

Supporting Information

Manuscript: Shedding light on Dark taxa: Exploring a cryptic diversity of parasitoid wasps affected by Artificial Light at Night (ALAN)

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Table S1: Total number of Hymenoptera per family/subfamily attracted to road lights at three municipal sites from 2021-2022 in Southern Germany (Baden-Württemberg). Taxa with parasitoid lifestyle are printed in bold. Site 1 Alter Flugplatz, n=17 samplings (conversion from conventional LED 4000K to tailored LED 4000K), Site 2 Backofen Riedwiesen, n=15 samplings (conversion from conventional HPS cylinder 2000K to tailored LED 2700K). Site 3 Heimbachau, n=23 samplings (conversion from conventional bell-shaped HPS 2000K to tailored LED 2700K/2000K).

Subfamily	Site 1	Site 2	Site 3	TOTAL
<i>Apidae</i>	1	0	0	1
<i>Braconidae</i>	2	4	17	23
<i>Ceraphronidae</i>	2	1	0	3
<i>Crabronidae</i>	2	0	0	2
<i>Diapriidae</i>	2	1	3	6
<i>Encyrtidae</i>	3	1	2	6
<i>Eulophidae</i>	1	1	3	5
<i>Figitidae</i>	0	1	2	3
<i>Formicidae</i>	161	61	28	250
<i>Ichneumonidae</i>	7	5	4	16
<i>Mymaridae</i>	0	1	3	4
<i>Pirenidae</i>	0	1	0	1
<i>Platygastridae</i>	1	4	17	22
<i>Pompilidae</i>	0	1	1	2
<i>Proctotrupidae</i>	0	2	9	11
<i>Pteromalidae</i>	2	2	0	4
<i>Scelionidae</i>	2	0	0	2
<i>Sphecidae</i>	0	1	0	1
<i>Vespinæ</i>	8	31	10	49
TOTAL	194	118	99	411

Table S2: Generalised linear model showing the BACI effect on the total number of parasitoid wasps per road light (Abundance) 14 luminaires per groups. **2021:** n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.

Abundance ~Group	Estimate	SE	Z	P
Intercept	1.2321	0.2146	5.741	9.44e-09 ***
Period (before/after)	-1.1962	0.3106	-3.851	0.000118 ***
Site (control/impact)	-1.4020	0.2852	-4.915	8.87e-07 ***
Period:Site	1.2665	0.4964	2.552	0.010725 *

Table S3: Generalised linear model showing the effect of the treatment group on the total number of parasitoid wasps per road light (Abundance) 14 luminaires per group. **2021:** n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.

Abundance ~Group	Estimate	SE	Z	P
Control Before	0.005289	0.315992	1.271	0.986645
Impact Before	-0.160893	0.432054	0.678	0.709602
Control After	1.197170	0.2856	0.348528	0.000593 ***
Impact After	-0.166899	0.2999	0.407114	0.681837

Table S4: Pairwise comparison (Tukey post hoc test of Generalised linear model) showing differences in the total number of parasitoid wasps per road light (Abundance) between treatment groups in a combined analysis over three municipal sites. 14 luminaires per group. **2021: n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.**

contrast	Estimate	SE	Df	t-ratio	p-value
Control before- Impact before	0.160892942	0.4320538	56	0.37239098	0.9821998970
Control before - Control after	- 1.197170407	0.3485282	56	-3.43493086	0.0060112231
Control before - Impact after	0.166899144	0.4071136	56	0.40995718	0.9765212216
Impact before - Control after	- 1.358063349	0.3637251	56	- 3.73376290	0.0024371413
Impact before - Impact after	0.006006202	0.4205650	56	0.01428127	0.9999989400
Control after- Impact after	1.364069551	0.3213565	56	4.24472385	0.0004716123

Table S5: Generalised linear model showing the BACI effect on the total number of parasitoid wasp species per road light (Abundance) 14 luminaires per groups. **2021:** n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.

Abundance ~Group	Estimate	SE	Z	P
Intercept	1.0144	0.1636	6.200	5.66e-10 ***
Period (before/after)	- 0.9944	0.3089	- 3.219	0.001286 **
Site (control/impact)	- 1.1148	0.2938	- 3.795	0.000148 ***
Period:Site	0.9762	0.4987	1.958	0.050280

Table S6: Generalised linear model showing the effect of the treatment group on the total number of parasitoid wasp species per road light (Species richness) 14 luminaires per group. **2021:** n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.

Species richness ~Group	Estimate	SE	Z	P
Control Before	8.045e-05	2.697e-01	0.000	0.99976
Impact After	-1.542e-01	3.934e-01	- 0.392	0.69517
Control Before	9.742e-01	3.074e-01	3.170	0.00153**
Impact After	-1.244e-01	3.690e-01	- 0.337	0.73600

Table S7: Pairwise comparison (Tukey post hoc test of Generalised linear model) showing differences in the total number of parasitoid wasp species per road light (Species richness) between treatment groups in a combined analysis over three municipal sites. 14 luminaires per group. **2021:** n = 26 samplings (8 samplings Site 1 Alter Flugplatz, 8 samplings Site 2 Backofen Riedwiesen, 10 samplings Site 3 Heimbachau; **2022:** n = 29 samplings (9 samplings Site 1 Alter Flugplatz, 7 samplings Site 2 Backofen Riedwiesen, Site 3 Heimbachau 13 samplings). Treatment groups: Control sites (before): (conventional LED 4000K, HPS 2000K); Control sites (after): (conventional LED 4000K, HPS 2000K), Impact sites (before): (conventional LED 4000K, HPS 2000K); Impact sites after (tailored and shielded LED 4000K/2700K/2000K in 2022). P-values lower than 0.05 are printed in bold.

contrast	Estimate	SE	Df	t-ratio	p-value
Control before- Impact before	0.15415154	0.3933980	56	0.39184623	0.979385097
Control before - Control after	- 0.97421003	0.3073598	56	- 3.16960750	0.012760656
Control before - Impact after	0.12440110	0.3689671	56	0.33716043	0.986662119
Impact before - Control after	- 1.12836157	0.3261516	56	- 3.45962322	0.005537354
Impact before - Impact after	- 0.02975044	0.3847616	56	- 0.07732174	0.999832184
Control after- Control after	1.09861113	0.2886752	56	3.80570000	0.001922537

Table S8: Parasitoids attracted to road lights at three municipal sites in Southern Germany (Baden-Württemberg) from 2021-2022.

Superfamily	Family	Genus	Species/ Morphotypes	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
<i>Ceraphronoidea</i>	<i>Ceraphronidae</i>	<i>Ceraphronidae</i>	<i>Ceraphronidae sp1.</i>	Tailored LED 4000K	Alter Flugplatz	220829	SQ_2022_05_7_037	KA_290822_C12A
			<i>Ceraphronidae sp2.</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05_7_058	KA_270921_C9B
			<i>Ceraphronidae sp3.</i>	Conventional HPS 2000K	Backofen Riedwiesen	210902	SQ_2022_05_7_093	BR_020921_C25A
<i>Chalcidoidae</i>	<i>Encyrtidae</i>	<i>Blastothrix</i>	<i>Blastothrix sp.</i>	Conventional LED 4000K	Alter Flugplatz	220719	SQ_2022_05_7_013	KA_190722_C16A
		<i>Copidosoma</i>	<i>Copidosoma sp.</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_001	HA_290622_C6A
			<i>Encyrtidae sp1.</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05_7_034	KA_270921_C17A
			<i>Encyrtidae sp1.</i>	Tailored LED 2700K	Backofen Riedwiesen	220916	SQ_2022_05_7_049	BR_160922_C22A
			<i>Encyrtidae sp2.</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_003	HA_290622_C7B
		<i>Metaphycus</i>	<i>Metaphycus sp.</i>	Tailored LED 4000K	Alter Flugplatz	220719	SQ_2022_05_7_028	KA_190722_C13A
<i>Chalcidoidae</i>	<i>Eulophidae</i>	<i>Aprostocetus</i>	<i>Aprostocetus sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	220816	SQ_2022_05_7_085	BR_160822_C27B
		<i>Diglyphus</i>	<i>Diglyphus isaea</i>	Conventional HPS 2000K	Heimbachau	220601	SQ_2022_05_7_002	HA_010622_C5A
		<i>Omphale</i>	<i>Omphale lugens</i>	Conventional HPS 2000K	Heimbachau	210612	SQ_2022_05_7_045	HA_120621_C1B
		<i>Omphale</i>	<i>Omphale radialis</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_039	HA_240822_C8A
		<i>Omphale</i>	<i>Omphale sp.</i>	Conventional LED 4000K	Alter Flugplatz	210531	SQ_2022_05_7_022	KA_310521_C10A

Superfamily	Family	Genus	Species	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
<i>Chalcidoidea</i>	<i>Mymaridae</i>	<i>Mymaridae</i>	<i>Mymaridae sp1.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_025	HA_240822_C5A
			<i>Mymaridae sp1.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_086	HA_240822_C7A
			<i>Mymaridae sp2.</i>	Tailored LED 2700K	Backofen Riedwiesen	220816	SQ_2022_05_7_027	KA_160822_C22A
			<i>Mymaridae sp3.</i>	Conventional HPS 2000K	Heimbachau	220817	SQ_2022_05_7_074	HA_180822_C7A
<i>Chalcidoidea</i>	<i>Pirenidae</i>	<i>Gastrancistrus</i>	<i>Gastrancistrus sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	210902	SQ_2022_05_7_035	BR_020921_C22B
<i>Chalcidoidea</i>	<i>Pteromalidae</i>	<i>Cratomus</i>	<i>Cratomus megacephalus</i>	Conventional HPS 2000K	Backofen Riedwiesen	210602	SQ_2022_05_7_010	BR_020621_C24A
		<i>Cyclogastrella</i>	<i>Cyclogastrella sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	220816	SQ_2022_05_7_073	BR_160822_C27A
		<i>Pachycrepoides</i>	<i>Pachycrepoides vindemmiae</i>	Tailored LED 4000K	Alter Flugplatz	221017	SQ_2022_05_7_061	KA_171022_C9A
		<i>Stenomalin</i>	<i>Stenomalina sp.</i>	Conventional LED 4000K	Alter Flugplatz	220627	SQ_2022_05_7_015	KA_270622_C14A
<i>Cynipoidea</i>	<i>Figitidae</i>	<i>Alloxysta</i>	<i>Alloxysta sp.</i>	Conventional HPS 2000K	Heimbachau	220518	SQ_2022_05_7_038	HA_180522_C6A
			<i>Alloxysta victrix</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_050	HA_290622_C7A
		<i>Leptopilina</i>	<i>Leptopilina japonica</i>	Conventional HPS 2000K	Backofen Riedwiesen	220816	SQ_2022_05_7_062	BR_160822_C24A
<i>Diaprioidae</i>	<i>Diapriidae</i>		<i>Diapriidae sp1.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_066	HA_240822_C7H
			<i>Diapriidae sp1.</i>	Tailored LED 2000K	Heimbachau	220726	SQ_2022_05_7_090	KA_260722_C2A
			<i>Diapriidae sp2.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_031	HA_240822_C7I

Superfamily	Family	Genus	Species	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
<i>Diapriidae</i>	<i>Diapriidae</i>		<i>Diapriidae sp2.</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05_7_046	KA_270921_C9A
			<i>Diapriidae sp3.</i>	Conventional LED 4000K	Alter Flugplatz	220627	SQ_2022_05_7_078	KA_270622_C15B
			<i>Diapriidae sp2.</i>	Tailored LED 2700K	Backofen Riedwiesen	220816	SQ_2022_05_7_019	BR_160822_C21B
<i>Ichneumonidae</i>	<i>Braconidae</i>	<i>Alious</i>	<i>Alious lepidus</i>	Conventional HPS 2000K	Backofen Riedwiesen	220628	SQ_2022_05_7_068	BR_280622_C27A
			<i>Alysiinae sp.</i>	Tailored LED 2000K	Heimbachau	220726	SQ_2022_05_7_095	HA_260722_C4A
		<i>Apanteles</i>	<i>Apanteles sodalis</i>	Conventional HPS 2000K	Backofen Riedwiesen	210902	SQ_2022_05_7_023	BR_020921_C22A
<i>Ichneumonidae</i>	<i>Braconidae</i>	<i>Aphidius</i>	<i>Aphidius rhopalosiphii</i>	Conventional HPS 2000K	Backofen Riedwiesen	220628	SQ_2022_05_7_048	BR_280622_C26A
		<i>Asobara</i>	<i>Asobara rufescens</i>	Conventional HPS 2000K	Backofen Riedwiesen	210902	SQ_2022_05_7_047	BR_020921_C24A
		<i>Blacus</i>	<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_008	HA_290622_C5A
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_012	HA_290622_C8A
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05_7_044	HA_260722_C7C
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05_7_072	HA_240822_C7J
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05_7_098	HA_290622_C6B
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220721	SQ_2022_05_7_032	HA_210722_C6C
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220721	SQ_2022_05_7_043	HA_210722_C6A

Superfamily	Family	Genus	Species	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
Ichneumon oidea	Braconidae	<i>Blacus</i>	<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220721	SQ_2022_05 7_091	HA_210722 _C6B
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_067	HA_260722 _C7B
			<i>Blacus ruficornis</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_079	HA_260722 _C8B
			<i>Braconidae sp.</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_020	HA_260722 _C5A
		<i>Dinotrema</i>	<i>Dinotrema sp.</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05 7_024	HA_290622 _C8B
			<i>Dinotrema sp.</i>	Conventional HPS 2000K	Heimbachau	220721	SQ_2022_05 7_055	HA_210722 _C8A
			<i>Dinotrema sp.</i>	Conventional LED 4000K	Alter Flugplatz	220719	SQ_2022_05 7_092	KA_190722 _C17A
		<i>Dolichogenidea</i>	<i>Dolichogenidea sp.</i>	Conventional HPS 2000K	Heimbachau	220629	SQ_2022_05 7_036	HA_290622 _C8C
		<i>Eubazus</i>	<i>Eubazus sp.</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05 7_082	KA_270921 _C10A
		<i>Lipolexis</i>	<i>Lipolexis sp.</i>	Conventional HPS 2000K	Heimbachau	210612	SQ_2022_05 7_069	HA_120621 _C5A
		<i>Meteorus</i>	<i>Meteorus affinis</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_084	HA_260722 _C5B
Ichneumon oidea	Ichneumonidae	<i>Acrotomus</i>	<i>Acrotomus succinctus</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05 7_101	KA_270921 _C14A
		<i>Amblyteles</i>	<i>Amblyteles armatorius</i>	Conventional LED 4000K	Alter Flugplatz	221017	SQ_2022_05 7_100	KA_171022 _C15A
		<i>Aptesis</i>	<i>Aptesis assimilis</i>	Conventional HPS 2000K	Backofen Riedwiesen	210902	SQ_2022_05 7_081	BR_020921_ _C27A
		<i>Barycnemis</i>	<i>Barycnemis angustipennis</i>	Conventional HPS 2000K	Heimbachau	220831	SQ_2022_05 7_104	HA_310822 _C8A

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<i>Ichneumon oidea</i>	<i>Ichneumonidae</i>	<i>Cratichneumon</i>	<i>Cratichneumon sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	220830	SQ_2022_05_7_105	BR_300822_C27A
			<i>Ctenopelmatinae sp.</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05_7_097	KA_270921_C16A
		<i>Diadegma</i>	<i>Diadegma fenestrata</i>	Conventional LED 4000K	Alter Flugplatz	210927	SQ_2022_05_7_070	KA_270921_C15A
		<i>Endasys</i>	<i>Endasys sp.</i>	Conventional HPS 2000K	Heimbachau	210818	SQ_2022_05_7_106	HA_180821_C1A
		<i>Gelis</i>	<i>Gelis sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	210602	SQ_2022_05_7_059	BR_020621_C23A
			<i>Gelis sp.</i>	Conventional HPS 2000K	Heimbachau	210804	SQ_2022_05_7_009	HA_040821_C2A
			<i>Gelis sp.</i>	Conventional LED 4000K	Alter Flugplatz	210816	SQ_2022_05_7_011	KA_160821_C18A
			<i>Gelis sp.</i>	Conventional LED 4000K	Alter Flugplatz	220915	SQ_2022_05_7_056	KA_150922_C15A
		<i>Metopius</i>	<i>Metopius fuscipennis</i>	Conventional HPS 2000K	Backofen Riedwiesen	220830	SQ_2022_05_7_103	BR_300822_C26A
		<i>Netelia</i>	<i>Netelia sp.</i>	Tailored LED 2000K	Heimbachau	220726	SQ_2022_05_7_102	HA_260722_C1A
		<i>Stenomacrus</i>	<i>Stenomacrus affinator</i>	Conventional HPS 2000K	Backofen Riedwiesen	220628	SQ_2022_05_7_060	BR_280622_C24A
<i>Platygastr oidea</i>	<i>Platygastridae</i>	<i>Temelucha</i>	<i>Temelucha sp.</i>	Conventional LED 4000K	Alter Flugplatz	220627	SQ_2022_05_7_099	KA_270622_C15A
		<i>Amblyaspis</i>	<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	210602	SQ_2022_05_7_071	BR_020621_C22A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	220830	SQ_2022_05_7_064	BR_300822_C28A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	210612	SQ_2022_05_7_033	HA_120621_C1A

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<i>Platygastr</i> <i>oidea</i>	<i>Platygastr</i> <i>idae</i>	<i>Amblyaspis</i>	<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	210831	SQ_2022_05 7_021	HA_310821 _C5A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220705	SQ_2022_05 7_005	HA_050722 _C7A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220705	SQ_2022_05 7_088	HA_050722 _C5A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_006	HA_260722 _C8A
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_029	HA_240822 _C5C
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_030	HA_240822 _C7E
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_041	HA_240822 _C6D
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_042	HA_240822 _C7F
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_053	HA_240822 _C7B
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_054	HA_240822 _C7G
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_065	HA_240822 _C7C
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_077	HA_240822 _C7D
			<i>Amblyaspis sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_089	HA_240822 _C5D
			<i>Amblyaspis sp.</i>	Conventional LED 4000K	Alter Flugplatz	220531	SQ_2022_05 7_040	KA_310522 _C17A
			<i>Amblyaspis sp.</i>	Tailored LED 2700K	Backofen Riedwiesen	220816	SQ_2022_05 7_018	BR_160822_ _C21A

Superfamily	Family	Genus	Species	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
<i>Platygastr</i> <i>oidea</i>	<i>Platygastr</i> <i>idae</i>	<i>Inostemma</i>	<i>Inostemma sp.</i>	Conventional HPS 2000K	Backofen Riedwiesen	210602	SQ_2022_05 7_083	BR_020621_ C24B
			<i>Inostemma sp.</i>	Tailored LED 2700K	Heimbachau	220817	SQ_2022_05 7_052	HA_180822 C2A
			<i>Platygastridae sp.</i>	Tailored LED 2700K	Heimbachau	220518	SQ_2022_05 7_017	HA_180522 C1A
	<i>Scelionida</i> <i>e</i>	<i>Synopeas</i>	<i>Synopeas sp.</i>	Tailored LED 2000K	Heimbachau	220824	SQ_2022_05 7_076	HA_240822 C3A
		<i>Scelionidae</i>	<i>Scelionidae sp1.</i>	Conventional LED 4000K	Alter Flugplatz	220719	SQ_2022_05 7_014	KA_190722 C14A
			<i>Scelionidae sp2.</i>	Conventional LED 4000K	Alter Flugplatz	210630	SQ_2022_05 7_094	KA_300621 C16A
<i>Proctotrup</i> <i>oidea</i>	<i>Proctotru</i> <i>pidae</i>	<i>Exallonyx</i>	<i>Exallonyx nixonii</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_051	HA_260722 C6A
			<i>Exallonyx sp.</i>	Conventional HPS 2000K	Heimbachau	220726	SQ_2022_05 7_007	HA_260722 C7A
	<i>Proctotrup</i> <i>es</i>		<i>Proctotrupes sp.</i>	Tailored LED 2700K	Backofen Riedwiesen	220628	SQ_2022_05 7_080	BR_280622_ C23A
			<i>Proctotrupes sp.</i>	Tailored LED 2700K	Backofen Riedwiesen	220628	SQ_2022_05 7_107	BR_280622_ C19A
			<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	210612	SQ_2022_05 7_057	HA_120621 C7A
			<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	220831	SQ_2022_05 7_026	HA_310822 C6A
			<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_016	HA_240822 C5B
			<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_063	HA_240822 C6A
			<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_075	HA_240822 C6B

Superfamily	Family	Genus	Species	Luminaire	Municipal Site	Starting date	Sanger_Seq ID	Sample ID
<i>Proctotrupoidea</i>	<i>Proctotrupidae</i>		<i>Proctotrupinae sp.</i>	Conventional HPS 2000K	Heimbachau	220824	SQ_2022_05 7_087	HA_240822 _C6C
			<i>Proctotrupinae sp.</i>	Tailored LED 2000K	Heimbachau	220824	SQ_2022_05 7_004	HA_240822 _C2A

Table S9: List of identified species examined both morphologically and molecularly. Abbreviations: AF=Alter Flugplatz, BR=Backofen

Riedwiesen, HA=Heimbachau, IGB=Leibniz Institute Berlin, Müggelseedamm 310, AIM=Advanced Identification GmbH Leipzig

Locality	Species	Specimen-ID	Luminaire	AIM-ID	Collection Date	Sequencer	Sequence length (bp)	Depository	Sequence Data repository
AF	<i>Acrotomus succinctus</i> (Gravenhorst 1829)	KA_2709 21_C14A	Conventional LED 4000K	SQ_2022 _057_10 1	27.09.2 1	AIM	603	IGB	10.6084/m9. figshare.262 06229
BR	<i>Aliolus lepidus</i> (Haliday 1835)	BR_28062 2_C27A	Conventional HPS 2000K cylinder	SQ_2022 _057_06 8	28.06.2 2	AIM	654	IGB	10.6084/m9. figshare.262 06229
HA	<i>Alloxysta victrix</i> (Westwood 1833)	HA_2906 22_C7A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_05 0	29.06.2 2	AIM	637	IGB	10.6084/m9. figshare.262 06229
AF	<i>Amblyteles armatorius</i> (Forster 1771)	KA_1710 22_C15A	Conventional LED 4000K	SQ_2022 _057_10 0	17.10.2 2	AIM	606	IGB	10.6084/m9. figshare.262 06229
BR	<i>Apanteles sodalis</i> (Haliday 1834)	BR_02092 1_C22A	Conventional HPS 2000K cylinder	SQ_2022 _057_02 3	02.09.2 1	AIM	587	IGB	10.6084/m9. figshare.262 06229
BR	<i>Aphidius rhopalosiphi</i> (De Stefani Perez 1902)	BR_28062 2_C26A	Conventional HPS 2000K cylinder	SQ_2022 _057_04 8	28.06.2 2	AIM	639	IGB	10.6084/m9. figshare.262 06229
BR	<i>Aptesis assimilis</i> (Gravenhorst 1829)	BR_02092 1_C27A	Conventional HPS 2000K cylinder	SQ_2022 _057_08 1	02.09.2 1	AIM	625	IGB	10.6084/m9. figshare.262 06229
BR	<i>Asobara rufescens</i> (Forster 1862)	BR_02092 1_C24A	Conventional HPS 2000K cylinder	SQ_2022 _057_04 7	03.09.2 1	AIM	614	IGB	10.6084/m9. figshare.262 06229

Locality	Species	Specimen ID	Luminaire	AIM-ID	Collection Date	Sequencer	Sequence length (bp)	Depository	Sequence Data repository
HA	<i>Barycnemis angustipennis</i> (Holmgren 1860)	HA_3108 22_C8A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_10 4	31.08.2 2	AIM	579	IGB	10.6084/m9. figshare.262 06229
HA	<i>Blacus ruficornis</i> (Nees 1811)	HA_2906 22_C5A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_00 8	29.06.2 2	AIM	635	IGB	10.6084/m9. figshare.262 06229
HA	<i>Blacus ruficornis</i> (Nees 1811)	HA_2906 22_C8A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_01 2	29.06.2 2	AIM	598	IGB	10.6084/m9. figshare.262 06229
HA	<i>Blacus ruficornis</i> (Nees 1811)	HA_2607 22_C7C	Conventional HPS 2000K bow-shaped	SQ_2022 _057_04 4	26.07.2 2	AIM	307	IGB	10.6084/m9. figshare.262 06229
HA	<i>Blacus ruficornis</i> (Nees 1811)	HA_2408 22_C7J	Conventional HPS 2000K bow-shaped	SQ_2022 _057_07 2	24.08.2 2	AIM	634	IGB	10.6084/m9. figshare.262 06229
BR	<i>Cratomus megacephalus</i> (Fabricius 1793)	BR_02062 1_C24A	Conventional HPS 2000K cylinder	SQ_2022 _057_01 0	02.06.2 1	AIM	644	IGB	10.6084/m9. figshare.262 06229
AF	<i>Diadegma fenestrale</i> (Holgren 1860)	KA_2709 21_C15A	Conventional LED 4000K	SQ_2022 _057_07 0	27.09.2 1	AIM	647	IGB	10.6084/m9. figshare.262 06229
HA	<i>Diglyphus isaea</i> (Walker 1838)	HA_0106 22_C5A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_00 2	01.06.2 2	AIM	646	IGB	10.6084/m9. figshare.262 06229
HA	<i>Exallonyx nixon</i> (Townes 1981)	HA_2607 22_C6A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_05 1	26.07.2 2	AIM	301	IGB	10.6084/m9. figshare.262 06229

Locality	Species	Specimen-ID	Luminaire	AIM-ID	Collection Date	Sequencer	Sequence length (bp)	Depository	Sequence Data repository
BR	<i>Leptopilina japonica</i> (Novković & Kimura 2011)	BR_16082 2_C24A	Conventional HPS 2000K cylinder	SQ_2022 _057_06 2	16.08.2 2	AIM	598	IGB	10.6084/m9. figshare.262 06229
HA	<i>Meteorus affinis</i> (Wesmael 1835)	HA_2607 22_C5B	Conventional HPS 2000K bow-shaped	SQ_2022 _057_08 4	26.07.2 2	AIM	618	IGB	10.6084/m9. figshare.262 06229
BR	<i>Metopius fuscipennis</i> (Wesmael 1849)	BR_30082 2_C26A	Conventional HPS 2000K cylinder	SQ_2022 _057_10 3	30.08.2 2	AIM	612	IGB	10.6084/m9. figshare.262 06229
HA	<i>Omphale lugens</i> (Nees 1834)	HA_1206 21_C1B	Conventional HPS 2000K bow-shaped	SQ_2022 _057_04 5	12.06.2 1	AIM	573	IGB	10.6084/m9. figshare.262 06229
HA	<i>Omphale radialis</i> (Thomson 1878)	HA_2408 22_C8A	Conventional HPS 2000K bow-shaped	SQ_2022 _057_03 9	24.08.2 2	AIM	278	IGB	10.6084/m9. figshare.262 06229
AF	<i>Pachycrepoideus vindemmiae</i> (Rondani 1875)	KA_1710 22_C9A	Tailored LED 4000K	SQ_2022 _057_06 1	12.10.2 2	AIM	297	IGB	10.6084/m9. figshare.262 06229
BR	<i>Stenomacrus affinator</i> (Aubert 1981)	BR_28062 2_C24A	Conventional HPS 2000K cylinder	SQ_2022 _057_06 0	28.06.2 2	AIM	633	IGB	10.6084/m9. figshare.262 06229

Table S10: Identified species, distribution in Germany and Baden-Württemberg. Species not previously reported in Baden-Württemberg in the literature or the Global Biodiversity Information Facility (GBIF) are printed in bold and shaded in grey.

