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Supplementary Material

Article

Molecular Phylogeny and Historical Biogeography of the Butterfly Tribe Aeromachini Tutt (Lepidoptera: Hesperiidae) from China

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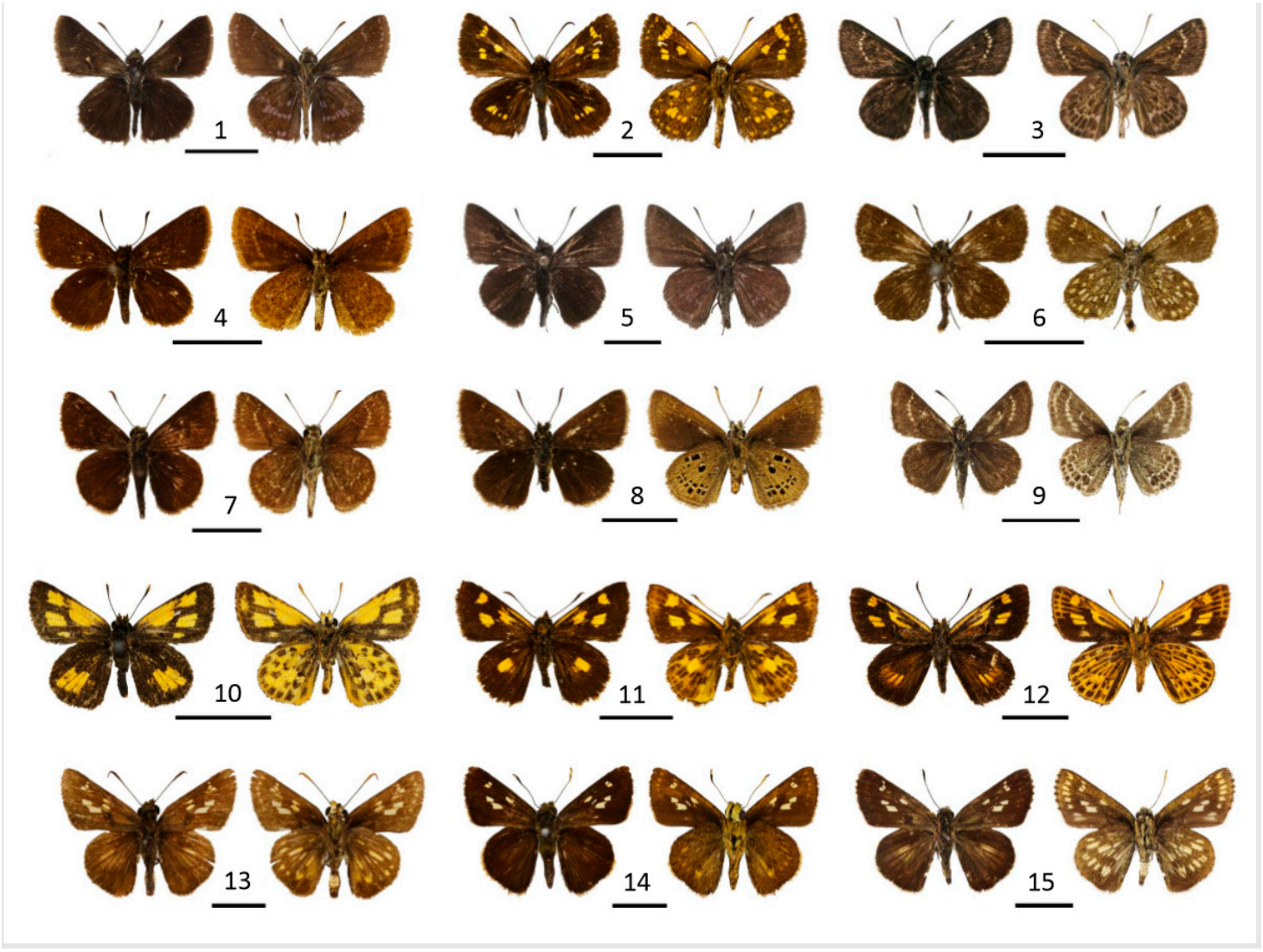
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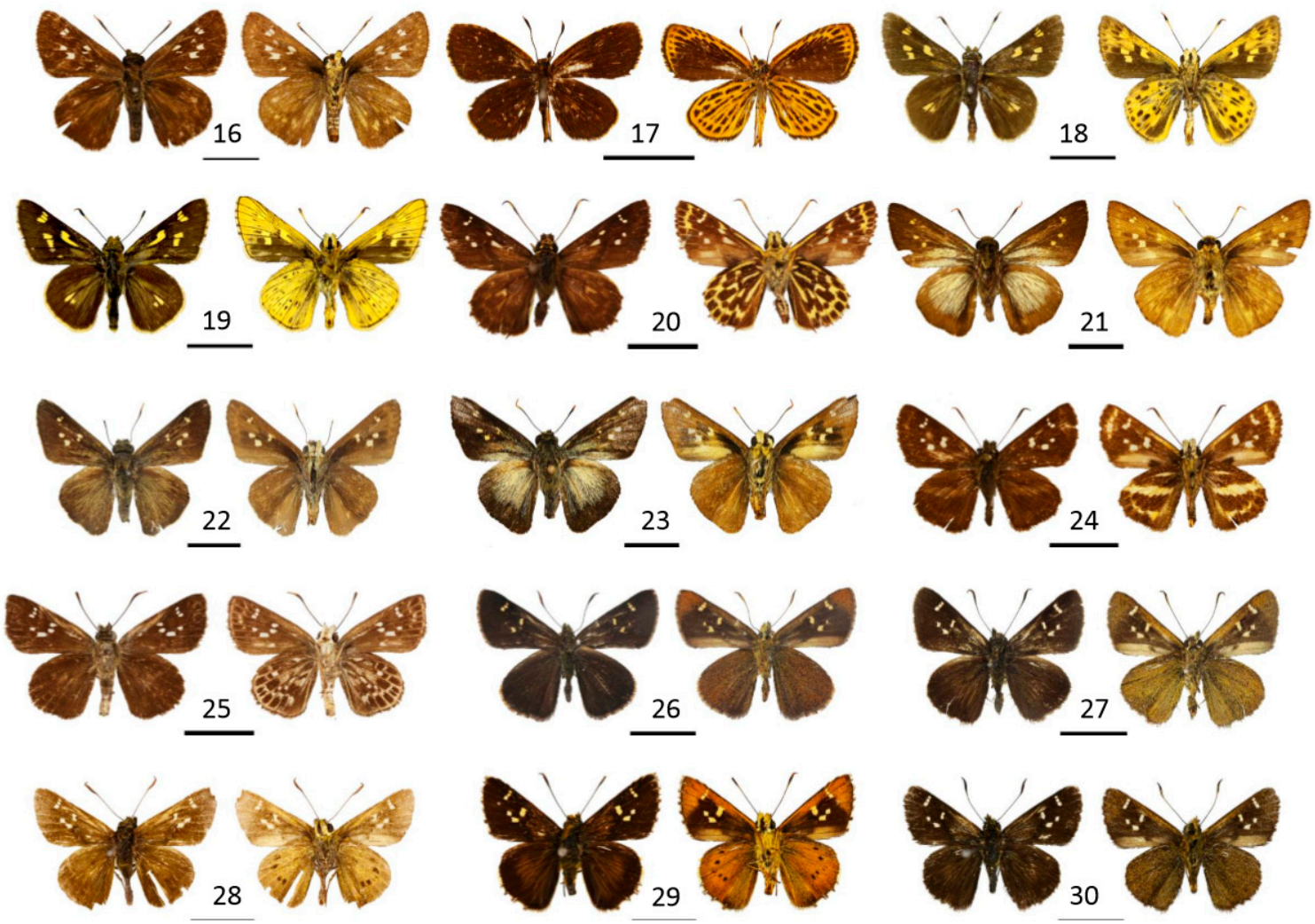
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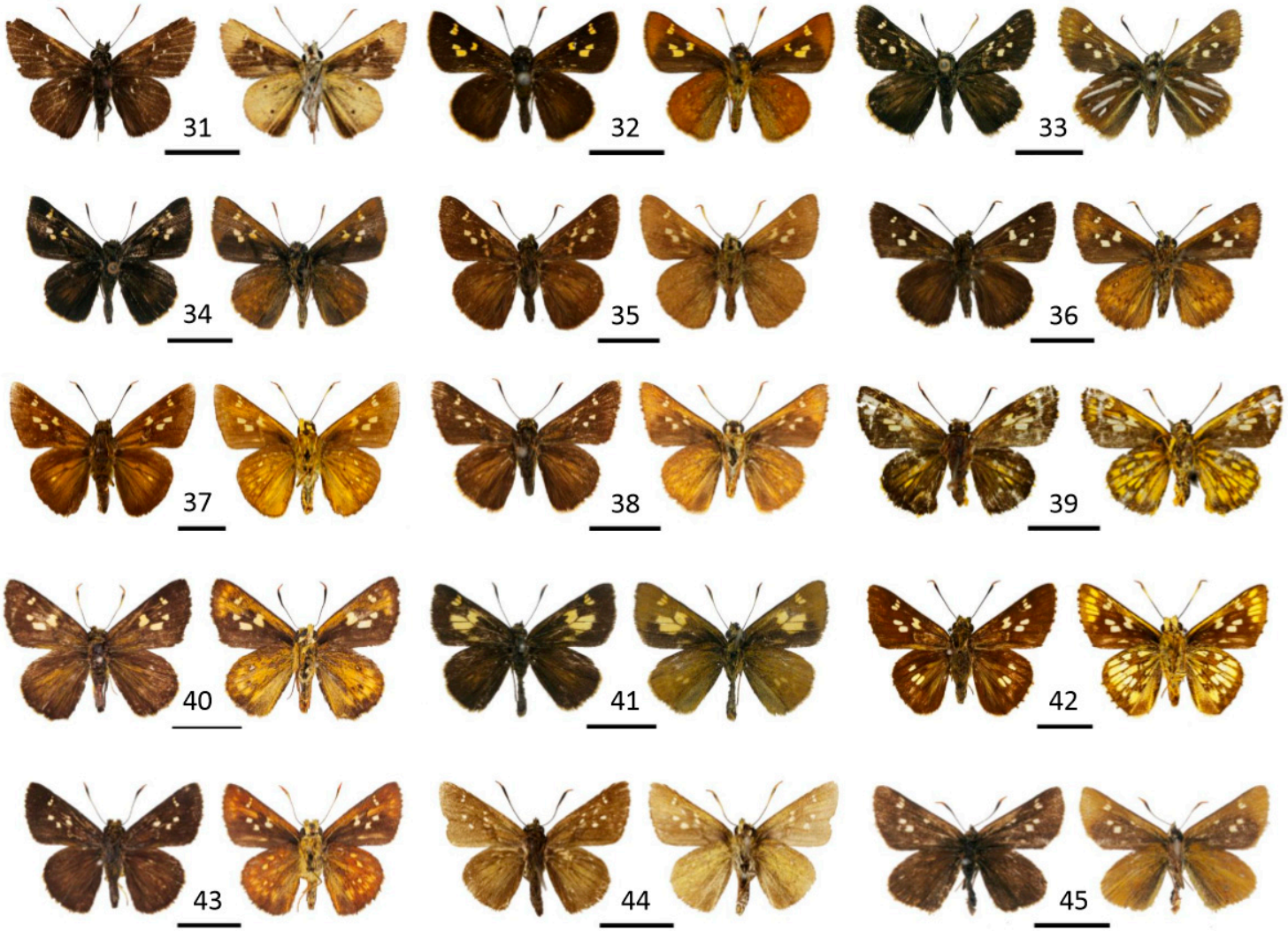


