

Figure S1. Illustration of how ‘characters’ at multiple spatial scales are generated. A pre-processor, shatter, samples the wing stochastically at multiple scales and locations within the image (white boxes). The material sampled (the ‘shards’) are then converted into pseudo-images called NVDs; these are unique reduced dimensionality ‘signatures’ for each shard that are then used by DAISY-II to build its (PSOM) neural network.

Hyles-livornica-A.b9aea381f7010d7f	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-nicaea-A.e4116d9100635d24	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.e74853f789038a0f	Hyles-gallii-MF2.12f7f0e3d599743	1
Hyles-hippophaes-A.e74853f789038a0f	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-livornica-A.7402f1cdbc228685	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.320fceffbf2d378a	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.e74853f789038a0f	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-livornica-A.d5106ca97fc12ddf	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.9a60a2b38b880de1	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-livornica-A.8c7a04af9a9b0222	Hyles-gallii-MF5.12f7f0e3d599743	1
Hyles-livornica-A.69e4906ae5cdd52d	Hyles-gallii-MF2.12f7f0e3d599743	1
Hyles-livornica-A.2d1637f14795da18	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.9a60a2b38b880de1	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-nicaea-A.e4116d9100635d24	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-livornica-A.2d1637f14795da18	Hyles-gallii-MF1.12f7f0e3d599743	1
Hyles-hippophaes-A.de6b107ea83f1610	Hyles-hippophaes-MP1.469e8859d3a0067	1
Hyles-livornica-A.d5106ca97fc12ddf	Hyles-gallii-MF1.12f7f0e3d599743	1

Figure S2. Portion of binary rule-set produced by DAISY-II. This is used to build the character association matrix, which is then used by the inflater for force-placement optimisation.

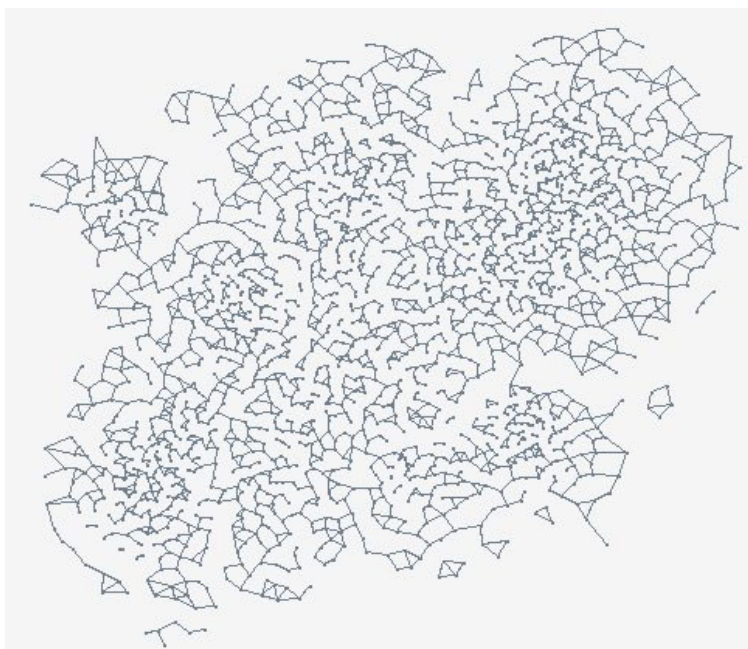


Figure S3. Example of an optimal, self consistent 2D morph-space visualisation produced by the inflater. A line segment between (NVD) image-characters indicates that the association between them is strong and that they are 1st, 2nd or 3rd nearest neighbours in R2 (2D space).

Table S1. Samples included in Whole Genome In Solution Capture (WISC) Sequencing

MTD-TW Voucher code.	Taxon	Country	Site	Elevation	Collection Day	Collection Month	Collection Year	Collected by	Collection / Storage
11578	<i>Hyles chamyla</i> "f. apocyni"	Tajikistan	30 km W Shartuz (Shahrtuz, Shaartuz, Shahrituz town) , Amu-Darya river	300	28	6	1994	V.&A.Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11580	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Amu-Darya river, 35-40 km W Shartuz	300	28	7	1994	Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11581	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Amu-Darya river, 35-40 km W Shartuz	300	28	8	1994	Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11941	<i>Hyles chamyla</i> "f.apocyni"	China	Xinjiang, SW from Kashi, W Taklimakan desert, Terembazar	1200	7	6	2013	Floriani	U. Eitschberger collection, Marktleuthen, Germany
11951	<i>Hyles chamyla</i> "f.apocyni"	Kyrgyzstan	Inn. Tian Shan, Naryn river valley, Kazarman village	1250	21	7	2000	S.Churkin	U. Eitschberger collection, Marktleuthen, Germany
11952	<i>Hyles chamyla</i> "f.apocyni"	China	Xinjiang region, W Taklimakan (Taklamakan) desert, Yarkan He (Yarkant/Yarkand) river valley, Tugay forest	1140	9-12	6	2013	Floriani; U.	U. Eitschberger collection, Marktleuthen, Germany
11966	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Shugnansky Mts., 2,5 km SW of Kishlak Vodzh	2670	16	7	2011	S.K.Korb	U. Eitschberger collection, Marktleuthen, Germany
12148	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Khatlon Vakhsh river, Tigrovaja balka reserve	330	20	5	2017	B.Benedek &S.Ilniczky	Senckenberg Natural History Collections, Dresden, Germany
12221	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Vakhshkaja dolina valley, Molotovobad village region, 6-th village, Khatlon region, Dusti distr.	380	25	8	1953	leg. Ju. Shchetkin	Zoological Institute, Saint-Petersburg, Russia
12284	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	S Tajikistan, Khatlon region, Tigrovaja balka natural reserve	335	23-24	7	1988	V.V. Dubatolov	
1728	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Tigrovaja balka nature reserve	335	10	8	2000	via Dr.Ronald Brechlin	R. Brechlin, Pasewalk, Germany, local coll.
9298	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Tigrovaja balka nature reserve	335	16-20	5	1999	A.Bergmann	Spingidae Museum, Pribram, Czech Republic

