Supplementary Material

Tables

Supplementary Table S1: Details of the 372 specimens used.

Reg. ID.	Species Population/ Race	Common Name	Family	Sex	Latitude (Dec)	Longitude (Dec)	Date Collected
LEP3067	*Mesodina aeluropis*	Montane Iris-skipper	Hesperiidae 1	Unknown	-33.63	150.28	04/11/1941
LEP3065	*Mesodina aeluropis*	Montane Iris-skipper	Hesperiidae 1	Unknown	-33.63	150.28	01/12/1933
LEP3061	*Mesodina aeluropis*	Montane Iris-skipper	Hesperiidae 1	Unknown	-33.88	151.22	08/01/1945
LEP3060	*Mesodina aeluropis*	Montane Iris-skipper	Hesperiidae 1	Unknown	-33.88	151.22	09/01/1945
LEP3089	*Mesodina aeluropis*	Montane Iris-skipper	Hesperiidae 1	Unknown	-33.63	150.28	07/12/1946
LEP11165	*Tellervo zoilus zoilus*	(Cairns) Hamadryad	Nymphalidae 1	Unknown	-16.82	145.60	31/12/1977
LEP11171	*Tellervo zoilus zoilus*	(Cairns) Hamadryad	Nymphalidae 1	Unknown	-17.92	146.10	17/01/1978
LEP11170	*Tellervo zoilus zoilus*	(Cairns) Hamadryad	Nymphalidae 1	Unknown	-20.82	149.27	17/01/1978
LEP5824	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Female	-17.08	145.77	29/12/1925
LEP5822	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Female	-16.82	145.60	xx/05/1909
LEP5820	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Female	-16.82	145.60	xx/05/1908
LEP5819	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Female	-16.82	145.60	xx/05/1907
LEP5821	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Female	-16.82	145.60	xx/11/1898
LEP5810	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Male	-16.82	145.60	xx/05/1907
LEP5816	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Male	-16.82	145.60	xx/10/1908
LEP5817	*Arhopala wildei wildei*	White Oak-blue	Lycaenidae 1	Male	-16.82	145.60	xx/10/1909
LEP2138	*Hesperilla flavescens*	Yellow Sedge-skipper	Hesperiidae 2	Unknown	-37.87	144.82	29/11/1941
LEP2129	*Hesperilla flavescens*	Yellow Sedge-skipper	Hesperiidae 2	Unknown	-37.87	144.82	03/11/1945
LEP2133	*Hesperilla flavescens*	Yellow Sedge-skipper	Hesperiidae 2	Unknown	-37.87	144.82	27/10/1946
LEP2131	*Hesperilla flavescens*	Yellow Sedge-skipper	Hesperiidae 2	Unknown	-37.87	144.82	05/11/1948
LEP2127	*Hesperilla flavescens*	Yellow Sedge-skipper	Hesperiidae 2	Unknown	-37.87	144.82	03/11/1945
LEP3577	*Suniana sunias rectivitta*	Wide-brand Grass-dart	Hesperiidae 3	Unknown	-20.82	149.27	29/04/1949
LEP3574	*Suniana sunias rectivitta*	Wide-brand Grass-dart	Hesperiidae 3	Unknown	-16.90	145.73	06/10/1949

LEP3570	*Suniana sunias rectivitta*	Wide-brand Grass-dart	Hesperiidae 3	Unknown	-20.82	149.27	07/05/1949
LEP3565	*Suniana sunias rectivitta*	Wide-brand Grass-dart	Hesperiidae 3	Unknown	-16.82	145.60	xx/03/1907
LEP3568	*Suniana sunias rectivitta*	Wide-brand Grass-dart	Hesperiidae 3	Unknown	-16.82	145.60	xx/04/1907
LEP3029	*Mesodina cyanophracta*	Blue Iris-skipper	Hesperiidae 4	Unknown	-33.33	115.63	07/11/1945
LEP3030	*Mesodina cyanophracta*	Blue Iris-skipper	Hesperiidae 4	Unknown	-33.33	115.63	11/11/1948
LEP3048	*Mesodina cyanophracta*	Blue Iris-skipper	Hesperiidae 4	Unknown	-33.33	115.63	06/12/1931
LEP3037	*Mesodina cyanophracta*	Blue Iris-skipper	Hesperiidae 4	Unknown	-32.85	115.92	12/11/1909
LEP3042	*Mesodina cyanophracta*	Blue Iris-skipper	Hesperiidae 4	Unknown	-32.85	115.92	05/11/1909
LEP7807	*Paralucia pyrodiscus lucida*	Dull Copper	Lycaenidae 2	Unknown	-37.73	144.80	30/12/1920
LEP7806	*Paralucia pyrodiscus lucida*	Dull Copper	Lycaenidae 2	Unknown	-37.73	144.80	30/12/1920
LEP7803	*Paralucia pyrodiscus lucida*	Dull Copper	Lycaenidae 2	Unknown	-37.72	145.15	17/01/1947
LEP33697	*Paralucia pyrodiscus lucida*	Dull Copper	Lycaenidae 2	Unknown	-37.70	145.10	06/02/1949
LEP7799	*Paralucia pyrodiscus lucida*	Dull Copper	Lycaenidae 2	Unknown	-37.70	145.10	16/01/1950
LEP7828	*Paralucia pyrodiscus pyrodiscus*	Dull Copper	Lycaenidae 3	Unknown	-33.63	150.28	18/02/1941
LEP7829	*Paralucia pyrodiscus pyrodiscus*	Dull Copper	Lycaenidae 3	Unknown	-33.63	150.28	26/12/1944
LEP7823	*Paralucia pyrodiscus pyrodiscus*	Dull Copper	Lycaenidae 3	Unknown	-34.12	150.73	09/04/1909
LEP7819	*Paralucia pyrodiscus pyrodiscus*	Dull Copper	Lycaenidae 3	Unknown	-33.88	151.22	09/12/1905
LEP7820	*Paralucia pyrodiscus pyrodiscus*	Dull Copper	Lycaenidae 3	Unknown	-33.88	151.22	09/12/1905
LEP12525	*Tisiphone abeona albifascia*	Varied Sword-grass Brown	Nymphalidae 2	Unknown	-37.73	148.10	4-8/1/1932
LEP12524	*Tisiphone abeona albifascia*	Varied Sword-grass Brown	Nymphalidae 2	Unknown	-37.73	148.10	22/02/1947
LEP12523	*Tisiphone abeona albifascia*	Varied Sword-grass Brown	Nymphalidae 2	Unknown	-37.73	148.10	22/02/1947
LEP12522	*Tisiphone abeona albifascia*	Varied Sword-grass Brown	Nymphalidae 2	Unknown	-37.73	148.10	20/02/1947
LEP12520	*Tisiphone abeona albifascia*	Varied Sword-grass Brown	Nymphalidae 2	Unknown	-37.73	148.10	04/03/1946
LEP12625	*Tisiphone abeona joanna rawnsleyi-morrisi hybrid*	Varied Sword-grass Brown	Nymphalidae 3	Unknown	-31.45	152.92	16/10/1913
LEP12614	*Tisiphone abeona joanna rawnsleyi-morrisi hybrid*	Varied Sword-grass Brown	Nymphalidae 3	Unknown	-31.45	152.92	16/10/1913
LEP12615	*Tisiphone abeona joanna rawnsleyi-morrisi hybrid*	Varied Sword-grass Brown	Nymphalidae 3	Unknown	-31.45	152.92	02/04/1918
LEP12591	*Tisiphone abeona joanna rawnsleyi-morrisi hybrid*	Varied Sword-grass Brown	Nymphalidae 3	Unknown	-31.45	152.92	29/03/1918
LEP12611	*Tisiphone abeona joanna rawnsleyi-morrisi hybrid*	Varied Sword-grass Brown	Nymphalidae 3	Unknown	-31.45	152.92	03/04/1918
LEP12551	*Tisiphone abeona abeona*	Varied Sword-grass Brown	Nymphalidae 4	Unknown	-33.88	151.22	xx/10/1923
LEP12552	*Tisiphone abeona abeona*	Varied Sword-grass Brown	Nymphalidae 4	Unknown	-33.88	151.22	25/10/1923

LEP12555	*Tisiphone abeona abeona*	Varied Sword-grass Brown	Nymphalidae 4	Unknown	-33.88	151.22	24/10/1922
LEP12550	*Tisiphone abeona abeona*	Varied Sword-grass Brown	Nymphalidae 4	Unknown	-33.88	151.22	xx/10/1923
LEP12549	*Tisiphone abeona abeona*	Varied Sword-grass Brown	Nymphalidae 4	Unknown	-33.88	151.22	22/10/1922
LEP12677	*Tisiphone abeona rawnsleyi*	Varied Sword-grass Brown	Nymphalidae 5	Unknown	-26.68	152.97	01/04/1923
LEP12678	*Tisiphone abeona rawnsleyi*	Varied Sword-grass Brown	Nymphalidae 5	Unknown	-26.68	152.97	01/04/1923
LEP12676	*Tisiphone abeona rawnsleyi*	Varied Sword-grass Brown	Nymphalidae 5	Unknown	-26.68	152.97	01/04/1923
LEP12679	*Tisiphone abeona rawnsleyi*	Varied Sword-grass Brown	Nymphalidae 5	Unknown	-26.68	152.97	01/04/1923
LEP12684	*Tisiphone abeona rawnsleyi*	Varied Sword-grass Brown	Nymphalidae 5	Unknown	-26.68	152.97	19/10/1922
LEP12672	*Tisiphone abeona regalis*	Varied Sword-grass Brown	Nymphalidae 6	Unknown	-28.87	153.58	12/10/1902
LEP12665	*Tisiphone abeona regalis*	Varied Sword-grass Brown	Nymphalidae 6	Unknown	-30.33	152.72	06/12/1911
LEP12673	*Tisiphone abeona regalis*	Varied Sword-grass Brown	Nymphalidae 6	Unknown	-31.87	151.42	10-23/01/1948
LEP12670	*Tisiphone abeona regalis*	Varied Sword-grass Brown	Nymphalidae 6	Unknown	-31.98	151.45	26/01/1922
LEP12669	*Tisiphone abeona regalis*	Varied Sword-grass Brown	Nymphalidae 6	Unknown	-31.98	151.45	26/01/1922
LEP12630	*Tisiphone abeona morrisi*	Varied Sword-grass Brown	Nymphalidae 7	Unknown	-28.87	153.58	04/12/1912
LEP12632	*Tisiphone abeona morrisi*	Varied Sword-grass Brown	Nymphalidae 7	Unknown	-28.87	153.58	05/02/1898
LEP12635	*Tisiphone abeona morrisi*	Varied Sword-grass Brown	Nymphalidae 7	Unknown	-28.87	153.58	30/09/1922
LEP12657	*Tisiphone abeona morrisi*	Varied Sword-grass Brown	Nymphalidae 7	Unknown	-28.42	152.75	23/11/1920
LEP12658	*Tisiphone abeona morrisi*	Varied Sword-grass Brown	Nymphalidae 7	Unknown	-28.42	152.75	13/12/1920
LEP12237	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Male	-37.50	144.58	19/11/1907
LEP12238	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Male	-37.50	144.58	07/01/1905
LEP12239	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Male	-37.50	144.58	22/11/1891
LEP12241	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Male	-37.50	144.58	19/11/1911
LEP12242	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Male	-37.50	144.58	03/12/1911
LEP12248	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Female	-37.50	144.58	07/01/1912
LEP12249	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Female	-37.50	144.58	27/xx/1908
LEP12250	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Female	-37.50	144.58	07/01/1912
LEP12251	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Female	-37.50	144.58	07/01/1912
LEP12252	*Heteronympha merope merope*	Common Brown	Nymphalidae 8	Female	-37.50	144.58	07/01/1912
LEP12311	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Male	-33.97	116.13	xx/01/1905
LEP12310	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Male	-33.97	116.13	xx/01/1905

LEP12309	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Male	-33.97	116.13	xx/01/1905
LEP12308	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Male	-33.97	116.13	xx/01/1905
LEP12307	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Male	-33.97	116.13	xx/01/1905
LEP12317	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Female	-33.97	116.13	xx/02/1905
LEP12316	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Female	-33.97	116.13	xx/02/1905
LEP12315	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Female	-33.97	116.13	xx/02/1905
LEP12314	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Female	-33.97	116.13	xx/02/1905
LEP12313	*Heteronympha merope duboulayi*	Common Brown	Nymphalidae 9	Female	-33.97	116.13	xx/02/1905
LEP14072	*Delias nigrina*	Black Jezebel	Pieridae 1	Female	-27.47	153.02	09/03/1905
LEP14073	*Delias nigrina*	Black Jezebel	Pieridae 1	Female	-27.47	153.02	12/03/1905
LEP14074	*Delias nigrina*	Black Jezebel	Pieridae 1	Female	-27.47	153.02	12/03/1905
LEP14077	*Delias nigrina*	Black Jezebel	Pieridae 1	Female	-27.47	153.02	01/05/1906
LEP14078	*Delias nigrina*	Black Jezebel	Pieridae 1	Female	-27.47	153.02	-
LEP14069	*Delias nigrina*	Black Jezebel	Pieridae 1	Male	-27.47	153.02	09/03/1905
LEP14070	*Delias nigrina*	Black Jezebel	Pieridae 1	Male	-27.47	153.02	12/03/1905
LEP14071	*Delias nigrina*	Black Jezebel	Pieridae 1	Male	-27.47	153.02	-
LEP14076	*Delias nigrina*	Black Jezebel	Pieridae 1	Male	-27.47	153.02	12/03/1905
LEP14079	*Delias nigrina*	Black Jezebel	Pieridae 1	Male	-27.47	153.02	30/01/1902
LEP14424	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Male	-27.45	153.05	xx/03/1916
LEP14423	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Male	-27.47	153.02	29/04/1906
LEP14422	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Male	-27.45	153.05	xx/03/1916
LEP14421	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Female	-27.45	153.05	xx/03/1916
LEP14420	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Female	-27.45	153.05	xx/03/1916
LEP14434	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Female	-27.45	153.05	xx/03/1916
LEP14433	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Female	-27.45	153.05	xx/03/1916
LEP14432	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Female	-27.45	153.05	xx/03/1916
LEP14431	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Male	-27.45	153.05	xx/03/1916
LEP14430	*Catopsilia pyranthe crokera*	White Migrant	Pieridae 2	Male	-27.45	153.05	xx/03/1916
LEP4563	*Graphium macleayanum macleayanum*	Macleay's Swallowtail	Papilionidae 1	Unknown	-37.70	145.68	03/12/1971
LEP4564	*Graphium macleayanum macleayanum*	Macleay's Swallowtail	Papilionidae 1	Unknown	-37.70	145.68	01/12/1970