Figure S1. Diversity of Aeromachini (upperside and underside): (1) Aeromachus catocyanea; (2) Aeromachus dalailama; (3) Aeromachus inachus; (4) Aeromachus jhora; (5) Aeromachus kali; (6) Aeromachus nanus; (7) Aeromachus piceus; (8) Aeromachus propinquus; (9) Aeromachus stigmata; (10) Ampittia dioscorides; (11) Ampittia trimacula; (12) Ampittia virgata; (13) Halpe gamma; (14) Halpe knyvetti; (15) Halpe nephele; (16) Halpe pauper; (17) Ampittia subvittatus; (18) Onryza maga; (19) Onryza pesudomaga; (20) Parasovia perbella; (21) Pithauria linus; (22) Pithauria murdava;

(23) Pithauria stramineipennis; (24) Sebastonyma dolopia; (25) Halpemorpha eminens; (26) Sovia fangi; (27) Sovia grahami; (28) Sovia lii; (29) Sovia lucasii; (30) Sovia separate; (31) Sovia subflava; (32) Pedesta baileyi; (33) Pedesta bivitta; (34) Pedesta blanchardii; (35) Pedesta fusca; (36) Pedesta hyrie; (37) Pededta kuata; (38) Pedesta latris; (39) Pedesta luanchuanensis; (40) Pedesta maculata; (41) Pedesta masuriensis; (42) Pedesta submacula; (43) Pedesta xiaoqingae; (44) Pedesta yingqii; (45) Pedesta zinnia. Scale bar = 10 mm.