Family/Subfamily	Species	Host	Presence/ Absence Germany GBIF	Presence/Absence Baden- Württemberg GBIF	Other Reports
<i>Ichneumonidae</i> <i>Tryphoninae</i>	<i>Acrotomus</i> <i>succinctus</i>	<i>Symphyta</i> ¹	(+)	(+)	² (Germany: Baden-Württemberg); ³ (Britain); ⁴ (Switzerland); ⁵ (Netherlands)
<i>Braconidae</i> <i>Brachistinae</i>	<i>Aliolus</i> <i>lepidus</i>	Coleoptera ⁶	(+)	(-)	⁷ (Germany); ⁶ (Bulgaria, Czech Republic, Germany); ⁸ (Germany: Schleswig-Holstein, Lower Saxony)
<i>Figitidae</i> <i>Charipinae</i>	<i>Alloxysta</i> <i>victrix</i>	<i>Hyperparasitoid</i> <i>Aphidiinae</i> ⁸	(+)	(-)	⁹ (Germany: Baden-Württemberg); ¹⁰ (Norway); ⁸ (Germany: Schleswig-Holstein, Lower Saxony)
<i>Ichneumonidae</i> <i>Ichneumoninae</i>	<i>Amblyteles</i> <i>armatorius</i>	<i>Lepidoptera</i> ¹¹ <i>Xestia, Noctua</i>	(+)	(+)	⁴ (Switzerland); ³ (Britain)
<i>Braconidae</i> <i>Microgastrinae</i>	<i>Apanteles</i> <i>sodalis</i>	<i>Lepidoptera</i>¹ <i>Tortricidae</i>	(-)	(-)	⁷ (Germany); Aydoğdu (2014) ¹² (Turkey)
<i>Braconidae</i> <i>Aphidiinae</i>	<i>Aphidius</i> <i>rhopalosiphi</i>	<i>Aphididae</i>¹³	(+)	(-)	⁷ (Germany); ⁸ (Germany: Schleswig-Holstein, Lower Saxony)
<i>Ichneumonidae</i> <i>Cryptinae</i>	<i>Aptesis</i> <i>assimilis</i>	<i>Symphyta</i> ¹⁴	(+)	(+)	¹⁵ (Germany: Baden-Württemberg); ³ (Britain)
<i>Braconidae</i> <i>Alysiinae</i>	<i>Asobara</i> <i>rufescens</i>	Diptera ¹⁶	(+)	(-)	⁷ (Germany); ¹⁶ (North-America)
<i>Braconidae</i> <i>Tersilochinae</i>	<i>Barycnemis</i> <i>angustipennis</i>	<i>Coleoptera</i> ¹⁷	(+)	(+)	¹⁵ (Germany: Baden-Württemberg); Klopstein (2019) ⁴ (Switzerland); ³ (Britain)
<i>Braconidae</i> <i>Brachistinae</i>	<i>Blacus</i> <i>ruficornis</i>	Coleoptera ¹⁴	(+)	(-)	⁷ (Germany); ¹⁸ (Britain, Germany: Bavaria)
<i>Pteromalidae</i> <i>Pteromalinae</i>	<i>Cratomus</i> <i>megacephalus</i>	Unknown ¹⁹	(+)	(+)	²⁰ (Germany), ²¹ (Germany); ¹⁹ (Poland ²² (Romania)

Family/Subfamily	Species	Host	Presence/ Absence Germany GBIF	Presence/Absence Baden- Württemberg GBIF	Other Reports
<i>Ichneumonidae</i> <i>Campopleginae</i>	<i>Diadegma</i> <i>fenestrale</i>	<i>Lepidoptera</i> ^{23,24} <i>Plutella xylostella</i>	(+)	(-)	³ (Britain); ⁴ (Switzerland); ²⁵ (Germany: Baden-Württemberg)
<i>Eulophidae</i> <i>Eulophinae</i>	<i>Diglyphus</i> <i>isaea</i>	<i>Diptera</i> ²⁶	(+)	(-)	²⁰ (Germany); ²⁶ (Netherlands)
<i>Proctotrupidae</i> <i>Proctotrupinae</i>	<i>Exallonyx</i> <i>nixonii</i>	Unknown ^{14,27}	(+)	(-)	²⁸ (Iran); ²⁷ (Britain)
<i>Figitidae</i> <i>Eucoilinae</i>	<i>Leptopilina</i> <i>japonica</i>	<i>Diptera</i> ²⁹	(+)	(+)	²⁹ (Germany: Baden-Württemberg); ³⁰ (Italy); ¹⁶ (North-America)
<i>Braconidae</i> <i>Euphorinae</i>	<i>Meteorus</i> <i>affinis</i>	<i>Lepidoptera</i> ³¹	(-)	(-)	⁷ (Germany); ³¹ , Stigenberg & Shaw (2013) (Europe, Korea, China, Russia)
<i>Ichneumonidae</i> <i>Metopiinae</i>	<i>Metopius</i> <i>fuscipennis</i>	<i>Lepidoptera</i> ¹⁴	(+)	(+)	⁴ (Switzerland); ¹⁵ (Germany: Baden-Württemberg)
<i>Eulophidae</i> <i>Entedoniae</i>	<i>Omphale lugens</i>	<i>Cecidomyiidae</i> (<i>Diptera</i>) ³²	(+)	(-)	²⁰ (Germany); ³³ (Netherlands)
<i>Eulophidae</i> <i>Entedoniae</i>	<i>Omphale radialis</i>	<i>Cecidomyiidae</i> (<i>Diptera</i>) ³²	(+)	(-)	²⁰ (Germany); ³³ (Netherlands, France, Germany: Northrhine-Westphalia, Rheinland-Pfalz)
<i>Pteromalidae</i> <i>Pachyneurinae</i>	<i>Pachycrepoideus</i> <i>vindemmiae</i>	<i>Diptera</i> ³⁴	(-)	(-)	³⁵ (Germany: Schleswig-Holstein); ²⁰ (Germany); ³⁴ (Germany: Baden-Württemberg); ³⁶ (Switzerland); ¹⁶ (North-America)
<i>Ichneumonidae</i> <i>Orthocentrinae</i>	<i>Stenomacrus</i> <i>affinitor</i>	Unknown ¹	(+)	(-)	³⁷ (Finland); ³⁸ (Iran)

Table S11: Classification of existing lighting before (2021) and after (2022) conversion of half of the luminaires at three municipal sites in Baden-Württemberg.

	Site 1 Alter Flugplatz. Karlsruhe	Backofen Riedwiesen. Brühl	Heimbachau. Betzweiler
Coordinates	49.02107968828992. 8.37779407517844	49.41185086276461. 8.519436152709618	48.363683514004585. 8.481609229369308
Habitat	Dry and sandy Oligotrophic grasslands	Damp meadows. Wet floodplains	Wet Floodplain vegetation. Semi-arid grassland
Traffic usage	Cycle path. No motorised vehicles. pedestrians	Residential street <30km/h. Motorised vehicles + sidewalk	marketplace + parking lot. Slow Motorised vehicles
Pollution class	Extreme	Very high	Low
Light regime	Urban	Peri-urban	Rural
2021			
Luminaire	Trilux Lumega 700	Abele Geiger Trend	Hess Barcelona
Illuminant	LED	HPS	HPS
Mean (lux)	9.5	3.1	5.1
Height (m)	4.5	3.5	3.5
Spectrum (K)	4000	2000	2000
Number	10	10	8
Sample events	8	8	10 (3 nights with part- time-illumination (technical problems))
2022			
Luminaire	Selux Tal + shield	Selux Tal + shield	Selux Beta + shield
Illuminant	LED	LED	LED
Mean (lux)	9.2	3.1	5.2
Height (m)	4.5	3.5	3.5
Spectrum (K)	4000	2700	2700
Number	5	5	4
Controls	5	5	4
Sample events	9	7	8 (+ 5 samplings with 2000K)

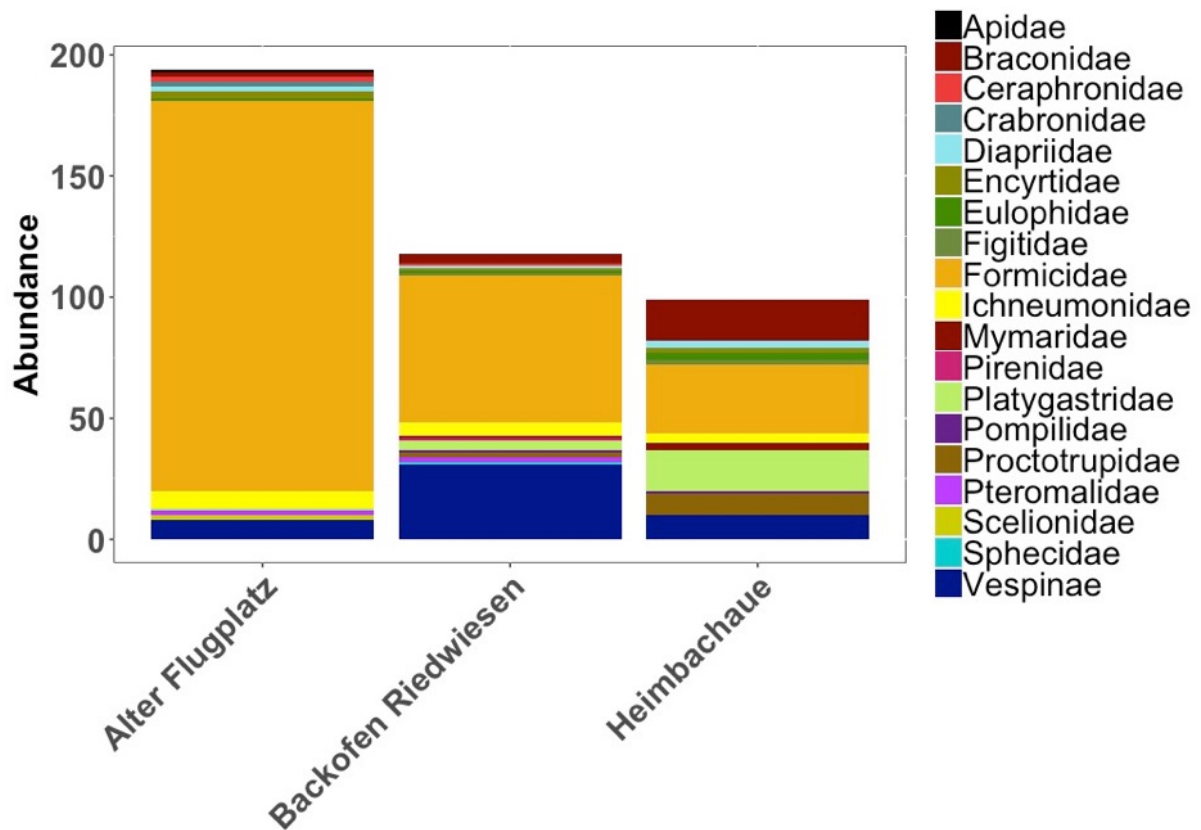


Figure S1: Total number of *Hymenoptera* per family/subfamily (colour coded) attracted to road lights at three municipal sites from 2021-2022 in Southern Germany (Baden-Württemberg). Site 1 Alter Flugplatz n=17 samplings, 10 luminaires per treatment (conversion from conventional LED 4000K to tailored LED 4000K), Site 2 Backofen Riedwiesen n=15 samplings, 10 luminaires per treatment (conversion from conventional HPS cylinder 2000K to tailored LED 2700K). Site 3 Heimbachau = 23 samplings, 4 luminaires per treatment (conversion from conventional bell-shaped HPS 2000K to tailored LED 2700K (includes 5 control samplings with tailored LED in a 2000K configuration)).

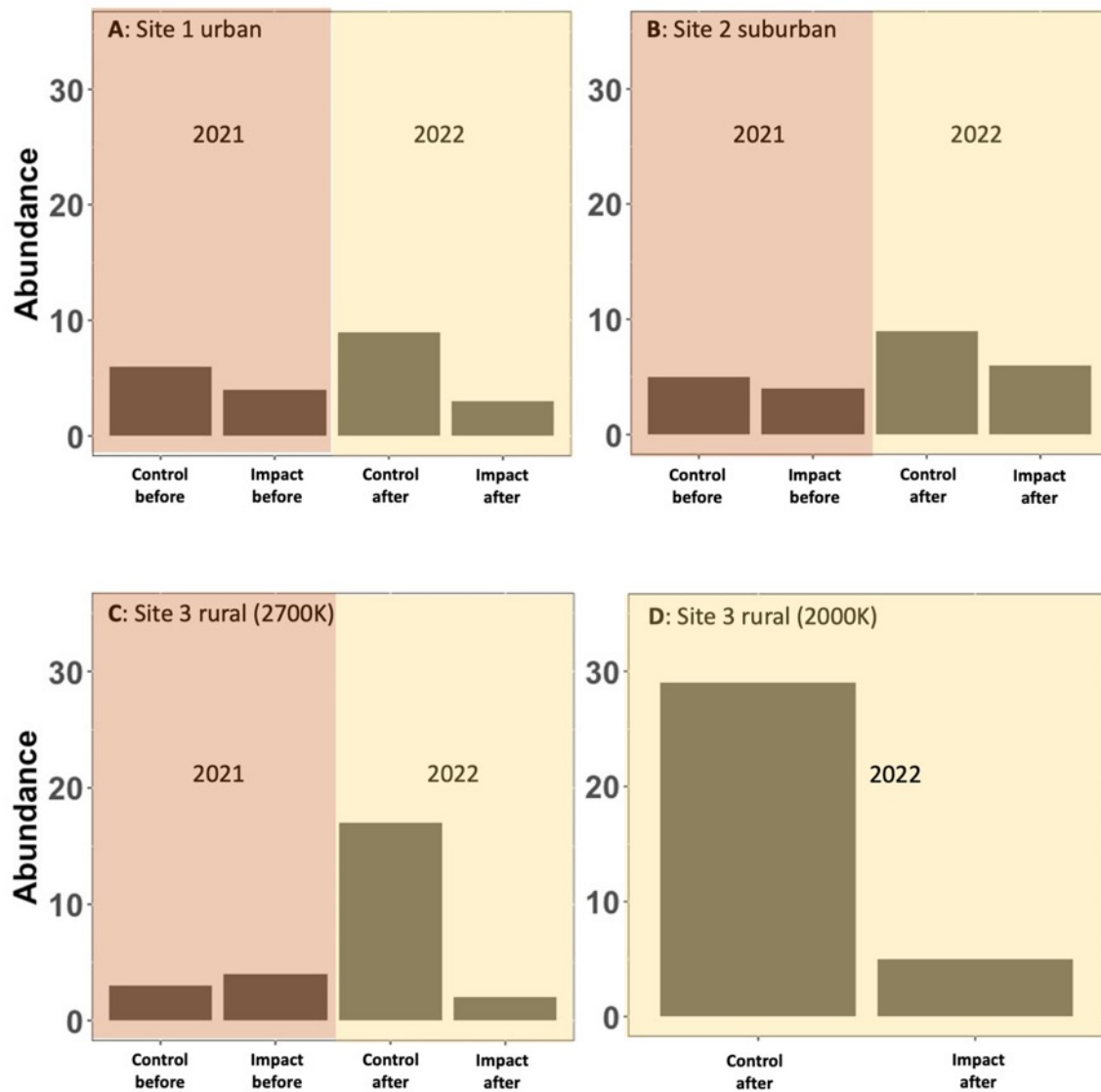


Figure S2: Total number of parasitoid wasps (bars) per control/impact sites before (2021) and after (2022) conversion of the luminaires at the impact sites to tailored and shielded LED.

A: Site 1 Alter Flugplatz, urban, n=8 samplings 2021, 9 samplings 2022, 5 luminaires per control/impact (conversion from conventional LED 4000K to tailored LED 4000K), **B:** Site 2 Backofen Riedwiesen n=7 samplings 2021, 8 samplings 2022, 5 luminaires per control/impact (conversion from conventional HPS cylinder 2000K to tailored LED 2700K). **C:** Site 3 Heimbachau n=10 samplings 2021, 8 samplings 2022, 4 luminaires per control/impact (conversion from conventional bell-shaped HPS 2000K to tailored LED 2700K), **D:** Site 3

Heimbachau: 5 samplings, 4 luminaires per control/impact (HPS 2000K vs. tailored LED 2000K).

Acrotomus succinctus (Ichneumonidae)

Sanger_ID: SQ_2022_057_101

Data_ID: KA_270921_C14A (conventional LED 4000K)



Figure S3: *Acrotomus succinctus*

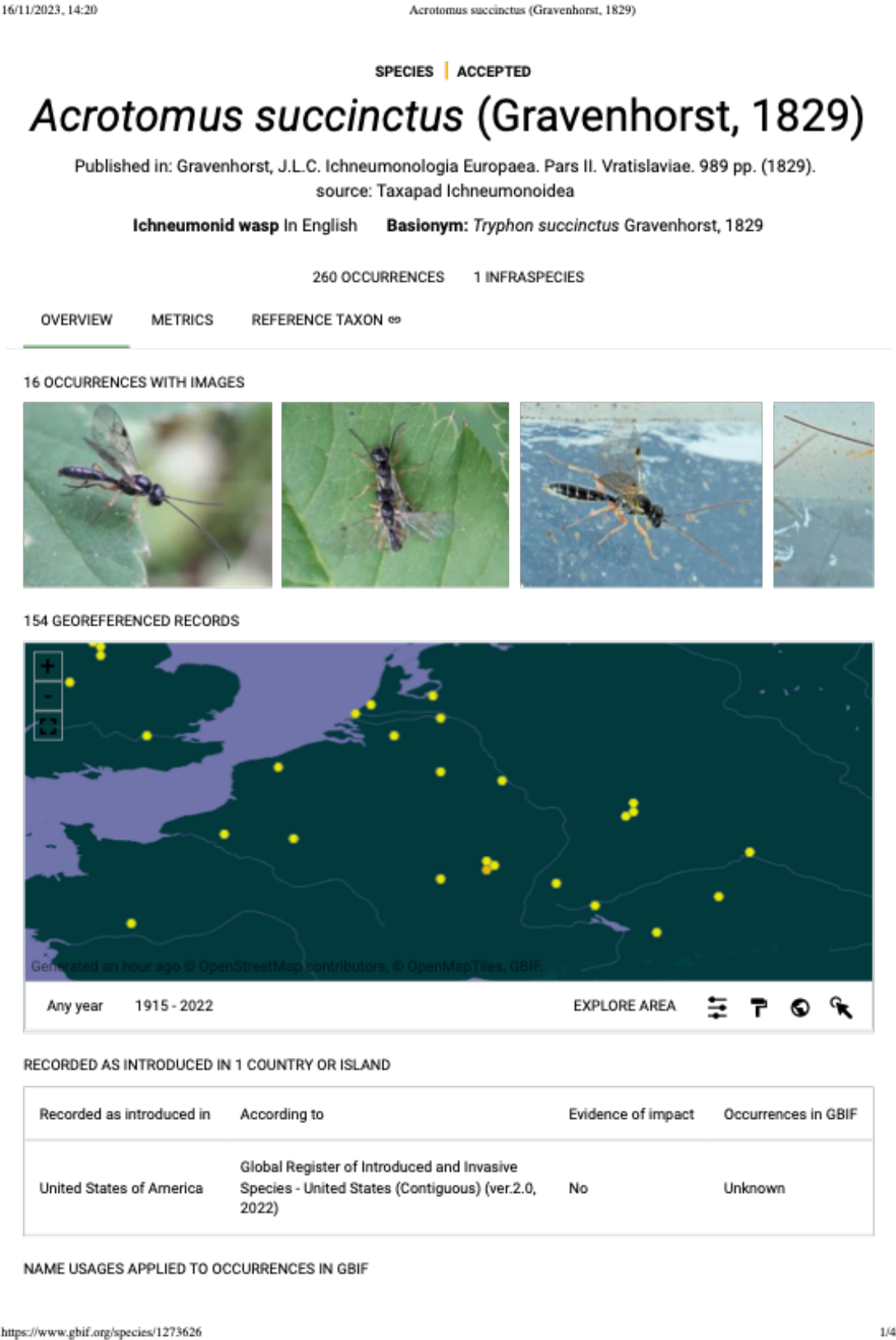


Figure S4: Global Biodiversity Information Facility (GBIF) Webpage *Acrotomus Succinctus*

Aliolus lepidus (Braconidae)

Sanger_ID: SQ_2022_057_068

Data_ID: BR_280622_C27A (conventional HPS 2000K)



Figure S5: *Aliolus lepidus*

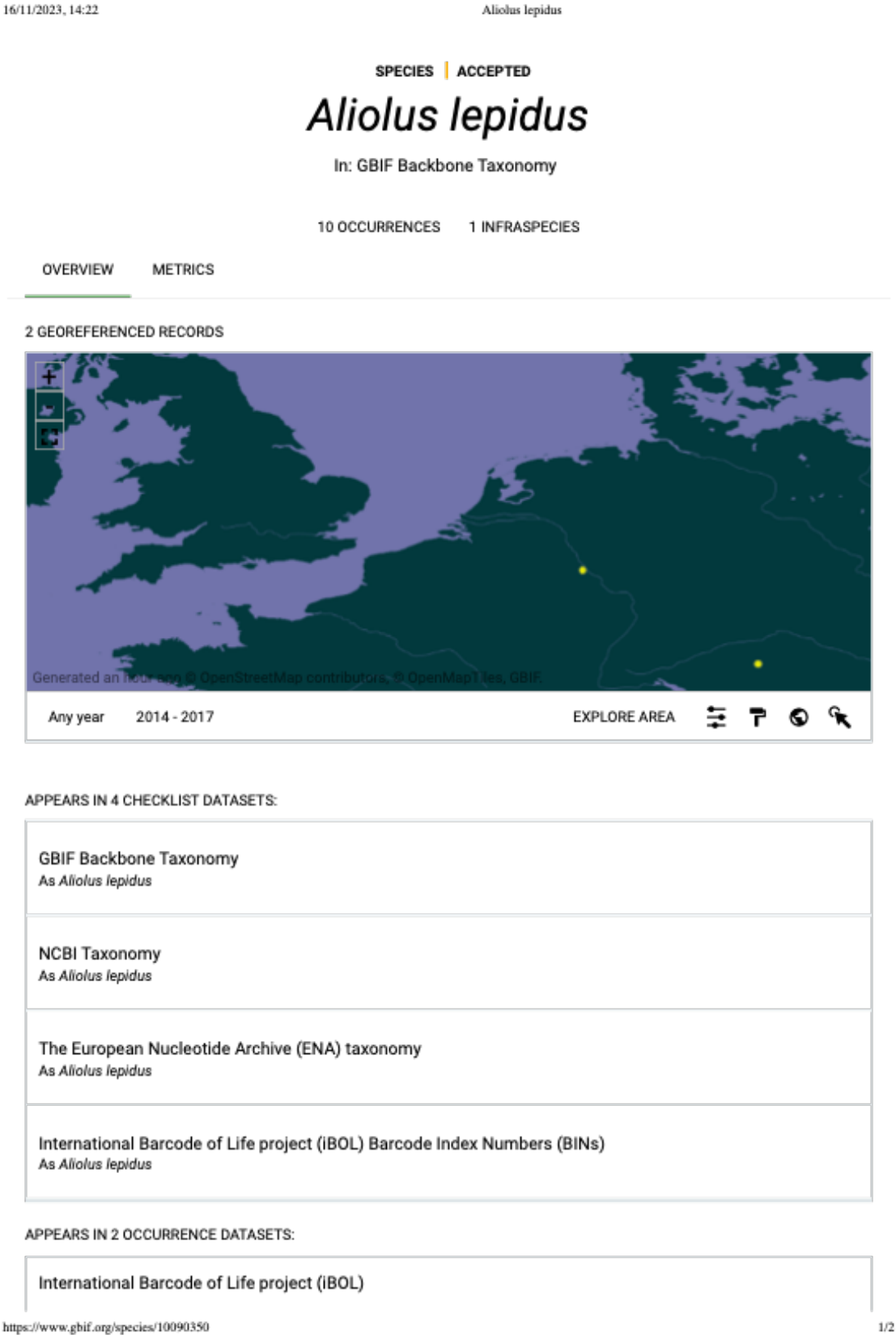


Figure S6: Global Biodiversity Information Facility (GBIF) Webpage *Aliolus lepidus*

Alloxysta sp. (*Figitidae*)

Sanger_ID: SQ_2022_057_038

Data_ID: HA_180522_C6A (conventional HPS 2000K)



Figure S7: *Alloxysta* sp.

GENUS | ACCEPTED

Alloxysta Förster, 1869

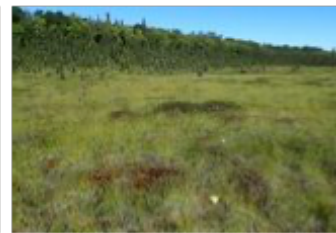
Published in: Förster, Arnold. 1869. Ueber die Gallwespen. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 19: 327-370.

source: A list of the terrestrial fungi, flora and fauna of Madeira and Selvagens archipelagos

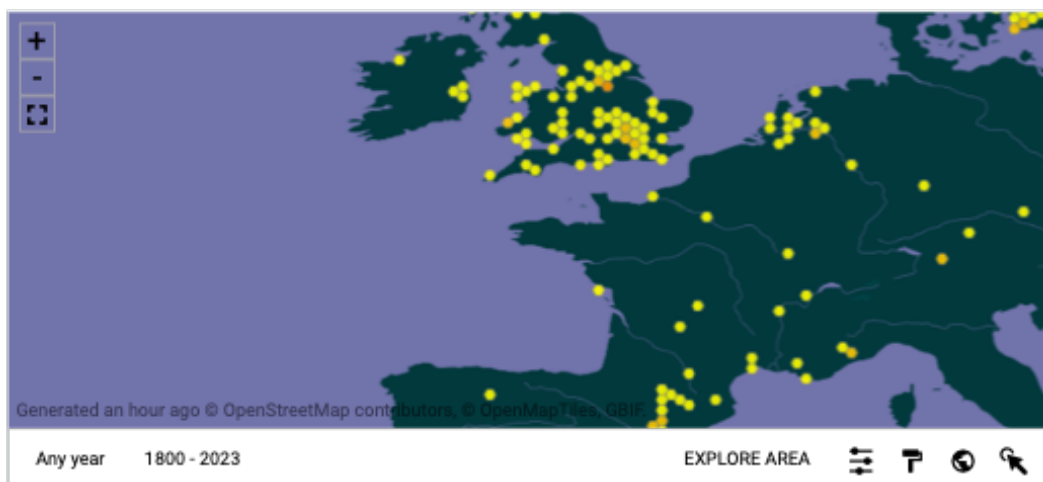
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OVERVIEW 5 TREATMENTS METRICS REFERENCE TAXON ↻

97 OCCURRENCES WITH IMAGES



1,299 GEOREFERENCED RECORDS



APPEARS IN 26 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Alloxysta* Förster, 1869

NCBI Taxonomy
As *Alloxysta*

Figure S8: Global Biodiversity Information Facility (GBIF) Webpage *Alloxysta*

Alloxysta victrix (Figitidae)

Sanger_ID: SQ_2022_057_050

Data_ID: HA_290622_C7A (conventional HPS 2000K)



Figure S9: *Alloxysta victrix*

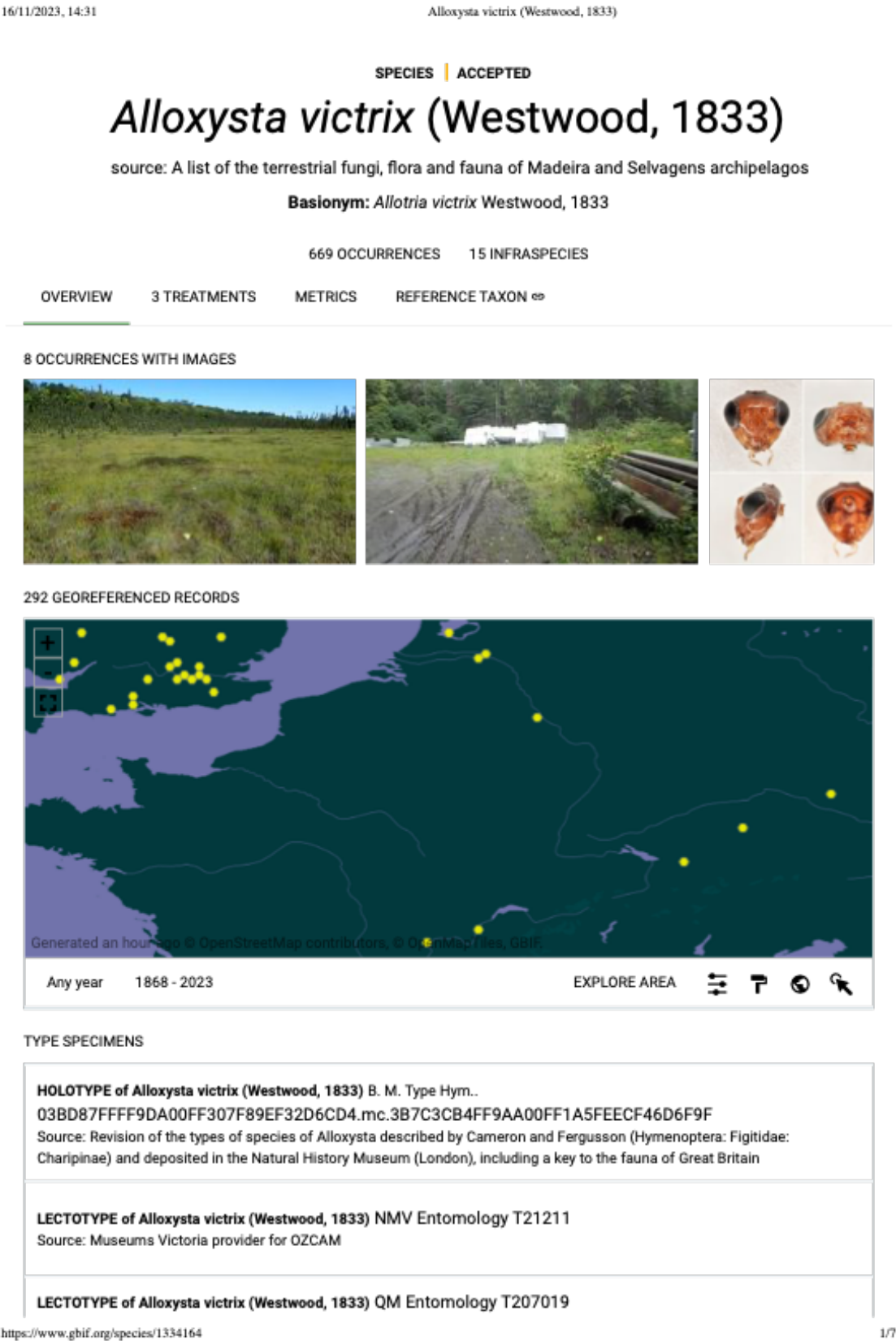


Figure S10: Global Biodiversity Information Facility (GBIF) Webpage *Alloxysta victrix*

Amblyaspis sp. (Platygastridae)

16/11/2023, 14:34

Amblyaspis Förster, 1856

GENUS | ACCEPTED

Amblyaspis Förster, 1856

Published in: Foerster, Arnold. 1856. Hymenopterologische Studien. II. Heft. Chalcididae und Proctotrupii. Ernst ter Meer, Aachen.: 1-152.