LEP4565	*Graphium macleayanum macleayanum*	Macleay's Swallowtail	Papilionidae 1	Unknown	-37.70	145.68	25/11/1969
LEP4576	*Graphium macleayanum macleayanum*	Macleay's Swallowtail	Papilionidae 1	Unknown	-32.07	151.57	22/01/1972
LEP4580	*Graphium macleayanum macleayanum*	Macleay's Swallowtail	Papilionidae 1	Unknown	-21.13	148.50	09/01/1970
LEP4319	*Papilio demoleus sthenelus*	Chequered Swallowtail	Papilionidae 2	Unknown	-27.47	153.02	20/03/1905
LEP4323	*Papilio demoleus sthenelus*	Chequered Swallowtail	Papilionidae 2	Unknown	-27.47	153.02	11/03/1905
LEP4324	*Papilio demoleus sthenelus*	Chequered Swallowtail	Papilionidae 2	Unknown	-27.47	153.02	10/03/1905
LEP4326	*Papilio demoleus sthenelus*	Chequered Swallowtail	Papilionidae 2	Unknown	-27.47	153.02	14/10/1967
LEP4327	*Papilio demoleus sthenelus*	Chequered Swallowtail	Papilionidae 2	Unknown	-27.47	153.02	14/10/1967
LEP575	*Trapezites maheta*	Northern Silver Ochre	Hesperiidae 5	Unknown	-26.80	153.13	24/09/1972
LEP577	*Trapezites maheta*	Northern Silver Ochre	Hesperiidae 5	Unknown	-26.80	153.13	01/10/1972
LEP578	*Trapezites maheta*	Northern Silver Ochre	Hesperiidae 5	Unknown	-26.80	153.13	02/10/1976
LEP17006	*Toxidia parvula*	Banded Grass-skipper	Hesperiidae 6	Unknown	-33.35	150.15	08/01/1972
LEP17005	*Toxidia parvula*	Banded Grass-skipper	Hesperiidae 6	Unknown	-33.35	150.15	08/01/1972
LEP17007	*Toxidia parvula*	Banded Grass-skipper	Hesperiidae 6	Unknown	-35.05	150.67	18/12/1972
LEP17008	*Toxidia parvula*	Banded Grass-skipper	Hesperiidae 6	Unknown	-35.05	150.67	18/12/1972
LEP17010	*Toxidia parvula*	Banded Grass-skipper	Hesperiidae 6	Unknown	-29.68	152.93	31/08/1976
LEP3169	*Taractrocera papyria papyria*	White-banded Grass-dart	Hesperiidae 7	Unknown	-37.82	145.23	26/10/1947
LEP3170	*Taractrocera papyria papyria*	White-banded Grass-dart	Hesperiidae 7	Unknown	-37.82	145.23	17/11/1946
LEP3171	*Taractrocera papyria papyria*	White-banded Grass-dart	Hesperiidae 7	Unknown	-37.82	145.23	23/11/1947
LEP3172	*Taractrocera papyria papyria*	White-banded Grass-dart	Hesperiidae 7	Unknown	-37.82	145.23	18/10/1946
LEP2687	*Taractrocera papyria papyria*	White-banded Grass-dart	Hesperiidae 7	Unknown	-37.20	145.00	02/12/1994
LEP3188	*Taractrocera papyria agraulia*	White-banded Grass-dart	Hesperiidae 8	Unknown	-31.97	115.83	24/11/1948
LEP3192	*Taractrocera papyria agraulia*	White-banded Grass-dart	Hesperiidae 8	Unknown	-32.15	116.00	20/11/1948
LEP3193	*Taractrocera papyria agraulia*	White-banded Grass-dart	Hesperiidae 8	Unknown	-32.15	116.00	20/11/1948
LEP3205	*Taractrocera papyria agraulia*	White-banded Grass-dart	Hesperiidae 8	Unknown	-32.85	115.92	12/11/1906
LEP3203	*Taractrocera papyria agraulia*	White-banded Grass-dart	Hesperiidae 8	Unknown	-32.85	115.92	30/11/1907
LEP13369	*Argynnina hobartia tasmanica*	Tasmanian Brown	Nymphalidae 10	Unknown	-41.90	145.33	10/11/1907
LEP13367	*Argynnina hobartia tasmanica*	Tasmanian Brown	Nymphalidae 10	Unknown	-41.90	145.33	06/11/1904
LEP13359	*Argynnina hobartia tasmanica*	Tasmanian Brown	Nymphalidae 10	Unknown	-41.90	145.33	27/10/1907
LEP13356	*Argynnina hobartia tasmanica*	Tasmanian Brown	Nymphalidae 10	Unknown	-41.90	145.33	27/10/1907

LEP13353	*Argynnina hobartia tasmanica*	Tasmanian Brown	Nymphalidae 10	Unknown	-41.90	145.33	27/10/1907
LEP7741	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Male	-38.27	144.52	10/11/1974
LEP7740	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Male	-38.27	144.52	10/11/1974
LEP7739	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Male	-38.27	144.52	10/11/1974
LEP7738	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Male	-38.27	144.52	05/10/1970
LEP7697	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Male	-38.27	144.52	21/11/1953
LEP7706	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Female	-38.28	144.50	15/11/1925
LEP7730	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Female	-38.27	144.52	xx/11/1912
LEP7750	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Female	-38.27	144.52	06/11/1974
LEP7723	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Female	-38.28	144.50	15/11/1925
LEP7747	*Acrodipsas myrmecophila*	Small Ant-blue	Lycaenidae 4	Female	-38.27	144.52	05/11/1972
LEP129	*Badamia exclamationis*	Narrow-winged Awl (Brown Awl)	Hesperiidae 9	Unknown	-19.27	146.82	01/02/1902
LEP110	*Badamia exclamationis*	Narrow-winged Awl (Brown Awl)	Hesperiidae 9	Unknown	-23.60	150.17	18/11/1923
LEP112	*Badamia exclamationis*	Narrow-winged Awl (Brown Awl)	Hesperiidae 9	Unknown	-16.92	145.77	-
LEP127	*Badamia exclamationis*	Narrow-winged Awl (Brown Awl)	Hesperiidae 9	Unknown	-19.27	146.82	01/01/1902
LEP128	*Badamia exclamationis*	Narrow-winged Awl (Brown Awl)	Hesperiidae 9	Unknown	-19.27	146.82	15/03/1905
LEP150	*Euschemon rafflesia rafflesia*	Regent Skipper	Hesperiidae 10	Unknown	-28.08	153.45	02/12/1973
LEP152	*Euschemon rafflesia rafflesia*	Regent Skipper	Hesperiidae 10	Unknown	-31.45	152.92	17/03/1976
LEP172	*Euschemon rafflesia rafflesia*	Regent Skipper	Hesperiidae 10	Unknown	-27.97	153.20	01/12/1943
LEP161	*Euschemon rafflesia rafflesia*	Regent Skipper	Hesperiidae 10	Unknown	-28.90	153.40	10/02/1973
LEP6866	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Male	-28.08	153.45	23/09/1941
LEP6865	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Male	-28.08	153.45	29/09/1941
LEP6864	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Male	-28.08	153.45	07/10/1941
LEP6889	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Male	-27.57	151.95	17/10/1949
LEP6886	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Male	-29.68	152.93	26/01/1968
LEP6881	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Female	-27.47	153.47	23/11/1919
LEP6880	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Female	-27.57	151.95	xx/10/1949
LEP6877	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Female	-27.47	153.47	28/11/1919
LEP6872	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Female	-28.08	153.45	29/09/1941
LEP6869	*Hypochrysops delicia delicia*	Moonlight Jewel	Lycaenidae 5	Female	-27.57	151.95	26/10/1949

LEP5149	*Pseudalmenus chlorinda barringtonensis*	Silky Hairstreak	Lycaenidae 6	Unknown	-31.87	151.42	27/10/1948
LEP5152	*Pseudalmenus chlorinda barringtonensis*	Silky Hairstreak	Lycaenidae 6	Unknown	-31.87	151.42	27/10/1948
LEP5168	*Pseudalmenus chlorinda barringtonensis*	Silky Hairstreak	Lycaenidae 6	Unknown	-31.87	151.42	07/09/1948
LEP5169	*Pseudalmenus chlorinda barringtonensis*	Silky Hairstreak	Lycaenidae 6	Unknown	-31.87	151.42	27/10/1948
LEP5171	*Pseudalmenus chlorinda barringtonensis*	Silky Hairstreak	Lycaenidae 6	Unknown	-31.87	151.42	11/10/1948
LEP5200	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak	Lycaenidae 7	Unknown	-38.18	146.27	20/11/1948
LEP5206	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak	Lycaenidae 7	Unknown	-38.18	146.27	16/11/1943
LEP5210	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak	Lycaenidae 7	Unknown	-37.95	145.48	23/10/1947
LEP5221	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak	Lycaenidae 7	Unknown	-37.50	144.58	01/11/1912
LEP5246	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak	Lycaenidae 7	Unknown	-37.38	144.33	22/10/1956
LEP6123	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Male	-34.95	138.88	xx/01/1936
LEP6124	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Male	-34.95	138.88	xx/01/1934
LEP6129	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Male	-34.95	138.88	07/01/1936
LEP6126	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Male	-34.95	138.88	xx/01/1934
LEP6131	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Male	-34.98	138.72	22/01/1942
LEP6127	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Female	-34.95	138.88	xx/01/1934
LEP6128	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Female	-34.95	138.88	xx/01/1934
LEP6132	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Female	-34.98	138.72	10/01/1948
LEP6133	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Female	-34.98	138.72	04/01/1942
LEP6135	*Ogyris genoveva*	Southern Purple Azure	Lycaenidae 8	Female	-34.95	138.88	xx/01/1934
LEP6146	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Male	-33.88	151.22	29/10/1930
LEP6145	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Male	-33.88	151.22	04/10/1930
LEP6147	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Male	-33.88	151.22	03/11/1930
LEP6141	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Male	-33.88	151.22	12/02/1931
LEP6138	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Male	-33.40	151.30	25/02/1918
LEP6152	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Female	-33.88	151.22	17/11/1930
LEP6153	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Female	-33.88	151.22	11/11/1930
LEP6154	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Female	-33.88	151.22	21/10/1930
LEP6155	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Female	-33.88	151.22	28/11/1930
LEP6159	*Ogyris genoveva* (south-coast NSW population)	Southern Purple Azure	Lycaenidae 9	Female	-33.88	151.22	06/11/1930

LEP10350	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Male	-27.47	153.02	21/11/1965
LEP10363	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Male	-29.12	153.43	25/01/1978
LEP10368	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Male	-33.47	151.43	11/01/1972
LEP10371	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Male	-34.13	151.07	22/12/1972
LEP10372	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Male	-37.63	146.62	21/12/1976
LEP10356	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Female	-26.80	153.13	15/01/1973
LEP10359	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Female	-37.52	146.63	17/01/1971
LEP10380	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Female	-38.02	146.37	08/11/1970
LEP10370	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Female	-29.12	153.43	25/01/1978
LEP10358	*Candalides hyacinthinus hyacinthinus*	Common Dusky Blue	Lycaenidae 10	Female	-26.80	153.13	15/01/1973
LEP10918	*Euploea corinna*	Common Crow (Australian Crow/ Oleander Butterfly)	Nymphalidae 11	Unknown	-10.68	142.15	22/05/1908
LEP10919	*Euploea corinna*	Common Crow (Australian Crow/ Oleander Butterfly)	Nymphalidae 11	Unknown	-10.68	142.15	12/05/1908
LEP10920	*Euploea corinna*	Common Crow (Australian Crow/ Oleander Butterfly)	Nymphalidae 11	Unknown	-10.68	142.15	25/05/1908
LEP10922	*Euploea corinna*	Common Crow (Australian Crow/ Oleander Butterfly)	Nymphalidae 11	Unknown	-10.68	142.15	25/05/1908
LEP10923	*Euploea corinna*	Common Crow (Australian Crow/ Oleander Butterfly)	Nymphalidae 11	Unknown	-10.68	142.15	30/05/1908
LEP4506	*Papilio anactus*	Dingy/ Dainty Swallowtail	Papilionidae 3	Unknown	-35.73	143.92	-
LEP4504	*Papilio anactus*	Dingy/ Dainty Swallowtail	Papilionidae 3	Unknown	-35.73	143.92	16/02/1915
LEP4503	*Papilio anactus*	Dingy/ Dainty Swallowtail	Papilionidae 3	Unknown	-35.73	143.92	16/02/1915
LEP4502	*Papilio anactus*	Dingy/ Dainty Swallowtail	Papilionidae 3	Unknown	-35.73	143.92	07/04/1924
LEP4501	*Papilio anactus*	Dingy/ Dainty Swallowtail	Papilionidae 3	Unknown	-35.73	143.92	27/11/1925
LEP4822	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Male	-12.48	130.82	xx/09/1908
LEP4823	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Male	-12.48	130.82	24/10/1908
LEP4824	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Male	-12.48	130.82	23/04/1909
LEP4825	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Male	-12.48	130.82	xx/09/1908
LEP4826	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Male	-12.48	130.82	24/10/1908
LEP4827	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Female	-12.48	130.82	xx/09/1908
LEP4828	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Female	-12.48	130.82	30/10/1908
LEP4829	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Female	-12.45	130.83	-
LEP4830	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Female	-12.45	130.83	-
LEP4831	*Cressida cressida cressida*	Clearwing Swallowtail	Papilionidae 4	Female	-12.45	130.83	xx/05/1952

