012)	0.539(0.036)	5.538(0.442)

<i>Artemisia japonica</i>	72.071(38.667)	2.629(1.193)	21.308(7.592)	0.037(0.005)	0.315(0.063)	8.591(2.215)
<i>Artemisia kanashiroi</i>	29.987(7.764)	1.764(0.318)	9.826(2.877)	0.063(0.023)	0.352(0.154)	5.487(0.706)
<i>Artemisia lancea</i>	33.984(21.982)	1.795(0.252)	10.696(3.473)	0.138(0.189)	0.681(0.804)	5.874(1.277)
<i>Artemisia lavandulifolia</i>	45.755(15.147)	1.901(0.699)	7.427(2.843)	0.047(0.023)	0.186(0.109)	4.036(1.175)
<i>Artemisia leucophylla</i>	67.659(36.653)	1.564(0.374)	7.212(1.548)	0.026(0.007)	0.123(0.038)	4.665(0.684)
<i>Artemisia mongolica</i>	64.875(39.149)	2.974(0.961)	10.701(3.828)	0.064(0.044)	0.24(0.18)	3.858(1.465)
<i>Artemisia ordosica</i>	41.918(19.243)	2.159(0.55)	13.646(3.876)	0.061(0.033)	0.376(0.172)	6.335(0.796)
<i>Artemisia palustris</i>	53.952(9.526)	1.708(0.266)	10.103(0.432)	0.032(0.009)	0.192(0.041)	6.014(0.981)
<i>Artemisia phaeolepis</i>	34.482(5.899)	1.514(0.13)	8.439(0.133)	0.044(0.004)	0.248(0.039)	5.591(0.392)
<i>Artemisia pubescens</i>	14.249(15.098)	2.032(0.678)	6.196(2.164)	0.391(0.41)	0.86(0.773)	3.575(1.959)
<i>Artemisia roxburghiana</i>	33.859(12.787)	2.471(0.298)	15.265(4.075)	0.08(0.03)	0.468(0.067)	6.143(1.335)
<i>Artemisia rubripes</i>	47.382(26.53)	2.25(0.584)	10.128(2.896)	0.071(0.069)	0.29(0.218)	4.64(1.33)
<i>Artemisia sacrorum</i>	47.623(28.862)	2.166(0.777)	10.393(4.764)	0.061(0.045)	0.265(0.165)	4.806(1.479)
<i>Artemisia scoparia</i>	42.61(18.225)	1.888(0.51)	11.225(3.945)	0.055(0.033)	0.313(0.183)	6.072(1.865)
<i>Artemisia selengensis</i>	33.202(8.147)	1.655(0.63)	7.002(7.244)	0.049(0.009)	0.192(0.169)	3.606(2.53)
<i>Artemisia sieversiana</i>	52.176(35.49)	2.488(0.736)	10.627(3.754)	0.117(0.164)	0.525(0.787)	4.492(1.525)
<i>Artemisia subulata</i>	43.054(8.271)	1.847(0.065)	7.637(0.701)	0.044(0.008)	0.18(0.023)	4.131(0.255)
<i>Hippolytia trifida</i>	4.97(2.249)	0.848(0.242)	4.167(0.965)	0.183(0.042)	0.927(0.31)	4.993(0.532)
<i>Neopallasia pectinata</i>	30.05(19.183)	1.438(0.432)	7.698(2.672)	0.066(0.049)	0.348(0.236)	5.425(1.372)
<i>Seriphidium finitum</i>	38.81(2.105)	1.61(0.247)	9.468(1.355)	0.041(0.004)	0.243(0.022)	5.884(0.063)
<i>Seriphidium gracilescens</i>	4.359(0.139)	1.412(0.158)	5.702(0.121)	0.324(0.036)	1.309(0.064)	4.069(0.442)
<i>Seriphidium lehmannianum</i>	17.393(7.376)	1.648(0.443)	9.696(2.938)	0.1(0.022)	0.575(0.066)	5.892(1.006)
<i>Seriphidium nitrosum</i>	19.982(6.585)	2.135(0.489)	10.425(0.837)	0.121(0.069)	0.577(0.221)	5.067(1.08)
<i>Seriphidium santolinum</i>	13.923(1.675)	1.923(0.322)	5.764(0.806)	0.14(0.031)	0.423(0.114)	3.053(0.622)
<i>Seriphidium terrae-albae</i>	13.508(14.995)	1.83(1.088)	9.734(6.97)	0.304(0.206)	1.316(0.684)	4.93(1.252)