In: GBIF Backbone Taxonomy

1,122 OCCURRENCES 65 SPECIES

OVERVIEW 3 TREATMENTS METRICS

9 OCCURRENCES WITH IMAGES



241 GEOREFERENCED RECORDS



APPEARS IN 22 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Amblyaspis* Förster, 1856

Catalogue of Life Checklist
As *Amblyaspis* Förster, 1856

<https://www.gbif.org/species/1400355>

1/4

Figure S11: Global Biodiversity Information Facility (GBIF) Webpage *Amblyaspis*

Sanger_ID: SQ_2022_057_005

Data_ID: HA_050722_C7A (conventional HPS 2000K)



Figure S12: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_006

Data-ID: HA_260722_C8A (conventional HPS 2000K)



Figure S13: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_018

Data-ID: BR_160822_C21A (conventional HPS 2000K)



Figure S14: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_021

Data-ID: HA_310821_C5A (conventional HPS 2000K)



Figure S15: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_029

Data-ID: HA_240822_C5C (conventional HPS 2000K)



Figure S16: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_030

Data-ID: HA_240822_C7E (conventional HPS 2000K)



Figure S17: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_033

Data-ID: HA_120621_C1A (conventional HPS 2000K)



Figure S18: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_040

Data-ID: KA_310522_C17A (conventional LED 4000K)



Figure S19: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_041

Data-ID: HA_240822_C6D (conventional HPS 2000K)



Figure S20: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_042

Data-ID: HA_240822_C7F (conventional HPS 2000K)



Figure S21 *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_053

Data-ID: HA_240822_C7B (conventional HPS 2000K)



Figure S22: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_054

Data-ID: HA_240822_C7G (conventional HPS 2000K)



Figure S23: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_064

Data-ID: BR_300822_C28A (conventional HPS 2000K)



Figure S24 *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_065

Data-ID: HA_240822_C7C (conventional HPS 2000K)

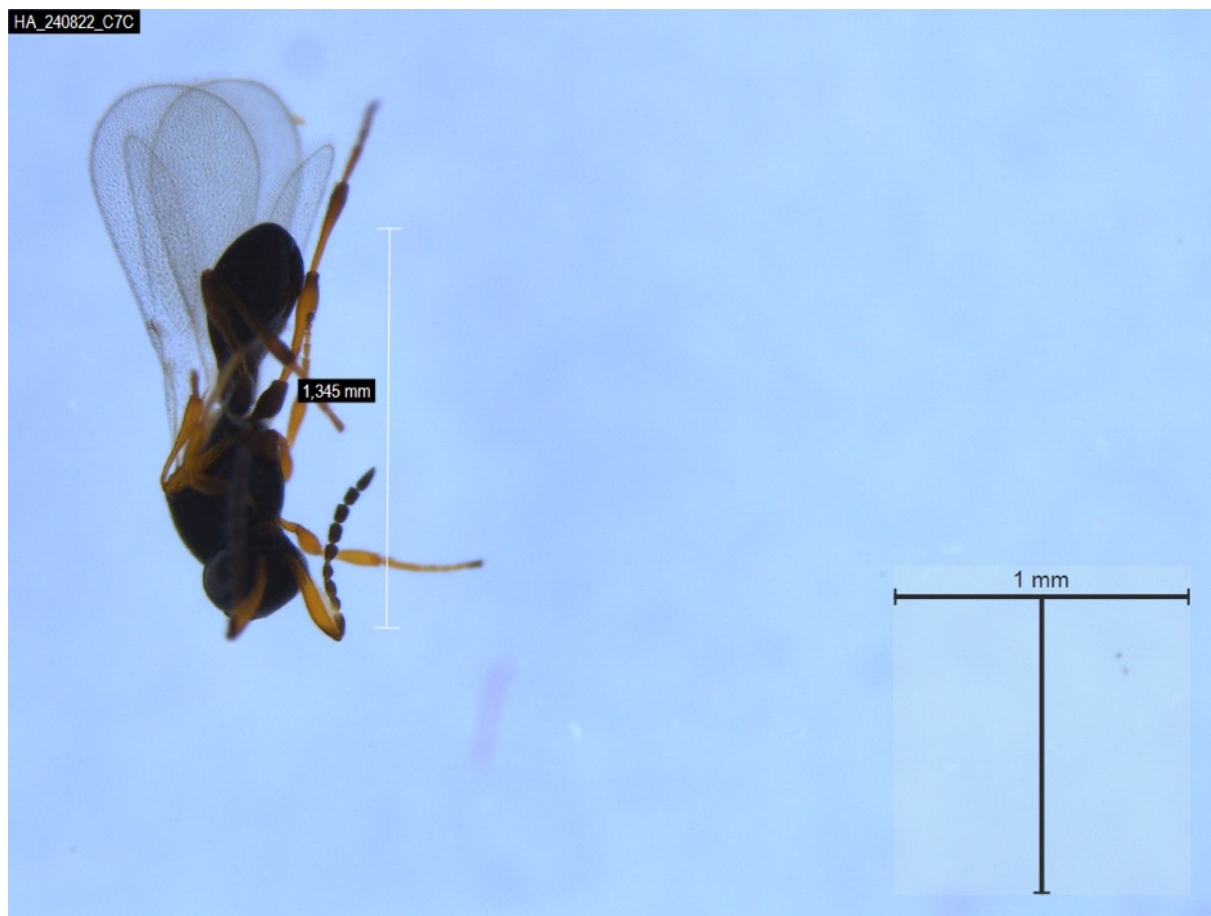


Figure S25: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_071

Data-ID: BR_020621_C22A (conventional HPS 2000K)

BR_020621_C22A_F11



Figure S26: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_077

Data-ID: HA_240822_C7D (conventional HPS 2000K)



Figure S27: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_088

Data-ID: HA_050722_C5A (conventional HPS 2000K)



Figure S28: *Amblyaspis* sp.

Sanger-ID: SQ_2022_057_089

Data-ID: HA_240822_C5D (conventional HPS 2000K)



Figure S29 *Amblyaspis* sp.

Amblyteles armatorius (Ichneumonidae)

16/11/2023, 14:32

Amblyteles armatorius (Forster, 1771)

SPECIES | ACCEPTED

Amblyteles armatorius (Forster, 1771)

Published in: Forster, J.R. Novae species insectorum. Centuria I. London. 100 pp. (Ichneumonidae on pp. 81-85). (1771).

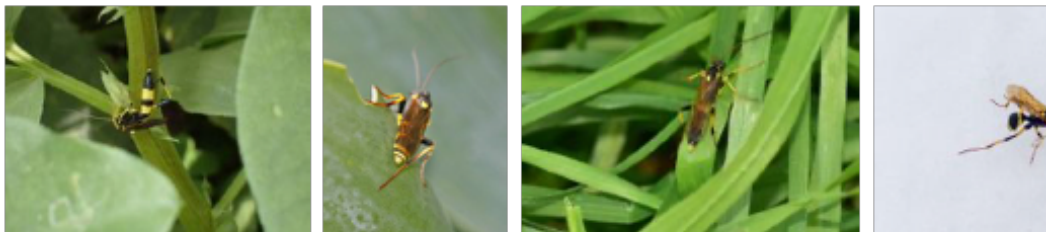
source: Taxapad Ichneumonoidea

Basionym: *Ichneumon armatorius* Forster, 1771

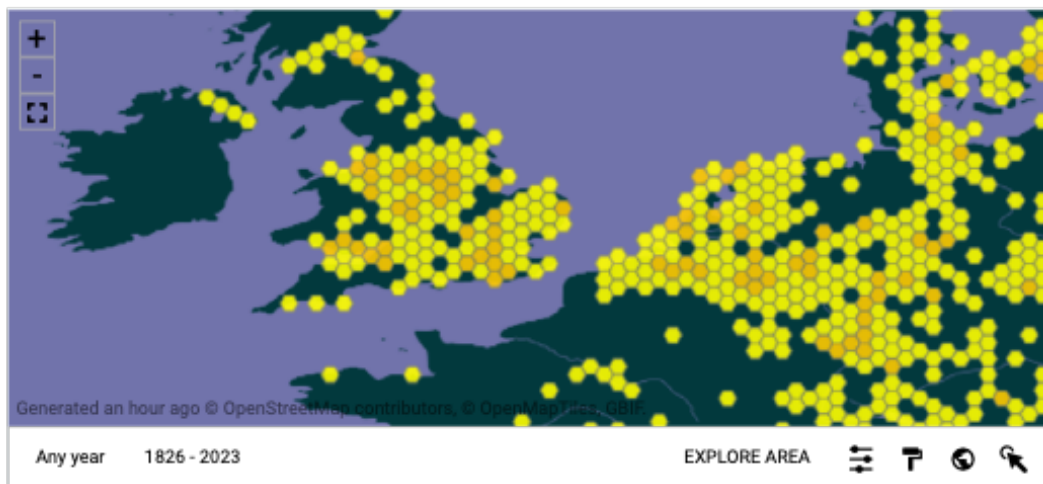
2,713 OCCURRENCES 1 INFRASPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON 

1,393 OCCURRENCES WITH IMAGES



2,422 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of *Amblyteles armatorius* (Forster, 1771) NHMD EN NHMD48340
Source: NHMD Entomology Collection

PARALECTOTYPE of *Amblyteles armatorius* (Forster, 1771) NHMD EN NHMD48341
Source: NHMD Entomology Collection

<https://www.gbif.org/species/1286739>

1/5

Figure S30: Global Biodiversity Information Facility (GBIF) Webpage *Amblyteles armatorius*

Sanger_ID: SQ_2022_057_100

Data_ID: KA_171022_C15A (conventional LED 4000K)



Figure S31 *Amblyteles armatorius*

Apanteles sodalis (Braconidae)

Sanger_ID: SQ_2022_057_023

Data_ID: BR_020921_C22A (conventional HPS 2000K)



Figure S32: *Apanteles sodalis*

16/11/2023, 14:39

Apanteles sodalis (Haliday, 1834)

SPECIES | ACCEPTED

Apanteles sodalis (Haliday, 1834)

Published in: Haliday, A.H. Essay on parasitic Hymenoptera. Entomological Magazine. 2(iii):225-259. (1834).
source: Taxapad Ichneumonoidea

Braconid wasp In English Basionym: Microgaster sodalis Haliday, 1834

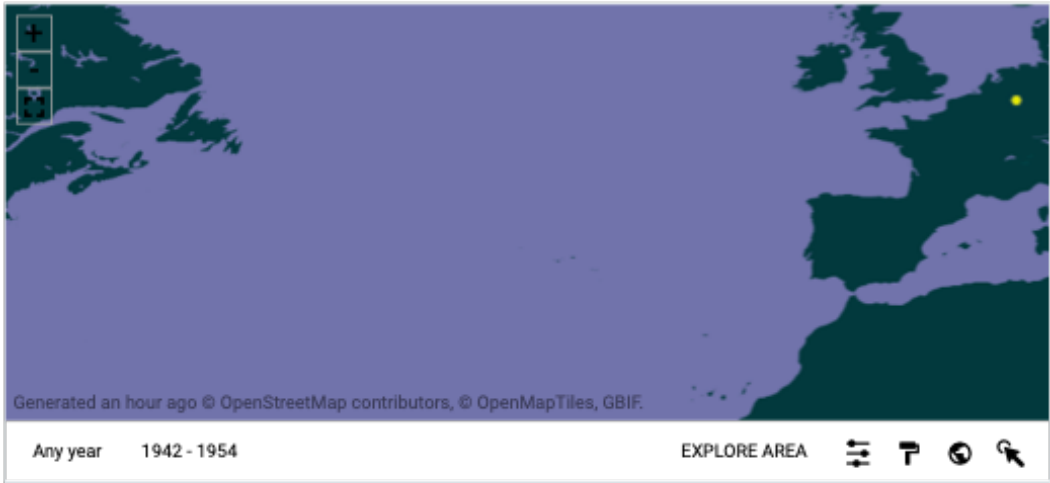
59 OCCURRENCES 4 INFRASPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON ↗

5 OCCURRENCES WITH IMAGES



6 GEOREFERENCED RECORDS



RECORDED AS INTRODUCED IN 1 COUNTRY OR ISLAND

Recorded as introduced in	According to	Evidence of impact	Occurrences in GBIF
United States of America	Global Register of Introduced and Invasive Species - United States (Contiguous) (ver.2.0, 2022)	No	Unknown

TYPE SPECIMENS

<https://www.gbif.org/species/1267656>

1/5

Figure S33: Global Biodiversity Information Facility (GBIF) Webpage *Apanteles sodalis*

Aphidius rhopalosiphi (Braconidae)

Sanger_ID: SQ_2022_057_048

Data_ID: BR_280622_C26A (conventional HPS 2000K)

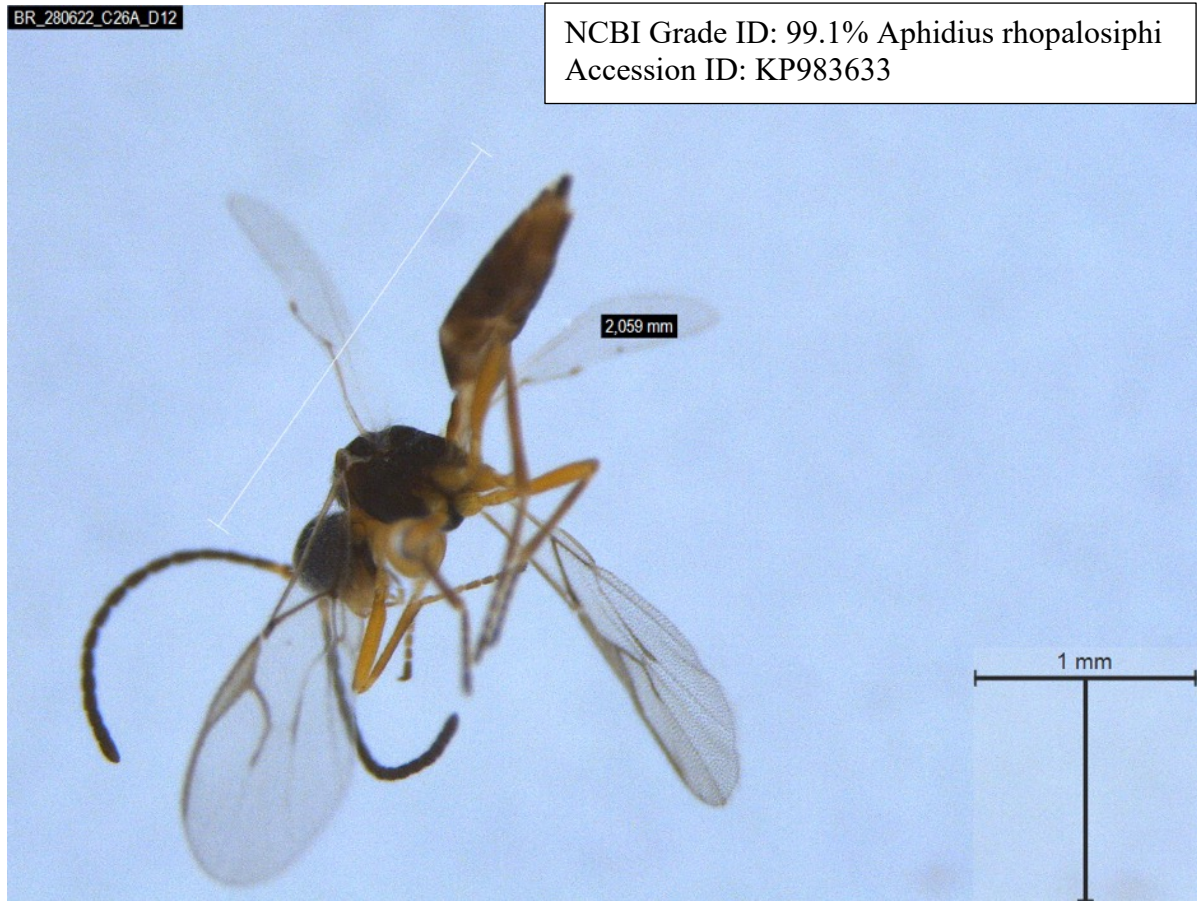


Figure S34: *Aphidius rhopalosiphi*



Aprostocetus sp. (Eulophidae)

Sanger_ID: SQ_2022_057_085

Data_ID: BR_160822_C27B (conventional HPS 2000K)

No photo available

BOLD Grade ID: 96.99% <i>Aprostocetus</i> BIN: BOLD:ADS2460
--

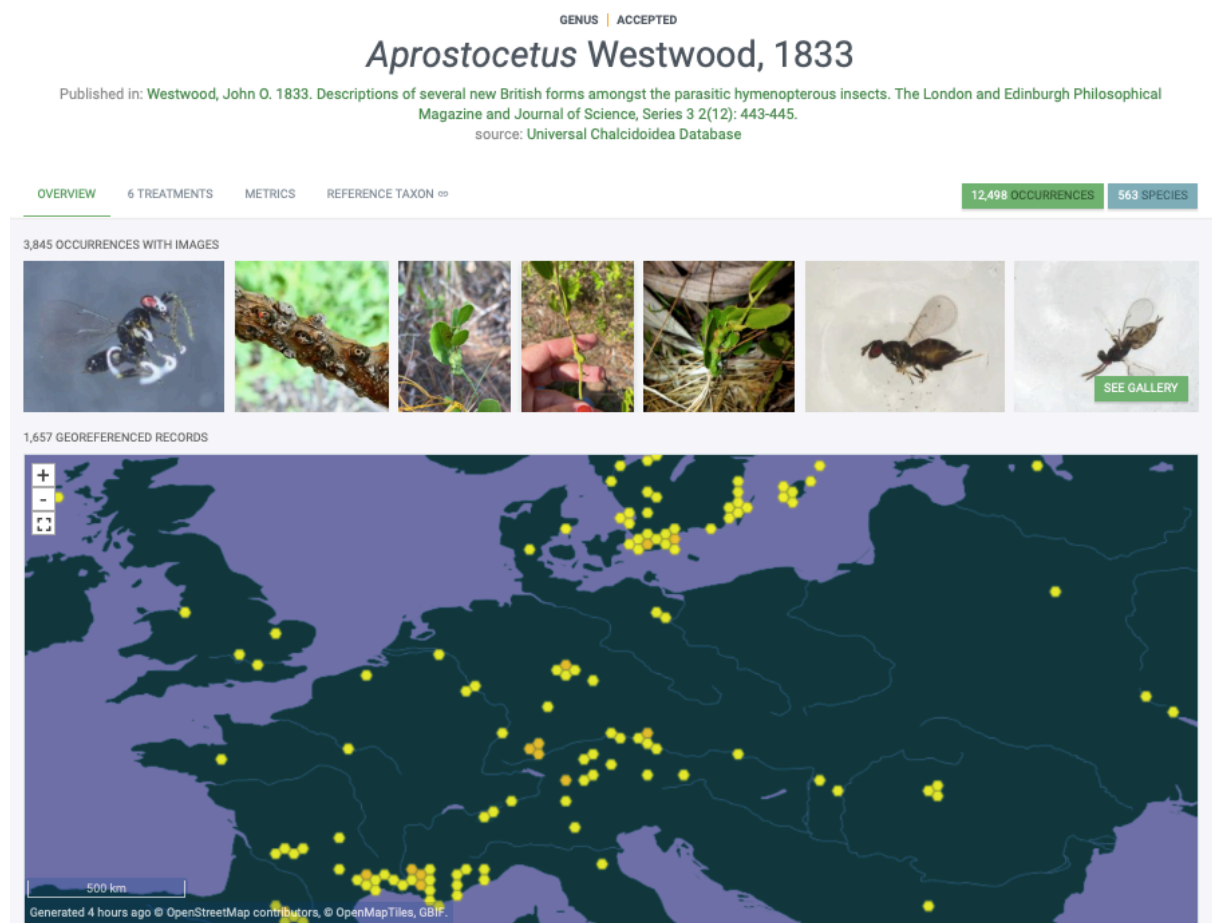


Figure S36: Global Biodiversity Information Facility (GBIF) Webpage *Aprostocetus* 18.12.23

Aptesis assimilis (Ichneumonidae)

Sanger_ID: SQ_2022_057_081

Data_ID: BR_020921_C27A (conventional HPS 2000K)



Figure S37 *Aptesis Assimilis*

SPECIES | ACCEPTED

Aptesis assimilis (Gravenhorst, 1829)

Published in: Gravenhorst, J.L.C. Ichneumonologia Europaea. Pars II. Vratislaviae. 989 pp. (1829).

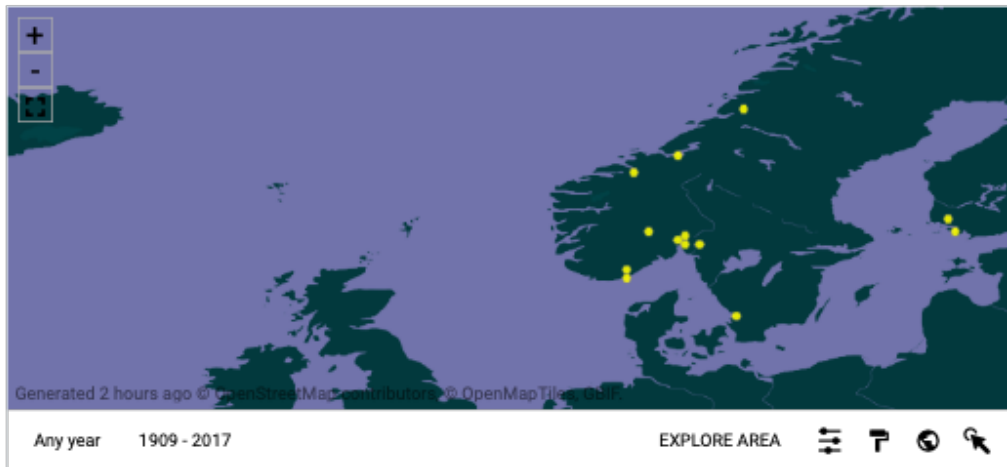
source: Taxapad Ichneumonoidea

Basionym: *Phygadeuon assimilis* Gravenhorst, 1829

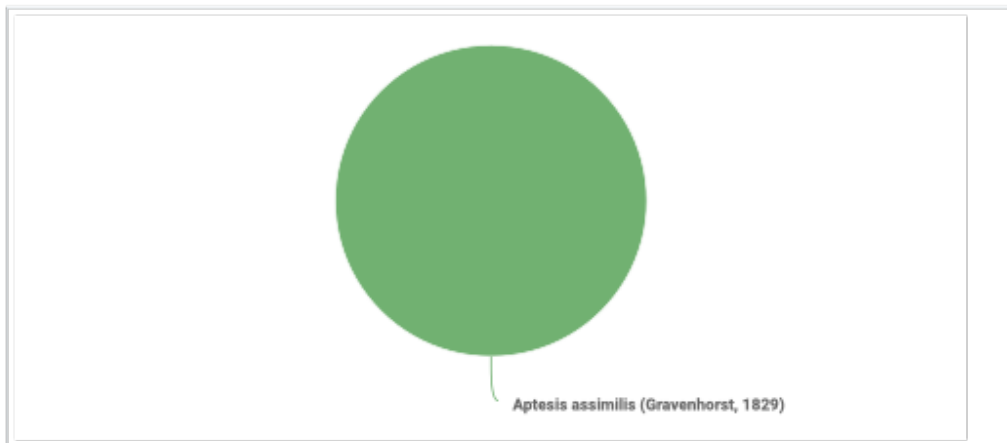
49 OCCURRENCES 1 INFRA-SPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON 

27 GEOREFERENCED RECORDS



NAME USAGES APPLIED TO OCCURRENCES IN GBIF



DESCRIPTION

DESCRIPTION

<https://www.gbif.org/species/1299696>

1/3

Figure S38: Global Biodiversity Information Facility (GBIF) Webpage *Aptesis assimilis*

Asobara rufescens (Braconidae)

Sanger_ID: SQ_2022_057_047

Data_ID: BR_020921_C24A (conventional HPS 2000K)



Figure S39: *Asobara rufescens*

SPECIES | ACCEPTED

Asobara rufescens (Forster, 1862)

Published in: Forster, A. Synopsis der Familien und Gattungen der Braconiden. Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westfalens. 19:225-288. (1862).