LEP4670	*Graphium macfarlanei macfarlanei*	Green Triangle	Papilionidae 5	Unknown	-16.82	145.60	xx/05/1907
LEP4673	*Graphium macfarlanei macfarlanei*	Green Triangle	Papilionidae 5	Unknown	-16.82	145.60	xx/04/1906
LEP4672	*Graphium macfarlanei macfarlanei*	Green Triangle	Papilionidae 5	Unknown	-16.82	145.60	xx/04/1908
LEP4671	*Graphium macfarlanei macfarlanei*	Green Triangle	Papilionidae 5	Unknown	-16.82	145.60	xx/05/1905
LEP4669	*Graphium macfarlanei macfarlanei*	Green Triangle	Papilionidae 5	Unknown	-16.82	145.60	xx/03/1905
LEP4706	*Graphium choredon*	Blue Triangle	Papilionidae 6	Unknown	-27.47	153.02	25/01/1906
LEP4705	*Graphium choredon*	Blue Triangle	Papilionidae 6	Unknown	-27.47	153.02	09/03/1905
LEP4704	*Graphium choredon*	Blue Triangle	Papilionidae 6	Unknown	-27.47	153.02	-
LEP4702	*Graphium choredon*	Blue Triangle	Papilionidae 6	Unknown	-27.47	153.02	21/01/1906
LEP4701	*Graphium choredon*	Blue Triangle	Papilionidae 6	Unknown	-27.47	153.02	22/01/1906
LEP4621	*Graphium eurypylus lycaon*	Pale Triangle	Papilionidae 7	Unknown	-27.47	153.02	02/04/1905
LEP4623	*Graphium eurypylus lycaon*	Pale Triangle	Papilionidae 7	Unknown	-27.47	153.02	09/03/1905
LEP4624	*Graphium eurypylus lycaon*	Pale Triangle	Papilionidae 7	Unknown	-27.47	153.02	25/01/1906
LEP4625	*Graphium eurypylus lycaon*	Pale Triangle	Papilionidae 7	Unknown	-27.47	153.02	05/02/1906
LEP4626	*Graphium eurypylus lycaon*	Pale Triangle	Papilionidae 7	Unknown	-27.47	153.02	-
LEP4679	*Graphium agamemnon ligatum*	Green-spotted Triangle	Papilionidae 8	Unknown	-10.18	142.27	12/03/1910
LEP4680	*Graphium agamemnon ligatum*	Green-spotted Triangle	Papilionidae 8	Unknown	-10.18	142.27	02/03/1910
LEP4682	*Graphium agamemnon ligatum*	Green-spotted Triangle	Papilionidae 8	Unknown	-10.18	142.27	02/03/1910
LEP4683	*Graphium agamemnon ligatum*	Green-spotted Triangle	Papilionidae 8	Unknown	-10.18	142.27	04/03/1910
LEP4684	*Graphium agamemnon ligatum*	Green-spotted Triangle	Papilionidae 8	Unknown	-10.18	142.27	28/02/1910
LEP14215	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Male	-37.50	144.58	10/02/1922
LEP14216	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Male	-37.50	144.58	10/02/1922
LEP14217	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Male	-37.50	144.58	10/02/1922
LEP14218	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Male	-37.50	144.58	26/02/1906
LEP14219	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Male	-37.50	144.58	25/01/1894
LEP14225	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Female	-37.50	144.58	16/02/1892
LEP14226	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Female	-37.50	144.58	12/02/1922
LEP14227	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Female	-37.50	144.58	08/02/1922
LEP14228	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Female	-37.50	144.58	19/01/1920
LEP14229	*Delias aganippe*	Spotted Jezebel	Pieridae 3	Female	-37.50	144.58	10/03/1907

LEP14866	*Eurema hecabe*	Large Grass-yellow	Pieridae 4	Unknown	-16.90	145.73	05/10/1949
LEP14864	*Eurema hecabe*	Large Grass-yellow	Pieridae 4	Unknown	-16.90	145.73	05/10/1949
LEP14863	*Eurema hecabe*	Large Grass-yellow	Pieridae 4	Unknown	-16.90	145.73	06/10/1949
LEP14896	*Eurema brigitta australis*	No-brand Grass-yellow	Pieridae 5	Unknown	-27.47	153.02	01/05/1906
LEP14900	*Eurema brigitta australis*	No-brand Grass-yellow	Pieridae 5	Unknown	-27.47	153.02	14/03/1905
LEP14895	*Eurema brigitta australis*	No-brand Grass-yellow	Pieridae 5	Unknown	-27.47	153.02	29/04/1906
LEP14905	*Eurema brigitta australis*	No-brand Grass-yellow	Pieridae 5	Unknown	-27.47	153.02	29/04/1906
LEP14899	*Eurema brigitta australis*	No-brand Grass-yellow	Pieridae 5	Unknown	-27.47	153.02	29/04/1906
LEP14384	*Appias melania*	Grey Albatross	Pieridae 6	Unknown	-16.82	145.60	xx/02/1901
LEP14385	*Appias melania*	Grey Albatross	Pieridae 6	Unknown	-16.82	145.60	xx/12/1901
LEP14387	*Appias melania*	Grey Albatross	Pieridae 6	Unknown	-16.82	145.60	xx/12/1901
LEP14393	*Appias melania*	Grey Albatross	Pieridae 6	Unknown	-16.82	145.60	xx/12/1901
LEP14392	*Appias melania*	Grey Albatross	Pieridae 6	Unknown	-16.82	145.60	19/03/1950
LEP14721	*Elodina padusa*	Narrow-winged Pearl-white	Pieridae 7	Unknown	-27.88	151.27	08/01/1928
LEP14720	*Elodina padusa*	Narrow-winged Pearl-white	Pieridae 7	Unknown	-27.88	151.27	15/03/1927
LEP14719	*Elodina padusa*	Narrow-winged Pearl-white	Pieridae 7	Unknown	-27.88	151.27	18/03/1928
LEP14718	*Elodina padusa*	Narrow-winged Pearl-white	Pieridae 7	Unknown	-27.88	151.27	12/10/1930
LEP14717	*Elodina padusa*	Narrow-winged Pearl-white	Pieridae 7	Unknown	-27.88	151.27	15/03/1927
LEP14765	*Elodina angulipennis*	Southern/ Common Pearl-white	Pieridae 8	Unknown	-27.47	153.02	xx/05/1915
LEP14763	*Elodina angulipennis*	Southern/ Common Pearl-white	Pieridae 8	Unknown	-27.47	153.02	01/05/1906
LEP14762	*Elodina angulipennis*	Southern/ Common Pearl-white	Pieridae 8	Unknown	-27.47	153.02	xx/05/1915
LEP14759	*Elodina angulipennis*	Southern/ Common Pearl-white	Pieridae 8	Unknown	-27.47	153.02	20/03/1905
LEP14758	*Elodina angulipennis*	Southern/ Common Pearl-white	Pieridae 8	Unknown	-27.47	153.02	01/05/1906
LEP14846	*Elodina parthia*	Striated Pearl-white/ Chalk White	Pieridae 9	Unknown	-27.47	153.02	18/04/1954
LEP14845	*Elodina parthia*	Striated Pearl-white/ Chalk White	Pieridae 9	Unknown	-27.47	153.02	25/04/1954
LEP14844	*Elodina parthia*	Striated Pearl-white/ Chalk White	Pieridae 9	Unknown	-27.47	153.02	18/08/1954
LEP14843	*Elodina parthia*	Striated Pearl-white/ Chalk White	Pieridae 9	Unknown	-28.13	153.20	25/01/1959
LEP14841	*Elodina parthia*	Striated Pearl-white/ Chalk White	Pieridae 9	Unknown	-27.88	151.27	11/05/1947
LEP14257	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Male	-37.72	148.47	26/10/1916
LEP14256	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Male	-37.72	148.47	31/10/1916

LEP14255	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Male	-37.72	148.47	29/10/1916
LEP14268	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Male	-38.18	146.27	18/01/1920
LEP14267	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Male	-38.18	146.27	17/08/1920
LEP14259	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Female	-37.72	148.47	29/10/1916
LEP14260	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Female	-37.72	148.47	31/10/1916
LEP14271	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Female	-38.18	146.27	22/09/1920
LEP14270	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Female	-38.18	146.27	17/01/1920
LEP14273	*Delias harpalyce*	Imperial Jezebel	Pieridae 10	Female	-37.05	146.08	05/11/1915
LEP14163	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Male	-16.82	145.60	xx/06/1905
LEP14165	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Male	-16.82	145.60	xx/06/1902
LEP14166	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Male	-16.82	145.60	xx/06/1900
LEP14168	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Male	-16.82	145.60	xx/07/1902
LEP14169	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Male	-16.82	145.60	xx/06/1902
LEP14174	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Female	-16.82	145.60	xx/06/1905
LEP14175	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Female	-16.82	145.60	xx/12/1905
LEP14176	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Female	-16.82	145.60	xx/06/1905
LEP14177	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Female	-16.82	145.60	xx/06/1905
LEP14178	*Delias ennia nigidius*	Yellow-banded Jezebel	Pieridae 11	Female	-16.82	145.60	xx/06/1902
LEP15053	*Eurema smilax*	Small Grass-yellow	Pieridae 12	Unknown	-37.50	144.58	21/11/1923
LEP15052	*Eurema smilax*	Small Grass-yellow	Pieridae 12	Unknown	-37.50	144.58	21/10/1894
LEP15065	*Eurema smilax*	Small Grass-yellow	Pieridae 12	Unknown	-31.67	150.67	25/03/1921
LEP15064	*Eurema smilax*	Small Grass-yellow	Pieridae 12	Unknown	-31.67	150.67	25/03/1921
LEP15063	*Eurema smilax*	Small Grass-yellow	Pieridae 12	Unknown	-31.67	150.67	25/03/1921
LEP4049	*Borbo impar lavinia*	Yellow Swift	Hesperiidae 11	Unknown	-12.48	130.82	xx/03/1909
LEP4048	*Borbo impar lavinia*	Yellow Swift	Hesperiidae 11	Unknown	-12.48	130.82	xx/02/1909
LEP4047	*Borbo impar lavinia*	Yellow Swift	Hesperiidae 11	Unknown	-12.48	130.82	xx/04/1909
LEP4046	*Borbo impar lavinia*	Yellow Swift	Hesperiidae 11	Unknown	-12.48	130.82	xx/03/1909
LEP4045	*Borbo impar lavinia*	Yellow Swift	Hesperiidae 11	Unknown	-12.48	130.82	xx/03/1909
LEP5324	*Jalmenus evagoras*	Imperial Hairstreak	Lycaenidae 11	Unknown	-33.03	151.67	01/02/1947
LEP5315	*Jalmenus evagoras*	Imperial Hairstreak	Lycaenidae 11	Unknown	-31.87	151.42	10-23/01/1948

LEP5322	*Jalmenus evagoras*	Imperial Hairstreak	Lycaenidae 11	Unknown	-31.87	151.42	10-23/01/1948
LEP5319	*Jalmenus evagoras*	Imperial Hairstreak	Lycaenidae 11	Unknown	-31.87	151.42	10-23/01/1948
LEP5317	*Jalmenus evagoras*	Imperial Hairstreak	Lycaenidae 11	Unknown	-31.87	151.42	10-23/01/1948
LEP7342	*Hypochrysops apelles apelles*	Copper Jewel	Lycaenidae 12	Unknown	-16.90	145.73	24/04/1927
LEP7339	*Hypochrysops apelles apelles*	Copper Jewel	Lycaenidae 12	Unknown	-10.68	142.15	26/06/1908
LEP7336	*Hypochrysops apelles apelles*	Copper Jewel	Lycaenidae 12	Unknown	-28.08	153.45	09/04/1941
LEP7332	*Hypochrysops apelles apelles*	Copper Jewel	Lycaenidae 12	Unknown	-21.15	149.18	08/03/1928
LEP7330	*Hypochrysops apelles apelles*	Copper Jewel	Lycaenidae 12	Unknown	-16.92	145.77	xx/11/1909
LEP104	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Male	-26.55	153.08	19/01/1973
LEP103	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Male	-26.55	153.08	17/01/1973
LEP99	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Male	-28.88	153.38	12/01/1905
LEP97	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Male	-29.68	152.93	14/04/1957
LEP101	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Male	-26.55	153.08	16/01/1973
LEP91	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Female	-31.45	152.92	17/04/1922
LEP90	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Female	-31.45	152.92	17/04/1922
LEP102	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Female	-31.45	152.92	02/01/1973
LEP98	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Female	-26.55	153.08	19/01/1973
LEP96	*Hasora khoda haslia*	Narrow-banded Awl	Hesperiidae 12	Female	-27.97	153.20	xx/01/1933
LEP13447	*Nesoxenica leprea elia*	Tasmanian Xenica	Nymphalidae 12	Unknown	-41.68	145.95	xx/01/1917
LEP13448	*Nesoxenica leprea elia*	Tasmanian Xenica	Nymphalidae 12	Unknown	-41.68	145.95	20/01/1917
LEP13449	*Nesoxenica leprea elia*	Tasmanian Xenica	Nymphalidae 12	Unknown	-41.68	145.95	xx/01/1917
LEP13450	*Nesoxenica leprea elia*	Tasmanian Xenica	Nymphalidae 12	Unknown	-41.68	145.95	21/01/1917
LEP13453	*Nesoxenica leprea elia*	Tasmanian Xenica	Nymphalidae 12	Unknown	-41.68	145.95	01/01/1908
LEP4588	*Protographium leosthenes leosthenes*	Four-barred Swordtail	Papilionidae 9	Unknown	-19.27	146.82	07/03/1944
LEP4591	*Protographium leosthenes leosthenes*	Four-barred Swordtail	Papilionidae 9	Unknown	-23.53	150.25	19/03/1924
LEP4599	*Protographium leosthenes leosthenes*	Four-barred Swordtail	Papilionidae 9	Unknown	-10.68	142.53	1946-1947
LEP4611	*Protographium leosthenes leosthenes*	Four-barred Swordtail	Papilionidae 9	Unknown	-12.73	143.28	10/11/1943
LEP4607	*Protographium leosthenes leosthenes*	Four-barred Swordtail	Papilionidae 9	Unknown	-23.33	150.58	xx/01/1976
LEP4825	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Male	-12.48	130.82	xx/09/1908
LEP4826	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Male	-12.48	130.82	24/10/1908

LEP4832	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Male	-13.40	130.28	14/04/1913
LEP4831	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Female	-12.45	130.83	xx/05/1952
LEP4828	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Female	-12.48	130.82	30/10/1908
LEP4830	*Cressida cressida* (NT population)	Clearwing Swallowtail	Papilionidae 10	Female	-12.45	130.83	-
LEP4213	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Male	-28.42	152.77	11/03/1905
LEP4220	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Male	-28.30	153.45	-
LEP4230	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Male	-28.42	152.77	11/03/1905
LEP4229	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Male	-28.42	152.77	-
LEP4238	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Male	-27.97	153.20	xx/03/1974
LEP4218	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Female	-26.77	152.85	08/10/1915
LEP4224	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Female	-28.30	153.45	12/03/1905
LEP4217	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Female	-28.42	152.77	31/03/1905
LEP4223	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Female	-28.30	153.45	12/03/1905
LEP4216	*Ornithoptera richmondia*	Richmond Birdwing	Papilionidae 11	Female	-28.42	152.77	12/03/1905
LEP4743	*Pachliopta polydorus queenslandica*	Red-bodied Swallowtail	Papilionidae 12	Unknown	-10.74	142.59	18/03/1906
LEP4746	*Pachliopta polydorus queenslandica*	Red-bodied Swallowtail	Papilionidae 12	Unknown	-10.74	142.59	17/03/1903
LEP4752	*Pachliopta polydorus queenslandica*	Red-bodied Swallowtail	Papilionidae 12	Unknown	-9.58	143.77	15/04/1908
LEP4760	*Pachliopta polydorus queenslandica*	Red-bodied Swallowtail	Papilionidae 12	Unknown	-9.58	143.77	21/01/1910
LEP4759	*Pachliopta polydorus queenslandica*	Red-bodied Swallowtail	Papilionidae 12	Unknown	-9.58	143.77	31/12/1908

Supplementary Table S2. Optimal camera exposure settings selected for photography based on the RGB pixel intensity values of the set of grey standards. Only information from the B channel was extracted for UVA images; and from R and B channels for NIR images. Camera height is from the sensor to the thorax of the butterfly specimen; 'Low' = 39cm, 'High' = 45.5cm. Shutter speed held at 1/60 sec for all conditions.