9299	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Tigrovaja balka nature reserve	335	12-18	5	1999	A.Bergmann	Sphingidae Museum, Pribram, Czech Republic
9300	<i>Hyles chamyla</i> "f.apocyni"	Tajikistan	Tigrovaja balka nature reserve	335	5-25	4	2000	A.Bergmann	Sphingidae Museum, Pribram, Czech Republic
1726	<i>Hyles chamyla</i> "f.chamyla"	Mongolia	Gobi Altay aimak (province), Zahuin Gobi	1000	6	6	2004	A.Saldaitis	R. Brechlin, Pasewalk, Germany, local coll.
9144	<i>Hyles chamyla</i> "f.chamyla"	Mongolia	SW Mongolia, Gobi-Altai aimak, 43 km S Bugat, 2 km N Alag-Nur lake	1060	26-28	6	2017	R.V.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9152	<i>Hyles chamyla</i> "f.chamyla"	Mongolia	SW Mongolia, Gobi-Altai aimak, 43 km S Bugat, 2 km N Alag-Nur lake	1060	26-28	6	2017	R.V.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9186	<i>Hyles chamyla</i> "f.chamyla"	Mongolia	SW Mongolia, Gobi-Altai aimak, Dzhungarian Gobi, Alag-Nuur lake	1200	9-10	7	2010	R.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9187	<i>Hyles chamyla</i> "f.chamyla"	Mongolia	SW Mongolia, Gobi-Altai aimak, Dzhungarian Gobi, Alag-Nuur lake	1200	1-2	6	2011	R.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9251	<i>Hyles chamyla</i> "f.chamyla"	Turkmenistan	Merv (Merw, east of the Caspian Sea)	230	-	-	-		Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
				230					Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9252	<i>Hyles chamyla</i> "f.chamyla"	Turkmenistan	Merv (Merw, east of the Caspian Sea)	760	-	-	1908	Püngeler?	Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9253	<i>Hyles chamyla</i> "f.chamyla"	China	Chamil (Kumul)/Ham		-	-	1908	Rückbeil?	Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany

				760						Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9254	<i>Hyles chamyla</i> "f.chamyla"	China	Chamil (Kumul)/Hami		-	-	1913	Denso?		
11308	<i>Hyles hippophaes baltistana</i>	Pakistan	Karakorum Mts., Naltar valley	2880	26-27	6	2014	B. Benedek & J. Babics		Bavarian State Collection of Zoology, Munich, Germany
11309	<i>Hyles hippophaes baltistana</i>	Pakistan	Karakorum Mts., Naltar valley	2880	26-27	6	2014	B. Benedek & J .Babics		Bavarian State Collection of Zoology, Munich, Germany
12438	<i>Hyles hippophaes baltistana</i>	India	Himachal Pradesh Spiti, Spiti Valley, Kaza	3550	3	7	1994	P. Kautt & V. Weisz		Museum Witt, München, Germany
12439	<i>Hyles hippophaes baltistana</i>	India	Himachal Pradesh Spiti, Spiti valley, Kaza	3550	13	7	1994	P. Kautt & V. Weisz		Museum Witt, München, Germany
				3160						Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9267	<i>Hyles hippophaes baltistana</i>	Pakistan	Hushey (Hushe) valley, Central Karakoram national park		4	7	2013	-		
				2880						Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9287	<i>Hyles hippophaes baltistana</i>	Pakistan	Karakoram Mts, Naltar valley		26-27	6	2014	B. Benedek & J Babies		
				2200						Museum für Naturkunde, Leibnitz-Institut für Evolution- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9288	<i>Hyles hippophaes baltistana</i>	Pakistan	Pakistan, Karakoram Mts., Chaprot village		29	6	2014	B. Benedek & J. Babies		