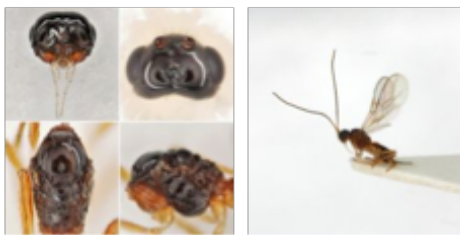
source: Taxapad Ichneumonoidea

Basionym: *Spanista rufescens* Foerster, 1862

158 OCCURRENCES 2 INFRASPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON ^{CS}

2 OCCURRENCES WITH IMAGES



81 GEOREFERENCED RECORDS



NAME USAGES APPLIED TO OCCURRENCES IN GBIF

Figure S40: Global Biodiversity Information Facility (GBIF) Webpage *Asobara rufescens*

***Barycnemis angustipennis* (Ichneumonidae)**

Sanger_ID: SQ_2022_057_104

Data_ID: HA_310822_C8A (conventional HPS 2000K)



Figure S41: *Barycnemis angustipennis*

SPECIES | ACCEPTED

Barycnemis angustipennis (Holmgren, 1860)

Published in: Holmgren, A.E. Forsok till uppställning och beskrifning af de i Sverige funna Ophionider. (Monographia Ophionidum Sueciae). Kongliga Svenska Vetenskapsakademiens Handlingar. 2(8):1-158. (1860).

source: Taxapad Ichneumonoidea

Basionym: Porizon angustipennis Holmgren, 1860

59 OCCURRENCES 1 INFRASPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON 

15 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of *Barycnemis angustipennis* (Holmgren, 1860) Carl Henrik Boheman Sweden. NRM NHRS NHRS-HEVA000012175
Source: Entomological Collections (NHRS), Swedish Museum of Natural History (NRM)

NAME USAGES APPLIED TO OCCURRENCES IN GBIF

Figure S42: Global Biodiversity Information Facility (GBIF) Webpage *Barycnemis angustipennis*

Braconidae sp. (Braconidae)

Sanger_ID: SQ_2022_057_020

Data_ID: HA_260722_C5A (conventional HPS 2000K)



Figure S43: *Braconidae sp.*

Blacus ruficornis (Braconidae)

16/11/2023, 15:37

Blacus ruficornis (Nees, 1811)

SPECIES | ACCEPTED

Blacus ruficornis (Nees, 1811)

Published in: Nees von Esenbeck, C.G. Ichneumonides Adsciti, in Genera et Familias Divisi. Magazin Gesellschaft Naturforschender Freunde zu Berlin. 5(1811). 37 pp. (1811).
source: Taxapad Ichneumonoidea

Basionym: *Bracon ruficornis* Nees, 1811

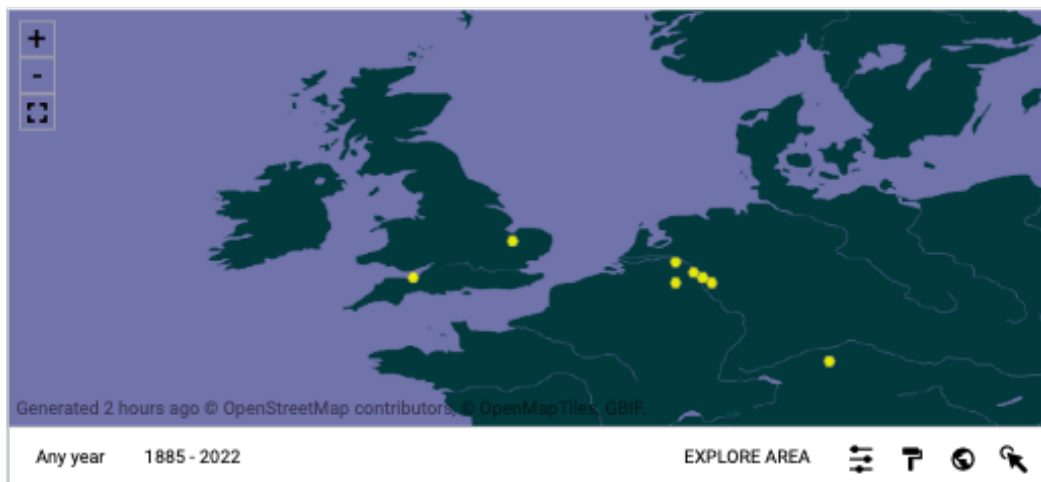
77 OCCURRENCES 3 INFRASPECIES

OVERVIEW METRICS REFERENCE TAXON 

8 OCCURRENCES WITH IMAGES



44 GEOREFERENCED RECORDS



TYPE SPECIMENS

HOLOTYPE of *Blacus dentatus* Hellén, 1958 Hellén, Wolter Finland. MZH <http://id.luomus.fi/GL.3314>
Source: Hymenoptera Eastern Fennoscandia (Luomus)

TYPE of *Blacus ruficornis* (Nees, 1811) RBINS-Scientific Heritage urn:catalog:RBINS:TVC EVCT.1183
Source: RBINS DaRWIN

<https://www.gbif.org/species/1252745>

1/4

Figure S44: Global Biodiversity Information Facility (GBIF) Webpage *Blacus ruficornis*

Sanger_ID: SQ_2022_057_008

Data_ID: HA_290622_C5A (conventional HPS 2000K)



Figure S45: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_012

Data_ID: HA_290622_C8A (conventional HPS 2000K)



Figure S46: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_044

Data_ID: HA_260722_C7C (conventional HPS 2000K)

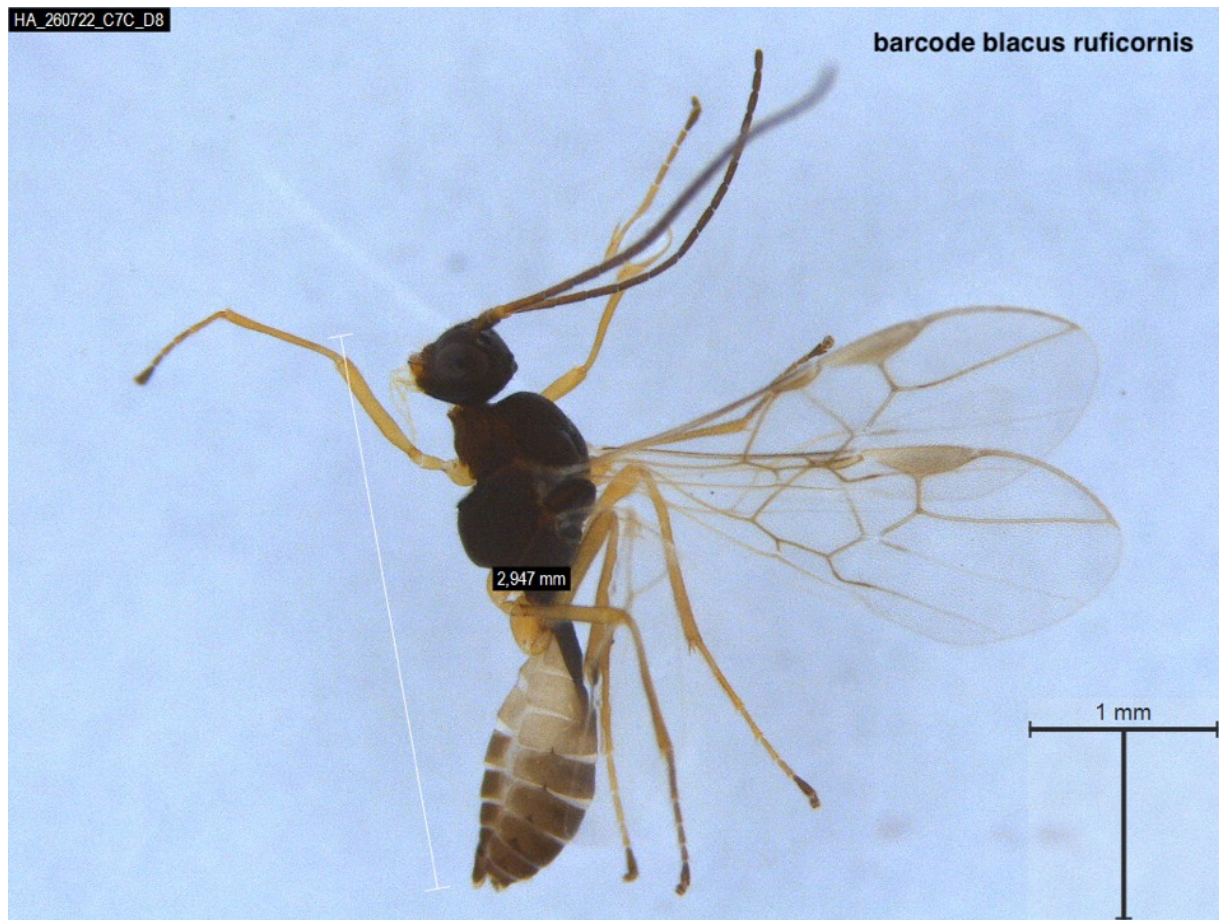


Figure S47: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_072
Data_ID: HA_240822_C7J (conventional HPS 2000K)

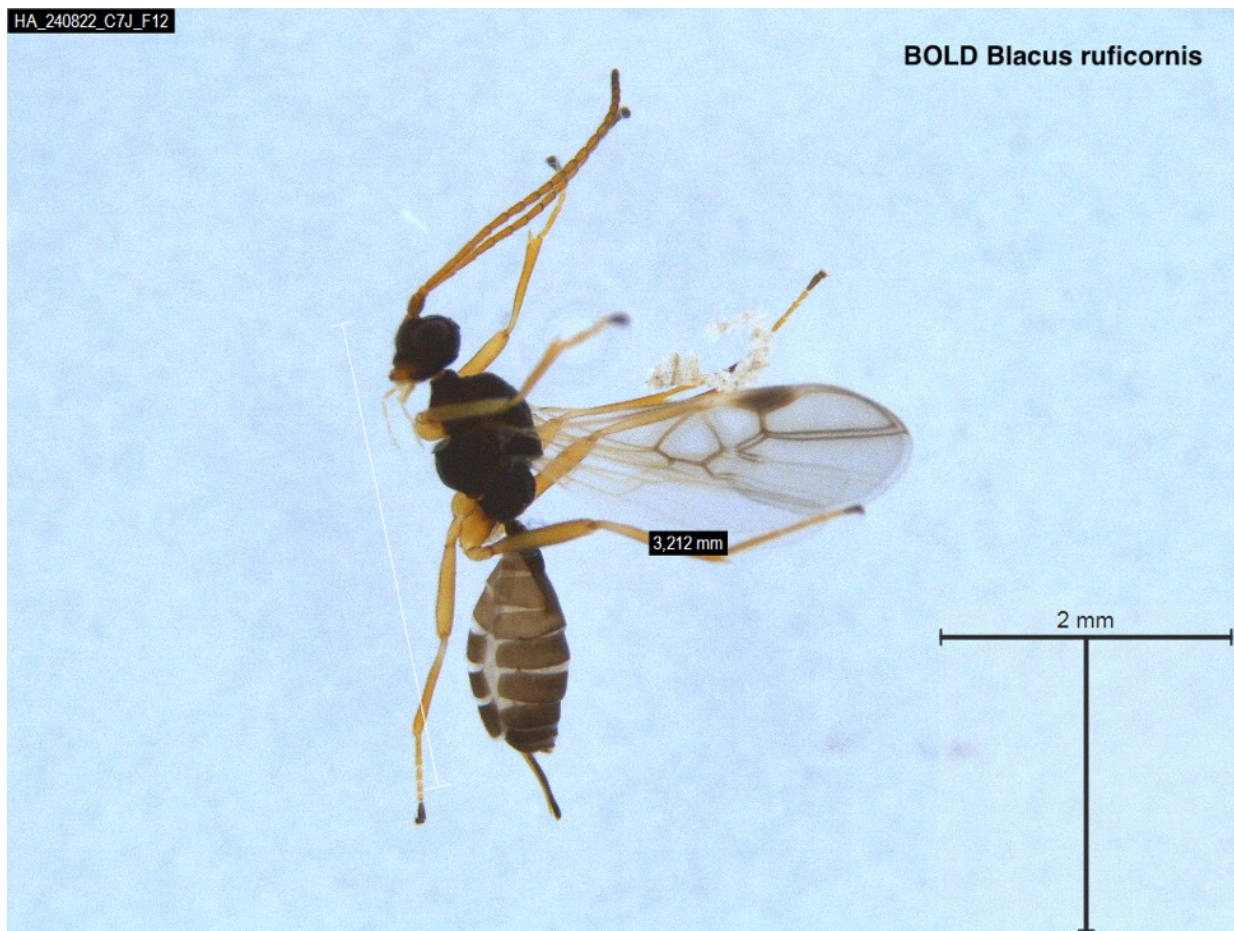


Figure S48: Blacus ruficornis

Sanger_ID: SQ_2022_057_032

Data_ID: HA_210722_C6C (conventional HPS 2000K)

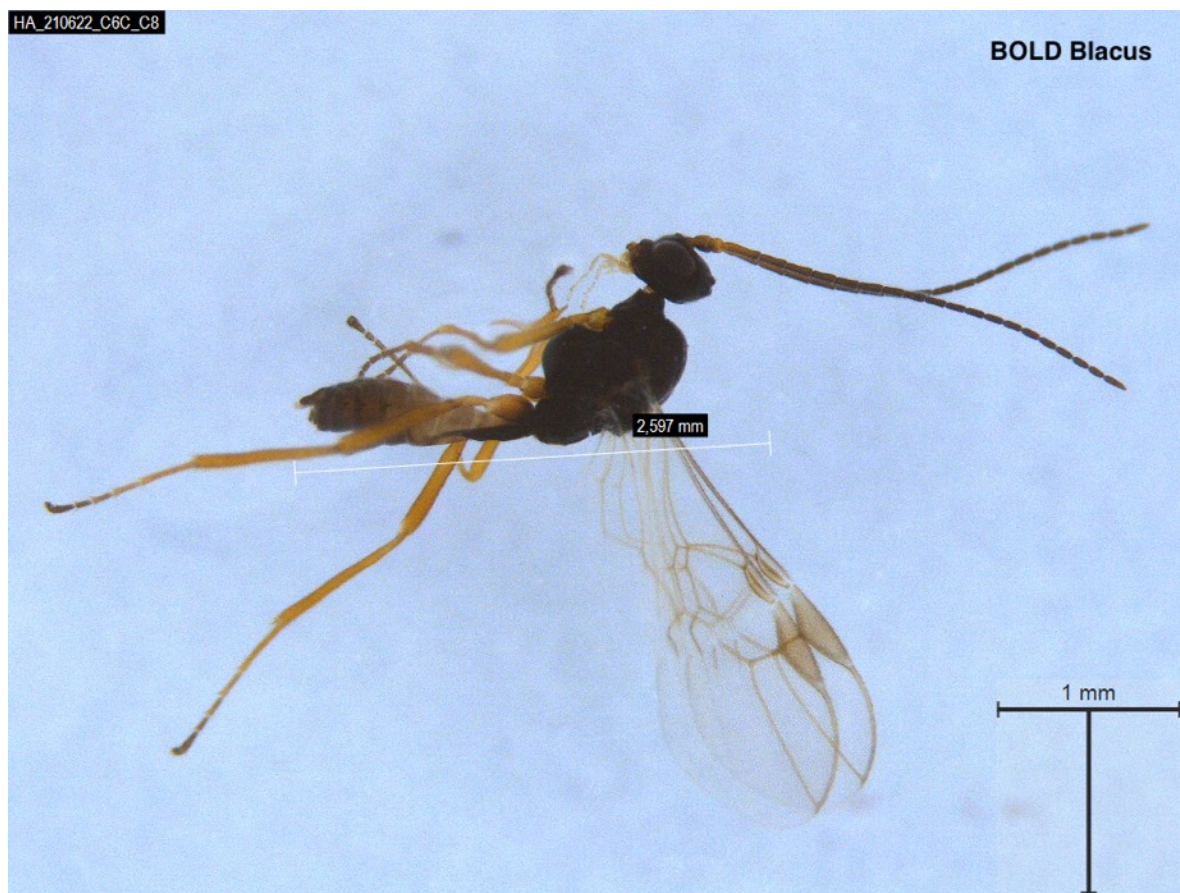


Figure S49: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_043

Data_ID: HA_210722_C6A (conventional HPS 2000K)



Figure S50: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_067

Data_ID: HA_260722_C7B (conventional HPS 2000K)



Figure S51: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_079
Data_ID: HA_260722_C8B (conventional HPS 2000K)



Figure S52: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_091

Data_ID: HA_210722_C6B (conventional HPS 2000K)

HA_210722_C6B_H7



Figure S53: *Blacus ruficornis*

Sanger_ID: SQ_2022_057_098
Data_ID: HA_290622_C6B (conventional HPS 2000K)



Figure S54: *Blacus ruficornis*

Blastothrix sp. (Encyrtidae)

Sanger_ID: SQ_2022_057_013

Data_ID: KA_190722_C16A (conventional LED 4000K)



Figure S55: Blastothrix sp.

GENUS | ACCEPTED

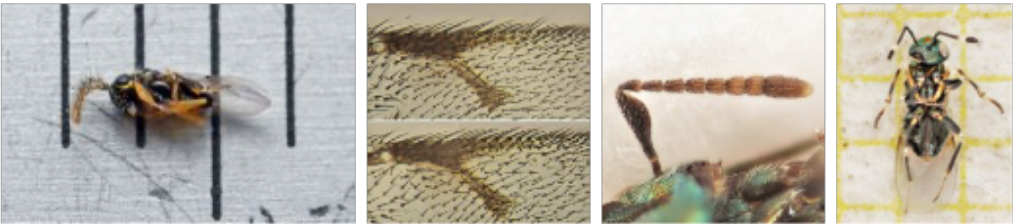
Blastothrix Mayr, 1876

Published in: Verh. Zool.-bot. Ges. Wien, 25, Abh. source: Universal Chalcidoidea Database

324 OCCURRENCES 29 SPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON

6 OCCURRENCES WITH IMAGES



37 GEOREFERENCED RECORDS



APPEARS IN 21 CHECKLIST DATASETS:

GBIF Backbone Taxonomy As <i>Blastothrix</i> Mayr, 1876
Catalogue of Life Checklist As <i>Blastothrix</i>
NCBI Taxonomy As <i>Blastothrix</i>

Figure S56: Global Biodiversity Information Facility (GBIF) Webpage *Blastothrix*

Ceraphronidae sp1. (Ceraphronidae)

Sanger_ID: SQ_2022_057_037

Data_ID: KA_290822_C12A (tailored LED 4000K)

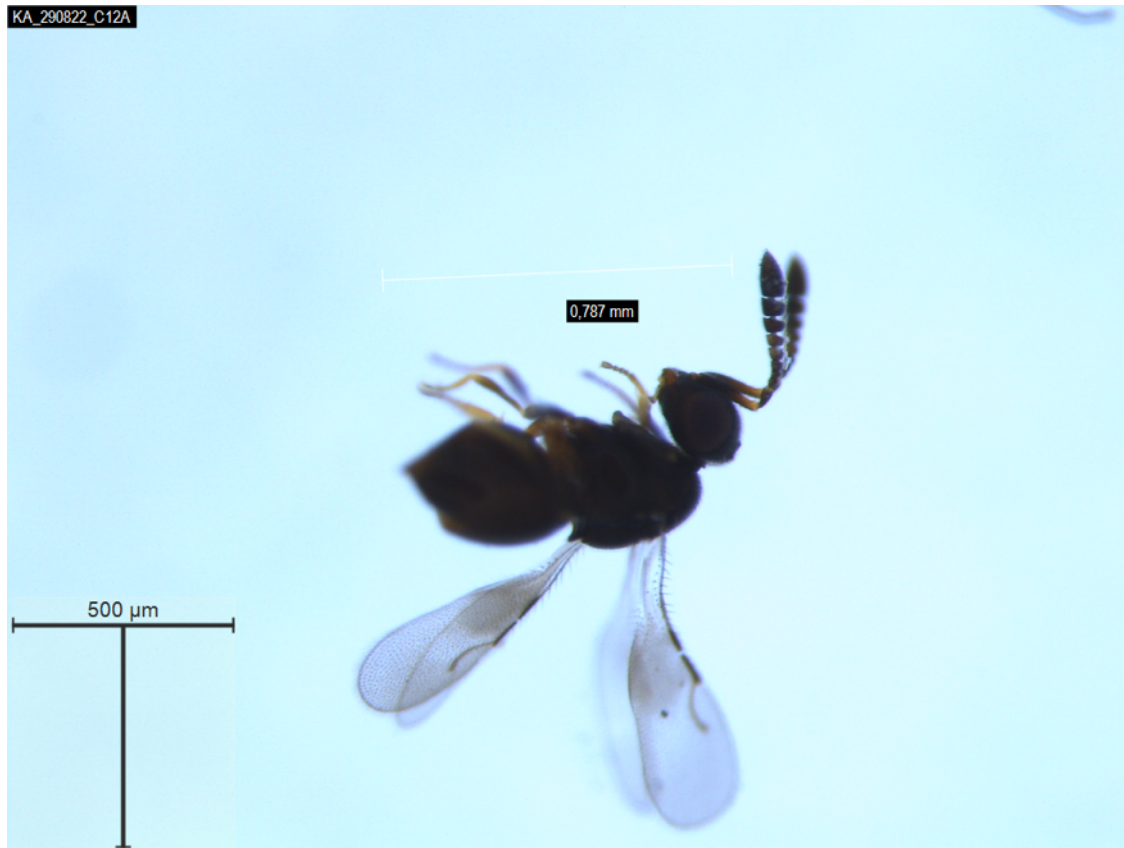


Figure S57 *Ceraphronidae sp1.*

Ceraphronidae sp2. (*Ceraphronidae*)

Sanger_ID: SQ_2022_057_058

Data_ID: KA_270921_C9B (conventional LED 4000K)



Figure S58: *Ceraphronidae* sp2.

Ceraphronidae sp3. (Ceraphronidae)

Sanger_ID: SQ_2022_057_093

Data_ID: BR_020921_C25A (conventional HPS 2000K)



Figure S59: Ceraphronidae sp3.

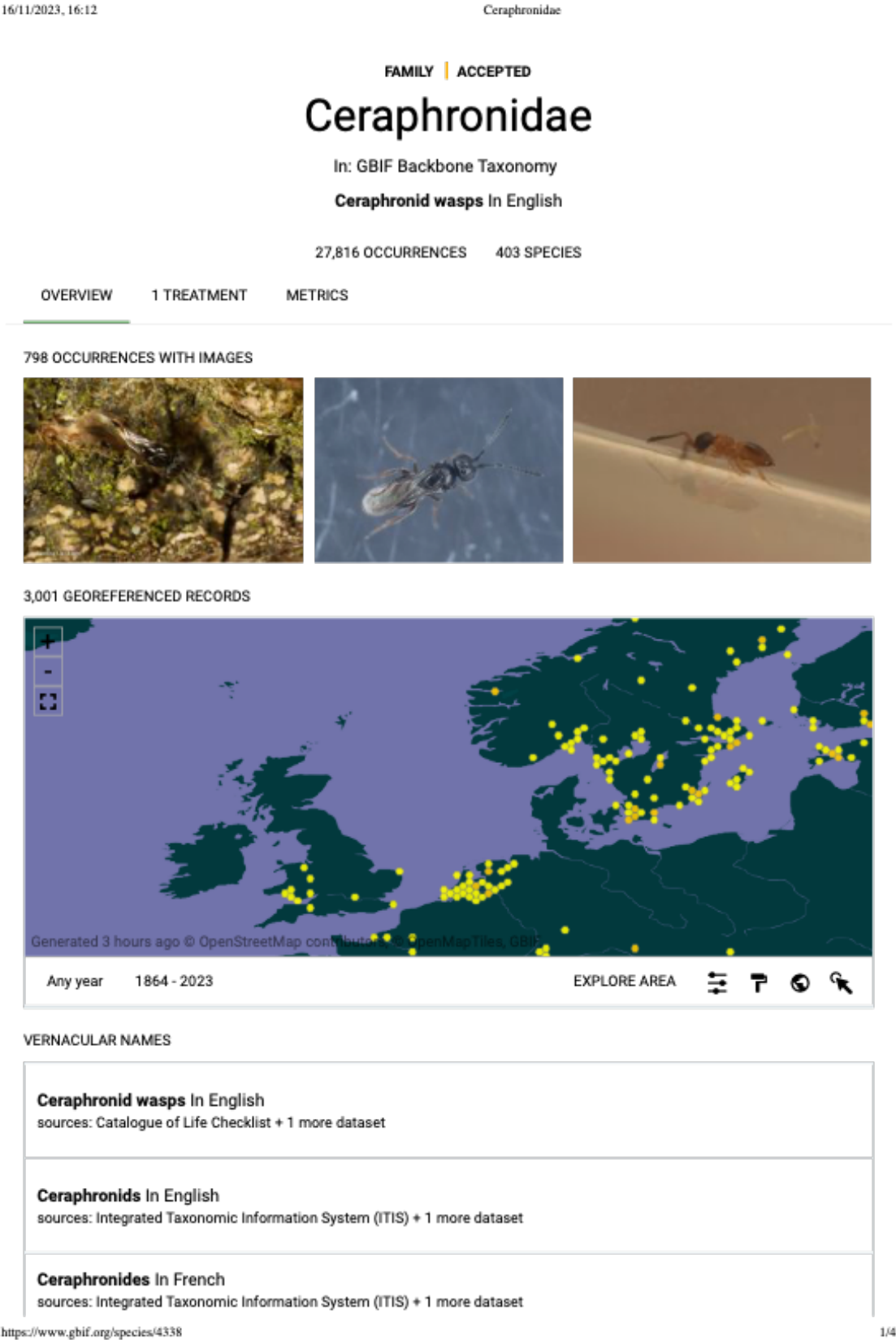


Figure S60: Global Biodiversity Information Facility (GBIF) Webpage *Ceraphronidae*

Copidosoma sp. (Encyrtidae)

Sanger_ID: SQ_2022_057_001

Data_ID: HA_290622_C6A (conventional HPS 2000K)

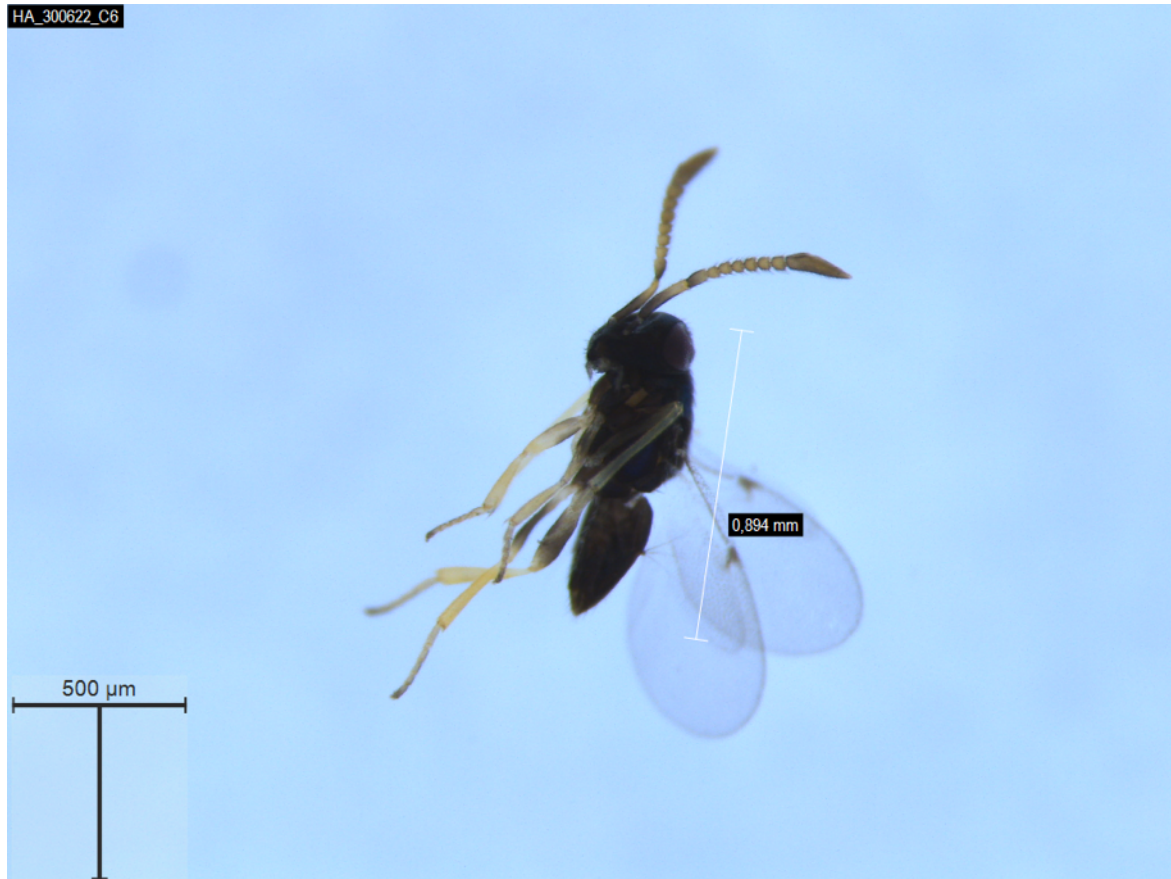


Figure S61: *Copidosoma* sp.