Spectrum	Aperture	Grey Std.	Camera Height	Magnification	Red	Green	Blue
UVA	22	5 %	Low	1:4	0.025	0.290	53.147
		10 %			0.004	0.517	79.144
		25 %			0.069	0.005	127.821
		50 %			25.485	3.20E-05	181.138
		80 %			55.356	0	203.790
		99 %			67.942	0	217.879
		5 %	High	1:5	0.054	1.079	48.986
		10 %			0.006	1.441	71.549
		25 %			0.003	0.048	116.815
		50 %			17.454	2.80E-05	174.485
		80 %			50.431	0	199.509
		99 %			62.125	0	212.646
Vis	16	5 %	Low	1:4	49.397	61.045	64.454
		10 %			76.104	91.952	95.558
		25 %			118.436	142.072	146.719
		50 %			160.673	187.891	194.102
		80 %			196.178	217.975	222.191
		99 %			207.854	227.816	232.064
		5 %	High	1:5	48.419	59.848	62.962
		10 %			73.239	88.436	91.687
		25 %			115.603	138.858	143.311
		50 %			162.604	189.525	195.534
		80 %			198.027	219.541	223.281
		99 %			209.345	228.893	232.826
NIR	16	5 %	Low	1:4	53.498	30.112	48.513
		10 %			79.796	46.739	72.552
		25 %			153.243	96.209	139.987
		50 %			197.777	134.411	182.823
		80 %			228.757	175.024	217.721
		99 %			238.690	189.601	228.377
		5 %	High	1:5	53.560	30.057	48.584
		10 %			79.009	46.167	71.912
		25 %			153.791	96.622	140.666
		50 %			201.892	138.697	187.132
		80 %			232.079	179.051	221.272
		99 %			241.368	193.504	231.472

Supplementary Table S3. Parameters for the linearisation equation (coefficients of the bi-exponential function, $y = ae^{bx} + ce^{dx}$) derived for each spectrum and channel used from the three images in Supplementary Figure 5. 'Low' = 39cm distance from the thorax of the specimen to the camera sensor, and 'High' = 45.5cm distance from the thorax of the specimen to the camera sensor.

a	b	c	d	Adjusted R^2	Channel	Photograph
4.12E-05	3.99E-02	3.88E-02	1.38E-02	0.9935	B	UVA - Low
3.97E-06	4.84E-02	3.93E-02	1.46E-02	0.9958	B	UVA - High
4.54E-02	1.49E-02	-9.36E-02	-2.19E-02	0.9998	R	Vis - Low
9.21E-09	7.12E-02	2.97E-02	1.50E-02	0.9991	G	Vis - Low
6.83E-07	5.36E-02	2.97E-02	1.43E-02	0.9986	B	Vis - Low
4.60E-02	1.46E-02	-1.21E-01	-2.63E-02	0.9994	R	Vis - High
1.45E-10	8.87E-02	3.02E-02	1.48E-02	0.9991	G	Vis - High
1.68E-07	5.92E-02	3.02E-02	1.42E-02	0.9986	B	Vis - High
2.12E-04	3.21E-02	4.46E-02	1.07E-02	0.9960	R	NIR - Low
3.18E-04	3.01E-02	4.28E-02	1.23E-02	0.9974	B	NIR - Low
8.89E-05	3.51E-02	4.43E-02	1.07E-02	0.9964	R	NIR - High
2.00E-04	3.17E-02	4.31E-02	1.20E-02	0.9975	B	NIR - High

Supplementary Table S4. Genbank accession numbers and associated primary references for sequences used in the phylogenetic analysis. Focal study taxa are indicated with the symbol #. Taxa with asterisks (*) represent conspecific sequences used as initial states for simulating sequences for sub-species for which data was not available.

Source reference	Family	Species	Voucher code	COI	CAD	EF1a-5' end	EF1a-3' end	GAPDH	IDH	MDH	RpS5	Wingless
(Heikkilä *et al.* 2012)	Callidulidae	*Pterodecta felderi*	MM07226-AYK-04-5717	GU828769/ GU929742	GU828248	GU829081	GU829362	-	GU830152	GU830470	GU830733	GU829631
(Heikkilä *et al.* 2012)	Callidulidae	*Pterothysana sp*	AZ-07-2027	GU828545/ GU828347	GU828056	GU828890	GU829190	GU829726	GU829936	GU830268	GU830577	GU829452
(Heikkilä *et al.* 2012)	Hedylidae	*Macrosoma bahiata*	RWH-96-0878	GU828863/ GU929825	GU828323	GU829166	GU829428	GU829913	GU830241	GU830555	GU830810	GU829711
(Heikkilä *et al.* 2012)	Hedylidae	*Macrosoma tipulata*	NW150-3	EU141362	EU141317	EU136669	EU136669	EU141497	EU141554	EU141619	EU141395	EU141243
(Heikkilä *et al.* 2012)	Hesperiidae	*Achlyodes busiris*	NW85-8	GQ864726	GQ864593	GQ864820	GQ864820	GQ864915	GQ865050	GQ865158	GQ865378	GQ864414
(Sahoo *et al.* 2016)	Hesperiidae	*Badamia exclamationis#*	370ADW	KY019678/ EU364301	KY045536	EU364096	-	KY027490	-	KY027996	KY028511	EU363903
(Zhu *et al.* 2016)	Hesperiidae	*Borbo cinnar#*	H068	KT240166	-	KT240148	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Hesperiidae	*Carterocephalus silvicola*	MM00616	JN204963	JN204936	JN204979	JN204979	-	JN205003	JN205021	JN205030	JN204921
(Sahoo *et al.* 2016)	Hesperiidae	*Euschemon rafflesia#*	85ADW	KY019752/ EU364337	KY045598	EU364132	-	KY027554	-	KY028063	KY028577	EU363939
(Heikkilä *et al.* 2012)	Hesperiidae	*Hasora chromus#*	MFB-07-003	GU828572/ GU828373	GU828077	GU828914	GU829207	-	GU829961	GU830286	GU830592	GU829476
(Sahoo *et al.* 2016)	Hesperiidae	*Hasora khoda#*	AW97	KY019765/ DQ018930	KY045608	DQ018901	-	KY027565	KY027812	KY028073	KY028583	DQ018871
(Sahoo *et al.* 2016)	Hesperiidae	*Hesperilla donnysa*	105ADW	KY019769/ EU364395	KY045612	EU364190	-	KY027569	KY027816	KY028077	KY028587	EU363997
(Hebert *et al.* 2013)	Hesperiidae	*Hesperilla flavescens#*	11ANIC_8269	KF388058	-	-	-	-	-	-	-	-
(Sahoo *et al.* 2016)	Hesperiidae	*Hesperilla ornata*	101ADW	KY019770/ EU364396	KY045613	EU364191	-	KY027570	KY027817	KY028078	KY028588	-
(Heikkilä *et al.* 2012)	Hesperiidae	*Jemadia pseudognetus*	07-SRNP-2719	JN204964	JN204937	JN204980	JN204980	-	JN205004	JN205022	JN205031	JN204922
(Sahoo *et al.* 2016)	Hesperiidae	*Mesodina aeluropis#*	116ADW	KY019794/ EU364398	KY045633	EU364193	-	KY027590	KY027837	KY028100	KY028607	EU363999
(Hebert *et al.* 2013)	Hesperiidae	*Mesodina cyanophracta#*	11ANIC_8315	KF390311	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Hesperiidae	*Mysoria ambigua*	DHJ-02-2459	JN204965	JN204938	JN204981	JN204981	-	JN205005	JN205023	JN205032	JN204923
(Heikkilä *et al.* 2012)	Hesperiidae	*Ochlodes faunus*	NW95-2	JN204953	JN204945	JN204972	JN204972	-	JN204996	JN205012	JN205038	-
(Heikkilä *et al.* 2012)	Hesperiidae	*Pyrgus malvae*	MM00034	GU828583	GU828085	GU828922	GU829215	GU829744	GU829972	GU830296	GU830600	GU829483
(Sahoo *et al.* 2016)	Hesperiidae	*Suniana sunias*	379ADW	KY019906/ EU364483	KY045727	EU364278	-	KY027684	KY027926	KY028197	-	EU364076

(Braby & Zwick 2015)	Hesperiidae	*Suniana sunias sauda*#	MFB_10_P190	KT582585	-	-	-	-	-	-	-	-
(Sahoo *et al.* 2016)	Hesperiidae	*Taractrocera papyria*	293ADW	KY019912/ EU364481	KY045733	EU364276	-	KY027689	KY027932	KY028203	-	EU364074
(Braby & Zwick 2015)	Hesperiidae	*Taractrocera papyria agraulia*#	MFB_13_42	KT582603	-	-	-	-	-	-	-	-
(Braby & Zwick 2015)	Hesperiidae	*Taractrocera papyria papyria*#	JA4	KT582608	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Hesperiidae	*Thymelicus lineola*	MM03333	JN204962	JN204935	JN204978	JN204978	JN204987	JN205002	JN205020	JN205029	JN204920
(Sahoo *et al.* 2016)	Hesperiidae	*Toxidia doubledayi*	88ADW	KY019922/ EU364400	KY045741	EU364195	-	KY027699	KY027941	KY028213	KY028719	EU364001
(Sahoo *et al.* 2016)	Hesperiidae	*Toxidia doubledayi*	ADW109	KY019924	KY045742	KY014411	-	KY027701	KY027943	KY028215	-	KY020017
(Hebert *et al.* 2013)	Hesperiidae	*Toxidia parvula*#	11ANIC_8216	KF391448	-	-	-	-	-	-	-	-
(Sahoo *et al.* 2016)	Hesperiidae	*Toxidia peron*	86ADW	KY019923/ EU364401	-	EU364196	-	KY027700	KY027942	KY028214	KY028720	EU364002
(Hebert *et al.* 2013)	Hesperiidae	*Trapezites maheta*#	11ANIC_8055	KF392488	-	-	-	-	-	-	-	-
(Sahoo *et al.* 2016)	Hesperiidae	*Trapezites symmomus*	AW89	KY019925/ DQ018932	KY045743	DQ018903	-	KY027702	KY027944	KY028216	-	DQ018873
(Heikkilä *et al.* 2012)	Hesperiidae	*Urbanus dorantes*	AW280	DQ018929/ DQ018929	-	DQ018900	DQ018900	-	-	-	-	DQ018870
(Hebert *et al.* 2013)	Lycaenidae	*Acrodipsas myrmecophila*#	11ANIC_5535	KF395078	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Lycaenidae	*Allotinus leogoron*	PM03-11	JN204957	-	-	-	-	-	JN205016	-	JN204915
(Megens *et al.* 2004)	Lycaenidae	*Arhopala wilde*#	KD-94-T069	AY235960/ AY235866/ AY235817	-	-	-	-	-	-	-	AY236012
(Heikkilä *et al.* 2012)	Lycaenidae	*Baliochila minima*	SP-93-P006	DQ018938	-	DQ018905	DQ018905	-	-	-	-	DQ018879
(Heikkilä *et al.* 2012)	Lycaenidae	*Callipsyche behrii*	AS-92-Z034	DQ018943	-	DQ018910	DQ018910	-	-	-	-	DQ018881
(Stradomsky 2016)	Lycaenidae	*Candalides helenita*	ILL-203	KM586798	-	KM586802	-	-	-	-	-	-
(Hebert *et al.* 2013)	Lycaenidae	*Candalides hyacinthinus*#	11ANIC_6285	JN276857	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Lycaenidae	*Celastrina neglecta*	EW28-1	EU141355	EU141297	EU136662	EU136662	EU141480	EU141533	EU141598	-	EU141236
(Heikkilä *et al.* 2012)	Lycaenidae	*Curetis barsine*	PM03-14	JN204954	JN204946	JN204973	JN204973	-	JN204997	JN205013	JN205039	JN204914
(Heikkilä *et al.* 2012)	Lycaenidae	*Curetis bulis*	MWT-93-A028	DQ018942	-	DQ018909	DQ018909	-	-	-	-	AF233549
(Heikkilä *et al.* 2012)	Lycaenidae	*Curetis tagalica*	PM03-12	JN204955	JN204947	JN204974	-	-	-	JN205014	JN205040	-
(Heikkilä *et al.* 2012)	Lycaenidae	*Favonius quercus*	MM04799	GU828706/ GU828501	JN204939	GU829029	GU829318	-	GU830092	GU830410	GU830694	GU829582
(Hebert *et al.* 2013)	Lycaenidae	*Hypochrysops apelles*#	11ANIC_5800	JN280787	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Lycaenidae	*Hypochrysops delicia*#	11ANIC_5578	KF393398	-	-	-	-	-	-	-	-
Eastwood, unpublished	Lycaenidae	*Hypochrysops miskini*	RE-2_A333	DQ456523	-	DQ456604	-	-	-	-	-	-
(Espeland *et al.* 2015)	Lycaenidae	*Jalmenus evagoras evagoras*#	MAT-98-S683	KT286506/	KT286331	KT286201	-	-	-	-	-	KT286028
(Heikkilä *et al.* 2012)	Lycaenidae	*Liphyra brassolis*	KD-94-T063	DQ018940	-	DQ018907	DQ018907	-	-	-	-	AF233551