				2200					
9289	<i>Hyles hippophaes baltistana</i>	Pakistan	Pakistan, Karakoram Mts., Chaprot village		29	6	2014	B. Benedek & J. Babies	Museum für Naturkunde, Leibnitz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
11552	<i>Hyles hippophaes bienerti</i>	Turkey	Nevsehir municipality, Göreme	1120	1	8	1990	Kautt	U. Eitschberger collection, Marktleuthen, Germany
11553	<i>Hyles hippophaes bienerti</i>	Turkey	4 km E from Nevsehir	1250	22	6	1979	Groß	U. Eitschberger collection, Marktleuthen, Germany
11554	<i>Hyles hippophaes bienerti</i>	Armenia	Aragadzor	1170	18	6	1997	U. Eitschberger	U. Eitschberger collection, Marktleuthen, Germany
11555	<i>Hyles hippophaes bienerti</i>	Turkmenistan	Kopetdag Mts., Garrygala (Magtymguly) city	330	1	7	1996	V .Perepel	U. Eitschberger collection, Marktleuthen, Germany
11557	<i>Hyles hippophaes bienerti</i>	Iran	Prov. Teheran, Alborz Mts., Damavand Mt, 15 km NE from Lar-e Polur	1700	1-2	7	2000	Gy. Fábíán, L. Szécsényi & K. Székely	U. Eitschberger collection, Marktleuthen, Germany
11963	<i>Hyles hippophaes bienerti</i>	Kyrgyzstan	Narün (Naryn) region, Ak-Tala district, Ak-Tal-Tschat (Ak-Tal-Chat)	1640	1	7	1996	V. Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11966	<i>Hyles hippophaes bienerti</i>	Tajikistan	Shugnansky Mts., 2,5km SW of kishlak Vodzh	2670	16	7	2011	U. Eitschberger	U. Eitschberger collection, Marktleuthen, Germany
11967	<i>Hyles hippophaes bienerti</i>	Tajikistan	S Tadjikistan: Tigrovaja balka (Tiger gully) nature reserve, down stream of Pianj (Panj) river	320	1-5	8	2006	V.Gurko	U. Eitschberger collection, Marktleuthen, Germany
11968	<i>Hyles hippophaes bienerti</i>	Kyrgyzstan	NE Fergansky Mts., 10 km SW Atai (Atay) village, East Kugart (Kek Art, Kökart) river	1860	16	7	2000	S.Churkin	U. Eitschberger collection, Marktleuthen, Germany
11969	<i>Hyles hippophaes bienerti</i>	Tajikistan	Darvaz Mts., near Tavildara vill. (town)	1710	9-18	8	2006	V.Gurko	U. Eitschberger collection, Marktleuthen, Germany
11972	<i>Hyles hippophaes baltistana</i>	China	Oueho, Altun Shan (Altyn Tagh)	2000	28	7	1996	Eitschberger	U. Eitschberger collection, Marktleuthen, Germany

11977	<i>Hyles hippophaes baltistana</i>	Russia	Volgograd region, Don river, Kamyshinka	70	11	8	2001	V. Lukhtanov & A. Dantchenko	U. Eitschberger collection, Marktleuthen, Germany
11978	<i>Hyles hippophaes bienerti</i>	Kyrgyzstan	(Border with Tajikistan), Alai-Kette, Kara-Myk	2270		7	1995	V. Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11979	<i>Hyles hippophaes bienerti</i>	Kyrgyzstan	Transalai (Transalay)-mountain chain (W), Schibe (Shibe) community	2410	17-19	7	1995	V. Lukhtanov	U. Eitschberger collection, Marktleuthen, Germany
11984	<i>Hyles hippophaes bienerti</i>	Kazakhstan	Nurly village, Ily (Ili) river valley	550	25-26	6	2002	M.Danilevsky	Senckenberg Natural History Collections, Dresden, Germany
11989	<i>Hyles hippophaes bienerti</i>	Russia	South Tuva Republic (Tyva), southern edge of Tannuola (Tannu-Ola) range, 30 km SW Samagaltai, Tes-Khen (Tes-Chem) river	950	21	6	2001	R. Yakovlev,	U. Eitschberger collection, Marktleuthen, Germany
11990	<i>Hyles hippophaes bienerti</i>	Russia	South Tuva Republic (Tyva), Erzin Distr., Ubsunur (Uvs Nuur) State Reserve, south bank of Lake Tore-Kholj (Tore-Chol)	1230	21-22	6	2002	R. Yakovlev, Germany	U. Eitschberger collection, Marktleuthen, Germany
12406	<i>Hyles hippophaes bienerti</i>	Turkmenistan	SW Turkmenistan, Kopetdag Mts., Garygala (Magtymguly) env.	330	1	6	1995	J. Miatleuski	U. Eitschberger collection, Marktleuthen, Germany
12409	<i>Hyles hippophaes bienerti</i>	China	Queho, Altun Shan Mts.	2000	28	7	1996	-	Collection M. Ströhle, Weiden, Germany
12410	<i>Hyles hippophaes bienerti</i>	Kazakhstan	West Kazakhstan, Ryn-kum sandy steppe, Dz hailau loc.	-15	25	6	1999	V. Karalius & I. Miatleuski	Collection M. Ströhle, Weiden, Germany
12412	<i>Hyles hippophaes bienerti</i>	China	Queho, Altun Shan Mts.	2000	28	7	1996	-	Collection M. Ströhle, Weiden, Germany
12414	<i>Hyles hippophaes bienerti</i>	Kazakhstan	West Kazakhstan, Ryn-kum sandy steppe, Dz hailau loc.	-15	25	6	1999	V. Karalius & I. Miatleuski	Collection M. Ströhle, Weiden, Germany
12415	<i>Hyles hippophaes bienerti</i>	Turkmenistan	SW Turkmenistan, Kopetdag Mts., Garygala (Magtymguly) env.	330	26-27	6	1995	J. Miatleuski	Collection M. Ströhle, Weiden, Germany