GENUS | ACCEPTED

Copidosoma Ratzeburg, 1844

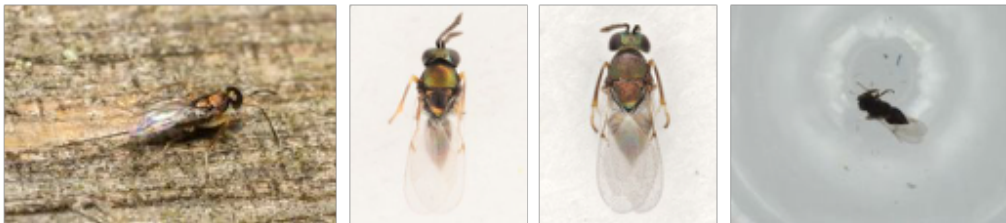
Published in: Ratzeburg, Julius T. C. 1844. Die Ichneumoniden der Forstinsecten in forstlicher und entomologischer Beziehung, als anhang zur Abbildung und Beschreibung der Forstinsecten. Nicolaischen Buchhandlung, Berlin. Vol. 1: 1-224.

source: Universal Chalcidoidea Database

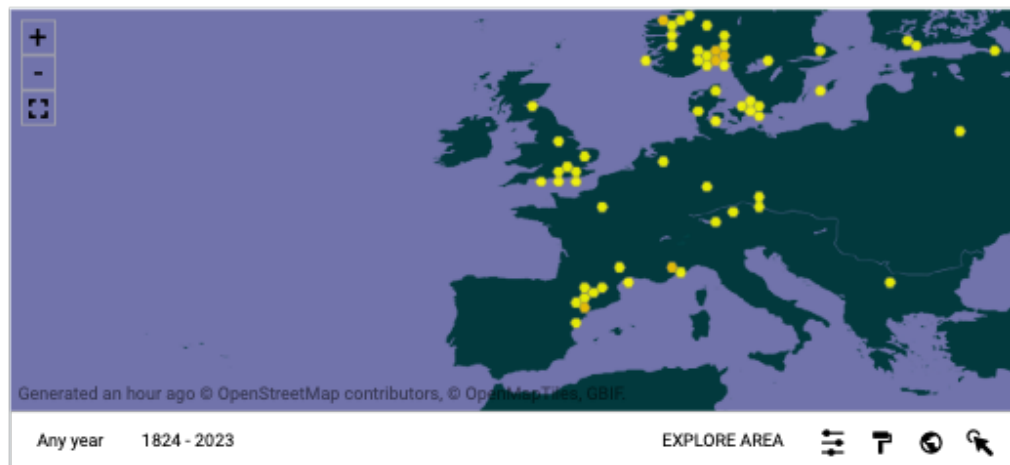
5,369 OCCURRENCES 175 SPECIES

OVERVIEW 3 TREATMENTS METRICS REFERENCE TAXON 

156 OCCURRENCES WITH IMAGES



810 GEOREFERENCED RECORDS



APPEARS IN 33 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Copidosoma* Ratzeburg, 1844

Catalogue of Life Checklist
As *Copidosoma*

<https://www.gbif.org/species/1374118>

1/4

Figure S62: Global Biodiversity Information Facility (GBIF) Webpage *Copidosoma*

Cratichneumon sp. (Ichneumonidae)

16/11/2023, 16:35

Cratichneumon Thomson, 1893

GENUS | ACCEPTED

Cratichneumon Thomson, 1893

Published in: Opusc. Ent., fasc. 18, source: Taxapad Ichneumonoidea

7,778 OCCURRENCES 132 SPECIES

OVERVIEW METRICS REFERENCE TAXON

1,354 OCCURRENCES WITH IMAGES



2,834 GEOREFERENCED RECORDS



APPEARS IN 25 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Cratichneumon* Thomson, 1893

Catalogue of Life Checklist
As *Cratichneumon*

NCBI Taxonomy
As *Cratichneumon*

<https://www.gbif.org/species/1295415>

1/3

Figure S63 Global Biodiversity Information Facility (GBIF) Webpage *Cratichneumon*

Sanger_ID: SQ_2022_057_105

Data_ID: BR_300822_C27A (conventional HPS 2000K)



Figure S64: *Cratichneumon* sp.

Cratomus megacephalus (Pteromalidae)

16/11/2023, 16:37

Cratomus megacephalus (Fabricius, 1793)

SPECIES | ACCEPTED

Cratomus megacephalus (Fabricius, 1793)

Published in: Curtis, J. A guide to an arrangement of British Insects; being a catalogue of all the named species hitherto discovered. PAGES: 256pp. (1829).

source: Universal Chalcidoidea Database

Basionym: *Cynips megacephala* Fabricius, 1793

83 OCCURRENCES 1 INFRASPECIES

OVERVIEW METRICS REFERENCE TAXON

25 OCCURRENCES WITH IMAGES



48 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of *Diplolepis megacephala* (Fabricius, 1793) NHMD EN NHMD48561
Source: NHMD Entomology Collection

PARALECTOTYPE of *Diplolepis megacephala* (Fabricius, 1793) NHMD EN NHMD48562
Source: NHMD Entomology Collection

<https://www.gbif.org/species/1392203>

1/4

Figure S65: Global Biodiversity Information Facility (GBIF) Webpage *Cratomus megacephalus*

Sanger_ID: SQ_2022_057_010

Data_ID: BR_020621_C24A (conventional HPS 2000K)



Figure S66: *Cratomus megacephalus*

Cyclogastrella sp. (Pteromalidae)

16/11/2023, 16:48

Cyclogastrella Bukowskii, 1938

GENUS | ACCEPTED

Cyclogastrella Bukowskii, 1938

Published in: Rev. Ent. U. R. S. S., 27

source: Universal Chalcidoidea Database

158 OCCURRENCES

8 SPECIES

OVERVIEW

METRICS

REFERENCE TAXON

1 OCCURRENCE WITH IMAGES



77 GEOREFERENCED RECORDS



APPEARS IN 19 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Cyclogastrella* Bukowskii, 1938

Catalogue of Life Checklist
As *Cyclogastrella*

NCBI Taxonomy
As *Cyclogastrella*

<https://www.gbif.org/species/1396151>

1/3

Figure S67: Global Biodiversity Information Facility (GBIF) Webpage *Cyclogastrella*

Sanger_ID: SQ_2022_057_073

Data_ID: BR_160822_C27A (conventional HPS 2000K)



Figure S68: *Cyclogastrella sp. (cf simplex)*

Diadegma fenestrale (Ichneumonidae)

16/11/2023, 16:56

Diadegma fenestrale (Holmgren, 1860)

SPECIES | ACCEPTED

Diadegma fenestrale (Holmgren, 1860)

Published in: Holmgren, A.E. Forsok till uppställning och beskrifning af de i Sverige funna Ophionider. (Monographia Ophionidum Sueciae). Kongliga Svenska Vetenskapsakademiens Handlingar. 2(8):1-158. (1860).

source: Taxapad Ichneumonoidea

Basionym: *Limneria fenestrale* Holmgren, 1860

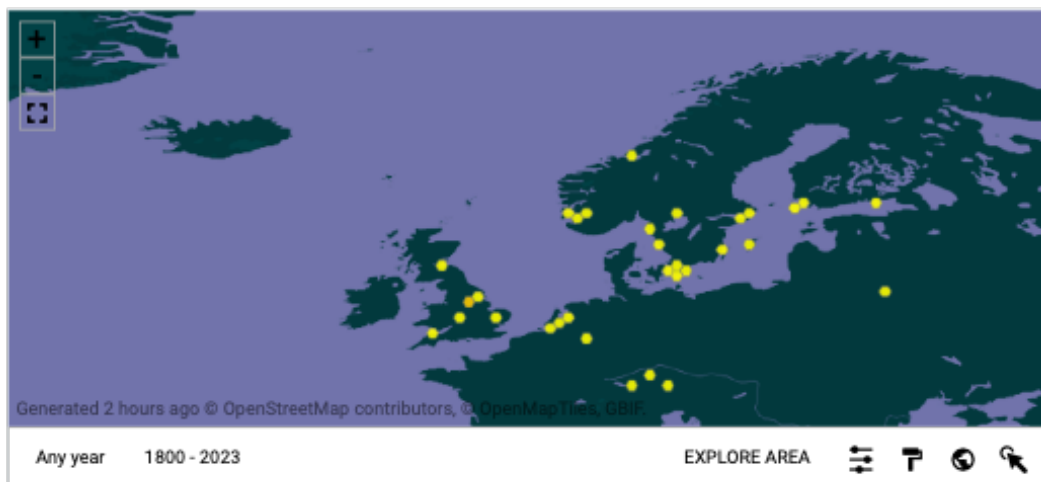
201 OCCURRENCES 2 INFRASPECIES

OVERVIEW METRICS REFERENCE TAXON 

2 OCCURRENCES WITH IMAGES



96 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of *Diadegma fenestrale* (Holmgren, 1860) Carl Henrik Boheman Sweden. NRM NHRS NHRS-HEVA000000014

Source: Entomological Collections (NHRS), Swedish Museum of Natural History (NRM)

TYPE of *Diadegma fenestrale* (Holmgren, 1860) Carl Henrik Boheman Sweden. NRM NHRS NHRS-HEVA000000015

Source: Entomological Collections (NHRS), Swedish Museum of Natural History (NRM)

<https://www.gbif.org/species/1291084>

1/4

Figure S69: Global Biodiversity Information Facility (GBIF) Webpage *Diadegma fenestrale*

Sanger_ID: SQ_2022_057_070

Data_ID: KA_270921_C15A (conventional LED 4000K)



Figure S70: *Diadegma fenestrata*

Diapriidae sp. (Diapriidae)

Sanger_ID: SQ_2022_057_066

Data_ID: HA_240822_C7H (conventional HPS 2000K)



Figure S71: *Diapriidae sp1.*

Sanger-ID: SQ_2022_057_090

Data_ID: KA_260722_C2A (conventional LED 4000K)



Figure S72: Diapriidae sp1.

Sanger_ID: SQ_2022_057_031
Data_ID: HA_240822_C7I (Conventional HPS 2000K)

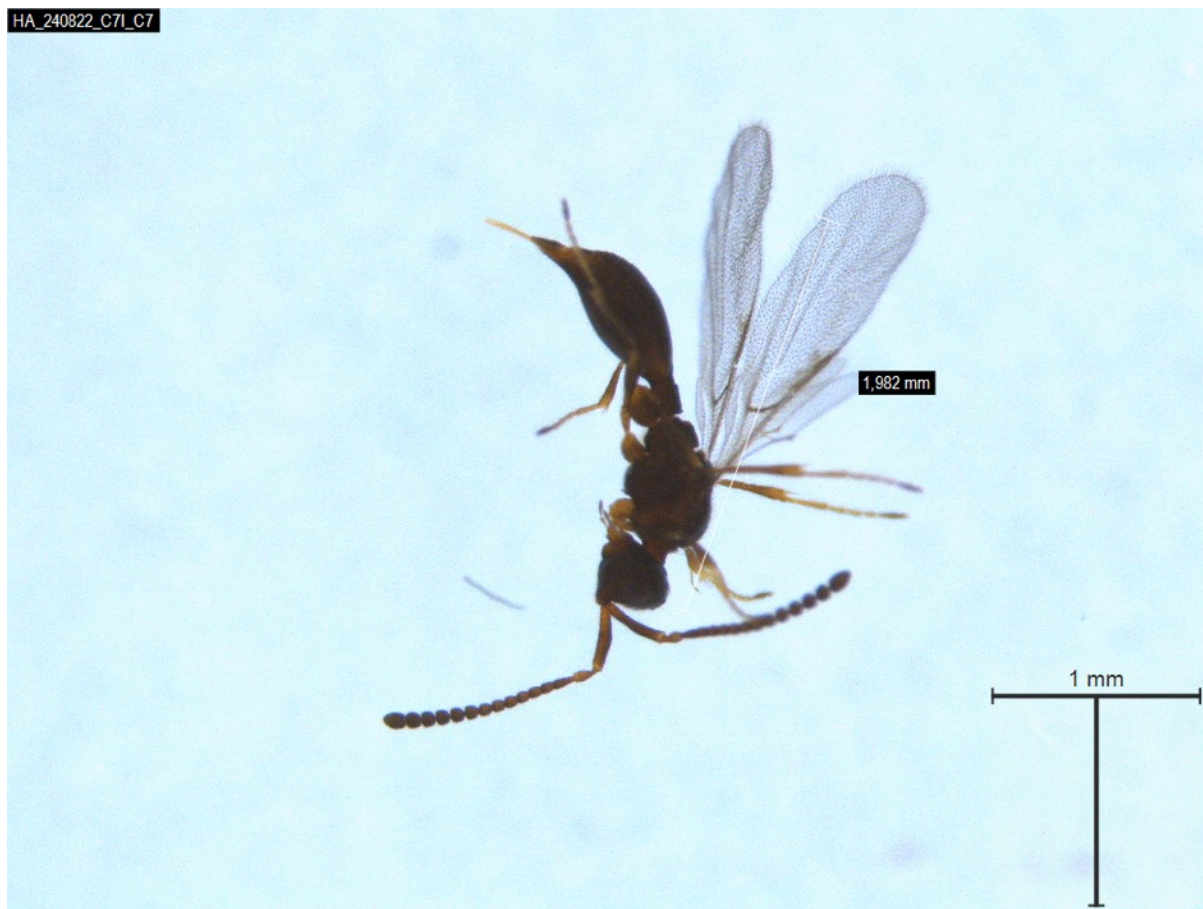


Figure S73: *Diapriidae* sp2.

Sanger_ID: SQ_2022_057_019

Data_ID: BR_160822_C21B (conventional HPS 2000K)

BR_160822_C21B_B7



Figure S74: *Diapriidae* sp2. (*cf Trichopria*)

Sanger_ID: SQ_2022_057_046

Data_ID: KA_270921_C9A (conventional LED 4000K)



Figure S75: *Diapriidae* sp2. (cf *Trichopria*)

Sanger_ID: SQ_2022_057_078

Data_ID: KA_270622_C15B (conventional LED 4000K)



Figure S76: *Diapriidae* sp3.

***Diglyphus isaea* (Eulophidae)**

Sanger_ID: SQ_2022_057_002

Data_ID: HA_010622_C5A (conventional HPS 2000K)



Figure S77: *Diglyphus isaea*

Dinotrema sp. (Braconidae)

16/11/2023, 17:19

Dinotrema Förster, 1862

GENUS | ACCEPTED

Dinotrema Förster, 1862

Published in: Foerster, Arnold. 1862. Synopsis der Familien und Gattungen der Braconen. Verhandlungen des naturhistorischen Vereines der preussischen Rheinlande und Westphalens 19: 225-288; pl.3.
source: Taxapad Ichneumonoidea

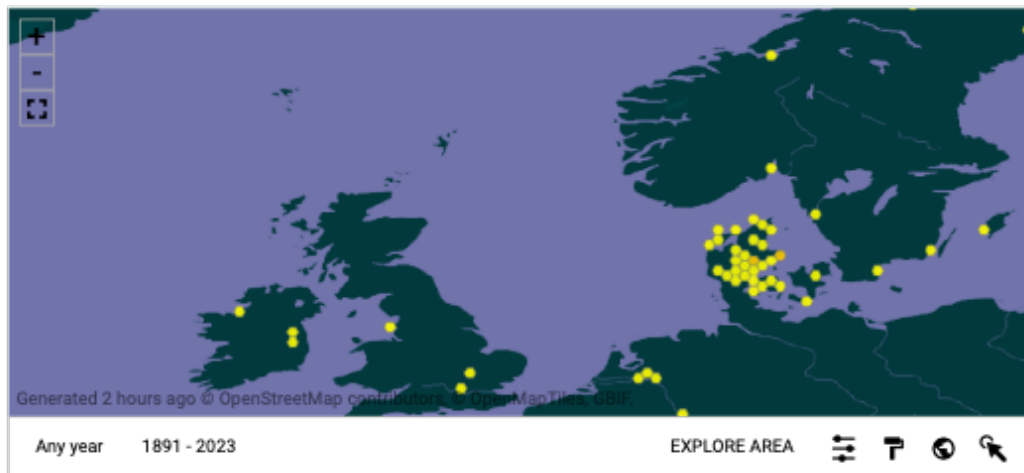
20,775 OCCURRENCES 354 SPECIES

OVERVIEW 4 TREATMENTS METRICS REFERENCE TAXON ↻

851 OCCURRENCES WITH IMAGES



1,797 GEOREFERENCED RECORDS



APPEARS IN 35 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Dinotrema* Förster, 1862

Catalogue of Life Checklist
As *Dinotrema*

<https://www.gbif.org/species/1258469>

1/3

Figure S78: Global Biodiversity Information Facility (GBIF) Webpage *Dinotrema*

Sanger_ID: SQ_2022_057_024

Data_ID: HA_290622_C8B (conventional HPS 2000K)

HA_290622_C8B_B12



Figure S79: *Dinotrema* sp.

Sanger_ID: SQ_2022_057_092

Data_ID: KA_190722_C17A (conventional LED 4000K)

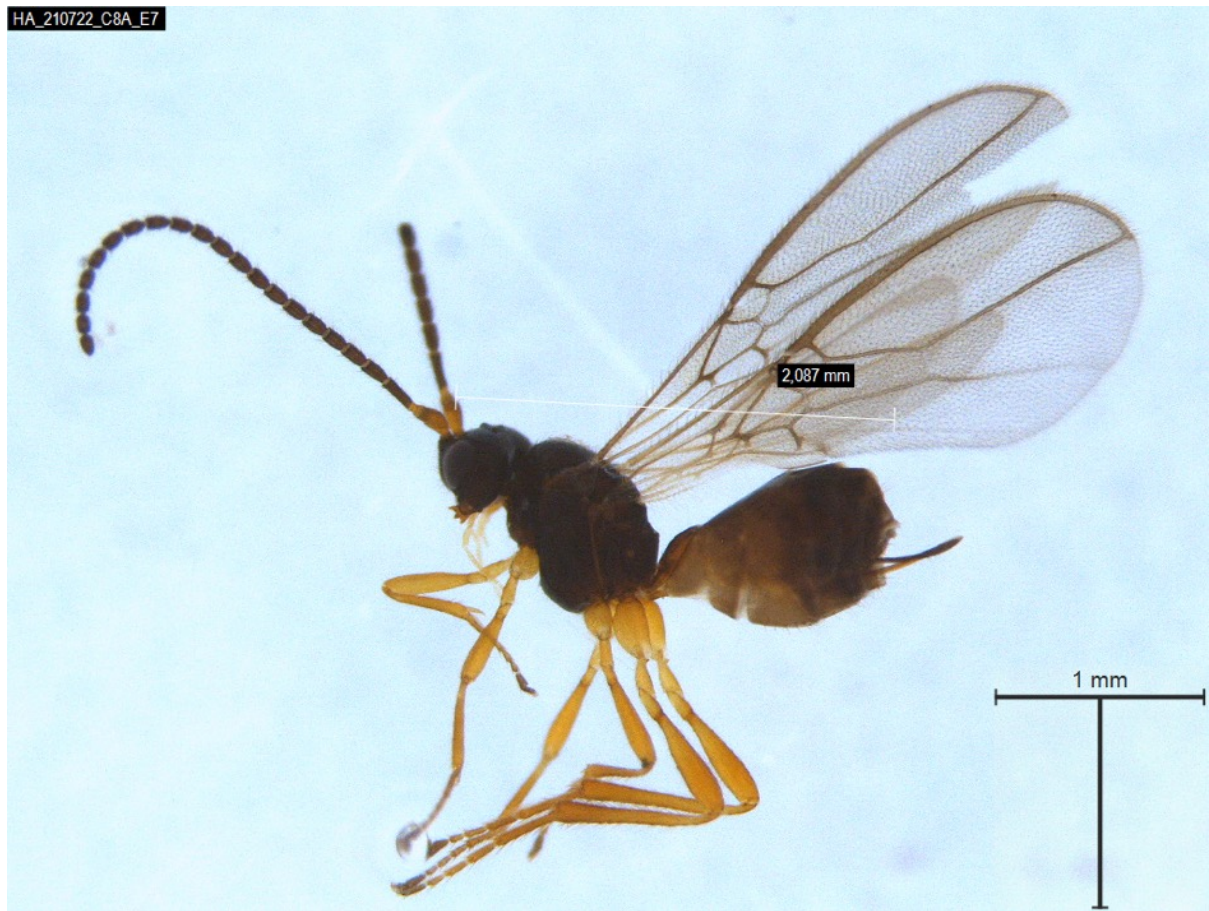


Figure S80: *Dinotrema* sp.

Sanger_ID: SQ_2022_057_055

Data_ID: HA_210722_C8A (conventional HPS 2000K)



Figure S81: *Dinotrema* sp.

Dolichogenidea sp. (Braconidae)

17/11/2023, 11:39

Dolichogenidea Viereck, 1911

GENUS | ACCEPTED

Dolichogenidea Viereck, 1911

Published in: Viereck, H. L. (1911). Descriptions of six new genera and thirty-one new species of ichneumon flies. *Proceedings of the United States National Museum*. 40(1812): 173-196.

source: Dyntaxa. Svensk taxonomisk databas

7,568 OCCURRENCES 120 SPECIES

OVERVIEW

5 TREATMENTS

METRICS

REFERENCE TAXON 

141 OCCURRENCES WITH IMAGES



1,692 GEOREFERENCED RECORDS



APPEARS IN 34 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Dolichogenidea* Viereck, 1911

NCBI Taxonomy
As *Dolichogenidea*

<https://www.gbif.org/species/1265820>

1/3

Figure S82: Global Biodiversity Information Facility (GBIF) Webpage *Doligochenidea*

Sanger_ID: SQ_2022_057_036
Data_ID: HA_290622_C8C (conventional HPS 2000K)



Figure S83: *Doligochenidea* sp.

Encyrtidae sp1. (*Encyrtidae*)

17/11/2023, 11:43

Encyrtidae

FAMILY | ACCEPTED

Encyrtidae

source: Universal Chalcidoidea Database

Encyrtid Wasps In English

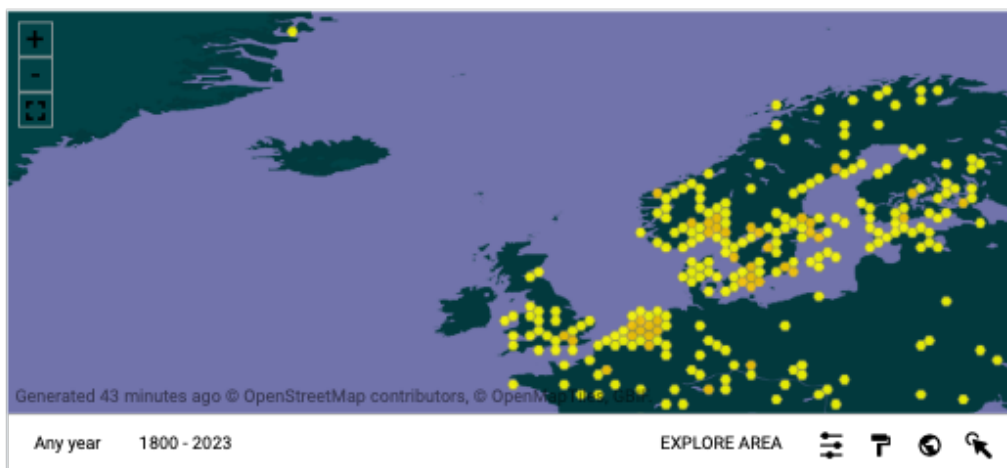
59,512 OCCURRENCES 4,170 SPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON

2,751 OCCURRENCES WITH IMAGES



6,602 GEOREFERENCED RECORDS



VERNACULAR NAMES

Encyrtid Wasps In English

sources: Checklist of Vermont Species + 1 more dataset

Encyrtids In English

sources: Checklist of Vermont Species + 1 more dataset

Sköldlussteklar In Swedish

source: Dyntaxa. Svensk taxonomisk databas

<https://www.gbif.org/species/9440>

1/4

Figure S84: Global Biodiversity Information Facility (GBIF) Webpage *Encyrtidae*

Sanger_ID: SQ_2022_057_034

Data_ID: KA_270921_C17A (conventional LED 4000K)

KA_270921_C17A_C10



Figure S85: *Encyrtidae* sp1.

Sanger_ID: SQ_2022_057_049
Data_ID: BR_160922_C22A (tailored LED 2700K)



Figure S86: *Encyrtidae* sp1. (Picture shows incorrect trap ID)

Encyrtidae sp2. (Encyrtidae)

Sanger_ID: SQ_2022_057_003

Data_ID: HA_290622_C7B (conventional HPS 2000K)



Figure S87: *Encyrtidae sp2.*

Endasys sp. (Ichneumonidae)

17/11/2023, 11:53

Endasys Förster, 1869

GENUS | ACCEPTED

Endasys Förster, 1869

Published in: Verh. Naturh. Ver. Rheinlande, 25 source: Taxapad Ichneumonoidea

996 OCCURRENCES 125 SPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON 

18 OCCURRENCES WITH IMAGES



316 GEOREFERENCED RECORDS



APPEARS IN 19 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Endasys* Förster, 1869

Catalogue of Life Checklist
As *Endasys*

NCBI Taxonomy
As *Endasys*

<https://www.gbif.org/species/1291166>

1/3

Figure S88: Global Biodiversity Information Facility (GBIF) Webpage *Endasys*

Sanger_ID: SQ_2022_057_106

Data_ID: HA_180821_C1A (conventional HPS 2000K)



Figure S89: *Endasys* sp.

Eubazus sp. (Braconidae)

17/11/2023, 11:47

Eubazus Nees, 1814

GENUS | ACCEPTED

Eubazus Nees, 1814

Published in: Nees von Esenbeck, C. G. 1812. Ichneumonides adsciti, in genera et familias divisi. Magazin für die neuesten Entdeckungen in der gesamten Naturkunde 6(3): 183-221; pl. iv.
source: Taxapad Ichneumonoidea

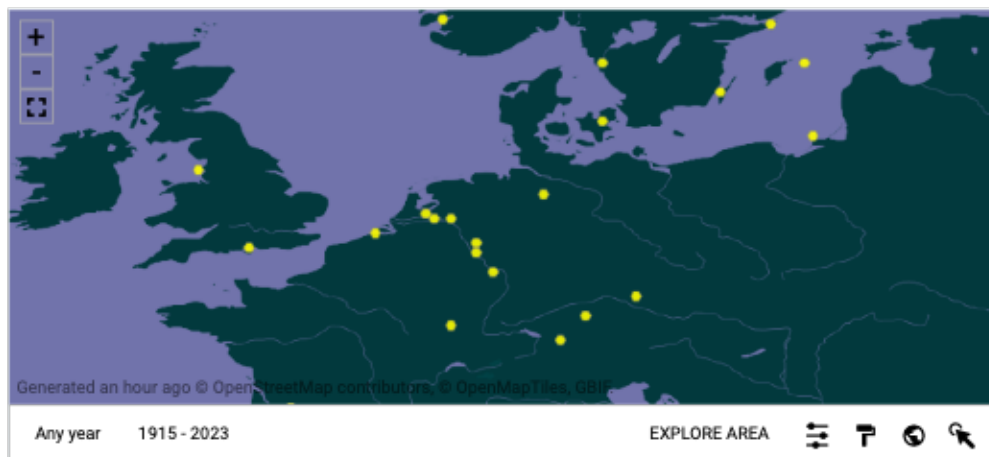
1,844 OCCURRENCES 153 SPECIES

OVERVIEW METRICS REFERENCE TAXON 

155 OCCURRENCES WITH IMAGES



400 GEOREFERENCED RECORDS



APPEARS IN 22 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Eubazus* Nees, 1814

Catalogue of Life Checklist
As *Eubazus*

<https://www.gbif.org/species/1253360>

1/3

Figure S90: Global Biodiversity Information Facility (GBIF) Webpage *Eubazus*

Sanger_ID: SQ_2022_057_082

Data_ID: KA_270921_C10A (conventional LED 4000K)



Figure S91: *Eubazus* sp.