(Heikkilä *et al.* 2012)	Lycaenidae	*Lucia limbaria*	K-D-94-Q002	DQ018944	-	DQ018911	DQ018911	-	-	-	-	DQ018882
(Heikkilä *et al.* 2012)	Lycaenidae	*Lycaena alciphron*	JL10-14	JN204956	-	JN204975	JN204975	-	JN204998	JN205015	JN205041	DQ018886
(Heikkilä *et al.* 2012)	Lycaenidae	*Miletus ancon*	KF-94-P022	DQ018941	-	DQ018908	DQ018908	-	-	-	-	AF233550
(Heikkilä *et al.* 2012)	Lycaenidae	*Miletus boisduvali*	PM03-10	JN204958	JN204948	-	-	-	-	JN205017	-	-
(Hebert *et al.* 2013)	Lycaenidae	*Ogyris genoveva*#*	gAx1	KF388998	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Lycaenidae	*Paralucia pyrodiscus**	11ANIC_5555	JN286124	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Lycaenidae	*Poritia erycinoides*	MWT-93-B007	DQ018939	-	DQ018906	DQ018906	-	-	-	-	DQ018880
(Eastwood *et al.* 2006)	Lycaenidae	*Pseudalmenus chlorinda barringtonensis*#	NP_96_X129	DQ456521	-	DQ456602	-	-	-	-	-	-
(Eastwood *et al.* 2006)	Lycaenidae	*Pseudalmenus chlorinda zephyrus*#	KD_96_Z588	DQ456520	-	DQ456601	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Lycaenidae	*Thecla coelicolor*	DY-93-G038	DQ018945	-	DQ018912	DQ018912	-	-	-	-	DQ018883
(Heikkilä *et al.* 2012)	Nymphalidae	*Actinote stratonice*	NW90-14	AY218233	EU141347	AY218252	AY218252	-	EU141586	EU141650	EU141427	DQ018892
(Heikkilä *et al.* 2012)	Nymphalidae	*Amathusia phidippus*	NW114-17	DQ018956	EU141306	DQ018923	DQ018923	EU141488	EU141542	EU141607	EU141384	DQ018894
(Heikkilä *et al.* 2012)	Nymphalidae	*Apatura iris*	NW69-6	AY090199	EU141335	AY090165	AY090165	EU141513	EU141572	EU141636	EU141413	AY090132
(Heikkilä *et al.* 2012)	Nymphalidae	*Aphantopus hyperanthus*	MM00045	JN204966	JN204940	-	JN204985	JN204988	JN205006	JN205024	JN205033	JN204924
(Wahlberg *et al.* 2009)	Nymphalidae	*Argynnina cyrila*	NW124-24	GQ357193	-	GQ357262	-	GQ357401	-	-	GQ357531	GQ357327
(Hebert *et al.* 2013)	Nymphalidae	*Argynnina hobartia*#	11ANIC_7415	KF397020	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Nymphalidae	*Argynnis paphia*	NW76-12	AY090200	EU141343	AY090166	AY090166	EU141519	EU141580	EU141644	EU141421	AY090133
(Heikkilä *et al.* 2012)	Nymphalidae	*Biblis hyperia*	NW106-3	DQ018955	EU141302	DQ018922	DQ018922	EU141484	EU141538	EU141603	EU141380	DQ018893
(Heikkilä *et al.* 2012)	Nymphalidae	*Calinaga buddha*	NW64-3	AY090208	EU141328	AY090174	AY090174	EU141506	EU141565	EU141629	EU141406	AY090141
(Heikkilä *et al.* 2012)	Nymphalidae	*Charaxes castor*	NW78-3	AY090219	EU152474	AY090185	AY090185	-	EU141581	EU141645	EU141422	AY090152
(Heikkilä *et al.* 2012)	Nymphalidae	*Colobura dirce*	NW68-11	AY090228	GQ864631	AY090196	AY090196	GQ864946	GQ865079	GQ865192	GQ865417	AY090162
(Heikkilä *et al.* 2012)	Nymphalidae	*Danaus plexippus*	NW108-21	DQ018954	EU141304	DQ018921	DQ018921	EU141486	EU141540	EU141605	EU141382	DQ018891
(Heikkilä *et al.* 2012)	Nymphalidae	*Erebia oeme*	EW24-7	DQ338780	EU141296	DQ338923	DQ338923	EU141479	EU141532	EU141597	EU141375	DQ338640
(Wahlberg *et al.* 2009)	Nymphalidae	*Euploea camaralzeman*	NW70-8	AY090205	GQ864648	AY090171	-	GQ864966	GQ865093	GQ865209	GQ865435	AY090138
(Brower *et al.* 2010)	Nymphalidae	*Euploea corinna*#	QL7	GU365909	-	GU365938	-	-	-	-	-	AF246566
(Brower *et al.* 2010)	Nymphalidae	*Euploea eunice*	JV2	GU365910	-	GU365939	-	-	-	-	-	GU365958
(Brower *et al.* 2010)	Nymphalidae	*Euploea mulciber*	SU1	GU365911	-	GU365940	-	-	-	-	-	GU365959
(Brower *et al.* 2010)	Nymphalidae	*Euploea mulciber*	SU2	GU365912	-	GU365941	-	-	-	-	-	GU365960
(Heikkilä *et al.* 2012)	Nymphalidae	*Heliconius hecale*	NW70-6	AY090202	EU141337	AY090168	AY090168	EU141514	EU141574	EU141638	EU141415	AY090135
(Wahlberg *et al.* 2009)	Nymphalidae	*Heteronympha merope*#	EW10-4	AY218243	EU141294	AY218263	-	EU141477	EU141530	EU141595	EU141373	AY218281
(Kodandaramaiah *et al.* 2018)	Nymphalidae	*Heteronympha merope*#	UK1-8	EU920736	-	EU920770	-	-	-	-	-	EU920802

(Norgate *et al.* 2009)	Nymphalidae	*Heteronympha merope duboulayi#*	WA1	GQ922188	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Nymphalidae	*Hypanartia paullus*	NW152-5	EU141365	EU141320	EU136672	EU136672	EU141499	EU141557	EU141621	EU141398	EU141246
(Heikkilä *et al.* 2012)	Nymphalidae	*Libythea celtis*	NW71-1	AY090198	EU141340	AY090164	AY090164	EU141517	EU141577	EU141641	EU141418	AY090131
(Heikkilä *et al.* 2012)	Nymphalidae	*Limenitis reducta*	NW67-2	AY090217	EU141331	AY090183	AY090183	EU141509	EU141568	EU141632	EU141409	AY090150
(Heikkilä *et al.* 2012)	Nymphalidae	*Marpesia orsilochus*	NW115-6	AY788604	JN204949	AY788706	AY788706	JN204995	JN205011	JN205018	JN205042	AF246532
(Heikkilä *et al.* 2012)	Nymphalidae	*Melitaea cinxia*	NW73-14	AY788656	EU141342	AY788776	AY788776	EU141518	EU141579	EU141643	EU141420	AY788536
(Heikkilä *et al.* 2012)	Nymphalidae	*Morpho helenor*	NW66-5	AY090210	EU141329	AY090176	AY090176	EU141507	EU141566	EU141630	EU141407	AY090143
(Wahlberg *et al.* 2009)	Nymphalidae	*Nesoxenica leprea#*	RA61	GQ864796	-	GQ864890	-	GQ357414	-	-	GQ357543	GQ864484
(Peña *et al.* 2006)	Nymphalidae	*Nesoxenica leprea#*	RA61	DQ338587	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Nymphalidae	*Nymphalis polychloros*	NW62-2	AY248788	EU141323	AY248813	AY248813	EU141502	EU141560	EU141624	EU141401	AY248829
(Heikkilä *et al.* 2012)	Nymphalidae	*Opoptera syme*	NW126-3	EU528323	GQ864689	EU528300	EU528300	EU528403	GQ865131	EU528361	EU528450	EU528280
(Wahlberg *et al.* 2009)	Nymphalidae	*Tellervo zoilus#*	QL5	GQ864812	GQ864717	GQ864906	-	GQ865039	GQ865152	GQ865270	GQ865502	GQ864499
(Wahlberg *et al.* 2009)	Nymphalidae	*Tisiphone abeona#*	UK1-15	GQ864816	-	GQ864910	-	GQ865044	-	-	GQ865507	GQ864503
(Kodandaramaiah *et al.* 2018)	Nymphalidae	*Tisiphone abeona#*	NW124-21	DQ338830	-	DQ338980	-	GQ357421	-	-	GQ357550	DQ338695
(Hebert *et al.* 2013)	Nymphalidae	*Tisiphone abeona**	11ANIC_7449	JN278842	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Nymphalidae	*Vanessa atalanta*	NW63-21	AY090221	GQ864722	AY090187	AY090187	GQ865045	GQ865155	GQ865275	GQ865508	AF412772
(Hebert *et al.* 2013)	Papilionidae	*Atrophaneura polydorus#*	11ANIC_7880	KF405037	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Papilionidae	*Baronia brevicornis*	FS.A-167	AF170866	GQ864594	AF173406	AF173406	GQ864916	GQ865051	GQ865159	GQ865379	AY569044
(Simonsen *et al.* 2011)	Papilionidae	*Cressida cressida#**	FS-b-1827	AY919289	-	GQ268399	-	-	-	-	-	GQ268411
(Heikkilä *et al.* 2012)	Papilionidae	*Eurytides branchus*	05-SRNP-57565	JN204967	JN204941	-	-	JN204989	-	JN205025	JN205034	JN204925
(Heikkilä *et al.* 2012)	Papilionidae	*Graphium agamemnon*	FS.B-900	AF170874	-	AF173414	AF173414	-	-	-	-	AY569046
(Simonsen *et al.* 2011)	Papilionidae	*Graphium agamemnon*	FS-b-3701	AF170874	-	AF173414	GQ268389	-	-	-	-	AY569046
(Wilson *et al.* 2014)	Papilionidae	*Graphium agamemnon agamemnon#*	KC0001	KC970100	-	-	-	-	-	-	-	-
(Yamada *et al.* 2015)	Papilionidae	*Graphium eurypylus acheron#*	48	AB981032	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Papilionidae	*Graphium macfarlanei#*	11ANIC_7846	KF396538	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Papilionidae	*Graphium macleayanum#*	11ANIC_7835	KF402654	-	-	-	-	-	-	-	-
(Yamada *et al.* 2015)	Papilionidae	*Graphium sarpedon (choredon)#*	Grs_Ok01	AB969796	-	-	-	-	-	-	-	-
(Simonsen *et al.* 2011)	Papilionidae	*Ornithoptera priamus*	RE-02-A033/FS-b-3776	AY919291	-	AY919296	-	-	-	-	-	GQ268414
Unpublished, Nabholz,B. 2018	Papilionidae	*Ornithoptera richmondia#*	NC_37869	LT999980	-	-	-	-	-	-	-	-
(Joshi *et al.* 2017)	Papilionidae	*Pachliopta hector*	PS620	KX467810	-	KX467838	-	-	-	-	-	KX467865

(Simonsen *et al.* 2011)	Papilionidae	*Papilio alexanor*	FS-b-40	AF044012	-	AF044821	GQ268390	-	-	-	-	GQ268407
(Hebert *et al.* 2013)	Papilionidae	*Papilio anactus*#	11ANIC_7854	KF403009	-	-	-	-	-	-	-	-
(Simonsen *et al.* 2011)	Papilionidae	*Papilio dardanus*	FS-940	AY457584	-	AY457612	-	-	-	-	-	GQ268405
(Simonsen *et al.* 2011)	Papilionidae	*Papilio demoleus*#	RE-02-A018	AY569092	-	AY569104	-	-	-	-	-	AY569115
(Heikkilä *et al.* 2012)	Papilionidae	*Papilio glaucus*	NW69-3	EU141368	EU141334	EU136675	EU136675	EU141512	EU141571	EU141635	EU141412	EU141249
(Espeland *et al.* 2015)	Papilionidae	*Papilio glaucus*	AF-94-A002	KT286455	KT286290	KT286155	-	-	-	-	-	KT285979
(Wahlberg *et al.* 2009)	Papilionidae	*Papilio machaon*	FS.a-27	AF044006	-	AF044819	-	-	-	-	-	AY569124
(Simonsen *et al.* 2011)	Papilionidae	*Papilio machaon*	FS-78	AY457593	-	EF485106	-	-	-	-	-	AY569124
(Simonsen *et al.* 2011)	Papilionidae	*Papilio thoas*	FS-302	AY457601	-	AY457632	-	-	-	-	-	AY569126
(Heikkilä *et al.* 2012)	Papilionidae	*Parides iphidamas*	DHJ-02-2492	JN204968	JN204942	JN204982	JN204982	JN204990	JN205007	-	JN205035	JN204926
(Heikkilä *et al.* 2012)	Papilionidae	*Parnassius phoebus*	NW167-15	JN204959	JN204950	JN204976	JN204976	-	JN204999	-	JN205043	JN204917
(Hebert *et al.* 2013)	Papilionidae	*Protographium leosthenes*#	11ANIC_7834	KF403279	-	-	-	-	-	-	-	-
(Simonsen *et al.* 2011)	Papilionidae	*Protographium marcellus*	FS-a-7	AF044022	-	AF044815	-	-	-	-	-	DQ351128
(Heikkilä *et al.* 2012)	Papilionidae	*Troides helena*	FS.B-974	AF170878	-	AF173418	AF173418	-	-	-	-	AY569047
(Heikkilä *et al.* 2012)	Pieridae	*Aporia crataegi*	NW149-4	EU141361	EU141316	EU136668	EU136668	EU141496	EU141553	EU141618	EU141394	EU141242
(Wahlberg *et al.* 2014)	Pieridae	*Appias aegis*	MFB-00-P491	KM046801	-	AY870589	-	-	-	KM046675	-	-
(Wahlberg *et al.* 2014)	Pieridae	*Appias drusilla*	MFB-00-P195	AY954579	KM046497	AY870525	-	KM046843	KM046737	KM046676	-	AY954609
(Hebert *et al.* 2013)	Pieridae	*Appias melania*#	11ANIC_6921	KF396317	-	-	-	-	-	-	-	-
(Wahlberg *et al.* 2014)	Pieridae	*Appias paulina*	MFB-00-P159	DQ082803	KM046503	AY870588	-	KM046850	KM046743	-	-	KM046567
(Wahlberg *et al.* 2014)	Pieridae	*Catopsilia pomona*	MFB-00-P059	KM046803	KM046504	AY870569	-	KM046851	KM046744	KM046682	KM046610	KM046568
(Ashfaq *et al.* 2013)	Pieridae	*Catopsilia pyranthe*#	NIBGE_BUT_250	KC158349	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Pieridae	*Colias palaeno*	MM03233	GU828690/ GU828486	GU828181	-	GU829301	GU829810	GU830077	GU830394	GU830680	GU829570
(Wahlberg *et al.* 2014)	Pieridae	*Delias aganippe*#	MFB-97-U344	DQ082770	KM046510	AY870511	-	KM046857	KM046750	-	KM046616	KM046570
(Wahlberg *et al.* 2014)	Pieridae	*Delias belladonna*	DL-01-N104	DQ082773	KM046511	AY870510	-	KM046858	KM046751	KM046687	KM046617	DQ082808
(Hebert *et al.* 2013)	Pieridae	*Delias ennia*#	11ANIC_6888	KF399303	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Pieridae	*Delias harpalyce*#	11ANIC_6897	KF398903	-	-	-	-	-	-	-	-
(Espeland *et al.* 2015)	Pieridae	*Delias microsticha*	MFB-00-P050	KT286510	KT286334	KT286205	-	-	-	-	-	KT286032
(Hebert *et al.* 2013)	Pieridae	*Delias nigrina*#	11ANIC_6905	KF400156	-	-	-	-	-	-	-	-
(Heikkilä *et al.* 2012)	Pieridae	*Dismorphia spio*	NW153-23	JN204960	JN204951	JN204977	JN204977	JN204993	JN205000	JN205019	JN205044	JN204918
(Wahlberg *et al.* 2014)	Pieridae	*Elodina angulipennis*#	MFB-00-P133	AY954588	KM046514	AY870522	-	-	KM046753	-	KM046620	AY954618
(Hebert *et al.* 2013)	Pieridae	*Elodina padusa*#	11ANIC_6862	KF400884	-	-	-	-	-	-	-	-