Table S1. Information on specimens used in this study.

Species/Specimen ID	Sex	Locality	Date	Accession number				
				COI	COII	V4	V7	D3
Aeromachus catocyanea 1	♂	Shizong, Yunnan Province	20150803	MK344787	MK344918	MK345036	MK345165	MK345296
Aeromachus catocyanea 2	♂	Baoxing, Sichuan Province	201507	MK344788	MK344919	MK345037	MK345166	MK345297
Aeromachus dalailama 1	♀	Baoxing, Sichuan Province	20150715	MK344809	MK344940	MK345058	MK345187	MK345318
Aeromachus dalailama 2	♂	Baoxing, Sichuan Province	20150720	MK344810	MK344941	MK345059	MK345188	MK345319
Aeromachus dalailama 3	♂	Baoxing, Sichuan Province	20150720	MK344811	MK344942	MK345060	MK345189	MK345320
Aeromachus dalailama 4	♂	Linan, Zhejiang Province	20140612	MK344812	MK344943	MK345061	MK345190	MK345321
Aeromachus dalailama 5	♀	Linan, Zhejiang Province	20140612	MK344813	MK344944	MK345062	MK345191	MK345322
Aeromachus inachus 1	♂	Moganshan, Zhejiang Province	20150928	MK344789	MK344920	MK345038	MK345167	MK345298
Aeromachus inachus 2	♂	Moganshan, Zhejiang Province	20150928	MK344790	MK344921	MK345039	MK345168	MK345299
Aeromachus inachus 3	♂	Zhenjiang, Jiangsu Province	20180601	MK344791	MK344922	MK345040	MK345169	MK345300
Aeromachus jhora 1	♀	Mengla, Yunnan Province	20160508	MK344796	MK344927	MK345045	MK345174	MK345305
Aeromachus jhora 2	♂	Mangshi, Yunnan Province	20150422	MK344797	MK344928	MK345046	MK345175	MK345306
Aeromachus jhora 3	♂	Mengla, Yunnan Province	20110104	MK344798	MK344929	MK345047	MK345176	MK345307
Aeromachus jhora 4	♀	Mengla, Yunnan Province	20130312	MK344799	MK344930	MK345048	MK345177	MK345308
Aeromachus kali 1	♂	Jinxiu, Guangxi Province	20110714	MK344792	MK344923	MK345041	MK345170	MK345301
Aeromachus kali 2	♂	Gongshan, Yunnan Province	20090526	MK344793	MK344924	MK345042	MK345171	MK345302
Aeromachus nanus 1	♂	Tianmushan, Zhejiang Province	20100529	MK344806	MK344937	MK345055	MK345184	MK345315
Aeromachus nanus 2	♀	Tianmushan, Zhejiang Province	20100601	MK344807	MK344938	MK345056	MK345185	MK345316
Aeromachus nanus 3	♂	Tianmushan, Zhejiang Province	20100529	MK344808	MK344939	MK345057	MK345186	MK345317
Aeromachus piceus 1	♂	Baoxing, Sichuan Province	201507	MK344800	MK344931	MK345049	MK345178	MK345309
Aeromachus piceus 2	♂	Baoxing, Sichuan Province	200907	MK344801	MK344932	MK345050	MK345179	MK345310
Aeromachus piceus 3	♂	Baoxing, Sichuan Province	200907	MK344802	MK344933	MK345051	MK345180	MK345311
Aeromachus propinquus 1	♂	Kunming, Yunnan Province	20130713	MK344803	MK344934	MK345052	MK345181	MK345312
Aeromachus propinquus 2	♂	Shigu, Yunnan Province	20160813	MK344804	MK344935	MK345053	MK345182	MK345313
Aeromachus propinquus 3	♂	Kunming, Yunnan Province	20130713	MK344805	MK344936	MK345054	MK345183	MK345314