Table A4. Effects of the first two principle components of climate on the four base cations and stoichiometric ratios of *Artemisia* species and their close relatives across northern China.

Variable	Predictors	Estimate		t-value	MCMC p-value
		REML	MCMC		
Base cations					
K	Intercept	1.253(0.011)	1.253(1.233,1.273)	117.88	<0.001
	PC1	-0.003(0.004)	-0.003(-0.011,0.005)	-0.78	0.460
	PC2	0.011(0.005)	0.010(0.001,0.021)	1.94	0.048
	PC1×PC2	0.004(0.002)	0.004(0.001,0.008)	2.22	0.020
Na	Intercept	-0.243(0.031)	-0.244(-0.303,-0.185)	-7.796	<0.001
	PC1	-0.015(0.012)	-0.016(-0.040,0.005)	-1.285	0.160
	PC2	0.032(0.016)	0.032(-0.001, 0.061)	1.971	0.045
	PC1×PC2	0.001(0.006)	0.002(-0.009,0.013)	0.240	0.754
Ca	Intercept	0.949(0.008)	0.949(0.933,0.966)	113.12	<0.001
	PC1	-0.009(0.003)	-0.009(-0.015,-0.003)	-2.81	0.002
	PC2	0.014(0.004)	0.014(0.006,0.022)	3.28	<0.001
	PC1×PC2	-0.0001(0.002)	-0.0001(-0.003,0.003)	-0.06	0.966
Mg	Intercept	0.271(0.012)	0.271(0.245,0.292)	23.262	<0.001
	PC1	-0.002(0.004)	-0.002(-0.010,0.007)	-0.465	0.629
	PC2	0.009(0.006)	0.009(-0.002,0.020)	1.567	0.131
	PC1×PC2	-0.001(0.002)	-0.001(-0.005,0.003)	-0.382	0.740
Stoichiometric ratios					
K:Na	Intercept	1.496(0.034)	1.495(1.434, 1.564)	43.96	<0.001
	PC1	0.012(0.013)	0.011(-0.015, 0.036)	0.92	0.389
	PC2	-0.022(0.018)	-0.022(-0.056, 0.014)	-1.23	0.223
	PC1×PC2	0.003(0.006)	0.003(-0.009, 0.015)	0.50	0.640
K:Ca	Intercept	0.303(0.012)	0.304(0.280, 0.326)	25.317	<0.001
	PC1	0.006(0.004)	0.006(-0.003, 0.014)	1.278	0.186
	PC2	-0.003(0.006)	-0.003(-0.015, 0.008)	-0.554	0.571
	PC1×PC2	0.004(0.002)	0.004(5.32E-05, 0.008)	1.991	0.051
K:Mg	Intercept	0.981(0.015)	0.980(0.949, 1.010)	64.1	<0.001
	PC1	-0.001(0.006)	-0.001(-0.012, 0.010)	-0.18	0.860
	PC2	0.001(0.008)	0.0008(-0.016, 0.015)	0.11	0.914
	PC1×PC2	0.005(0.003)	0.005(-0.0002, 0.011)	1.87	0.063
Na:Ca	Intercept	-1.193(0.032)	-1.195(-1.261, -1.140)	-37.6	<0.001
	PC1	-0.006(0.012)	-0.006(-0.029, 0.016)	-0.5	0.637
	PC2	0.017(0.016)	0.017(-0.018, 0.048)	1.06	0.286