(Hebert *et al.* 2013)	Pieridae	*Elodina parthia*[#]	11ANIC_6865	KF404198	-	-	-	-	-	-	-	-
(Hebert *et al.* 2013)	Pieridae	*Eurema brigitta*[#]	11ANIC_6743	KF397020	-	-	-	-	-	-	-	-
(Wahlberg *et al.* 2014)	Pieridae	*Eurema hecabe*	MFB-00-P036	DQ018935	-	AY870587	-	KM046867	KM046757	KM046694	-	DQ018876
(Sun et al. 2015)	Pieridae	*Eurema hecabe*[#]	NC_22685	KC257480	-	-	-	-	-	-	-	-
(Wahlberg *et al.* 2014)	Pieridae	*Eurema mexicana*	DW-92-Z084	AY954568	KM046520	AY870563	-	KM046868	KM046758	KM046695	-	AY954598
(Hebert *et al.* 2013)	Pieridae	*Eurema smilax*[#]	11ANIC_6854	KF397905	-	-	--	-	-	-	-	-
(Heikkilä *et al.* 2012)	Pieridae	*Leptidea sinapis*	NW149-5	GU828859/ GU929821	GU828319	GU829162	GU829424	GU829910	GU830237	GU830551	GU830806	GU829708
(Heikkilä *et al.* 2012)	Pieridae	*Pieris rapae*	MM06585	JN204969	-	JN204983	-	JN204991	JN205008	JN205026	JN205036	JN204927
(Heikkilä *et al.* 2012)	Riodinidae	*Amarynthis meneria*	NW85-9	GQ864727	-	GQ864821	GQ864821	-	-	-	-	GQ864415
(Heikkilä *et al.* 2012)	Riodinidae	*Emesis mandana*	PDV-94-T022	DQ018950	-	DQ018917	DQ018917	-	-	-	-	DQ018888
(Heikkilä *et al.* 2012)	Riodinidae	*Euselasia chrysippe*	06-SRNP-33176	JN204971	JN204944	JN204984	-	JN204992	JN205010	JN205028	JN205037	JN204929
(Heikkilä *et al.* 2012)	Riodinidae	*Hamearis lucina*	NW84-13	DQ018953	EU141346	DQ018920	DQ018920	-	EU141584	EU141648	EU141425	DQ018890
(Heikkilä *et al.* 2012)	Riodinidae	*Mesosemia lamachus*	05-SRNP-48598	GU828526/ GU828329	GU828038	GU828872	GU829174	GU829718	GU829917	GU830250	GU830562	GU829433
(Heikkilä *et al.* 2012)	Riodinidae	*Riodina lysippus*	PDV-94-A050	DQ018952	-	DQ018919	DQ018919	-	-	-	-	AF233540
(Heikkilä *et al.* 2012)	Riodinidae	*Styx infernalis*	NN77	JN204961	JN204952	-	-	JN204994	JN205001	-	JN205045	JN204919
(Heikkilä *et al.* 2012)	Thyrididae	*Mathoris loceusalis*	MM07644	GU828810/ GU929780	GU828281	GU829115	GU829391	GU829885	GU830191	GU830509	GU830764	-
(Heikkilä *et al.* 2012)	Thyrididae	*Morova subfasciata*	MM11237	GU828853	JN204933	GU829155	GU829420	GU829907	GU830231	GU830544	-	GU829701
(Heikkilä *et al.* 2012)	Thyrididae	*Rhodoneura terminalis*	05-SRNP-43040	GU828524/ GU828328	GU828036	GU828870	GU829172	GU829716	GU829915	GU830248	GU830560	GU829431
(Heikkilä *et al.* 2012)	Thyrididae	*Striglina cinnamomea*	MM07639	GU828809/ GU929779	JN204934	GU829114	GU829390	GU829884	GU830190	GU830508	-	GU829667
(Heikkilä *et al.* 2012)	Thyrididae	*Thyris fenestrella*	MM07057	GU828761/ GU929735	GU828243	GU829074	GU829357	GU829852	GU830146	GU830462	GU830728	GU829623

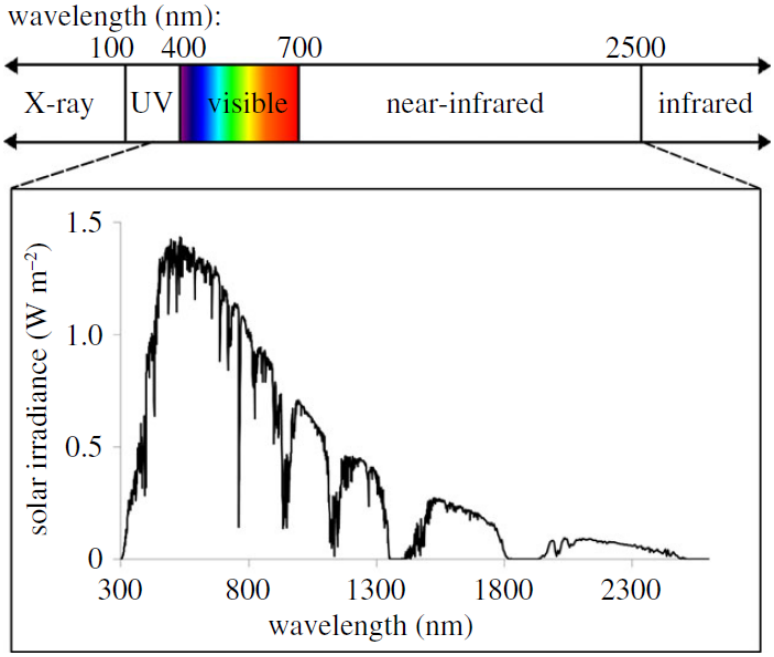
Supplementary Table S5. Eigenvectors from a Principal Components Analysis of climate variables. Low rain = average minimum monthly rainfall; High rain = average maximum monthly rainfall; Low temp. = average minimum monthly day-time temperature; High temp. = average maximum monthly day-time temperature; Low solar = average minimum monthly solar radiation; High solar = average maximum monthly solar radiation; Low cloud = average minimum monthly cloud coverage, High cloud = average maximum monthly cloud coverage. All data were calculated from daily measurements during a 27-year period (1990 – 2016 inclusive). The analysis was performed using data from the eight selected climate variables for each specimen (n = 372).

Variable	PC1	PC2	PC3
Low rain	-0.336	0.437	0.171
High rain	0.422	0.303	-0.076
Low temp.	0.469	0.032	0.213
High temp.	0.432	-0.258	-0.249
Low solar	0.297	0.224	0.766
High solar	-0.046	-0.521	0.458
Low cloud	-0.348	0.333	0.129
High cloud	0.303	0.466	-0.211
Eigenvalue	3.824	1.846	0.824
Proportion of variance	0.478	0.231	0.103

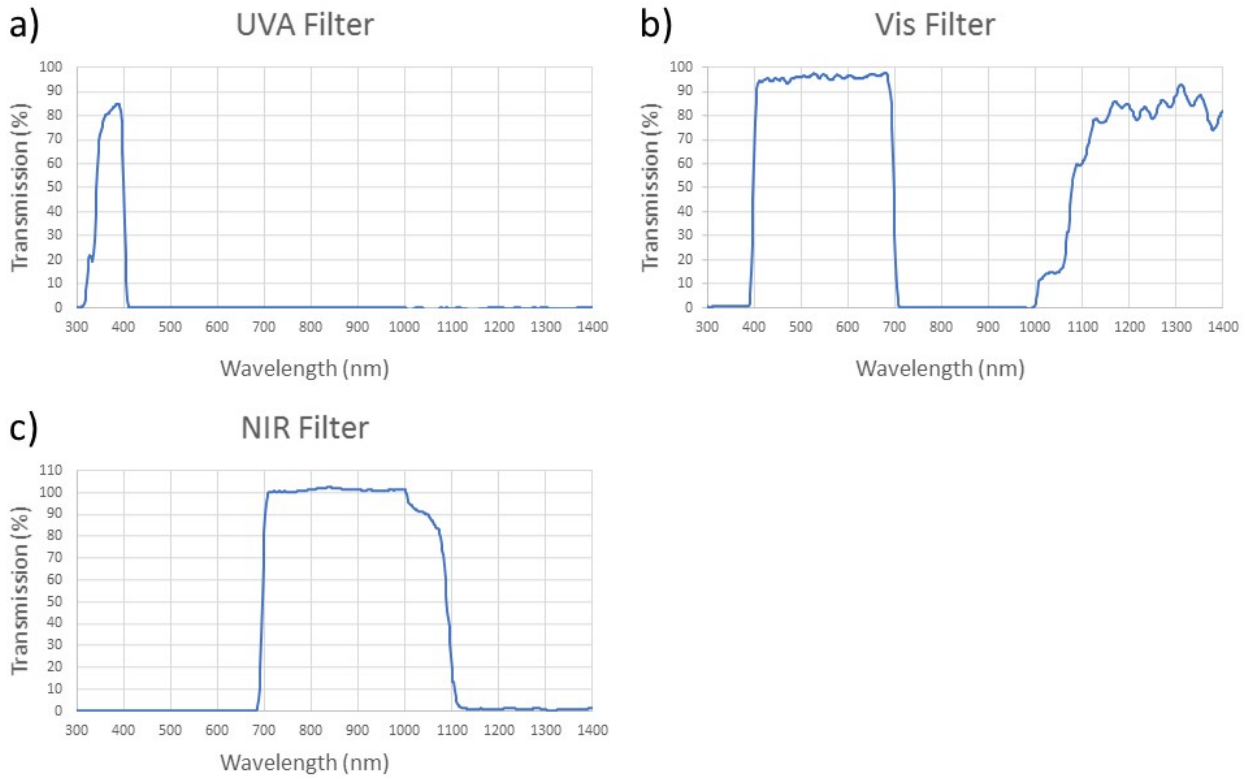
Supplementary Table S6. Results of reduced PGLS models predicting absolute total reflectance across 60 populations (49 species), across 4500 trees. Best models are shown for each body region. % of trees refers to the percentage of trees where the model presented was the best model. ER refers to the average evidence ratio between the best model (shown) and the null model.

	Predictors	Estimate	T-value	P-value	% trees	ER
Thorax	Wing size (log)	1.08 – 1.71	0.68 – 1.09	0.26 – 0.48	97.4	> 1000
	PC1	1.50 – 1.61	4.63 – 5.00	< 0.0001		
	PC2	-4.99 – -4.36	-2.47 – -2.09	0.01 – 0.04		
	PC1 * Wing	-1.59 – -1.46	-3.23 – -2.95	0.003 – 0.004		
Basal	PC1	0.82 – 1.08	1.99 – 2.61	0.01 – 0.05	97.3	74.7
	PC2	-1.49 – -1.10	-3.74 – -2.68	0.0001 – 0.008		
Entire	Wing size (log)	-7.72 – -5.43	-2.15 – -1.58	0.03 – 0.12	66.9	1.87
	PC2	0.69 – -0.48	-2.16 – -1.33	0.03 – 0.17		

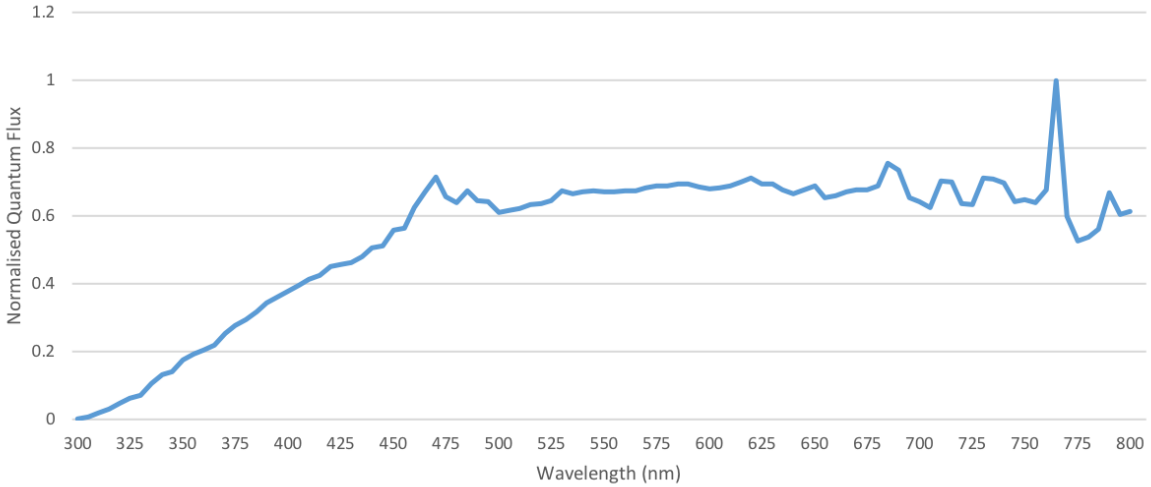
Figures



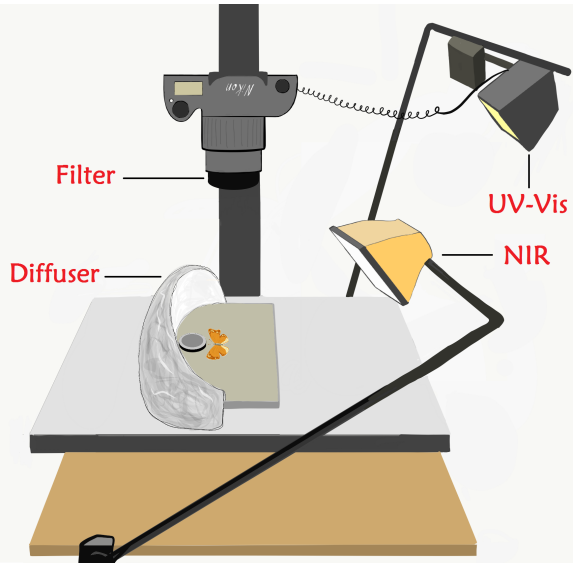
Supplementary Figure S1. Sunlight reaching the Earth's surface (ASTM G173–03 standard irradiance spectrum for dry air) showing ultraviolet (UV; 300 – 400 nm), human-visible (Vis; 400 – 700 nm) and near-infrared (NIR; 700 – 2500 nm) wavelengths. At sea level, the solar spectrum of sunlight encompasses the wavelength range from 300 – 2500 nm. NIR radiation contributes about 55 % of the total energy in sunlight. Figure reproduced from (Stuart-Fox *et al.* 2017) with permission.