Aeromachus stigmatus 1	♂	Yingjiang, Yunnan Province	20130518	MK344794	MK344925	MK345043	MK345172	MK345303
Aeromachus stigmatus 2	♂	Chayu, Xizang Province	20100829	MK344795	MK344926	MK345044	MK345173	MK345304
*Ampittia dioscorides*1	♂	Songjiang, Shanghai	20150713	MK344780	MK344911	MK345029	MK345158	MK345289
*Ampittia dioscorides*2	♀	Zhenjiang, Jiangsu Province	20180601	MK344781	MK344912	MK345030	MK345159	MK345290
*Ampittia dioscorides*3	♂	Zhenjiang, Jiangsu Province	20180601	MK344782	MK344913	MK345031	MK345160	MK345291
Ampittia subvittatus 1	♂	Motuo, Xizang Autonomous Region	20110805	MK344879	MK345001	MK345126	MK345257	MK345388
Ampittia subvittatus 2	♂	Hekou, Yunnan Province	20141005	MK344880	MK345002	MK345127	MK345258	MK345389
Ampittia subvittatus 3	♂	Hekou, Yunnan Province	20161022	MK344881	MK345003	MK345128	MK345259	MK345390
Ampittia trimacula 1	♂	Baoxing, Sichuan Province	200907	MK344786	MK344917	MK345035	MK345164	MK345295
Ampittia virgata 1	♂	Wuyishan, Fujian Province	20120512	MK344783	MK344914	MK345032	MK345161	MK345292
Ampittia virgata 2	♂	Taishun, Zhejiang Province	20120505	MK344784	MK344915	MK345033	MK345162	MK345293
Ampittia virgata 3	♂	Wuyishan, Fujian Province	20120512	MK344785	MK344916	MK345034	MK345163	MK345294

Halpe gamma 1	♂	Baoxing, Sichuan Province	201507	MK344825	MK344956	MK345074	MK345203	MK345334
Halpe gamma 2	♀	Taibei, Taiwan Province	20110920	MK344826	MK344957	MK345075	MK345204	MK345335
Halpe gamma 3	♂	Baoxing, Sichuan Province	200906	MK344827	MK344958	MK345076	MK345205	MK345336
Halpe knyvetti 1	♂	Motuo, Xizang Autonomous Region	20140728	MK344838	—	—	MK345216	MK345347
Halpe knyvetti 2	♂	Motuo, Xizang Autonomous Region	20130725	MK344839	—	—	MK345217	MK345348
Halpe nephele 1	♂	Baoxing, Sichuan Province	200906	MK344828	MK344959	MK345077	MK345206	MK345337
Halpe nephele 2	♂	Baoxing, Sichuan Province	200906	MK344829	MK344960	MK345078	MK345207	MK345338
Halpe paupera 1	♀	Lingui, Guangxi Province	20110713	MK344824	MK344955	MK345073	MK345202	MK345333
Halpemorpha eminens 1	♂	Nanling, Guangdong Province	20100710	MK344892	—	MK345139	MK345270	MK345401
Onryza maga 1	♂	Maoershan, Guangxi Province	20120725	MK344814	MK344945	MK345063	MK345192	MK345323
Onryza maga 2	♀	Wuyishan, Fujian Province	20160830	MK344815	MK344946	MK345064	MK345193	MK345324
Onryza maga 3	♂	Maoershan, Guangxi Province	20120725	MK344816	MK344947	MK345065	MK345194	MK345325
Onryza maga 4	♀	Tianmushan, Zhejiang Province	20110628	MK344817	MK344948	MK345066	MK345195	MK345326
Onryza maga 5	♀	Tianmushan, Zhejiang Province	20110628	MK344818	MK344949	MK345067	MK345196	MK345327
Onryza maga 6	♀	Hualian, Taiwan Province	20070704	MK344819	MK344950	MK345068	MK345197	MK345328
Onryza maga 7	♀	Hualian, Taiwan Province	20070705	MK344820	MK344951	MK345069	MK345198	MK345329