	PC1×PC2	0.002(0.006)	0.001(-0.010, 0.013)	0.27	0.783
Na:Mg	Intercept	-0.518(0.027)	-0.518(-0.574, -0.467)	-18.876	<0.001
	PC1	-0.012(0.010)	-0.012(-0.031, 0.011)	-1.17	0.283
	PC2	0.022(0.014)	0.021(-0.009, 0.048)	1.533	0.126
	PC1×PC2	0.003(0.005)	0.003(-0.006, 0.013)	0.522	0.611
Ca:Mg	Intercept	0.678(0.011)	0.678(0.656, 0.699)	61.47	<0.001
	PC1	-0.007(0.004)	-0.007(-0.014, 0.002)	-1.65	0.103
	PC2	0.005(0.006)	0.005(-0.006, 0.016)	0.84	0.451
	PC1×PC2	0.001(0.002)	0.001(-0.003, 0.005)	0.35	0.729

Restricted maximum likelihood (REML, estimate with standard error in parentheses) and Markov chain Monte Carlo (MCMC, estimate with HPD 95% intervals in parentheses) parameter estimates and their statistical significance for the fixed effects. MCMC p-values correspond to twice the proportion of iterations in which the posterior distribution was positive (if posterior mode was negative) or negative (if posterior mode was positive) during 10 000 iterations. The significant or marginally significant effect is shown in bold. Sample size was 569 for all base cations and stoichiometric ratios.

Table A5. Effects of soil organic carbon (SOC) and pH on stoichiometric ratios of the four base cations and stoichiometric ratios of *Artemisia* species and their close relatives across northern China.

Variable	Predictors	Estimate		t-value	MCMC p-value
		REML	MCMC		
Base cations					
K	Intercept	0.795(0.231)	0.792(0.285, 1.249)	3.436	0.003
	SOC	-2.105(0.721)	-2.144(-3.565, -0.526)	-2.92	0.003
	pH	0.538(0.271)	0.541(-0.005, 1.121)	1.987	0.043
	SOC×pH	2.475(0.850)	2.517(0.630, 4.196)	2.912	0.003
Na	Intercept	-0.480(0.642)	-0.481(-1.780, 0.680)	-0.748	0.457
	SOC	0.799(2.015)	0.916(-3.377, 4.626)	0.396	0.623
	pH	0.239(0.751)	0.240(-1.138, 1.749)	0.318	0.737
	SOC×pH	-1.118(2.380)	-1.248(-6.107, 3.389)	-0.47	0.560
Ca	Intercept	1.210(0.202)	1.216(0.809, 1.604)	5.986	<0.001
	SOC	0.665(0.630)	0.690(-0.376, 1.939)	1.055	0.283
	pH	-0.306(0.237)	-0.313(-0.797, 0.152)	-1.293	0.200
	SOC×pH	-0.782(0.743)	-0.815(-2.161, 0.577)	-1.053	0.286
Mg	Intercept	0.484(0.245)	0.474(-0.079, 0.951)	1.976	0.069
	SOC	0.617(0.763)	0.628(-0.975, 2.186)	0.809	0.417
	pH	-0.262(0.287)	-0.250(-0.804, 0.401)	-0.914	0.346
	SOC×pH	-0.790(0.899)	-0.802(-2.621, 1.059)	-0.879	0.391
Stoichio metric ratios					
K:Na	Intercept	1.013(0.684)	1.037(-0.277, 2.405)	1.480	0.169
	SOC	-3.701(2.145)	-3.547(-7.250, 0.840)	-1.726	0.106
	pH	0.604(0.801)	0.573(-0.850, 2.238)	0.754	0.500
	SOC×pH	4.512(2.532)	4.318(-0.777, 8.813)	1.782	0.086
K:Ca	Intercept	-0.374(0.256)	-0.375(-0.890, 0.128)	-1.458	0.126
	SOC	-2.639(0.798)	-2.635(-4.068, -0.749)	-3.305	<0.001
	pH	0.796(0.300)	0.796(0.183, 1.392)	2.652	0.009
	SOC×pH	3.105(0.941)	3.103(1.310, 5.245)	3.299	<0.001
K:Mg	Intercept	0.375(0.311)	0.375(-0.187, 0.983)	1.203	0.200
	SOC	-2.534(0.970)	-2.500(-4.490, -0.721)	-2.613	0.009
	pH	0.726(0.364)	0.725(0.00008, 1.380)	1.993	0.031
	SOC×pH	3.050(1.143)	3.010(0.773, 5.210)	2.667	0.009
Na:Ca	Intercept	-1.577(0.644)	-1.599(-2.814, -0.340)	-2.449	0.017
	SOC	0.515(2.014)	0.551(-3.606, 4.175)	0.256	0.751
	pH	0.412(0.754)	0.438(-1.063, 1.865)	0.547	0.537