Exallonyx nixonii (Proctotrupidae)

17/11/2023, 11:58

Exallonyx nixonii Townes, 1981

SPECIES | ACCEPTED

Exallonyx nixonii Townes, 1981

source: Taxon list of Hymenoptera from Germany compiled in the context of the GBOL project

71 OCCURRENCES

OVERVIEW

METRICS

REFERENCE TAXON 

2 OCCURRENCES WITH IMAGES



43 GEOREFERENCED RECORDS



APPEARS IN 16 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Exallonyx nixonii* Townes, 1981

NCBI Taxonomy
As *Exallonyx nixonii*

The European Nucleotide Archive (ENA) taxonomy
As *Exallonyx nixonii*

<https://www.gbif.org/species/4503925>

1/3

Figure S92: Global Biodiversity Information Facility (GBIF) Webpage *Exallonyx nixonii*

Sanger_ID: SQ_2022_057_051

Data_ID: HA_260722_C6A (conventional HPS 2000K)



Figure S93: *Exallonyx nixonii*

Exallonyx sp. (Proctotrupidae)

17/11/2023, 12:02

Exallonyx Kieffer, 1904

GENUS | ACCEPTED

Exallonyx Kieffer, 1904

Published in: Bull. Soc. Metz, 23

source: Catalogue of Life Checklist

2,133 OCCURRENCES 26 SPECIES

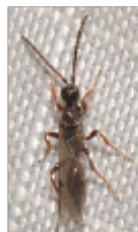
OVERVIEW

1 TREATMENT

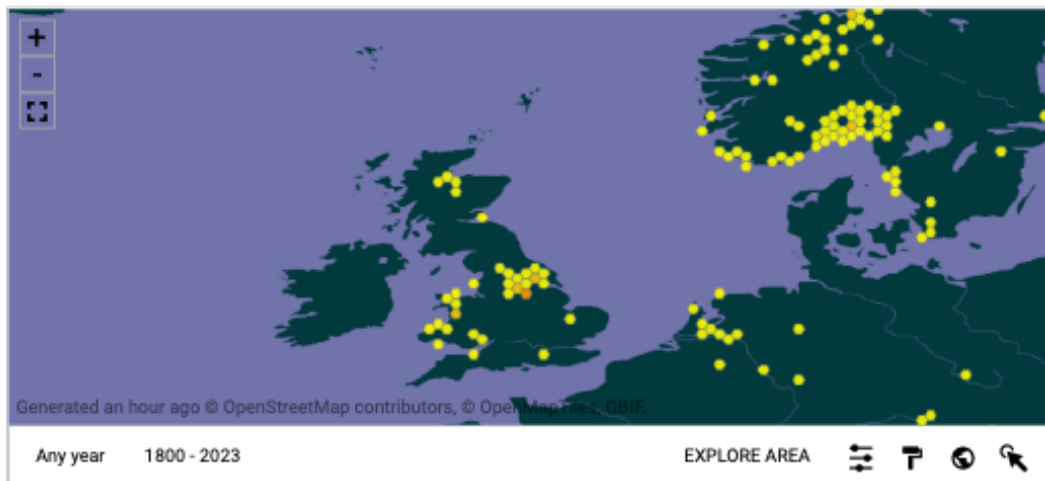
METRICS

REFERENCE TAXON 

39 OCCURRENCES WITH IMAGES



469 GEOREFERENCED RECORDS



APPEARS IN 24 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Exallonyx* Kieffer, 1904

Catalogue of Life Checklist
As *Exallonyx*

NCBI Taxonomy
As *Exallonyx*

<https://www.gbif.org/species/1248782>

1/3

Figure S94: Global Biodiversity Information Facility (GBIF) Webpage *Exallonyx*

Sanger_ID: SQ_2022_057_007

Data_ID: HA_260722_C7A (conventional HPS 2000K)

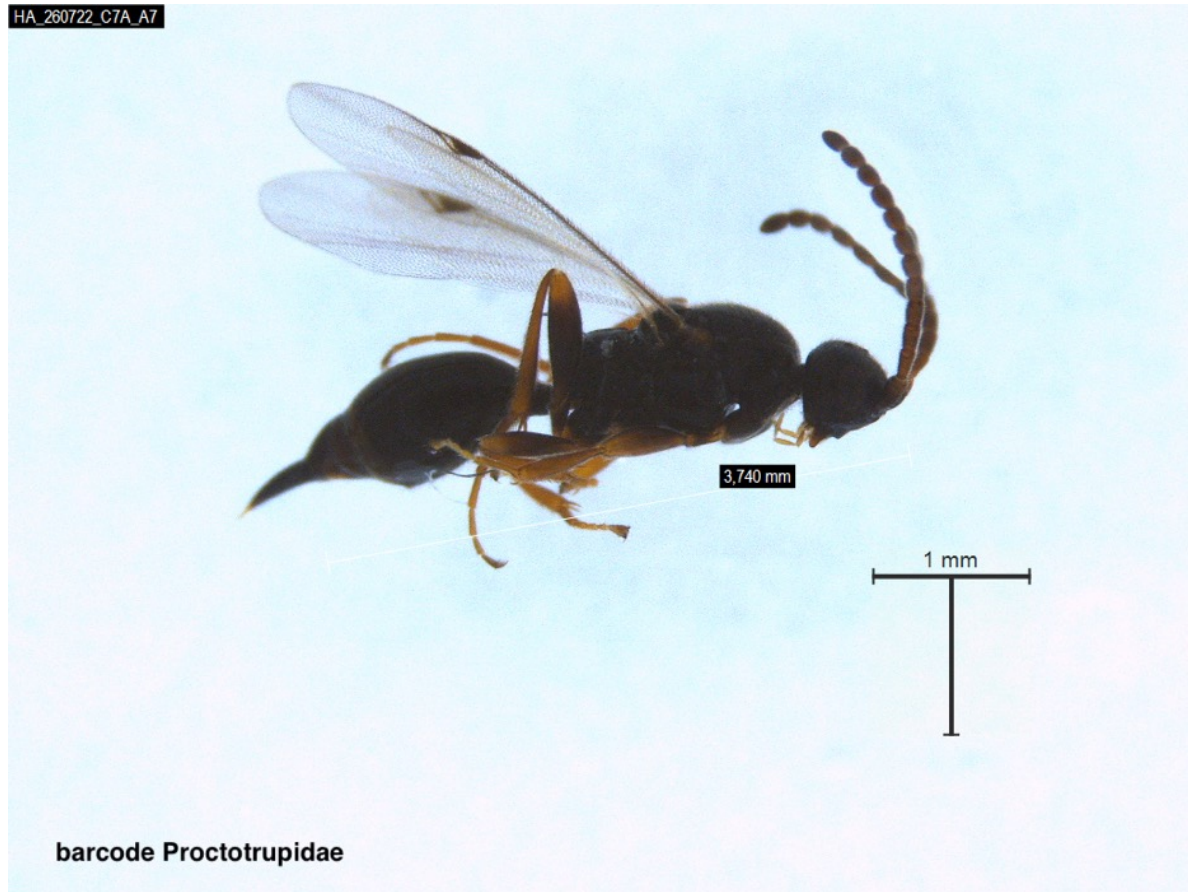


Figure S95: *Exallonyx* sp.

Gastrancistrus sp. (Pirenidae)

17/11/2023, 12:08

Gastrancistrus Westwood, 1833

GENUS | ACCEPTED

Gastrancistrus Westwood, 1833

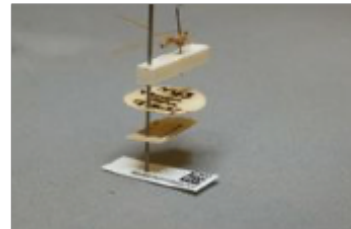
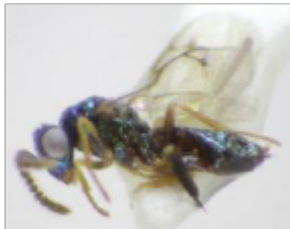
Published in: Westwood, John O. 1833. Descriptions of several new British forms amongst the parasitic hymenopterous insects. The London and Edinburgh Philosophical Magazine and Journal of Science, Series 3 2(12): 443-445.

source: Universal Chalcidoidea Database

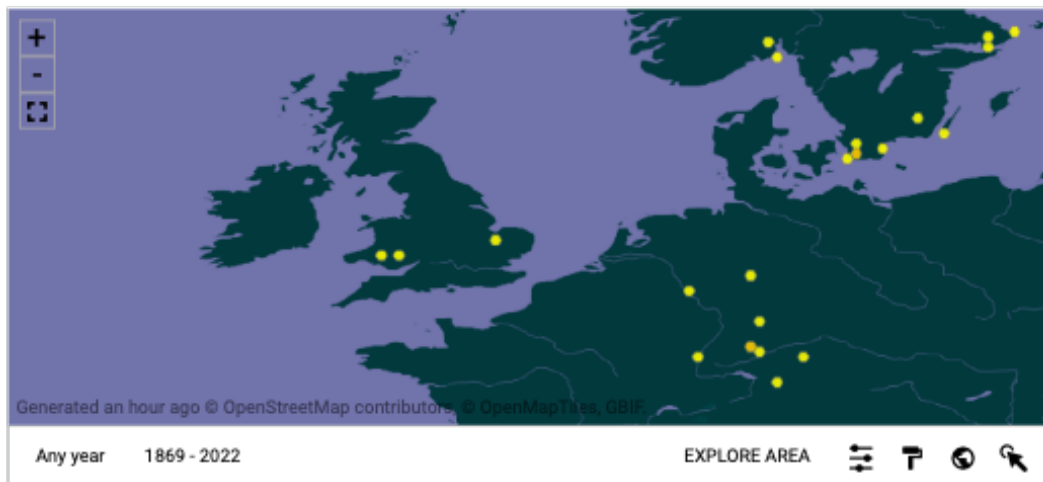
816 OCCURRENCES 126 SPECIES

OVERVIEW METRICS REFERENCE TAXON 

3 OCCURRENCES WITH IMAGES



246 GEOREFERENCED RECORDS



APPEARS IN 22 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Gastrancistrus* Westwood, 1833

Catalogue of Life Checklist
As *Gastrancistrus*

<https://www.gbif.org/species/1386439>

1/4

Figure S96: Global Biodiversity Information Facility (GBIF) Webpage *Gastrancistrus*

Sanger_ID: SQ_2022_057_035
Data_ID: BR_020921_C22B (conventional HPS 2000K)



Figure S97: *Gastrancistrus* sp.

Gelis sp. (Ichneumonidae)

17/11/2023, 12:14

Gelis Thunberg, 1827

GENUS | ACCEPTED

Gelis Thunberg, 1827

Published in: N. Acta Soc. Sci. Upsal., 9 source: Taxapad Ichneumonoidea

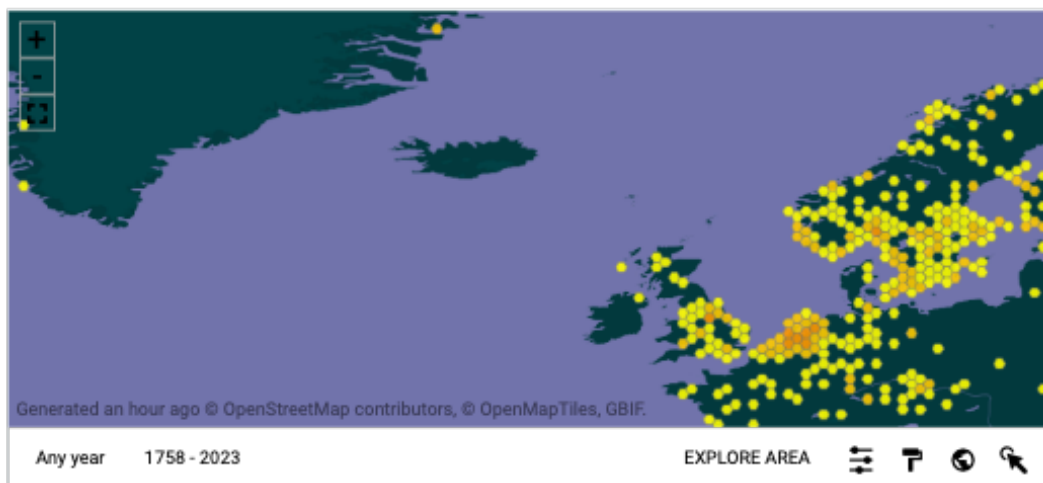
8,376 OCCURRENCES 291 SPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON 

1,777 OCCURRENCES WITH IMAGES



3,587 GEOREFERENCED RECORDS



APPEARS IN 29 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Gelis* Thunberg, 1827

Catalogue of Life Checklist
As *Gelis*

NCBI Taxonomy
As *Gelis*

<https://www.gbif.org/species/1290080>

1/3

Figure S98: Global Biodiversity Information Facility (GBIF) Webpage *Gelis*

Sanger_ID: SQ_2022_057_009

Data_ID: HA_040821_C2A (conventional HPS 2000K)

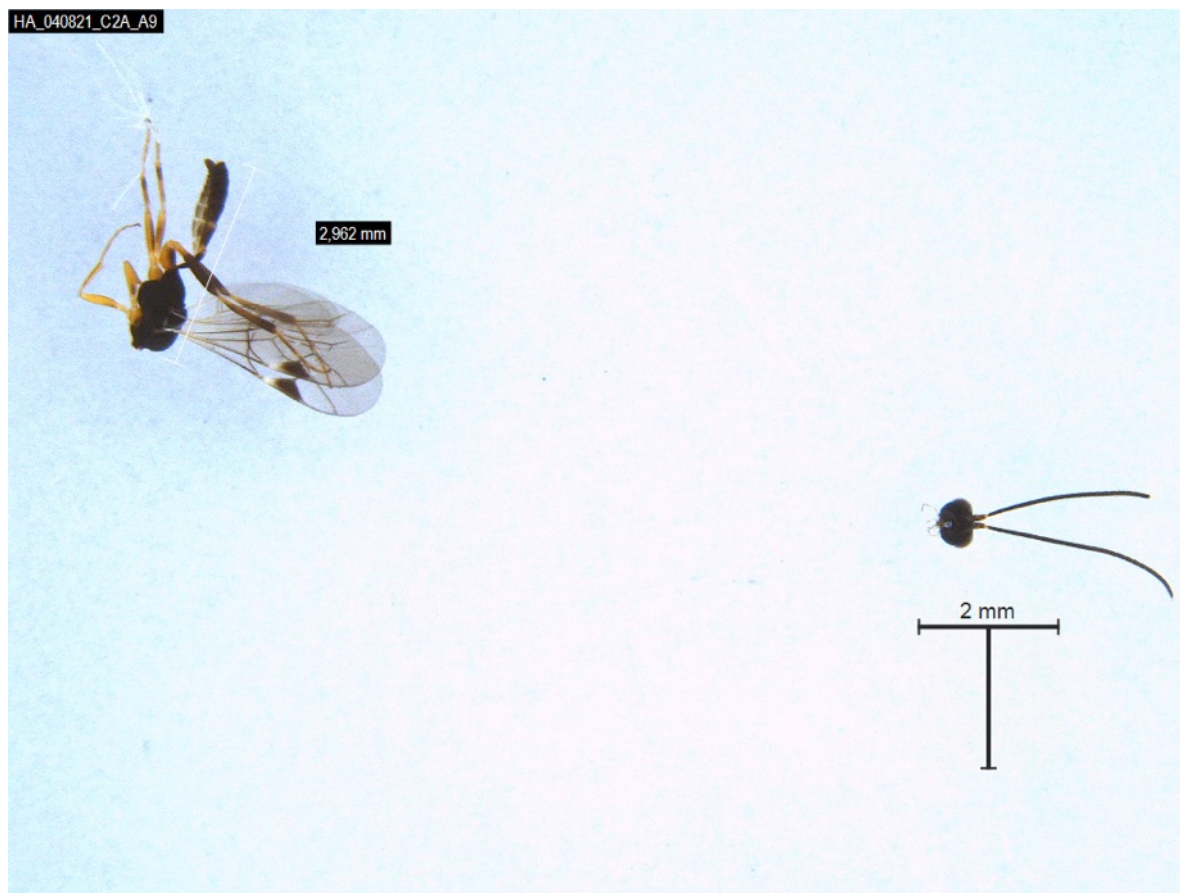


Figure S99: *Gelis* sp.

Sanger_ID: SQ_2022_057_011

Data_ID: KA_160821_C18A (conventional LED 4000K)



Figure S100: *Gelis* sp.

Sanger_ID: SQ_2022_057_056

Data_ID: KA_150922_C15A (conventional LED 4000K)



Figure S101: *Gelis* sp.

Sanger_ID: SQ_2022_057_059

Data_ID: BR_020621_C23A (conventional HPS 2000K)



Figure S102: *Gelis sp.*

Inostemma sp. (Platygastridae)

17/11/2023, 12:28

Inostemma Haliday, 1833

GENUS | ACCEPTED

Inostemma Haliday, 1833

Published in: Haliday, A.H. (1833). Essay on the classification of the parasitic Hymenoptera of Britain, which correspond with the Ichneumones minuti of Linnaeus. *Entomological Magazine*. 1(3): 259-276.

In: GBIF Backbone Taxonomy

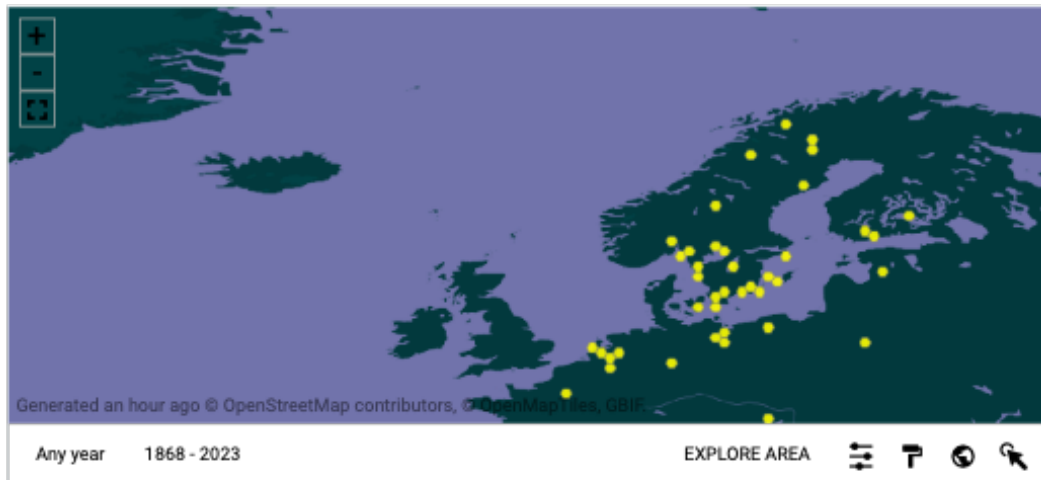
646 OCCURRENCES 101 SPECIES

OVERVIEW 1 TREATMENT METRICS

23 OCCURRENCES WITH IMAGES



205 GEOREFERENCED RECORDS



APPEARS IN 25 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Inostemma* Haliday, 1833

Catalogue of Life Checklist
As *Inostemma* Haliday, 1833

<https://www.gbif.org/species/1400244>

1/4

Figure S103: Global Biodiversity Information Facility (GBIF) Webpage *Inostemma*

specimen damaged, ovipositor housing lost
Sanger_ID: SQ_2022_057_052
Data_ID: HA_180822_C2A (conventional HPS 2000K)



Figure S104: *Inostemma* sp.

Sanger_ID: SQ_2022_057_083

Data_ID: BR_020621_C24B (conventional HPS 2000K)



Figure S105: *Inostemma* sp.

Leptopilina japonica (Figitidae)

17/11/2023, 13:05

Leptopilina japonica

SPECIES | ACCEPTED

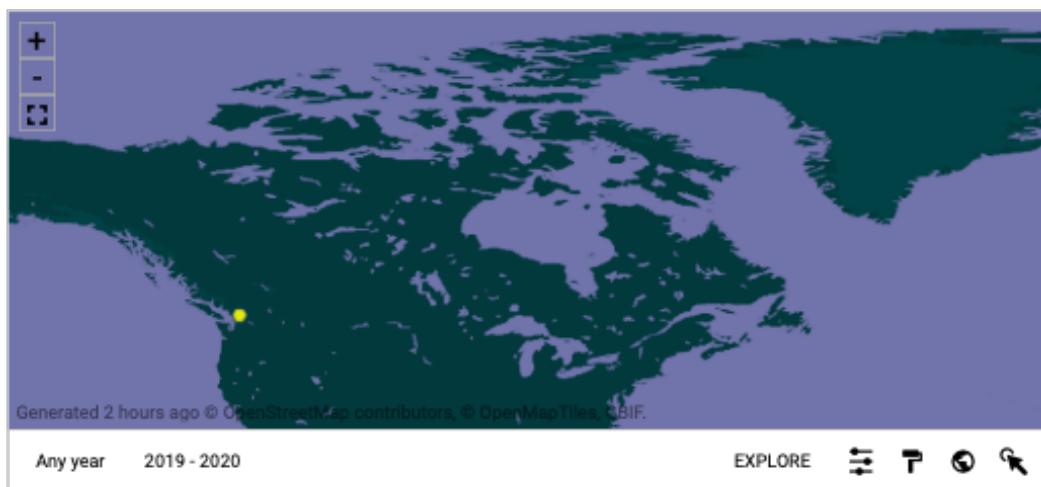
Leptopilina japonica

In: GBIF Backbone Taxonomy

26 OCCURRENCES

OVERVIEW | METRICS

5 GEOREFERENCED RECORDS



APPEARS IN 5 CHECKLIST DATASETS:

GBIF Backbone Taxonomy As <i>Leptopilina japonica</i>
NCBI Taxonomy As <i>Leptopilina japonica</i>
The European Nucleotide Archive (ENA) taxonomy As <i>Leptopilina japonica</i>
International Barcode of Life project (IBOL) Barcode Index Numbers (BINs) As <i>Leptopilina japonica</i>
Cynipoidea (gall wasps) - xBio:D Cyberinfrastructure, The Ohio State University As <i>Leptopilina japonica</i> Novković & Kimura

<https://www.gbif.org/species/11761119>

1/2

Figure S106: Global Biodiversity Information Facility (GBIF) Webpage *Leptopilina japonica*

Sanger_ID: SQ_2022_057_062

Data_ID: BR_160822_C24A (conventional HPS 2000K)



Figure S107: *Leptopilina japonica*

Lipolexis sp. (Braconidae)

17/11/2023, 13:10

Lipolexis Förster, 1862

GENUS | ACCEPTED

Lipolexis Förster, 1862

Published in: Foerster, Arnold. 1862. Synopsis der Familien und Gattungen der Braconen. Verhandlungen des naturhistorischen Vereines der preussischen Rheinlande und Westphalens 19: 225-288; pl.3.
source: Taxapad Ichneumonoidea

225 OCCURRENCES 10 SPECIES

OVERVIEW METRICS REFERENCE TAXON 

35 GEOREFERENCED RECORDS



APPEARS IN 22 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Lipolexis* Förster, 1862

Catalogue of Life Checklist
As *Lipolexis*

NCBI Taxonomy
As *Lipolexis*

The European Nucleotide Archive (ENA) taxonomy
As *Lipolexis*

International Barcode of Life project (IBOL) Barcode Index Numbers (BINs)
As *Lipolexis*

<https://www.gbif.org/species/1269578>

1/3

Figure S108: Global Biodiversity Information Facility (GBIF) Webpage *Lipolexis*

Sanger_ID: SQ_2022_057_069

Data_ID: HA_120621_C5A (conventional HPS 2000K)



Figure S109: *Lipolexis sp. (cf. gracilis)*

Ctenopelmatinae sp. (*Ichneumonidae*)

17/11/2023, 13:25

Mesoleius filicornis Holmgren, 1876

SPECIES | ACCEPTED

Mesoleius filicornis Holmgren, 1876

Published in: Holmgren, A.E. Dispositio Synoptica Mesoleiorum Scandinaviae. Kongliga Svenska Vetenskapsakademiens Handlingar. 13(12):1-51. (1876).
source: Taxapad Ichneumonoidea

23 OCCURRENCES

OVERVIEW METRICS REFERENCE TAXON 

15 GEOREFERENCED RECORDS



TYPE SPECIMENS

TYPE of *Mesoleius filicornis* Holmgren, 1876 Naturalis Hymenoptera BE.71342
Source: Naturalis Biodiversity Center (NL) - Museum collection digitized at storage unit level

TYPE of *Mesoleius filicornis* Holmgren, 1876 Naturalis Hymenoptera BE.77365
Source: Naturalis Biodiversity Center (NL) - Museum collection digitized at storage unit level

APPEARS IN 13 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Mesoleius filicornis* Holmgren, 1876

Catalogue of Life Checklist
As *Mesoleius filicornis* Holmgren, 1876

<https://www.gbif.org/species/1283279>

1/3

Figure S110: Global Biodiversity Information Facility (GBIF) Webpage *Mesoleius filicornis*

Sanger_ID: SQ_2022_057_097

Data_ID: KA_270921_C16A (conventional LED 4000K)



Figure S111: *Ctenopelmatinae* sp.

Metaphycus sp. (Encyrtidae)

17/11/2023, 13:31

Metaphycus Mercet, 1917

GENUS | ACCEPTED

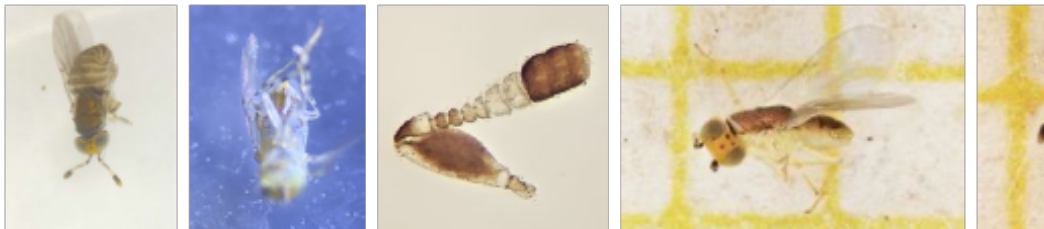
Metaphycus Mercet, 1917

Published in: *Boletín de la Real Sociedad Española de Historia Natural*, 17(2): 138
source: Universal Chalcidoidea Database

2,710 OCCURRENCES 454 SPECIES

OVERVIEW 3 TREATMENTS METRICS REFERENCE TAXON

66 OCCURRENCES WITH IMAGES



704 GEOREFERENCED RECORDS



APPEARS IN 36 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Metaphycus* Mercet, 1917

Catalogue of Life Checklist
As *Metaphycus*

NCBI Taxonomy

<https://www.gbif.org/species/1374887>

1/3

Figure S112: Global Biodiversity Information Facility (GBIF) Webpage *Metaphycus*

Sanger_ID: SQ_2022_057_028

Data_ID: KA_190722_C13A (tailored LED 4000K)



Figure S113: *Metaphycus* sp. (cf. *flavus*)

Meteorus affinis (Braconidae)

17/11/2023, 13:34

Meteorus affinis (Wesmael, 1835)

SPECIES | ACCEPTED

Meteorus affinis (Wesmael, 1835)

Published in: Wesmael, C. Monographie des Braconides de Belgique. Nouveaux Memoires de l'Academie Royale des Sciences et Belles-lettres Bruxelles. 9:1-252. (1835).

source: Taxapad Ichneumonoidea

Basionym: *Perilitus affinis* Wesmael, 1835

261 OCCURRENCES 7 INFRA-SPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON

2 OCCURRENCES WITH IMAGES



117 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of *Perilitus affinis* Wesmael, 1835 RBINS-Scientific Heritage urn:catalog:RBINS:TVC EVCT.685
Source: RBINS DaRWIN

NAME USAGES APPLIED TO OCCURRENCES IN GBIF

<https://www.gbif.org/species/1266153>

1/4

Figure S114: Global Biodiversity Information Facility (GBIF) Webpage *Meteorus affinis*

Sanger_ID: SQ_2022_057_084

Data_ID: HA_260722_C5B (conventional HPS 2000K)

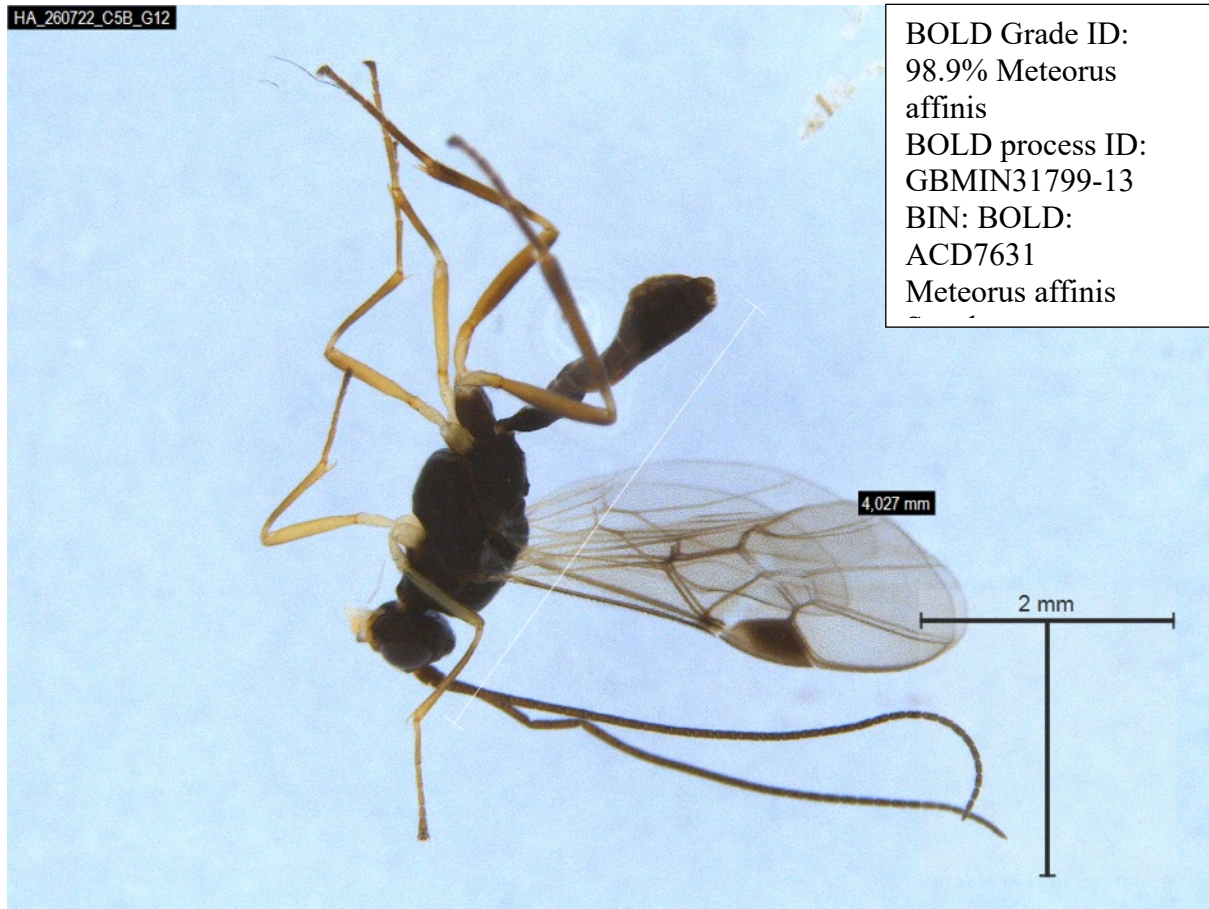


Figure S115: *Meteorus affinis*

Metopius fuscipennis (Ichneumonidae)