Onryza pesudomaga 1	♂	Linan, Zhejiang Province	20140613	MK344821	MK344952	MK345070	MK345199	MK345330
Onryza pesudomaga 2	♂	Qingliangfeng, Zhejiang Province	20140614	MK344822	MK344953	MK345071	MK345200	MK345331
Onryza pesudomaga 3	♂	Qingliangfeng, Zhejiang Province	20140614	MK344823	MK344954	MK345072	MK345201	MK345332
Parasovia perbella 1	♂	Nanling, Guangdong Province	20100612	MK344878	—	MK345125	MK345256	MK345387
Pedesta baileyi 1	♂	Tengchong, Yunnan Province	20130426	MK344852	MK344979	MK345099	MK345230	MK345361
Pedesta baileyi 2	♀	Motuo, Xizang Autonomous Region	20130811	MK344853	MK344980	MK345100	MK345231	MK345362
Pedesta bivitta 1	♂	Yulong, Yunnan Province	20140531	MK344849	MK344976	MK345096	MK345227	MK345358
Pedesta bivitta 2	♂	Yulong, Yunnan Province	20140614	MK344850	MK344977	MK345097	MK345228	MK345359
Pedesta bivitta 3	♂	Yulong, Yunnan Province	20140614	MK344851	MK344978	MK345098	MK345229	MK345360
Pedesta blanchardii 1	♂	Baoxing, Sichuan Province	201507	MK344856	MK344983	MK345103	MK345234	MK345365
Pedesta blanchardii 2	♂	Erlangshan, Sichuan Province	20120713	MK344857	MK344984	MK345104	MK345235	MK345366
Pedesta fusca 1	♂	Nanling, Guangdong Province	20140615	MK344873	MK344996	MK345120	MK345251	MK345382
Pedesta fusca 2	♂	Nanling, Guangdong Province	20130704	MK344874	MK344997	MK345121	MK345252	MK345383
Pedesta fusca 3	♂	Tengchong, Yunnan Province	20160808	MK344875	MK344998	MK345122	MK345253	MK345384
Pedesta fusca 4	♂	Ningshan, Shanxi Province	20160610	MK344876	MK344999	MK345123	MK345254	MK345385
Pedesta fusca 5	♂	Kang County, Gansu Province	20160608	MK344877	MK345000	MK345124	MK345255	MK345386
Pedesta hyrie 1	♂	Motuo, Xizang Autonomous Region	20130813	MK344871	—	MK345118	MK345249	MK345380
Pedesta kuata 1	♂	Gutianshan, Zhejiang Province	20130617	MK344865	MK344990	MK345112	MK345243	MK345374
Pedesta kuata 2	♂	Qingliangfeng, Zhejiang Province	20120709	MK344866	MK344991	MK345113	MK345244	MK345375
Pedesta kuata 3	♂	Gutianshan, Zhejiang Province	20130617	MK344867	MK344992	MK345114	MK345245	MK345376
Pedesta kuata 4	♂	Tianmushan, Zhejiang Province	20100617	MK344868	MK344993	MK345115	MK345246	MK345377
Pedesta kuata 5	♂	Qingliangfeng, Zhejiang Province	20120709	MK344869	MK344994	MK345116	MK345247	MK345378
Pedesta latris 1	♂	Kunming, Yunnan Province	20150603	MK344859	MK344985	MK345106	MK345237	MK345368
Pedesta latris 2	♂	Yanling, Hunan Province	20160613	MK344860	MK344986	MK345107	MK345238	MK345369
Pedesta latris 3	♂	Hutiaoxia, Yunnan Province	20140602	MK344861	MK344987	MK345108	MK345239	MK345370
Pedesta latris 4	♂	Hutiaoxia, Yunnan Province	20140602	MK344862	MK344988	MK345109	MK345240	MK345371
Pedesta latris 5	♂	Baoxing, Sichuan Province	201506	MK344863	MK344989	MK345110	MK345241	MK345372