Na:Mg	SOC×pH	-0.770(2.376)	-0.808(-5.159,4.024)	-0.324	0.700
	Intercept	-0.703(0.575)	-0.682(-1.711, 0.348)	-1.222	0.194
	SOC	0.956(1.795)	0.975(-2.755, 4.175)	0.533	0.540
	pH	0.194(0.673)	0.170(-1.016, 1.344)	0.289	0.791
Ca:Mg	SOC×pH	-1.211(2.116)	-1.232(-5.217, 2.922)	-0.572	0.514
	Intercept	0.730(0.236)	0.724(0.316, 1.245)	3.086	0.006
	SOC	0.084(0.736)	0.110(-1.239, 1.575)	0.115	0.871
	pH	-0.048(0.277)	-0.041(-0.661, 0.432)	-0.174	0.891
	SOC×pH	-0.034(0.868)	-0.061(-1.646, 1.671)	-0.039	0.937

Restricted maximum likelihood (REML, estimate with standard error in parentheses) and Markov chain Monte Carlo (MCMC, estimate with HPD 95% intervals in parentheses) parameter estimates and their statistical significance for the fixed effects. MCMC p-values correspond to twice the proportion of iterations in which the posterior distribution was positive (if posterior mode was negative) or negative (if posterior mode was positive) during 10 000 iterations. The significant or marginally significant effect is shown in bold. Sample size was 569 for all base cations and stoichiometric ratios.