17/11/2023, 13:39

Metopius fuscipennis Wesmael, 1849

SPECIES | ACCEPTED

Metopius fuscipennis Wesmael, 1849

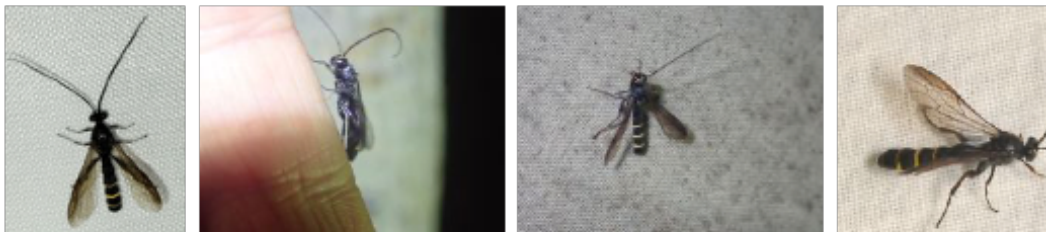
Published in: Wesmael, C. Notice sur les Ichneumonides de Belgique appartenant aux genres *Metopius*, *Banchus* et *Coleocentrus*. Bulletin de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique. 16(1):620-634. (1849).

source: Taxapad Ichneumonoidea

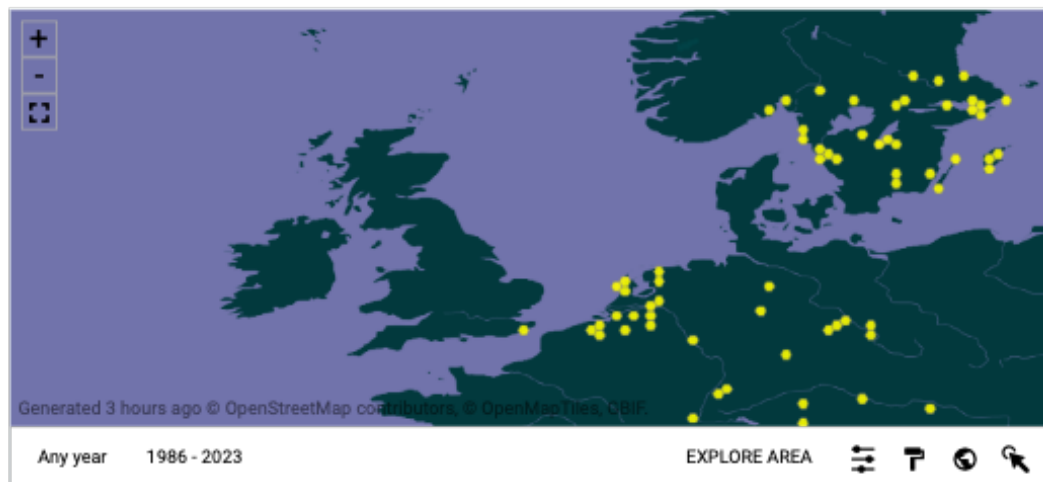
134 OCCURRENCES 1 INFRASPECIES

OVERVIEW METRICS REFERENCE TAXON 

49 OCCURRENCES WITH IMAGES



105 GEOREFERENCED RECORDS



NAME USAGES APPLIED TO OCCURRENCES IN GBIF

Figure S116: Global Biodiversity Information Facility (GBIF) Webpage *Metopius fuscipennis*

Sanger_ID: SQ_2022_057_103

Data_ID: BR_300822_C26A (conventional HPS 2000K)



Figure S117: *Metopius fuscipennis*

Mymaridae sp.1 (*Mymaridae*)

17/11/2023, 13:59

Mymaridae

FAMILY | ACCEPTED

Mymaridae

Published in: in Westwood, *Introd. mod. Classif. Brit. Ins.*, 2: 173
source: Universal Chalcidoidea Database

Fairyflies In English

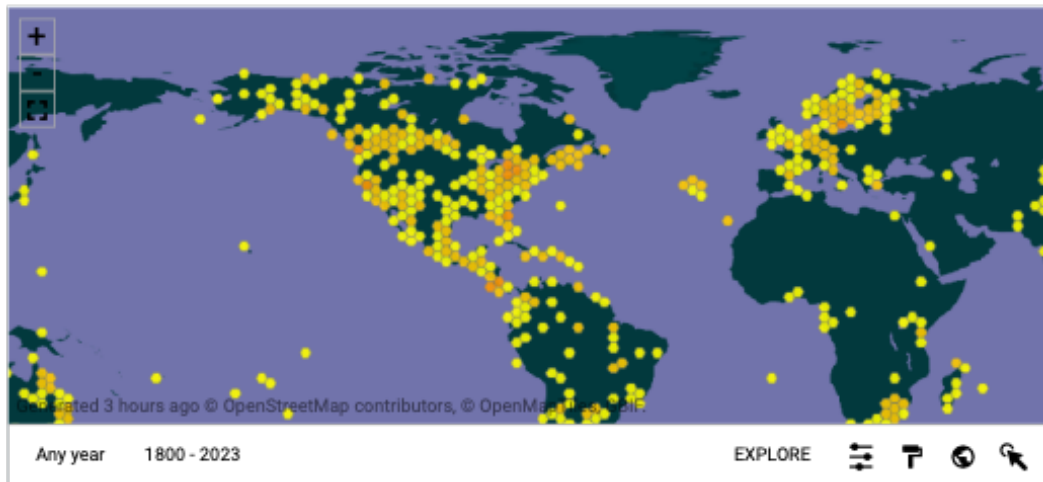
83,401 OCCURRENCES 1,603 SPECIES

OVERVIEW METRICS REFERENCE TAXON ^{en}

4,906 OCCURRENCES WITH IMAGES



4,296 GEOREFERENCED RECORDS



VERNACULAR NAMES

Fairyflies In English
sources: Integrated Taxonomic Information System (ITIS) + 1 more dataset

Fairyfly In English
source: The Paleobiology Database

Dvärgsteklar In Swedish

<https://www.gbif.org/species/9444>

1/4

Figure S118: Global Biodiversity Information Facility (GBIF) Webpage *Mymaridae*

Sanger_ID: SQ_2022_057_025

Data_ID: HA_240822_C5A (conventional HPS 2000K)

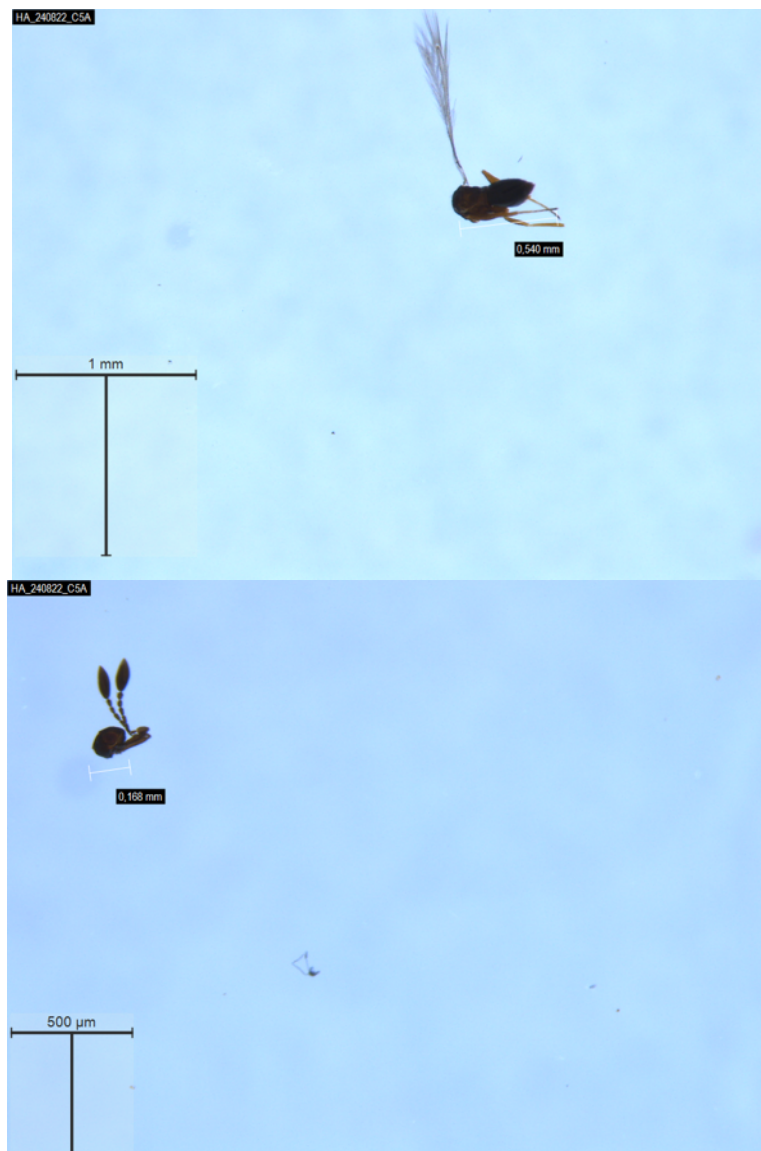


Figure S119: *Myrmaridae* sp1.

Mymaridae sp.1(Mymaridae)

Sanger_ID: SQ_2022_057_086

Data_ID: HA_240822_C7A (conventional HPS 2000K)



Figure S120: *Mymaridae sp.1*.

Mymaridae sp.2 (Mymaridae)

Sanger_ID: SQ_2022_057_027

Data_ID: KA_160822_C22A (tailored LED 4000K)



Figure S121: Mymaridae sp2.

Mymaridae sp.3 (Mymaridae)

Sanger_ID: SQ_2022_057_074

Data_ID: HA_180822_C7A (conventional HPS 2000K)



Figure S122: *Mymaridae sp.3*.

Netelia sp. (Ichneumonidae)

17/11/2023, 14:01

Netelia Gray, 1860

GENUS | ACCEPTED

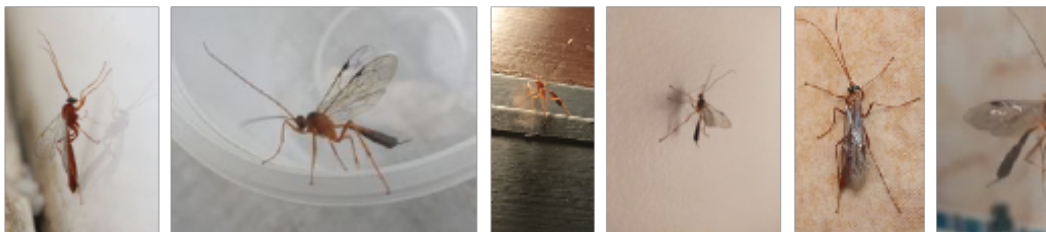
Netelia Gray, 1860

Published in: Ann. Mag. Nat. Hist., (3) 5 source: Taxapad Ichneumonoidea

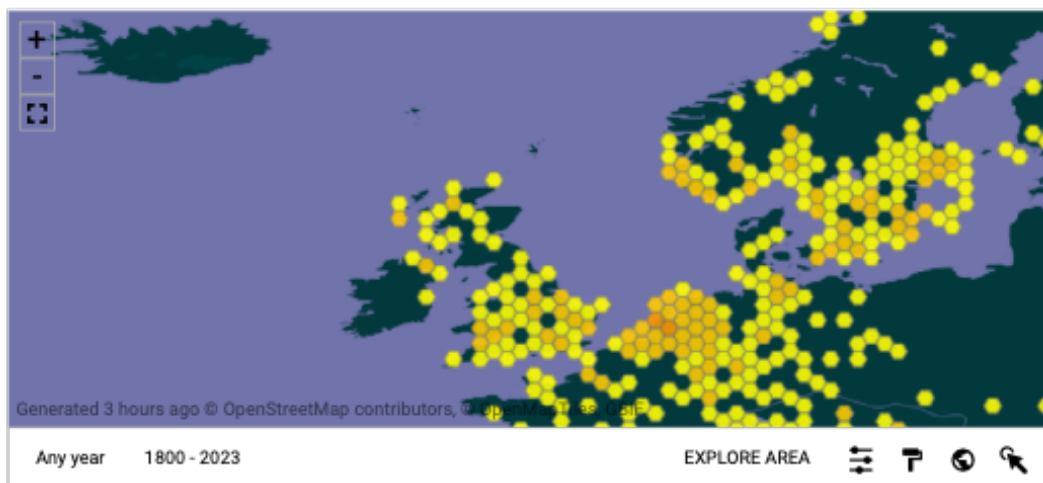
14,953 OCCURRENCES 330 SPECIES

OVERVIEW 4 TREATMENTS METRICS REFERENCE TAXON ↻

2,318 OCCURRENCES WITH IMAGES



4,191 GEOREFERENCED RECORDS



APPEARS IN 32 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Netelia* Gray, 1860

Catalogue of Life Checklist
As *Netelia*

NCBI Taxonomy
As *Netelia*

<https://www.gbif.org/species/1281873>

1/3

Figure S123: Global Biodiversity Information Facility (GBIF) Webpage *Netelia*

Sanger_ID: SQ_2022_057_102
Data_ID: HA_260722_C1A (tailored LED 2700K)



Figure S124: *Netelia* sp.

Omphale lugens (Eulophidae)

17/11/2023, 14:10

Omphale lugens (Nees, 1834)

SPECIES | ACCEPTED

Omphale lugens (Nees, 1834)

Published in: Efremova, Z.A.; Kriskovich, M.V. A new species of the genus [Omphale] (Hymenoptera, Eulophidae) from the Far East. JOURBOOK: Zoologicheskii Zhurnal VOLUME: 73(7,8) PAGES: 245-248. (1994).

source: Universal Chalcidoidea Database

Basionym: *Eulophus lugens* Nees, 1834

38 OCCURRENCES 1 INFRASPECIES

OVERVIEW 1 TREATMENT METRICS REFERENCE TAXON 

23 GEOREFERENCED RECORDS



TYPE SPECIMENS

LECTOTYPE of <i>Entedon navius</i> Walker, 1839 NHMUK BMNH(E) NHMUK010838574 Source: Natural History Museum (London) Collection Specimens
NEOTYPE of <i>Eulophus lugens</i> Nees, 1834 Naturalis Hymenoptera BE.2270108 Source: Naturalis Biodiversity Center (NL) - Museum collection digitized at storage unit level

NAME USAGES APPLIED TO OCCURRENCES IN GBIF

Figure S125: Global Biodiversity Information Facility (GBIF) Webpage *Omphale lugens*

Sanger_ID: SQ_2022_057_045

Data_ID: HA_120621_C1B (conventional HPS 2000K)

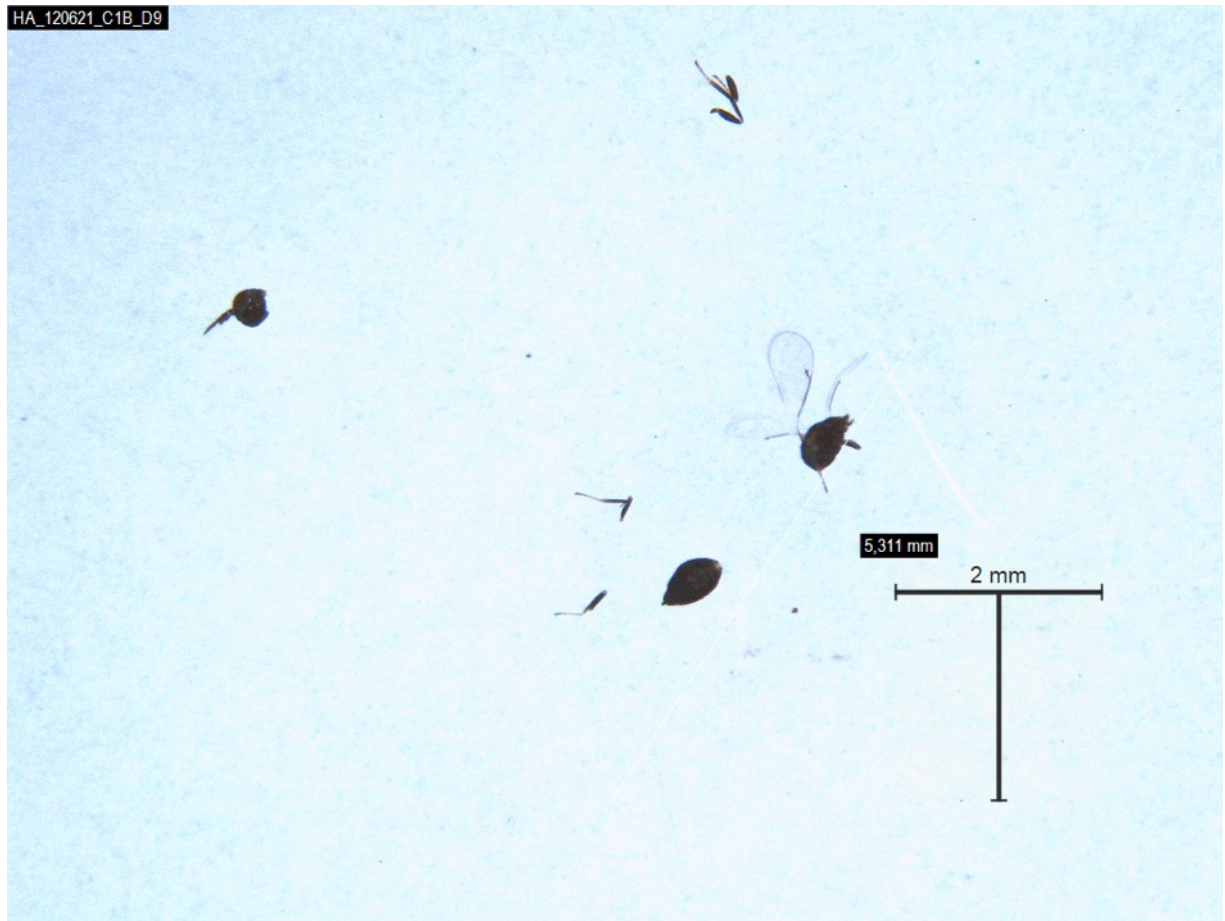


Figure S126: *Omphale lugens*

Omphale radialis (Eulophidae)

17/11/2023, 14:09

Omphale radialis (Thomson, 1878)

SPECIES | ACCEPTED

Omphale radialis (Thomson, 1878)

Published in: Graham, M.W.R. de V. Keys to the British genera and species of Elachertinae, Eulophinae, Entedontinae and Euderinae (Hym., Chalcidoidea). JOURBOOK: Transactions of the Society for British Entomology VOLUME: 13(10) PAGES: 169-204. (1959).

source: Universal Chalcidoidea Database

Basionym: *Derostenus radialis* Thomson, 1878

16 OCCURRENCES | 1 INFRASPECIES

OVERVIEW | METRICS | REFERENCE TAXON 

6 GEOREFERENCED RECORDS



TYPE SPECIMENS

TYPE of *Achrysocharella americana* Girault, 1916 Girault. USNM ENT USNMMENT01545217
Source: NMNH Extant Specimen Records (USNM, US)

NAME USAGES APPLIED TO OCCURRENCES IN GBIF

Figure S127: Global Biodiversity Information Facility (GBIF) Webpage *Omphale radialis*

Sanger_ID: SQ_2022_057_039

Data_ID: HA_240822_C8A (conventional HPS 2000K)

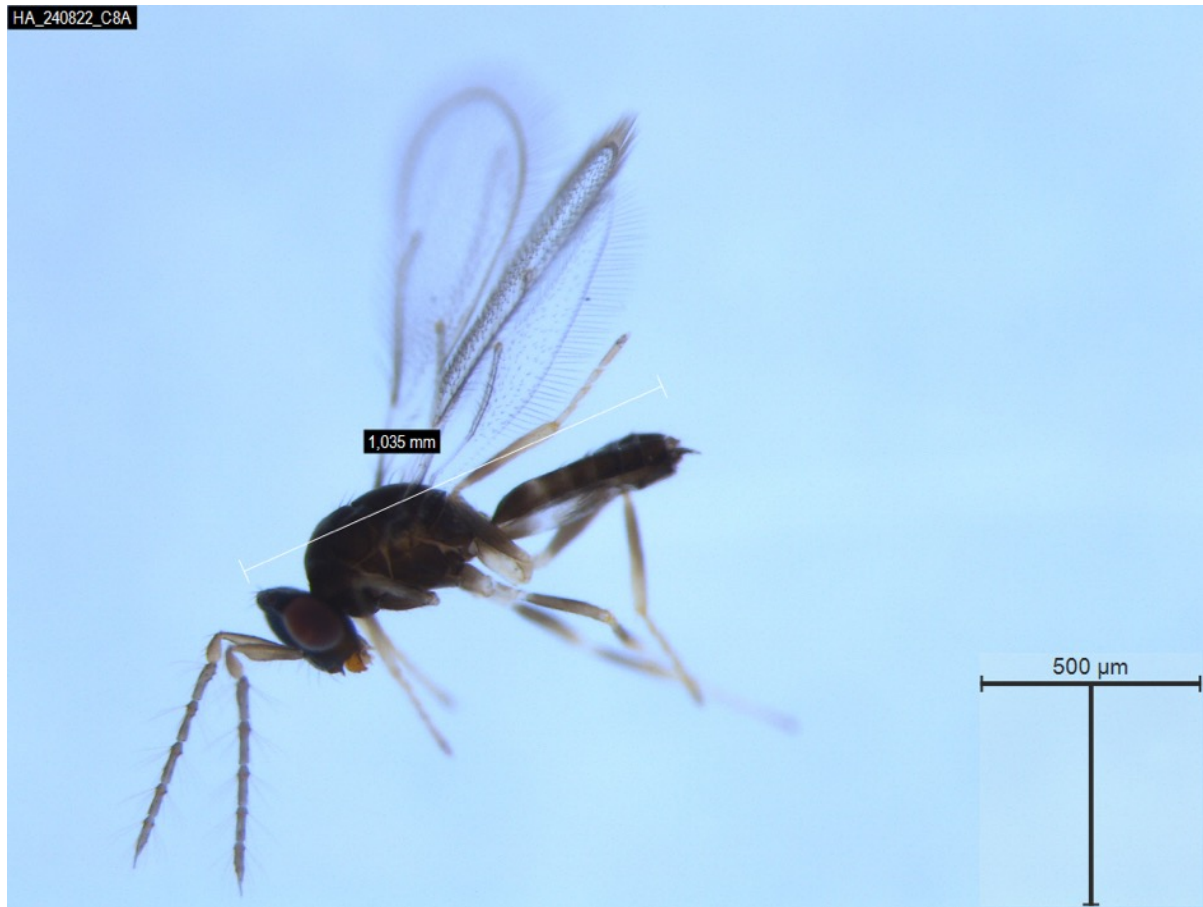


Figure S128: *Omphale radialis*

Omphale sp. (Eulophidae)

17/11/2023, 14:09

Omphale Haliday, 1833

GENUS | ACCEPTED

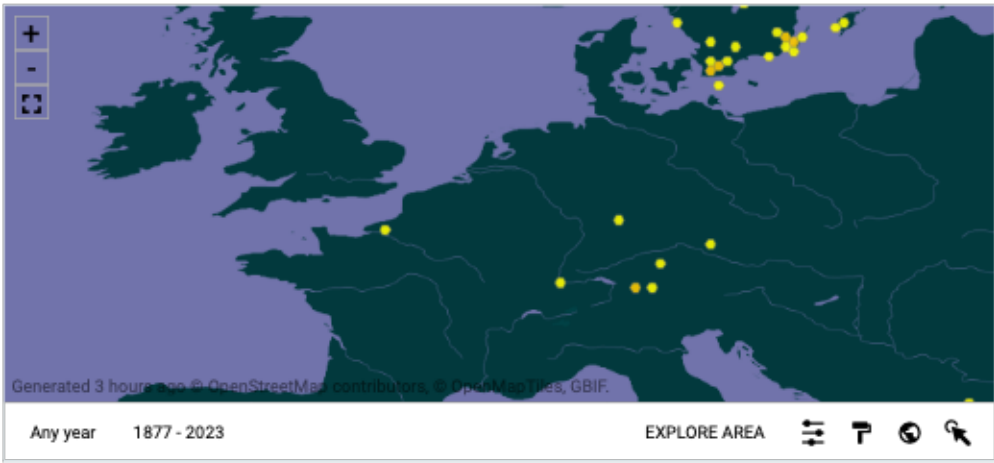
Omphale Haliday, 1833

Published in: Entom. Mag., 1 (4) source: Universal Chalcidoidea Database

3,484 OCCURRENCES 260 SPECIES

OVERVIEW 2 TREATMENTS METRICS REFERENCE TAXON 

355 GEOREFERENCED RECORDS



APPEARS IN 21 CHECKLIST DATASETS:

GBIF Backbone Taxonomy As <i>Omphale</i> Haliday, 1833
Catalogue of Life Checklist As <i>Omphale</i>
NCBI Taxonomy As <i>Omphale</i>
The European Nucleotide Archive (ENA) taxonomy As <i>Omphale</i>
International Barcode of Life project (IBOL) Barcode Index Numbers (BINs) As <i>Omphale</i>

<https://www.gbif.org/species/1382509>

1/3

Figure S129: Global Biodiversity Information Facility (GBIF) Webpage *Omphale*

Sanger_ID: SQ_2022_057_022

Data_ID: KA_310521_C10A (conventional LED 4000K)

KA_310521_C10A_B10



Figure S130: *Omphale* sp.

