

附录1 13个地理居群川续断形态特征的变异系数(包括川续断同一形态特征在居群内的变异系数均值(MCVS_w)、同一形态特征在居群间的变异系数(CVE_A)及同一居群内不同特征的变异系数均值(MCVD_w))

Appendix 1 Coefficients of variation for morphological traits across 13 geographic populations of *Dipsacus asper* (including mean *CV* for same traits within population, MCVS_w, *CV* for each traits among population, CVE_A, and mean *CV* for different traits within population, MCVD_w)

形态特征 Morphological traits	习水 Xishui (XS)	贵阳 Guiyang (GY)	西昌 Xichang (XC)	建始 Jianshi (JS)	麻栗坡 Malipo (MLP)	昆明 Kunming (KM)	丽江 Lijiang (LJ)	盐源 Yanyuan (YY)	喜德 Xide (XD)	大理 Dali (DL)	汶川 Wenchuan (WC)	小金 Xiaojin (XJ)	香格里拉 Shangri-La (SGRL)	MCVS _w	CVE _A
植株高度 Plant height	13.45	19.01	16.90	8.26	18.03	19.77	12.63	18.08	17.55	30.36	7.57	17.23	23.19	17.08	25.34
茎直径 Stem diameter	25.90	17.05	26.30	18.75	22.99	16.97	28.35	36.08	22.49	26.21	17.64	22.49	20.19	23.19	34.46
叶片长 Leaf length	20.82	29.34	26.22	22.48	25.53	24.87	18.20	27.01	22.99	35.09	19.64	18.49	28.95	24.59	33.24
叶片宽 Leaf width	19.95	34.67	21.41	37.33	27.91	35.51	30.00	27.62	30.32	43.99	24.44	19.37	22.33	28.84	41.91
花序竖直直径 Inflorescence vertical length	8.93	13.90	8.17	13.01	11.28	9.26	5.49	9.62	9.46	7.87	9.88	10.28	18.81	10.46	17.43
花序水平直径 Inflorescence horizontal length	10.26	11.45	6.10	13.94	9.87	6.86	5.99	7.56	17.18	8.20	8.53	10.71	15.13	10.14	17.22
花管长 Floral tube length	13.94	12.15	12.23	17.20	9.77	15.44	7.86	16.50	17.32	10.87	10.19	30.69	10.92	14.24	36.12
花冠长 Corolla length	16.92	10.98	22.30	19.36	12.73	18.34	11.31	16.49	21.31	27.55	17.52	21.73	15.34	17.84	22.68
花冠宽 Corolla width	17.28	11.48	23.05	25.77	10.18	20.54	33.17	21.32	24.79	12.11	16.62	16.28	15.37	19.07	24.67
雄蕊长 Stamen length	11.46	12.85	10.30	20.85	6.93	8.12	12.08	13.09	16.91	18.29	9.19	24.81	11.27	13.55	17.36
花柱长 Style length	13.78	8.71	15.57	16.92	12.28	9.34	12.04	23.99	18.34	10.07	12.87	13.68	12.04	13.82	19.97
MCVD _w	15.70	16.51	17.14	19.44	15.23	16.82	16.10	19.76	19.88	20.97	14.01	18.71	17.59	17.53	26.40

附录2 8个川续断居群中弗里熊蜂虫体特征的比较(平均值 ± 标准误, 单位: mm; 采用广义线性模型分析)。同行不同小写字母表示某特征在不同居群间差异显著; 同一特征的最大平均值以加粗字体突出显示。

Appendix 2 Comparison of morphological traits of *Bombus friseanus* across eight *Dipsacus asper* populations (mean ± SE, unit: mm; analyzed using generalized linear models). Different lowercase letters within the same row indicate significant differences in that trait among populations, and the largest mean value for each trait is highlighted in bold.