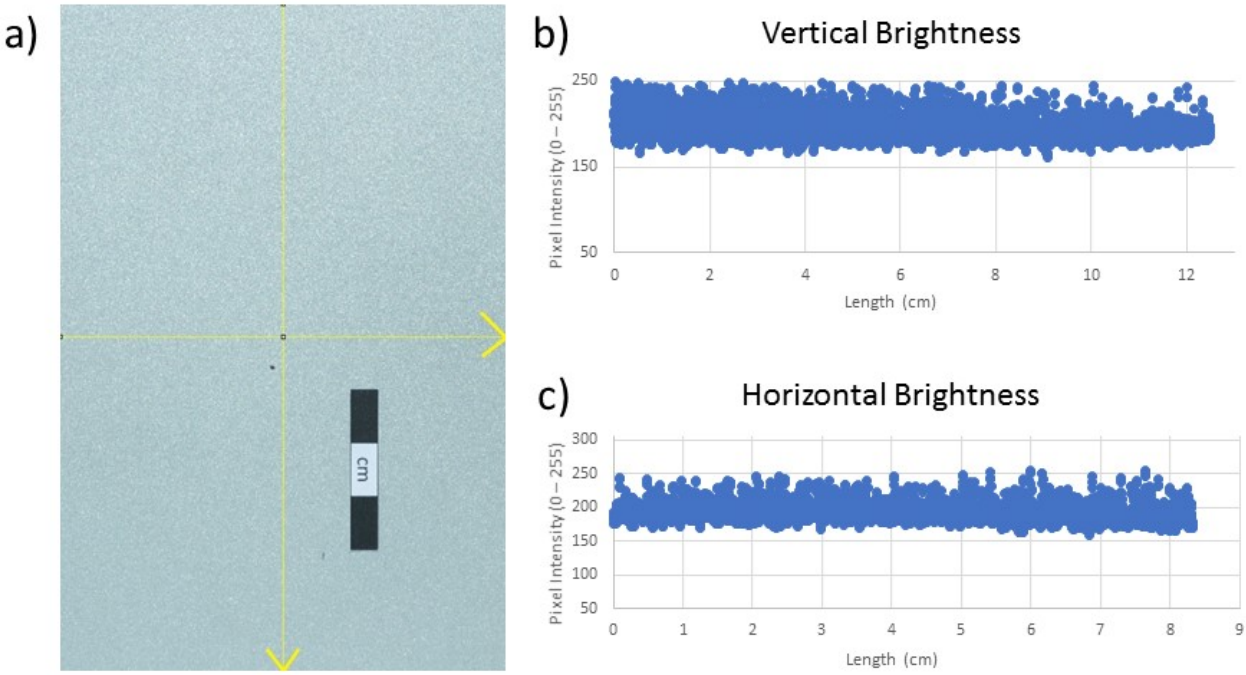
Supplementary Figure S2. Transmissions of filter combinations used for photography, measured with Ocean Optics dual spectrometer system. Specific transmission was achieved using combinations of optical filters manufactured by Edmund Optics (Singapore). Numbers within brackets indicate manufacturer item number, and are in order of cut-on/ cut-off function: a) UVA (84715, 84723, 49095 [KG-5 heat absorbing glass]); b) Visible (84754, 84727); and c) NIR (84760, 84735). Transmission beyond 1000 nm in b) does not affect UVA and Vis photographs, as the flash used does not illuminate this region of the EM spectrum.



Supplementary Figure S3. Spectral power distribution of Nikon SB-140 UVIR clone flash unit.

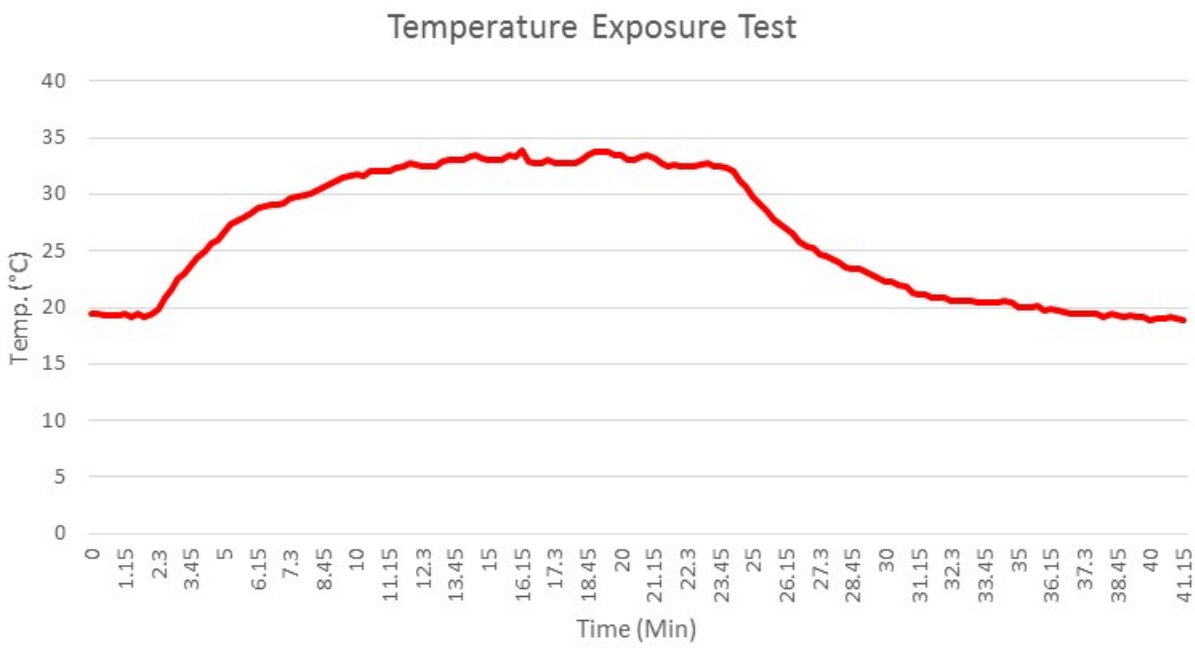


Supplementary Figure S4. Illustrated diagram of the photographic setup. The table extension with the NIR irradiating tungsten halogen lamp mounted to it folded down to allow UVA – Vis images to be taken with the flash light.

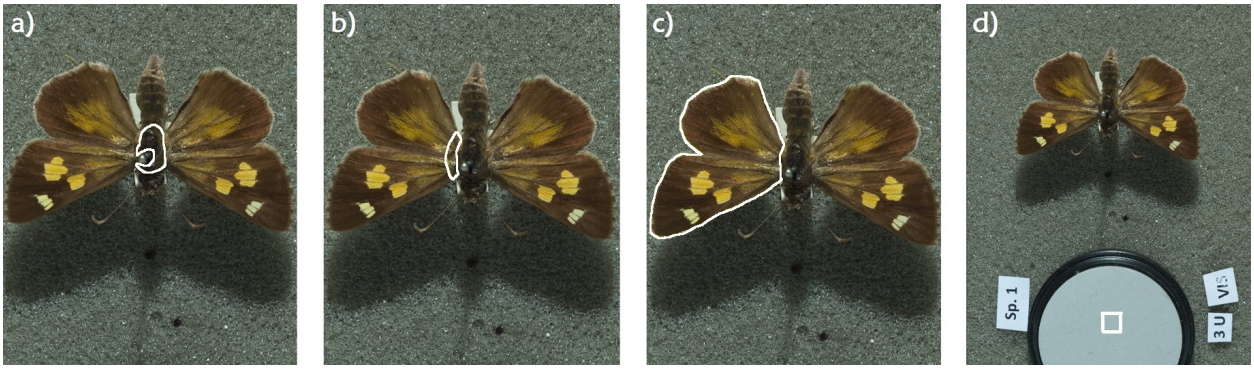


Supplementary Figure S5. (*a*) An evenly illuminated image of the sandblasted aluminium plate in the Vis spectrum at the high camera placement with the parabola-shaped aluminium reflector (45.5 cm from the specimen to the sensor). Brightness was stable across (*b*) the vertical axis, and (*c*) the horizontal axis. The 1 cm scale was 620 pixels.

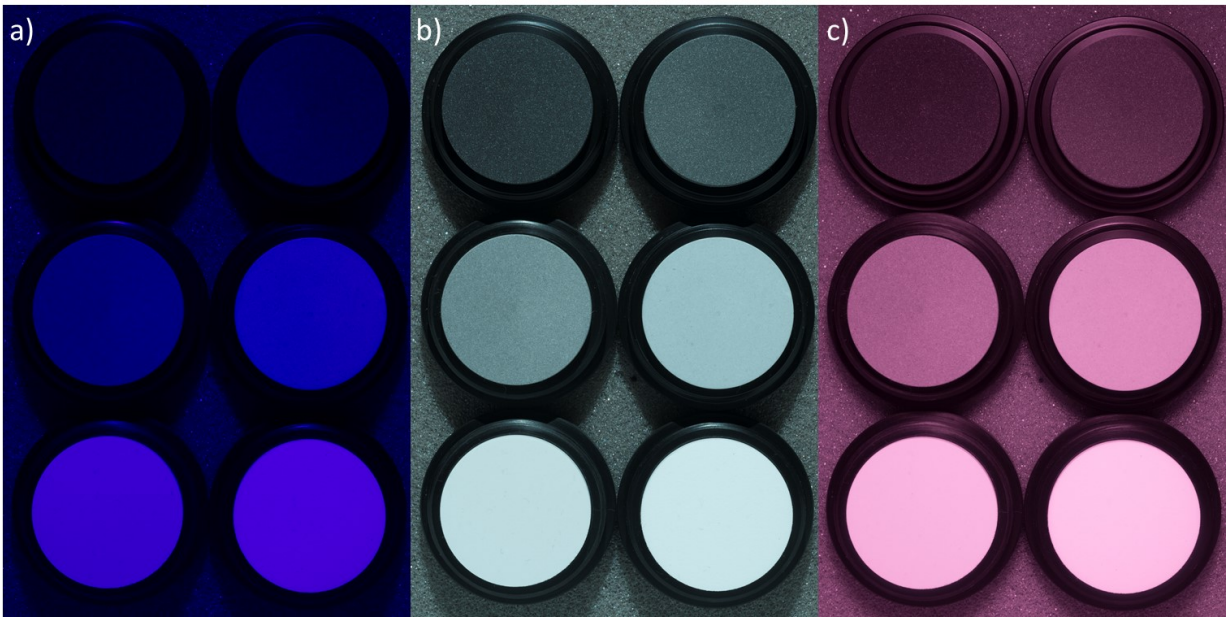
Supplementary Figure S6. Variation in pixel brightness (0 – 255) across the centre of 75 repeated images for (*a*) UVA, (*b*) Vis, and (*c*) NIR. Images had the highest pixel variation in the UVA waveband (SD: 4 pixels), followed by the Vis waveband (SD: 4 pixels) and the NIR waveband (SD: 2 pixels).



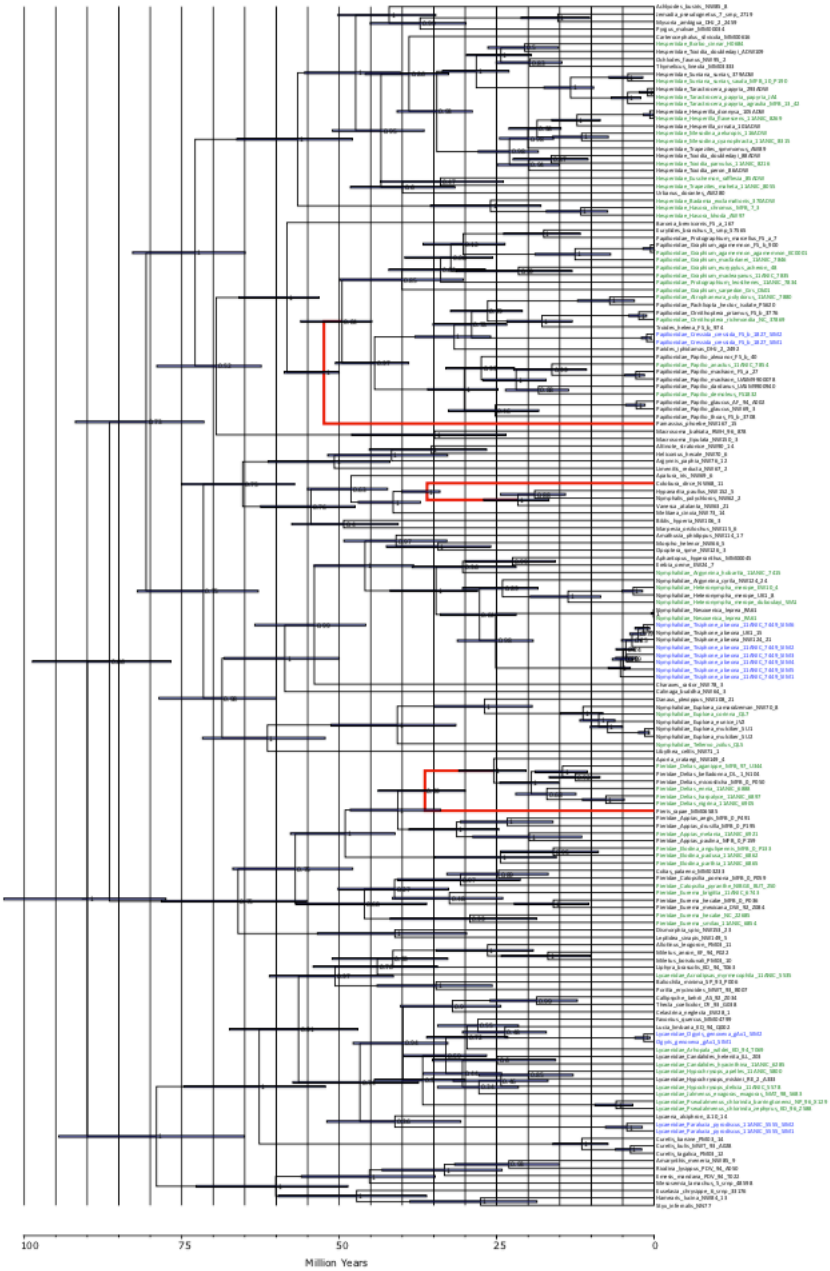
Supplementary Figure S7: Time taken for the tungsten halogen lamp and Blu Tack (1 cm diameter) to heat up and reach its maximum temperature. The Blu Tack was 19.2 °C at the time the halogen lamp was turned on (2 min). At 7.25 min the Blu Tack's temperature raised by 10°C (29.2°C) and at 13.5 min it raised above 33°C. The light was turned off at (24 min) after remaining stable between 32-34°C (average 33.03°C) for 10 min, within which it reached a maximum temperature of 33.9°C (16.5 min). The Blu Tack's temperature then decreased until it reached its original base temperature at 38.25 min.