12436	<i>Hyles hippophaes bienerti</i>	Turkmenistan	Kopet-Dagh Mts., valley of the rivers Ipay-Kala and Point-Kala	130	30	6	1992	Gy. Fabian, B. Herczig, A. Podlussany & Z. Varga	Hungarian Natural History Museum, Budapest, Hungary
12441	<i>Hyles hippophaes bienerti</i>	China	Daban Shan, Xining	2300	8	8	1996	-	Museum Witt, München, Germany
12719	<i>Hyles hippophaes bienerti</i>	Iran	Farab	1290	15	4	1910	L. Sheljuzhko	Zoological Museum, Taras Shevchenko National University of Kiev, Ukraine
12720	<i>Hyles hippophaes bienerti</i>	Tajikistan	W Pamir Mts., Chorag (Khorugh) town, Shugnan (Shighnan) province, at the boundary to Afghanistan	2100	-			ZMKU Kiev	Zoological Museum, Taras Shevchenko National University of Kiev, Ukraine
12721	<i>Hyles hippophaes bienerti</i>	Tajikistan	W Pamir Mts., Chorag (Khorugh) town, Shugnan (Shighnan) province, at the boundary to Afghanistan	2100	-			ZMKU Kiev	Zoological Museum, Taras Shevchenko National University of Kiev, Ukraine
4381	<i>Hyles hippophaes bienerti</i>	Russia			-			Gary Saunders	Senckenberg Natural History Collections, Dresden, Germany
9129	<i>Hyles hippophaes bienerti</i>	Kazakhstan	S Kazakhstan, Ili river valley near Koktal bridge	510	1	7	2012	S. Rybalkin & R. Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9131	<i>Hyles hippophaes bienerti</i>	Russia	S. Siberia, Altaj region, Mikhajlovskoe distr., 5 km SWW Mikhajlovskoe	160	20-21	7	2012	R. Yakovlev, Yu. Perunov & P. Ustjuzhanin	R.V. Yakovlev collection, Barnaul, Russia
9155	<i>Hyles hippophaes bienerti</i>	Kazakhstan	S Kazakhstan, Ili river valley near Koktal bridge	510	1	7	2012	S.Rybalkin & R.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9190	<i>Hyles hippophaes bienerti</i>	Mongolia	SW Mongolia, Hovd Aimak, Mongolian Altai (S. slope), Bulgan-Gol basin, Dood-Naryjn-Gol Valley	1300	7-8	7	2015	R.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9214	<i>Hyles hippophaes bienerti</i>	Mongolia	W Mongolia, Hovd Aimak, Dzun-Dzhargalant-Khairkhan, Ar-Shatyn-Gol river valley	1200	26	6	2015	R.Yakovlev	R.V. Yakovlev collection, Barnaul, Russia

				2045						Museum für Naturkunde, Leibnitz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Germany
9248	<i>Hyles hippophaes bienerti</i>	Kyrgyzstan	Narün (Naryn) - city and river					? Staudinger		
9278	<i>Hyles hippophaes bienerti</i>	Kazakhstan	West-Kazakhstan, Ryn desert (Ryn-Kum sandy steppe), 20km East from Bisen vill.	27	22	6	1999	V. Karalius & I. Miatleuski		Sphingidae Museum, Pribram, Czech Republic
9279	<i>Hyles hippophaes bienerti</i>	Kazakhstan	European part of Kazakhstan, Ryn desert (Ryn- Kum sandy steppe) NW, Urda (Orda) vill. env.	0	4	6	1999	V. Karalius & I. Miatleuski		Sphingidae Museum, Pribram, Czech Republic
9290	<i>Hyles hippophaes bienerti</i>	Tajikistan	Eastern Pamir Mts., Zulumart Mt. region	3770	1-10	8	2014	V.Gurko		Sphingidae Museum, Pribram, Czech Republic
9291	<i>Hyles hippophaes bienerti</i>	Tajikistan	W. Pamir Mts., Sarez lake area	3300	20-30	7	2002	V.Gurko		Sphingidae Museum, Pribram, Czech Republic
9318	<i>Hyles hippophaes bienerti</i>	China	30km NE of Shánshán, Xinjiang province	510	21-30	6	2002	Dr. F. Karrer		F. Karrer collection, Zofingen, Switzerland
9319	<i>Hyles hippophaes bienerti</i>	China	30km NE of Shánshán, Xinjiang province	510	21-30	6	2002	Dr. F. Karrer		F. Karrer collection, Zofingen, Switzerland
9320	<i>Hyles hippophaes bienerti</i>	China	30km NE of Shánshán, Xinjiang province	510	21-30	6	2002	Dr.F.Karrer		F. Karrer collection, Zofingen, Switzerland
12622	<i>Hyles hippophaes hippophaes</i>	Romania					1793	-		Hessisches Landesmuseum für Kunst und Natur, Wiesbaden, Germany
1075	<i>Hyles livornica</i>	Israel	Yotvata or Jordan: Southern Desert Wadi of Jebel Surebit	950	12	9	1990	leg. Müller		Bavarian State Collection of Zoology, Munich, Germany
3082	<i>Hyles livornica</i>	Iran	Semnan, 35km E Shahrud, Maymay	1400	22	6	2003	W. ten Hagen		Senckenberg Natural History Collections, Dresden, Germany
11667	<i>Hyles livornica</i>	Tajikistan	Tigrovaja Balka	600	22	6	1988	O.Gorbunov		U. Eitschberger collection, Marktleuthen, Germany