Pedesta luanchuanensis 1	♂	Taishun, Zhejiang Province	20180616	MK344872	MK344995	MK345119	MK345250	MK345381
Pedesta maculata 1	♂	Jinxiu, Guangxi Province	20110708	MK344847	—	MK345094	MK345225	MK345356
Pedesta maculata 2	♂	Jinxiu, Guangxi Province	20110723	MK344848	—	MK345095	MK345226	MK345357
Pedesta masuriensis 1	♂	Gongshan, Yunnan Province	20090607	MK344854	MK344981	MK345101	MK345232	MK345363
Pedesta masuriensis 2	♂	Gongshan, Yunnan Province	20090526	MK344855	MK344982	MK345102	MK345233	MK345364
Pedesta submacula 1	♀	Wuyishan, Fujian Province	20120512	MK344840	MK344969	MK345087	MK345218	MK345349
Pedesta submacula 2	♀	Tianmushan, Zhejiang Province	20130810	MK344841	MK344970	MK345088	MK345219	MK345350
Pedesta submacula 3	♂	Wuyishan, Fujian Province	20120512	MK344842	MK344971	MK345089	MK345220	MK345351
Pedesta submacula 4	♂	Tianmushan, Zhejiang Province	20130810	MK344843	MK344972	MK345090	MK345221	MK345352
Pedesta submacula 5	♂	Tianmushan, Zhejiang Province	20100617	MK344844	MK344973	MK345091	MK345222	MK345353
Pedesta submacula 6	♀	Tianmushan, Zhejiang Province	20100603	MK344845	MK344974	MK345092	MK345223	MK345354
Pedesta submacula 7	♂	Baoji, Shanxi Province	20100727	MK344846	MK344975	MK345093	MK345224	MK345355
Pedesta xiaoqingae 1	♂	Jinxiu, Guangxi Province	20110713	MK344864	—	MK345111	MK345242	MK345373
Pedesta yingqii 1	♂	Baoji, Shanxi Province	20090603	MK344858	—	MK345105	MK345236	MK345367
Pedesta zinnia 1	♀	Xianggelila, Yunnan Province	20090614	MK344870	—	MK345117	MK345248	MK345379
Pithauria linus 1	♂	Baoxing, Sichuan Province	201507	MK344884	MK345006	MK345131	MK345262	MK345393
Pithauria linus 2	♂	Lushan, Sichuan Province	20150718	MK344885	MK345007	MK345132	MK345263	MK345394
Pithauria linus 3	♂	Jinxiu, Guangxi Province	20110729	MK344886	MK345008	MK345133	MK345264	MK345395
Pithauria murdava 1	♂	Yuanjiang, Yunnan Province	20100907	MK344882	MK345004	MK345129	MK345260	MK345391
Pithauria murdava 2	♂	Yuanjiang, Yunnan Province	20100710	MK344883	MK345005	MK345130	MK345261	MK345392
Pithauria stramineipennis 1	♂	Jinghong, Yunnan Province	20170930	MK344887	MK345009	MK345134	MK345265	MK345396
Pithauria stramineipennis 2	♂	Jinghong, Yunnan Province	20170930	MK344888	MK345010	MK345135	MK345266	MK345397
Sebastonyma dolopia 1	♂	Dulongjiang, Yunnan Province	20150723	MK344889	MK345011	MK345136	MK345267	MK345398
Sebastonyma dolopia 2	♂	Motuo, Xizang Autonomous Region	20140724	MK344890	MK345012	MK345137	MK345268	MK345399
Sebastonyma dolopia 3	♂	Dulongjiang, Yunnan Province	20150723	MK344891	MK345013	MK345138	MK345269	MK345400
Sovia fangi 1	♂	Weixi, Yunnan Province	20100709	MK344896	MK345015	MK345143	MK345274	MK345405
Sovia fangi 2	♂	Weixi, Yunnan Province	20100709	MK344897	MK345016	MK345144	MK345275	MK345406
Sovia grahami 1	♂	Cuona, Xizang Autonomous Region	20100817	MK344894	—	MK345141	MK345272	MK345403