虫体特征	西昌	建始	昆明	盐源	喜德	大理	汶川	小金	Wald χ^2	df	P
Morphological traits	Xichang (XC)	Jianshi (JS)	Kunming (KM)	Yanyuan (YY)	Xide (XD)	Dali (DL)	Wenchuan (WC)	Xiaojin (XJ)			
体长 Body length	17.69 ± 0.31^a	17.81 ± 0.45^a	16.32 ± 0.48 ^{bcd}	17.42 ± 0.40^{ab}	16.12 ± 0.41 ^{cd}	16.81 ± 0.81 ^{abc}	15.88 ± 0.45 ^{cd}	15.39 ± 0.33 ^d	41.76	7	< 0.001
吻长 Proboscis length	6.72 ± 0.20 ^{bc}	7.15 ± 0.30^{ab}	7.83 ± 0.32^a	6.45 ± 0.27 ^{bc}	7.25 ± 0.27^{ab}	6.69 ± 0.54 ^{bc}	6.19 ± 0.30 ^{cd}	5.60 ± 0.22 ^d	47.85	7	< 0.001
头长 Head length	4.77 ± 0.10^{ab}	4.92 ± 0.15^a	4.29 ± 0.16 ^{cde}	4.64 ± 0.13^{abc}	4.48 ± 0.14 ^{bcd}	4.00 ± 0.27 ^e	4.29 ± 0.15 ^{cde}	4.10 ± 0.11 ^{de}	37.91	7	< 0.001
头宽 Head width	3.87 ± 0.07^{ab}	4.00 ± 0.10^a	3.46 ± 0.11 ^{cd}	3.91 ± 0.09^a	3.61 ± 0.09 ^{bc}	3.31 ± 0.18 ^d	3.50 ± 0.10 ^{cd}	3.40 ± 0.07 ^{cd}	52.61	7	< 0.001
头厚 Head height	2.36 ± 0.09^{ab}	2.63 ± 0.13^a	1.66 ± 0.13 ^d	2.47 ± 0.11^{ab}	2.21 ± 0.12 ^b	1.80 ± 0.23 ^{cd}	2.17 ± 0.13 ^{bc}	2.23 ± 0.09 ^b	37.49	7	< 0.001
胸长 Thorax length	5.38 ± 0.12^{ab}	5.48 ± 0.18^a	5.01 ± 0.20^{abcd}	5.34 ± 0.16^{abc}	4.78 ± 0.16 ^{cd}	5.32 ± 0.32^{abcd}	4.76 ± 0.18 ^d	4.84 ± 0.13 ^{bcd}	23.64	7	< 0.001
胸宽 Thorax width	5.06 ± 0.10^a	4.85 ± 0.16^{ab}	4.36 ± 0.16 ^c	5.17 ± 0.14^a	4.85 ± 0.14^{ab}	4.92 ± 0.28^a	4.46 ± 0.16 ^{bc}	4.42 ± 0.11 ^{bc}	36.7	7	< 0.001
胸厚 Thorax height	4.83 ± 0.15^{ab}	4.94 ± 0.22^a	3.80 ± 0.23 ^c	4.84 ± 0.20^{ab}	3.78 ± 0.20 ^c	3.76 ± 0.39 ^c	4.25 ± 0.22 ^{bc}	4.11 ± 0.16 ^c	42.02	7	< 0.001
腹长 Abdomen length	7.54 ± 0.18^a	7.41 ± 0.27^a	7.01 ± 0.28^{ab}	7.45 ± 0.24^a	6.87 ± 0.24 ^{ab}	7.49 ± 0.47^a	6.84 ± 0.27 ^{ab}	6.45 ± 0.19 ^b	23.99	7	< 0.001
腹宽 Abdomen width	5.83 ± 0.14^a	5.57 ± 0.20^{ab}	4.73 ± 0.21 ^c	5.58 ± 0.18^{ab}	5.28 ± 0.18^{abc}	5.14 ± 0.36 ^{bc}	5.16 ± 0.20 ^{bc}	5.07 ± 0.14 ^{bc}	29.06	7	< 0.001
腹厚 Abdomen height	4.26 ± 0.11^a	4.24 ± 0.17^{ab}	3.12 ± 0.18 ^d	4.19 ± 0.15^{ab}	3.54 ± 0.15 ^{cd}	3.32 ± 0.29 ^{cd}	3.78 ± 0.17 ^{bc}	3.61 ± 0.12 ^c	53.06	7	< 0.001