11991	<i>Hyles livornica</i>	China	Xinjiang, W Taklimakan desert, Yarkan He river valley, tugay forest	1140	9-12	6	2013	Floriani	U. Eitschberger collection, Marktleuthen, Germany
12091	<i>Hyles livornica</i>	Syria	Palmyra		30	4	1995	Rohlena Pavel	Sphingidae Museum, Pribram, Czech Republic
12095	<i>Hyles livornica</i>	Pakistan	NWFP, S. Waziristan agency, near Tanai vill.	1500-2500	2-12	9	2005	V. Gurko	Sphingidae Museum, Pribram, Czech Republic
9181	<i>Hyles nicaea sheljuzkoi</i>	Mongolia	Hovd Aimak, Mongolian Altai (S. slope) Bodonchin-Gol basin, Khondijn-Gol Valley	1750	27	6	2015	R. Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
11565	<i>Hyles nicaea sheljuzkoi</i>	Kazakhstan	Boro-Khoro Mts., 35 km N of Panfilov	1800	2	7	2010	S. K. Korb	Sphingidae Museum, Pribram, Czech Republic
12138	<i>Hyles nicaea sheljuzkoi</i>	Turkey	Prov. Sivas, 6km W of Gürün		6-7	7	1994	P. Gyulai	Sphingidae Museum, Pribram, Czech Republic
3081	<i>Hyles nicaea sheljuzkoi</i>	Iran	Yazd, Shir Kuh, S Deh Bala	2700	4	7	2000	leg. Schurian & ten Hagen	-
11563	<i>Hyles nicaea sheljuzkoi</i>	Tajikistan	Baljuan ... Wachsch m...., Sarychosor	1300	20	7	1999	ex coll Aidas Saldaitis	U. Eitschberger collection, Marktleuthen, Germany
4760	<i>Hyles nicaea sheljuzkoi</i>	Turkey	Siras		-	-	-	. Specimen no. BMNH 813546; NHMUK	Natural History Museum, London, United Kingdom
12722	<i>Hyles salangensis</i>	Afghanistan	Salang-Pass, N-Seite (Khinjan)	2100	5-11	7	1966	G. Ebert	Centrum für Naturkunde, Hamburg, Germany
12723	<i>Hyles salangensis</i>	Afghanistan	Salang-Pass S, Nv. Kabul	2700	1	7	1965	Kasy & Vartian	Centrum für Naturkunde, Hamburg, Germany
12724	<i>Hyles salangensis</i>	Afghanistan	Salang-Pass, N-side (Khinjan)	2100	5-11	7	1966	G. Ebert	Centrum für Naturkunde, Hamburg, Germany
12725	<i>Hyles salangensis</i>	Afghanistan	Provinz Kadaghan, Salang-Pass northern side	2100	13	6	1971	Vartian	Centrum für Naturkunde, Hamburg, Germany
12726	<i>Hyles salangensis</i>	Afghanistan	Provinz Kadaghan, Salang-Pass northern side	2100	13	6	1971	Vartian	Centrum für Naturkunde, Hamburg, Germany