Sovia grahami 2	♂	Cuona, Xizang Autonomous Region	20100818	MK344895	—	MK345142	MK345273	MK345404
Sovia lii 1	♂	Langao, Shanxi Province	20120729	MK344909	—	MK345156	MK345287	MK345418
Sovia lucasii 1	♂	Baoxing, Sichuan Province	201507	MK344902	MK345021	MK345149	MK345280	MK345411
Sovia lucasii 2	♀	Baoxing, Sichuan Province	20150721	MK344903	MK345022	MK345150	MK345281	MK345412
Sovia lucasii 3	♂	Houhe, Hubei Province	20130707	MK344904	MK345023	MK345151	MK345282	MK345413
Sovia lucasii 4	♂	Maoershan, Guangxi Province	20120723	MK344905	MK345024	MK345152	MK345283	MK345414
Sovia lucasii 5	♂	Hanyuan, Sichuan Province	200905	MK344906	MK345025	MK345153	MK345284	MK345415
Sovia lucasii 6	♂	Hanyuan, Sichuan Province	200905	MK344907	MK345026	MK345154	MK345285	MK345416
Sovia lucasii 7	♂	Hanyuan, Sichuan Province	200905	MK344908	MK345027	MK345155	MK345286	MK345417
Sovia separata 1	♂	Motuo, Xizang Autonomous Region	20130723	MK344898	MK345017	MK345145	MK345276	MK345407
Sovia separata 2	♂	Dulongjiang, Yunnan Province	20150716	MK344899	MK345018	MK345146	MK345277	MK345408
Sovia separata 3	♂	Motuo, Xizang Autonomous Region	20130727	MK344900	MK345019	MK345147	MK345278	MK345409
Sovia separata 4	♂	Dulongjiang, Yunnan Province	20150707	MK344901	MK345020	MK345148	MK345279	MK345410
Sovia subflava 1	♂	Weixi, Yunnan Province	20160720	MK344893	MK345014	MK345140	MK345271	MK345402
Polytremis nascens	♂	Qingyuan, Zhejiang	20070721	KJ574016*	KJ574025*	KC684355*	KC684372*	KC684338*
Udaspes folus				KT240164*	KT240164*			

Ochlodes venata	HM243593*	HM243593*
Hylephila phyleus	AF170859*	AF170859*
Heteropterus morpheus	KF881050*	KF881050*
Daimio tethys	KJ813807*	KJ813807*
Celaenorrhinus maculosa	KF543077*	KF543077*
Achalarus lyciades	KX249739*	KX249739*
Lobocla bifasciatus	KJ629166*	KJ629166*
Choaspes benjaminii	KJ629164*	KJ629164*
Hasora anura	KF881049*	KF881049*
Potanthus flavus	KJ629167*	KJ629167*
Macrosoma sp.	AF170854*	AF170854*

Table S2. Model parameters used in ancestral area estimation analysis.

Analysis model	Data Input	Areas	Range Constraints
S-DIVA	15000 trees + 1 condensed tree (from BEAST)	A: Himalaya-Hengduan Mountain Region B: Southern China Region C: Central China Region D: Northern China Region	All ranges checked in ancestral range matrix. Max areas = 4. Extinction allowed.
BBM	15000 trees + 1 condensed tree (from BEAST)	A: Himalaya-Hengduan Mountain Region B: Southern China Region C: Central China Region D: Northern China Region	All ranges checked in ancestral range matrix. Max areas = 4. The MCMC chains were run simultaneously for 5000 000 generations. The state was sampled every 100 generations. Fixed JC + G (Jukes-Cantor + Gamma) were used for analysis with null root distribution.