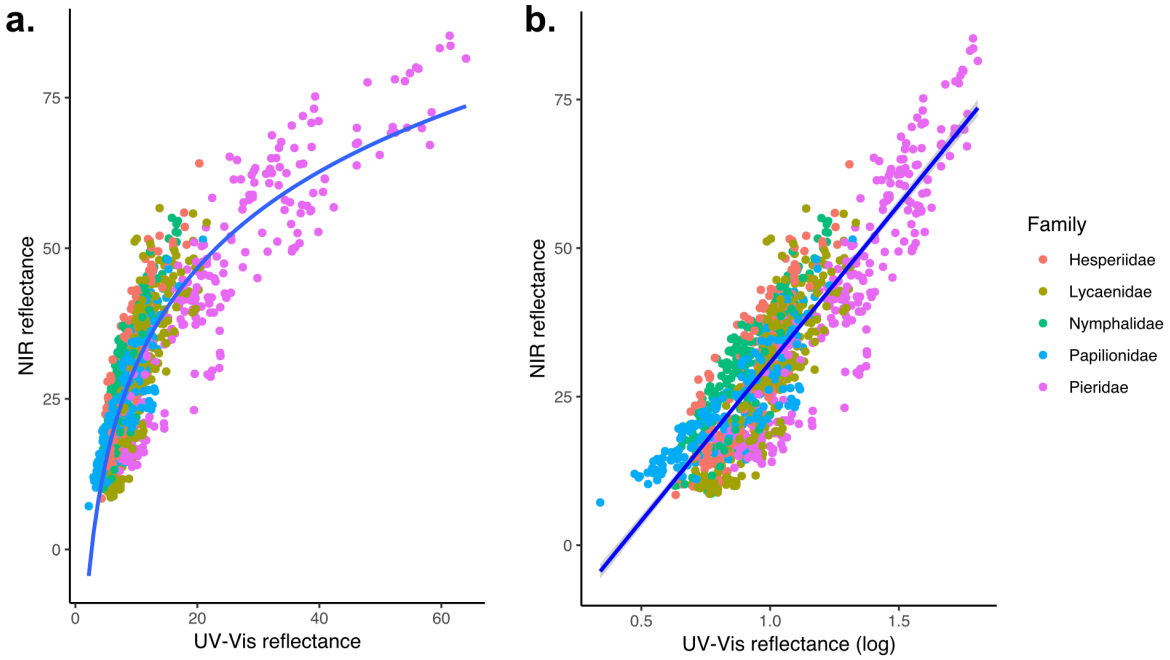
Supplementary Figure S8. (*a*-*c*) Thermoregulatory regions of each butterfly specimen, which were highlighted in ImageJ and had their RGB pixel intensity values extracted. (*d*) The region of the 40 % grey standard (250 by 250 pixels) that was highlighted to equalise the specimen's RGB pixel values relative to the exposure of each image.



Supplementary Figure S9. Images of the six zenith polymer diffuse reflectance grey standards (SphereOptics) photographed at the high camera placement in the (*a*) UVA (F22), (*b*) Vis (F16), and (*c*) NIR (F16), each at 1/ 60 sec. The grey standards are in order of 5 %, 10 %, 25 %, 50 %, 80 % and 99 % reflectance from left to right, top to bottom.



Supplementary Figure S10. BEAST2 maximum clade credibility tree based on 50 million generations with 10% burn-in removed. Branch support values are given as posterior probabilities, and node height uncertainty as 95% highest posterior density (HPD) credible intervals. Three fossil calibrations are indicated in red. Two of these represent minimum constraints placed on the stem (i.e. applied with "use originate" option) leading to Nymphalidae and Pieridae, both offset to 34 million years using gamma priors (alpha=1.5, beta=3). The third calibration represents a broad estimate of the divergence between Parnassiinae and Papilioninae, set using a uniform prior ranging from 50-80 million years (for further details see Heikkilä et al. 2012). Study taxa are indicated in green, while taxa for which COI sequences were simulated are indicated in blue.



Supplementary Figure S11. (*a*) Logarithmic relationship between UV-Vis and NIR reflectance; (*b*) linear regression of $\log_{10}$UVA – Vis and NIR reflectance for all body regions.

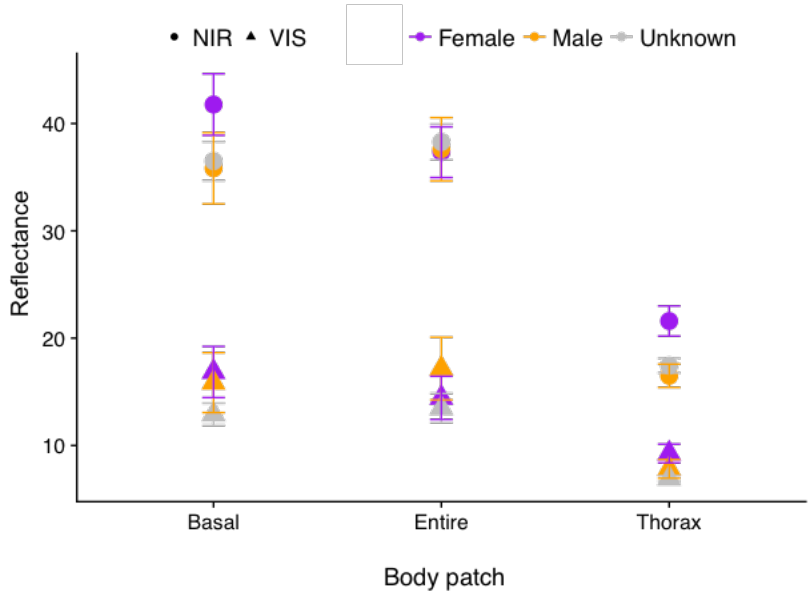


Figure S12. Differences between sexes in NIR and UV-Visible reflectance across body patches. Points and triangles represent averages across categories and lines represent 95% confidence intervals around the mean. Females have significantly higher reflectance in the basal part of the wing (NIR: B=-5.82, P < 0.001, VIS: -1.059, P = 0.006) and the thorax (NIR: B=-5.06, P < 0.001, VIS: -2.07, P < 0.001). Males have significantly higher reflectance in the entire wing in the Visible (B=2.74, P < 0.001) but not in the NIR part of the spectrum (B=0.420, P=0.525).

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Supplementary photographic methods

1. Filters

We measured transmission of the filters (Supplementary Figure S2) with a dual-spectrometer system (Ocean Optics) consisting of two spectrometers (USB2000+ [300 – 1000 nm] and NIRQuest [1000 – 2150 nm]) with two light sources (PX-2 pulsed Xenon UV – Vis light, and HL-2000 tungsten Vis – NIR halogen lights) connected by a quadrifurcated fibre optic (Ocean Optics; 2m, 600 µm diameter). The UVA filters were additionally combined a KG-5 heat absorbing glass (Edmund Optics) to eliminate transmission above 620 nm (see Supplemetary Figure S2). Although there is also transmission above 1000 nm for the Visible photo, the flash produces minimal illumination beyond 800 nm.

2. Background

All specimens were individually pin-mounted onto a 30 by 30 cm by 3.7 cm spectrally flat 15 % reflectance grey acoustic foam base (FL27-170) to reduce unwanted reflections, abnormal aberrations or false black edges on the pinned specimens in the images, which could alter reflectance data. This was measured using the UV–Vis–NIR spectrometer prior to setup. The average reflectance values of the foam for each waveband were 13.29 % (UVA), 13.17 % (Vis), 15.32 % (NIR), and 15.28 % (total).

3. Thermal test

To ensure consistent NIR illumination, we measured how long it would take to pre-heat the lamp before it would reach its maximum temperature and stabilise. A Bostik Blu Tack ball (1 cm in diameter) was used to represent a biological specimen because it behaves similarly in terms of heat gain (Norgate *et al.* 2010). The Blu Tack was coloured in black permanent marker, and pin mounted in the same position as the specimens. We measured the temperature (ºC) of the Blu Tack every 15 sec using a thermocouple inserted into the Blu Tack and YCT type-K thermometer (Model No. YC-821). The first 2 min were with the lamp turned off and we continued to take measurements until the Blu Tack's temperature had stabilised (to the nearest ºC) for 10 min. The lamp was then turned off and recording continued until the Blu Tack had returned to its initial temperature (to the nearest ºC) for 5 min. Based on

these data (Supplementary Figure 3), we concluded that there would be little variation in NIR irradiance after 14 min of pre-heating the lamp. To ensure there was no heat damage to the specimens, we ensured the specimens were exposed to the halogen lamp for < 2 min.

4. Illumination test

To ensure every image was evenly illuminated, we photographed a diffuse surface (sand-blasted aluminium) in the UVA, Vis and NIR wavebands for both camera heights. We took a line selection across the centre vertical and horizontal axes of the aluminium in each image using 'Plot profile' in ImageJ (1.50i; Ferreira & Rasband 2012; Supplementary Figure S4), to which we compared the fit of a second order polynomial or linear regression. The 1 cm scale of the aluminium plate was 480 pixels for low camera images, and 620 pixels for high camera images. We adjusted the shape and position of the parabola-shaped aluminium diffuse light reflector and repeated the illumination test until the illumination line was the straightest possible with the given setup.

5. Exposure settings

We photographed six zenith polymer diffuse reflectance standards (SphereOptics; Herrsching, Germany; 5 %, 10 %, 25 %, 50 %, 80 % and 99 % standards under all possible apertures and multiple shutter speeds to determine the optimal exposure settings for each light source, waveband (UVA, Vis, NIR) and camera height. For the UVA filter, a single image was taken at a shutter speed of 1/ 60 sec, the same speed as the flash unit, for apertures in order of F4, 5.6, 8, 11, 16, 22, 32 and 45, with a 30 sec pause in-between each image to allow the flash unit to fully recharge. This was done separately for both camera heights and was repeated for the Vis filter using the same shutter speed. For the NIR filter, this was separately done at shutter speeds 1/ 30 sec, 1/ 60 sec and 1/ 125 sec to determine the best shutter speed with the halogen lamp.

Mean pixel intensity values of the six reflectance standards were obtained from a 25 by 25 pixel sampling window for each channel (R, G and B) using a custom MATLAB (MathWorks) script. Based on these data, we selected the optimal aperture and shutter speed for each waveband ensuring that RGB values of the 99 % standard were < 95 % pixel saturation (242.5/ 255 pixel intensity (Johnsen 2016; Supplementary Table S3). For the UVA photographs, we

only used information from the blue channel at F22 as it displayed a linear sensitivity response, whereas as the green channel was non-responsive in the UVA spectrum and the red channel exhibited noise. For the Vis spectrum, all three channels displayed a linear response at F16. In the NIR, only the red and blue channels had sufficient sensitivity. Therefore, we photographed at F22 (1/ 60 sec) for the UVA (B), and at F16 (1/ 60 sec) for the Vis (RGB) and NIR (RB) wavebands.

6. Image stability validation test

Repeated image validation tests were taken for the settings used in each waveband to measure the variation inherent to the photographic system. Such variation can arise from the reflectance of the surface being photographed, the opening and closing of the lens aperture and camera shutter, heating of the sensor, and draining of the camera batteries and flash batteries. There also exists variation in the output of the flash after each full charge. To measure how this variation affects image brightness, we separately took 75 images of the diffuse aluminium plate in the UVA, Vis and NIR wavebands using the selected exposure settings. We then stacked the 75 images separately for each waveband in ImageJ and, in order, extracted the mean pixel intensity value from the centre (1000 by 1000 pixels) of each image, to produce a timescale of total brightness from that same region. For NIR images, the tungsten halogen lamp was pre-heated for 14 min and images were taken every 5 sec. For UVA and Vis images, brand new C batteries were used before photography, and images were taken every 20 sec to allow for the flash to recharge for the same length of time. We then graphed the variation in pixel intensity for each waveband (Supplementary Figure S5). There were no signs of significant pixel intensity variation, with the highest variation being 4 pixels (UVA) in an 8-bit (0 – 255 pixel) achromatic scale.

References (Methods)

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Reflectance and specimen age

To ensure that the age of collection of each specimen did not affect our results, two analyses were performed. First, the five species that had more specimens available (N=30) were selected, and for each species we tested whether the year of collection could predict reflectance in NIR and UV-Visible regions. We found no association between age and reflectance in any of the species (linear model, P > 0.05, see below).

Species selected:
Acrodipsas myrmecophila (NIR: T-value=-1.31, P-value=0.20; VIS: -1.84, P-value=0.08)
Arhopala wildei wildei (NIR: T-value=-0.01, P-value=0.99; VIS: -0.19, P-value=0.85)
Candalides hyacinthinus hyacinthinus (NIR: T-value=-0.24, P-value=0.81; VIS: -1.47, P-value=0.15)
Catopsilia pyranthe crokera (NIR: T-value=0.19, P-value=0.84; VIS: 0.51, P-value=0.61)
Delias nigrina (NIR: T-value=-0.50, P-value=0.62; VIS: -1.22, P-value=0.23)

In addition to the analysis above, we also run a linear model that included all species, and used as predictors of reflectance the age of the specimen and the species it belonged to. There was no significant association between age and reflectance for NIR (T-value= -1.869, P= 0.061) or UV-visible (T-value: --0.67, P= 0.50) across the whole dataset.