12727	<i>Hyles salangensis</i>	Afghanistan	Nord-Salang	2300	7	6	1975	Dr. Reshöft	Centrum für Naturkunde, Hamburg, Germany
12135	<i>Hyles vespertilio</i>	Azerbaijan	USSR, Nachicevan		1	7	1986	-	Sphingidae Museum, Příbram, Czech Republic
12136	<i>Hyles vespertilio</i>	Georgia	USSR, Sukhumi Region, Caucare		20	7	1970	-	Sphingidae Museum, Příbram, Czech Republic
12137	<i>Hyles vespertilio</i>	Croatia	Dalmatien (Croatia)		-	-	1938	-	Sphingidae Museum, Příbram, Czech Republic.
12623	<i>Hyles vespertilio</i>	Italy	-		-	-	1819	-	Hessisches Landesmuseum für Kunst und Natur, Wiesbaden, Germany
9124	<i>Hyles gallii</i>	Kazakhstan	Sarym-Sakty Mts., 12 km SSW Soldatovo vill.	1300 m	11-13	6	2012	R.V. Yakovlev	R.V. Yakovlev collection, Barnaul, Russia
9127	<i>Hyles gallii</i>	Russia	Altaj Kraj, Mikhajlovskoe distr., 5 km SWW Mikhajlovskoe		20-21	7	2012	R. Yakovlev, Yu. Perunov & P. Ustjuzhanin	R.V. Yakovlev collection, Barnaul, Russia
9128	<i>Hyles gallii</i>	Russia	Magadan reg., Susuman vill.		12	7	2011	V. Zurilina	R.V. Yakovlev collection, Barnaul, Russia
11089	<i>Hyles gallii</i>	Kyrgyzstan	Kyrgyzstan, Lake Ortotokoi		-	7	2014	S. Yevdoshenko	Senckenberg Natural History Collections, Dresden, Germany
11953	<i>Hyles gallii</i>	China	Xinjiang, Tian Shan, Ketmen Mts. (=T ieh-mi-li-k o Shan), ca. 50 km SSW Yinig (Kuldja)	1750-1900	20	6	2007	Grieshuber	U. Eitschberger collection, Markt-leuthen, Germany
11954	<i>Hyles gallii</i>	Mongolia	Dornod Aimag Humrog r., 120 km E from Sumber Sum		20	6	2004	U. Eitschberger	U. Eitschberger collection, Markt-leuthen, Germany

Table S2. Conserved Specimens used for RNA bait generation.

MTD-TW Accession No.	Taxon	Location	Collection Date	Recorded by	Tissue type (conservation)
4831	<i>Hyles hippophaes</i>	Russia	07.2014	Gary Saunders	larva (EtOH)
12014	<i>Hyles zygophylli</i>	Kasachstan	09.2014	-	larva (EtOH)
1117	<i>Hyles livornica</i>	Morocco	05.2005	-	larva (EtOH)
11787	<i>Hyles euphorbiae</i>	Kasachstan	06.2014	Serge Yevdoshenko	larva (EtOH)
3917	<i>Hyles centralasiae</i>	Kyrgyzstan	07.2006	Mark O'Neill	Imago, leg (EtOH)
5565	<i>Hyles euphorbiae</i>	Iran	21.-24.05.2009	Alireza Naderi	Imago, leg (EtOH)
9316	<i>Hyles siehei</i>	Turkey	21.6.2011	Martin Geck	Imago, leg (EtOH)

Table S3. Accession numbers of Sanger sequences included for comparison.

Taxon	NCBI Accession number	Internal ID	Collection data of new samples	Voucher deposition of new samples
<i>Hyles vespertilio</i>	FN386605	MTD-TW 628	n.a.	n.a.
<i>Hyles vespertilio</i>	AJ749445	(BMNH) 0007, MTD-TW 4336	n.a.	n.a.
<i>Hyles vespertilio</i>	AJ749446	(BMNH) 0114, MTD-TW 4351	n.a.	n.a.
<i>Hyles hippophaes hippophaes</i>	AJ749452	BMNH 695817, MTD-TW 4223	n.a.	n.a.
<i>Hyles hippophaes bienerti</i>	FN386565	MTD-TW 501	n.a.	n.a.
<i>Hyles hippophaes bienerti</i>	FN386567	MTD-TW 1317	n.a.	n.a.
<i>Hyles hippophaes bienerti</i>	FN386569	MTD-TW 3458	n.a.	n.a.
<i>Hyles hippophaes</i>	FN386570	MTD-TW 3459	n.a.	n.a.