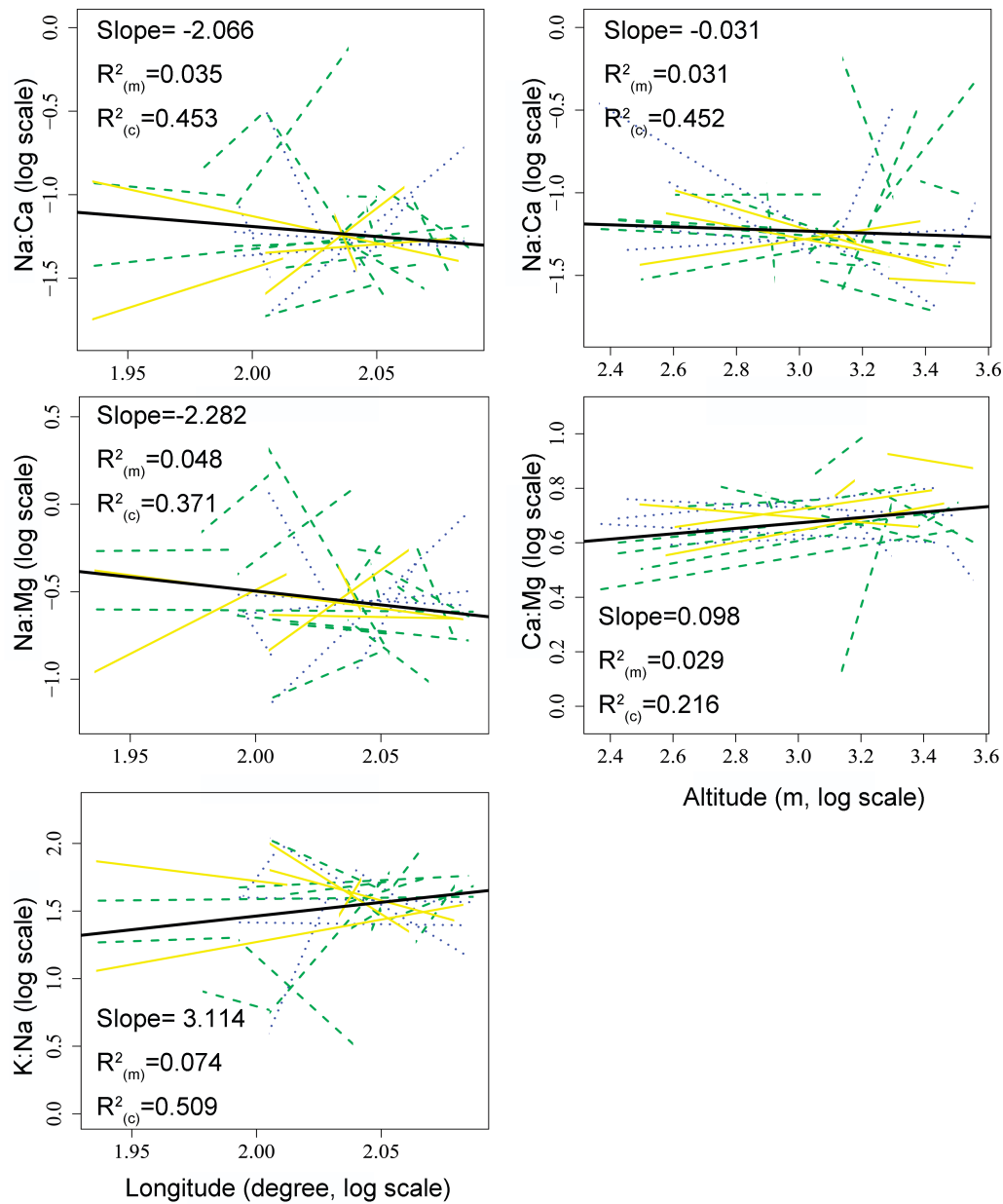


Figure A1. Plots of the significant geographical patterns of stoichiometry of the base cations of *Artemisia* species across northern China. Black lines are the regression lines ($p < 0.05$) of pooled species. Regression lines for each species are also shown: blue dotted lines for annuals, green dashed lines for perennials and yellow solid lines for semi-shrubs. $R^2_{(m)}$, marginal R^2 ; $R^2_{(c)}$, conditional R^2 . Note that regression lines for species that occurred in fewer than three sites are not shown.

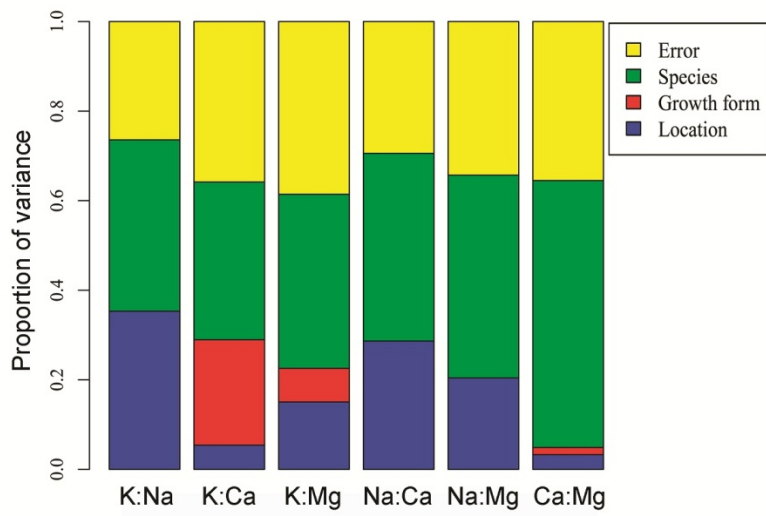


Figure A2. Variance partition of species, growth form and site on stoichiometry of the four base cations of *Artemisia* species and their close relatives across northern China. Variance partition was performed on the nested models (see Material and methods).

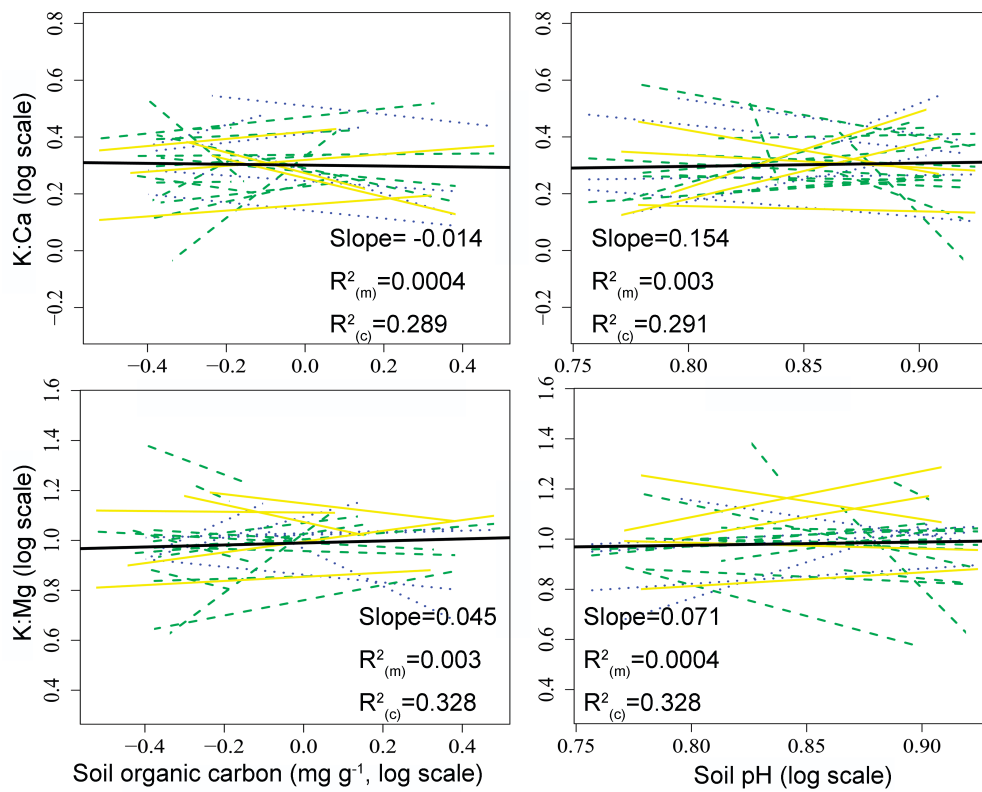


Figure A3. Effects of soil organic carbon and pH on K:Ca and K:Mg of *Artemisia* species across northern China. Black lines are the regression lines ($p < 0.05$) of pooled species. Regression lines for each species are also shown: blue dotted lines for annuals, green dashed lines for perennials and yellow solid lines for semi-shrubs. $R^2_{(m)}$, marginal R^2 ; $R^2_{(c)}$, conditional R^2 . Note that regression lines for species that occurred in fewer than three sites are not shown.