bienerti

<i>Hyles hippophaes bienerti</i>	FN386566	MTD-TW 1316	n.a.	n.a.
<i>Hyles hippophaes bienerti</i>	###	MTD-TW 3209	Russia, Saratov Province, nearby Engels city, leg. V. Anikin, 12.VIII 2007	Museum Witt München
<i>Hyles hippophaes bienerti</i>	###	MTD-TW 3086	Turkey, Adana Pozanti, 900m, leg. W. ten Hagen, 28.VII.1993	private collection Dr. W. ten Hagen (Mömlingen)
<i>Hyles hippophaes bienerti</i>	###	MTD-TW 3087	Iran, Qom Kuh-e Goran (South side), 2450m, leg. W. ten Hagen, 20/21.VII.1998	private collection Dr. W. ten Hagen (Mömlingen)
<i>Hyles hippophaes baltistana</i>	###	MTD-TW 6631	North India, Spiti, Himal Pradesh, Himalaya, leg. H. Harbich, 1995	Museum of Zoology, Senckenberg Dresden (Heimo Harbich's collection)
<i>Hyles hippophaes baltistana</i>	###	MTD-TW 6632	North India, Spiti, Himal Pradesh, Himalaya, leg. H. Harbich, 1995	Museum of Zoology, Senckenberg Dresden (Heimo Harbich's collection)
<i>Hyles chamyla f. chamyla</i>	###	MTD-TW 1725, BC-RBP 2279	Mongolia, Gobi Altay, Zahuin Gobi, Aimak, 1090 m, leg. Saldaitis, Jun-06-2004	private collection Dr. Ronald Brechlin (Pasewalk)
<i>Hyles chamyla f. chamyla</i>	###	MTD-TW 1726, BC-RBP 2280	Mongolia, Gobi Altay, Zahuin Gobi, Aimak, 1090 m, leg. Saldaitis, Jun-06-2004	private collection Dr. Ronald Brechlin (Pasewalk)
<i>Hyles chamyla f. apocyni</i>	###	MTD-TW 1325	Tadzhikistan, down stream Pianj R., "Tigrovaya balka" Reserve, V. Gurko, 1.-5.VIII.2006	collection V. Gurko
<i>Hyles chamyla f. apocyni</i>	###	MTD-TW 1326	Tadzhikistan, down stream Pianj R., "Tigrovaya balka" Reserve, V. Gurko, 1.-5.VIII.2006	collection V. Gurko

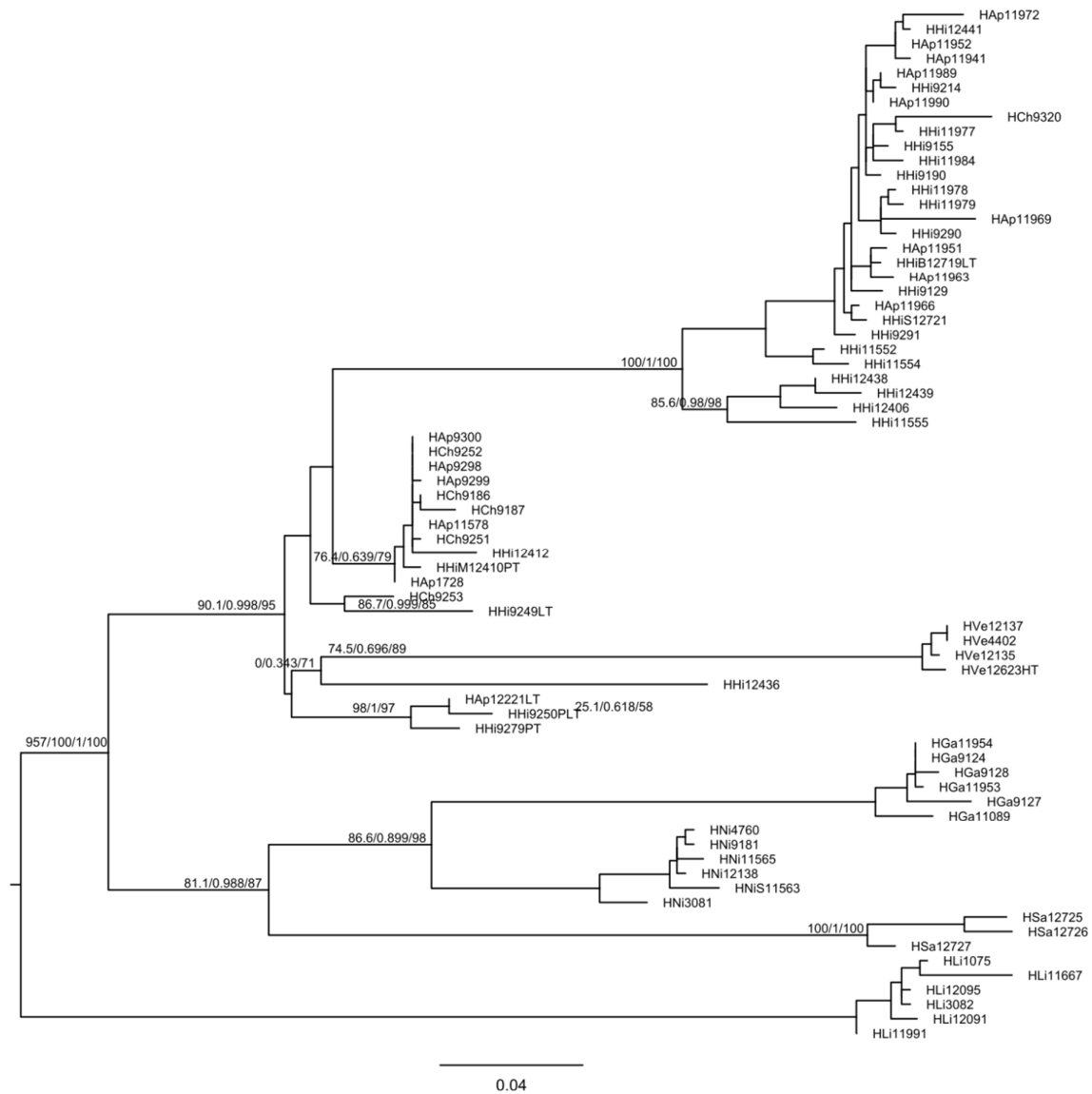


Figure S4. Maximum Likelihood tree based on 298 parsimony-informative mitochondrial SNPs of the *H. hippophaes* species cluster and *Hyles* outgroups. Node support values from left to right are ML bootstrap, Bayesian-like posterior probability, and parsimony bootstrap. Bootstrap support values are based upon 10000 ultra-fast bootstraps. The tree is unrooted but was rooted at the midpoint for illustration purposes. Two specimens with the highest missingness were deleted (*H. h. hippophaes* holotype, 51.75% and *H. h. bienerti* paratype, 29.53%).

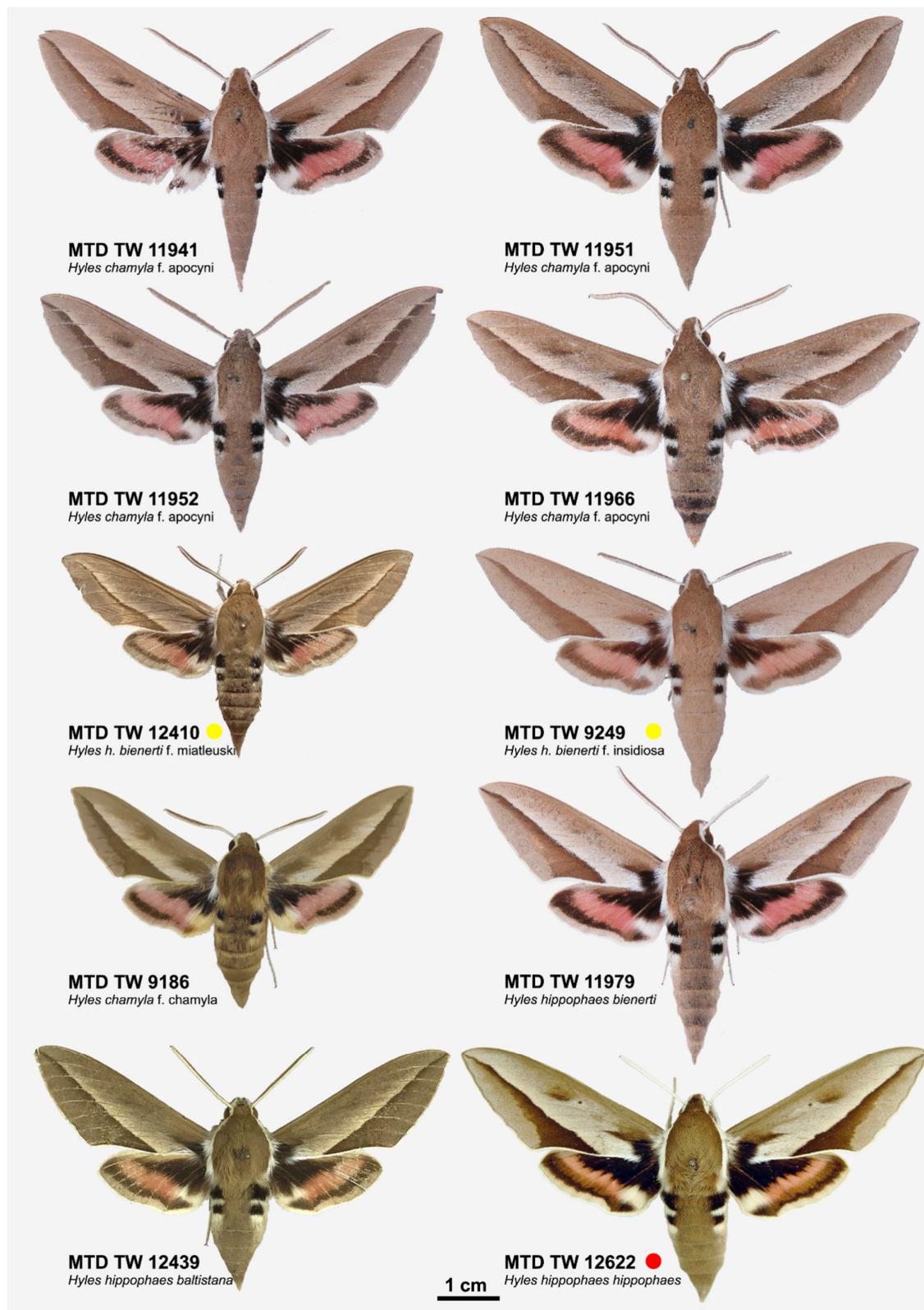


Figure S5. Habitus of specimens showing conflicting assignment according to mtDNA vs phenotype data, alongside typical phenotypes of known taxa. Voucher-codes and taxon names as in Figures 6, 8 and Table S1. Most such specimens correspond to the likely hybrid '*Hyles chamyla* f. *apocyni*'. Red dots mark holotypes, while yellow dots mark para- and lectotypes.