***Pachycrepoideus vindemmiae* (Pteromalidae)**

Sanger_ID: SQ_2022_057_061

Data_ID: KA_171022_C9A (tailored LED 4000K)



Figure S131: *Pachycrepoideus vindemmiae*

Proctotrupinae sp. (Proctotrupidae)

17/11/2023, 14:27

Parthenocodrus elongatus (Haliday, 1839)

SPECIES | ACCEPTED

Parthenocodrus elongatus (Haliday, 1839)

source: Taxon list of Hymenoptera from Germany compiled in the context of the GBOL project

Basionym: *Proctotrupes elongatus* Haliday, 1839

354 OCCURRENCES

OVERVIEW

METRICS

REFERENCE TAXON 

1 OCCURRENCE WITH IMAGES



92 GEOREFERENCED RECORDS

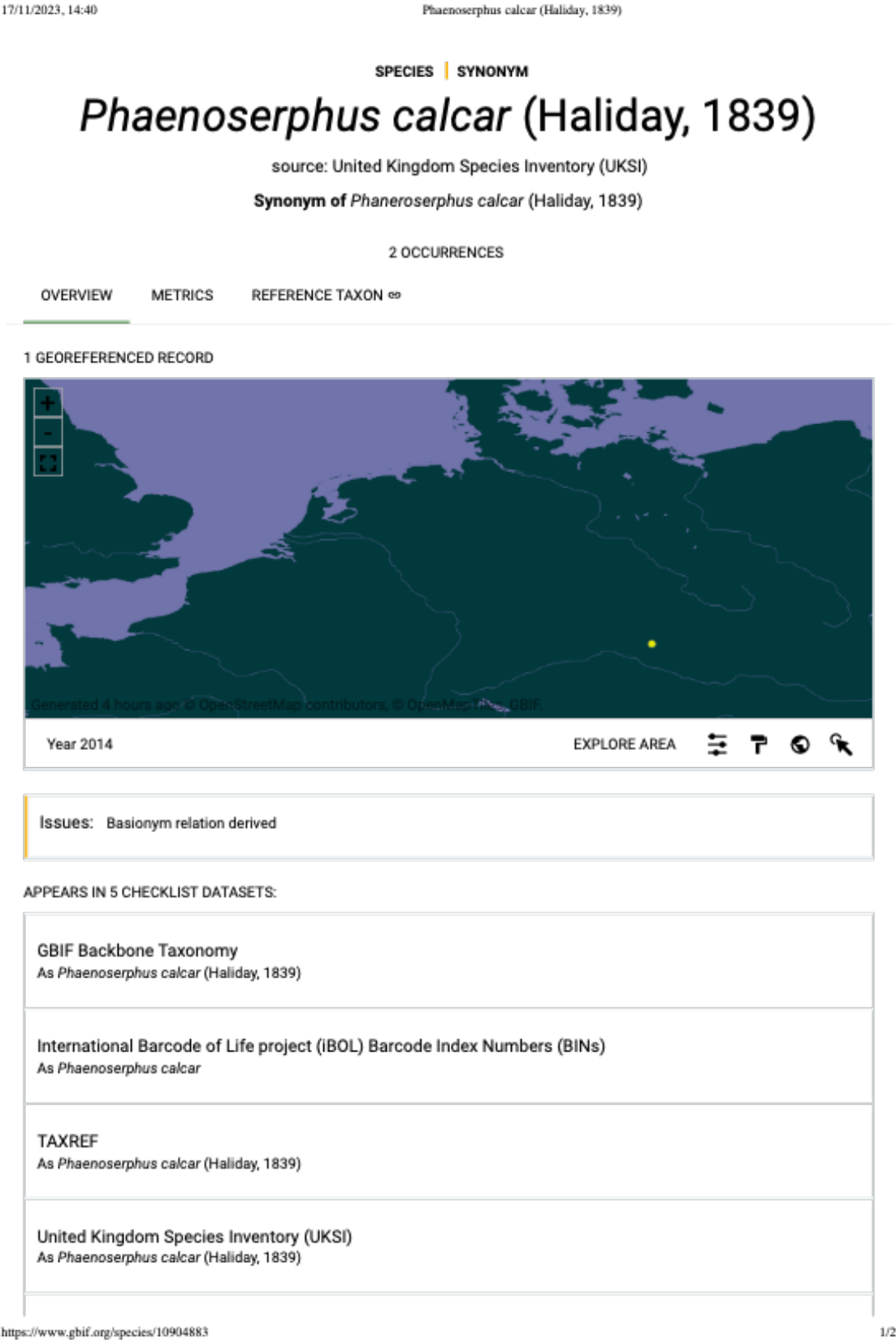


NAME USAGES APPLIED TO OCCURRENCES IN GBIF

<https://www.gbif.org/species/4503996>

1/4

Figure S132: Global Biodiversity Information Facility (GBIF) Webpage *Parthenocodrus elongatus*



Sanger_ID: SQ_2022_057_026

Data_ID: HA_310822_C6A (conventional HPS 2000K)



Figure S134: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_057

Data_ID: HA_120621_C7A (conventional HPS 2000K)



Figure S135: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_063

Data_ID: HA_240822_C6A (conventional HPS 2000K)



Figure S136: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_004

Data_ID: HA_240822_C2A (conventional HPS 2000K)



Figure S137: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_016

Data_ID: HA_240822_C5B (conventional HPS 2000K)

HA_240822_C5A



Figure S138: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_075

Data_ID: HA_240822_C6B (conventional HPS 2000K)



Figure S139: *Proctotrupinae* sp.

Sanger_ID: SQ_2022_057_087

Data_ID: HA_240822_C6C (conventional HPS 2000K)



Figure S140: *Proctotrupinae* sp.

Platygastridae sp. (Platygastridae)

Data_ID: HA_180522_C1A (tailored LED 2700K)

Sanger ID: SQ_2022_057_017



Figure S141: *Platygastridae sp.*

Proctotrupes sp. (Proctotrupidae)

17/11/2023, 14:57

Proctotrupes Latreille, 1796

GENUS | ACCEPTED

Proctotrupes Latreille, 1796

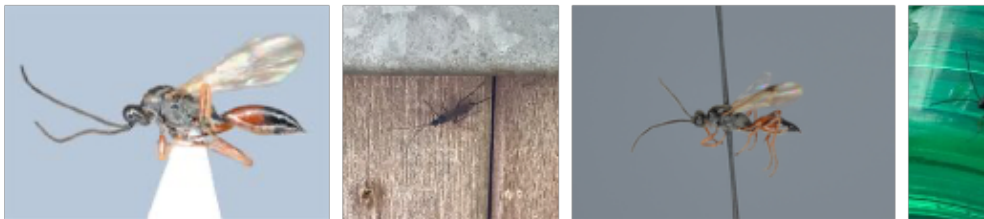
Published in: *Précis Caract. Ins.*: 108

source: Taxon list of Hymenoptera from Germany compiled in the context of the GBOL project

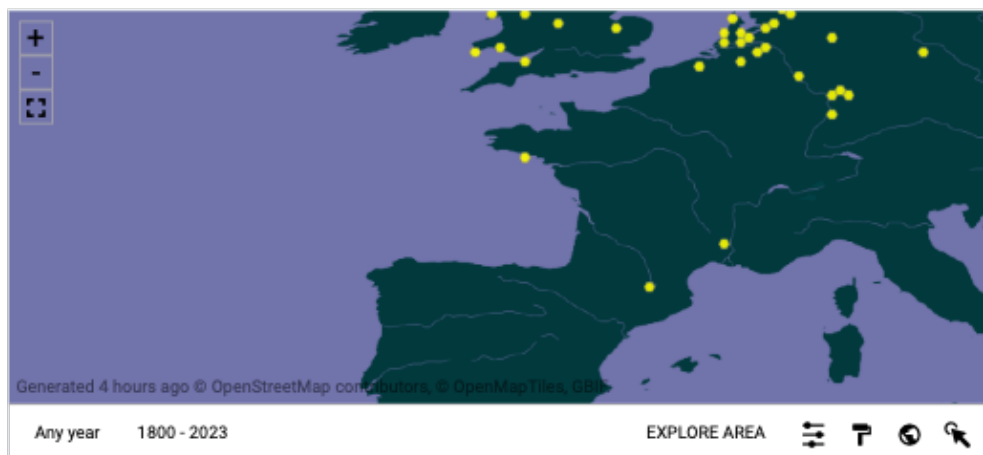
469 OCCURRENCES 6 SPECIES

OVERVIEW METRICS REFERENCE TAXON 

48 OCCURRENCES WITH IMAGES



232 GEOREFERENCED RECORDS



APPEARS IN 19 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Proctotrupes* Latreille, 1796

NCBI Taxonomy
As *Proctotrupes*

The European Nucleotide Archive (ENA) taxonomy

<https://www.gbif.org/species/4405302>

1/3

Figure S142: Global Biodiversity Information Facility (GBIF) Webpage *Proctotrupes*

Sanger_ID: SQ_2022_057_080
Data_ID: BR_280622_C23A (tailored LED 2700K)

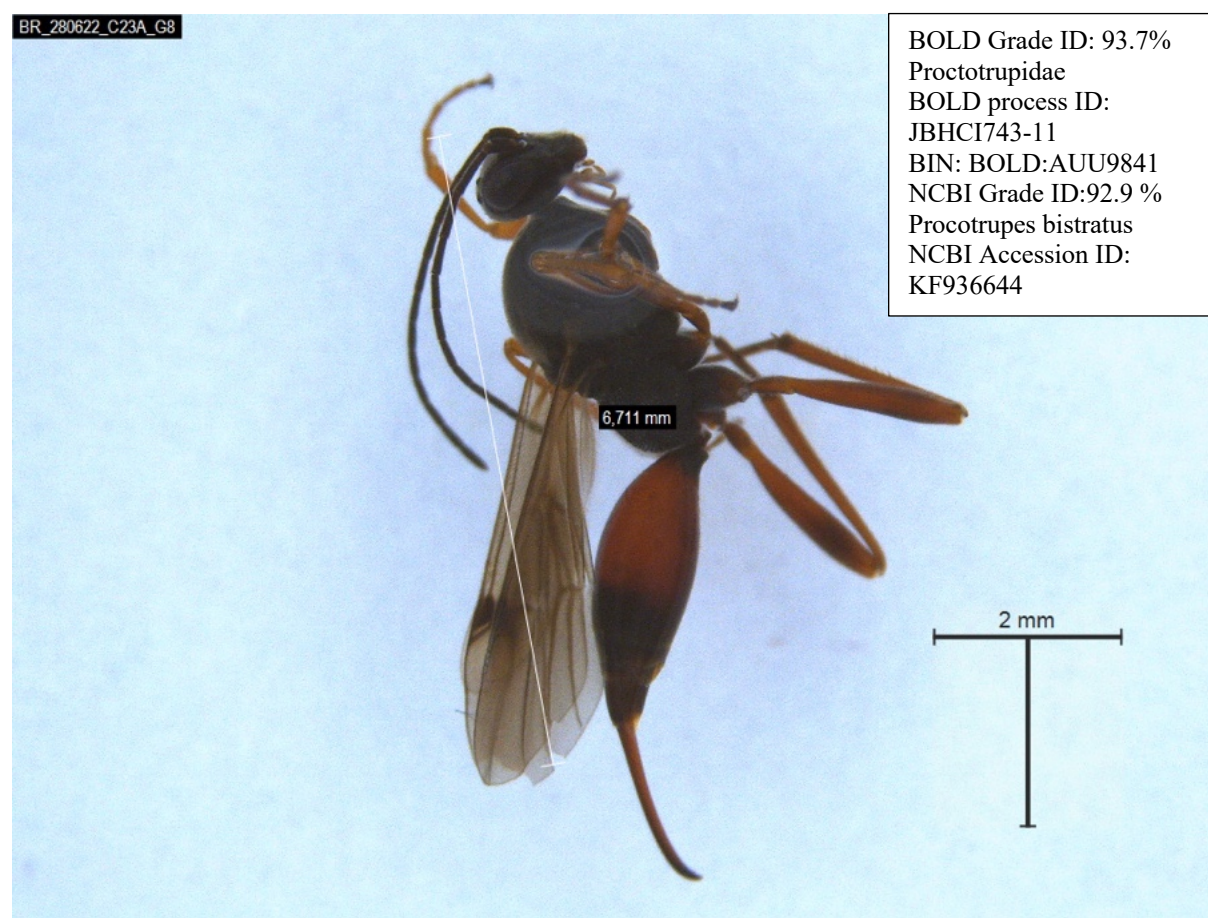


Figure S143: *Proctotrupes* sp.

Sanger_ID: SQ_2022_057_107
Data_ID: BR_280622_C19A (tailored LED 2700K)

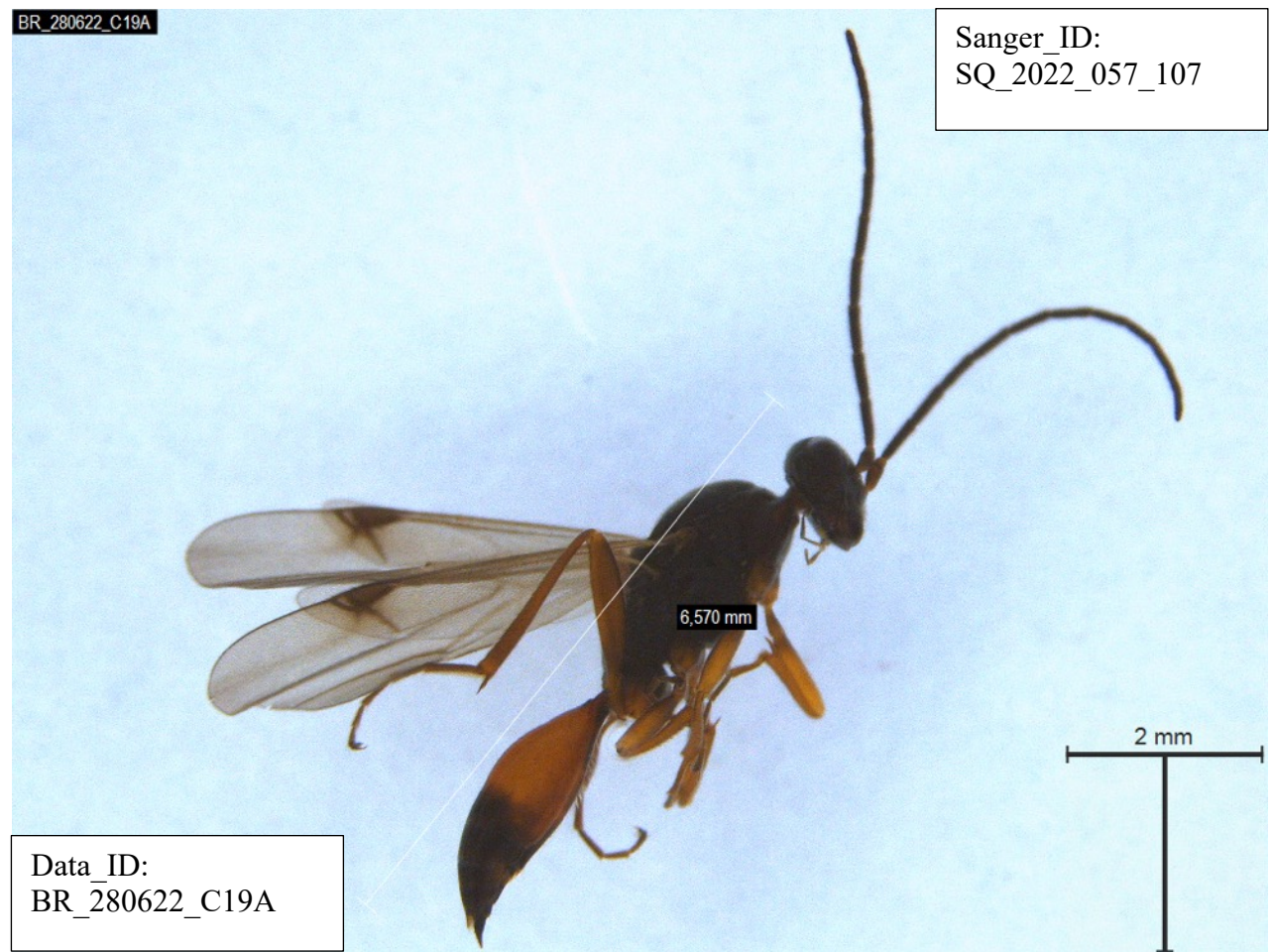


Figure S144: *Proctotrupes* sp.

Scelionidae sp1. (Scelionidae)

17/11/2023, 14:56

Scelionidae

FAMILY | ACCEPTED

Scelionidae

In: GBIF Backbone Taxonomy

Scelionid wasps In English

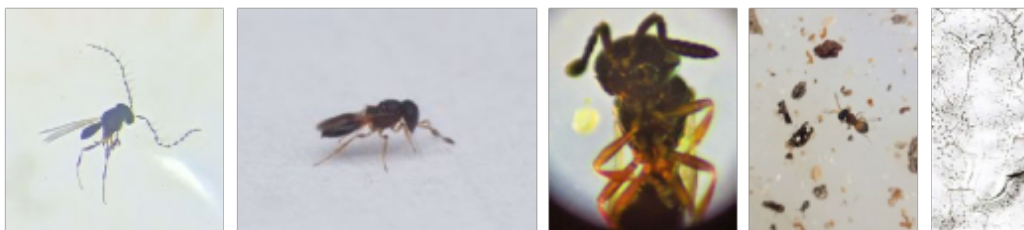
314,291 OCCURRENCES

3,555 SPECIES

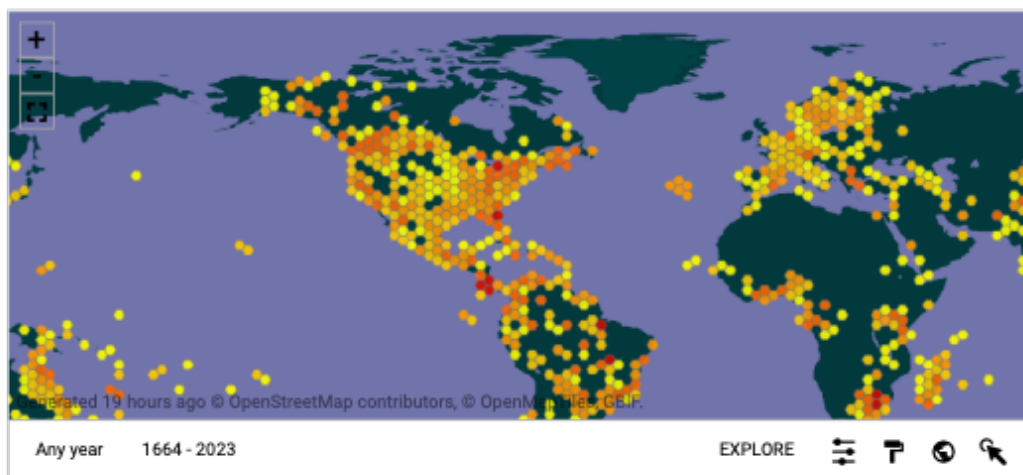
OVERVIEW

METRICS

27,654 OCCURRENCES WITH IMAGES



299,836 GEOREFERENCED RECORDS



VERNACULAR NAMES

Scelionid wasps In English

sources: Catalogue of Life Checklist + 1 more dataset

Scelionids In English

sources: Catalogue of Life Checklist + 1 more dataset

Äggmärkarsteklar In Swedish

source: Dyntaxa. Svensk taxonomisk databas

<https://www.gbif.org/species/4349>

1/4

Figure S145: Global Biodiversity Information Facility (GBIF) Webpage *Scelionidae Succinctus*

Sanger_ID: SQ_2022_057_014

Data_ID: KA_190722_C14A (conventional LED 4000K)



Figure S146: *Scelionidae sp1.*

Scelionidae sp2. (Scelionidae)

Sanger_ID: SQ_2022_057_094

Data_ID: KA_300621_C16A (conventional LED 4000K)

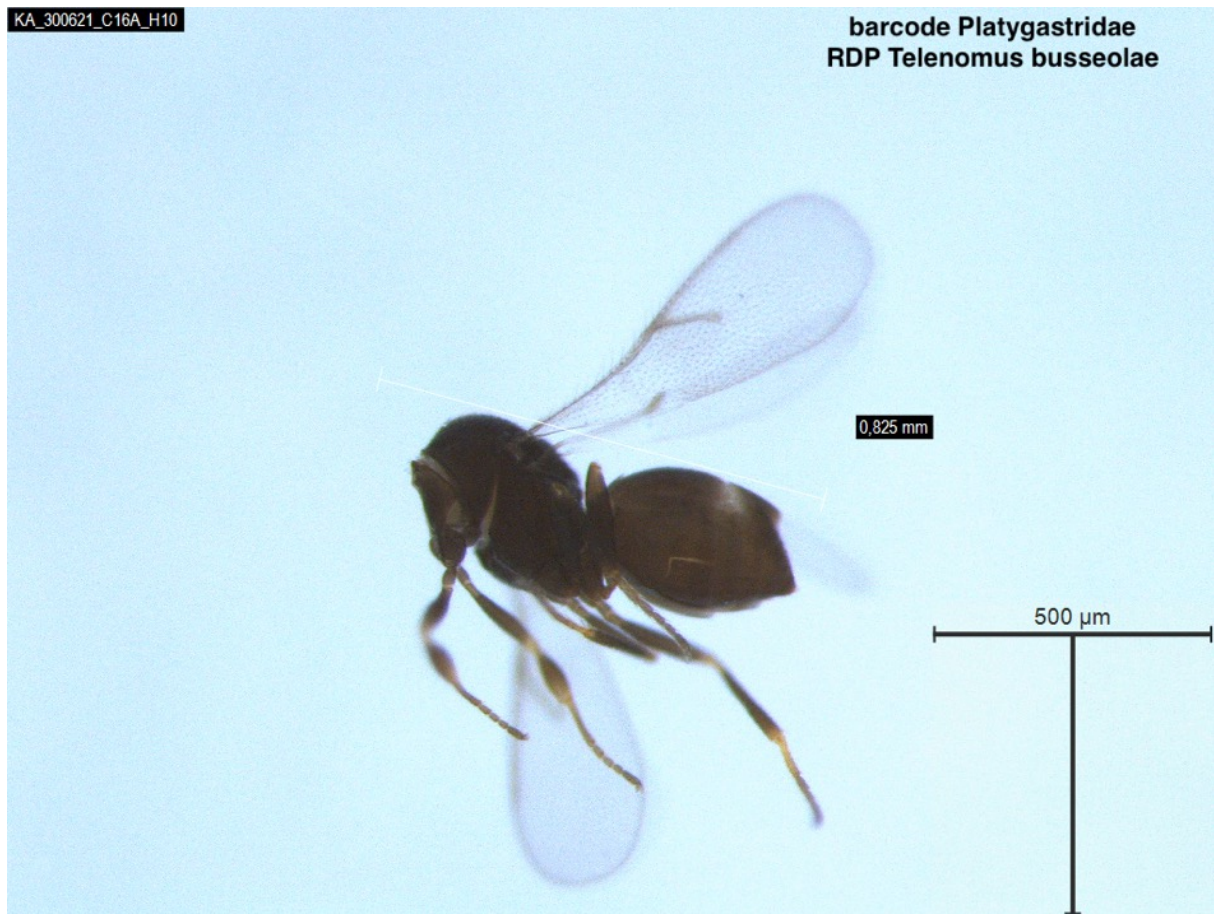


Figure S147: *Scelionidae sp2.*

Stenomacrus affinator (Ichneumonidae)

17/11/2023, 14:57

Stenomacrus affinator Aubert, 1981

SPECIES | ACCEPTED

Stenomacrus affinator Aubert, 1981

Published in: Aubert, J.F. Revision des Ichneumonides *Stenomacrus* sensu lato. Mitteilungen Munchener Entomologischen Gesellschaft. 71:139-159. (1981).
source: Taxapad Ichneumonoidea

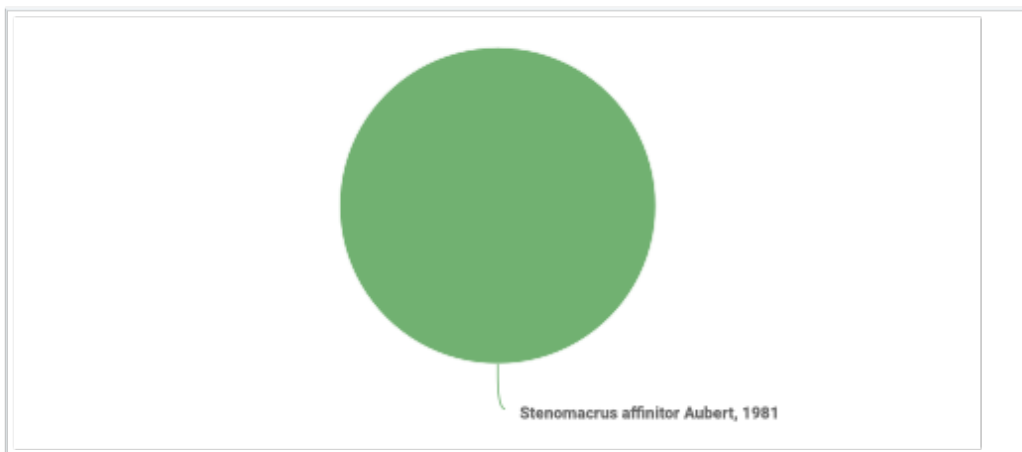
62 OCCURRENCES 3 INFRASPECIES

OVERVIEW METRICS REFERENCE TAXON 

17 GEOREFERENCED RECORDS



NAME USAGES APPLIED TO OCCURRENCES IN GBIF



APPEARS IN 8 CHECKLIST DATASETS:

GBIF Backbone Taxonomy

<https://www.gbif.org/species/1307987>

1/3

Figure S148: Global Biodiversity Information Facility (GBIF) Webpage *Stenomacrus affinator*

Sanger_ID: SQ_2022_057_060

Data_ID: BR_280622_C24A (conventional HPS 2000K)



Figure S149: *Stenomacrus affinator*

Stenomalina sp. (Pteromalidae)

17/11/2023, 15:02

Stenomalina Ghesquière, 1946

GENUS | ACCEPTED

Stenomalina Ghesquière, 1946

Published in: Rev. Zool. Bot., afr., 39

source: Universal Chalcidoidea Database

574 OCCURRENCES

21 SPECIES

OVERVIEW

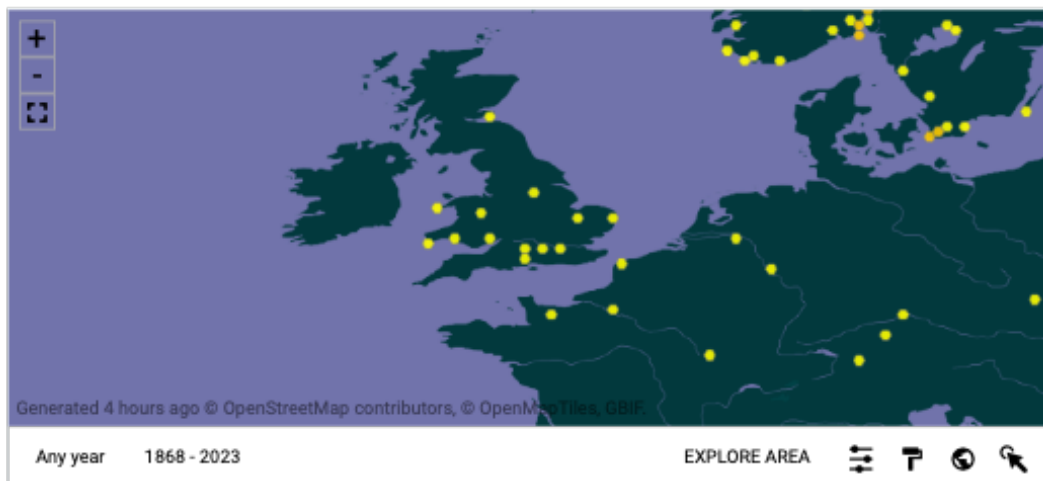
METRICS

REFERENCE TAXON 

11 OCCURRENCES WITH IMAGES



191 GEOREFERENCED RECORDS



APPEARS IN 19 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Stenomalina* Ghesquière, 1946

Catalogue of Life Checklist
As *Stenomalina*

NCBI Taxonomy
As *Stenomalina*

<https://www.gbif.org/species/1397525>

1/3

Figure S150: Global Biodiversity Information Facility (GBIF) Webpage *Acrotomus Succinctus*

Sanger_ID: SQ_2022_057_015

Data_ID: KA_270622_C14A (conventional LED 4000K)



Figure S151: *Stenomalina* sp.

Synopeas sp. (Platygastridae)

17/11/2023, 15:07

Synopeas Förster, 1856

GENUS | ACCEPTED

Synopeas Förster, 1856

Published in: Foerster, Arnold. 1856. Hymenopterologische Studien. II. Heft. Chalcidiae und Proctotrupii. Ernst ter Meer, Aachen.: 1-152.

In: GBIF Backbone Taxonomy

10,508 OCCURRENCES 310 SPECIES

OVERVIEW 4 TREATMENTS METRICS

52 OCCURRENCES WITH IMAGES



1,155 GEOREFERENCED RECORDS



APPEARS IN 33 CHECKLIST DATASETS:

GBIF Backbone Taxonomy
As *Synopeas* Förster, 1856

Catalogue of Life Checklist
As *Synopeas* Förster, 1856

<https://www.gbif.org/species/1400957>

1/3

Figure S152: Global Biodiversity Information Facility (GBIF) Webpage *Synopeas*

Sanger_ID: SQ_2022_057_076
Data_ID: HA_240822_C3A (tailored LED 2000K)

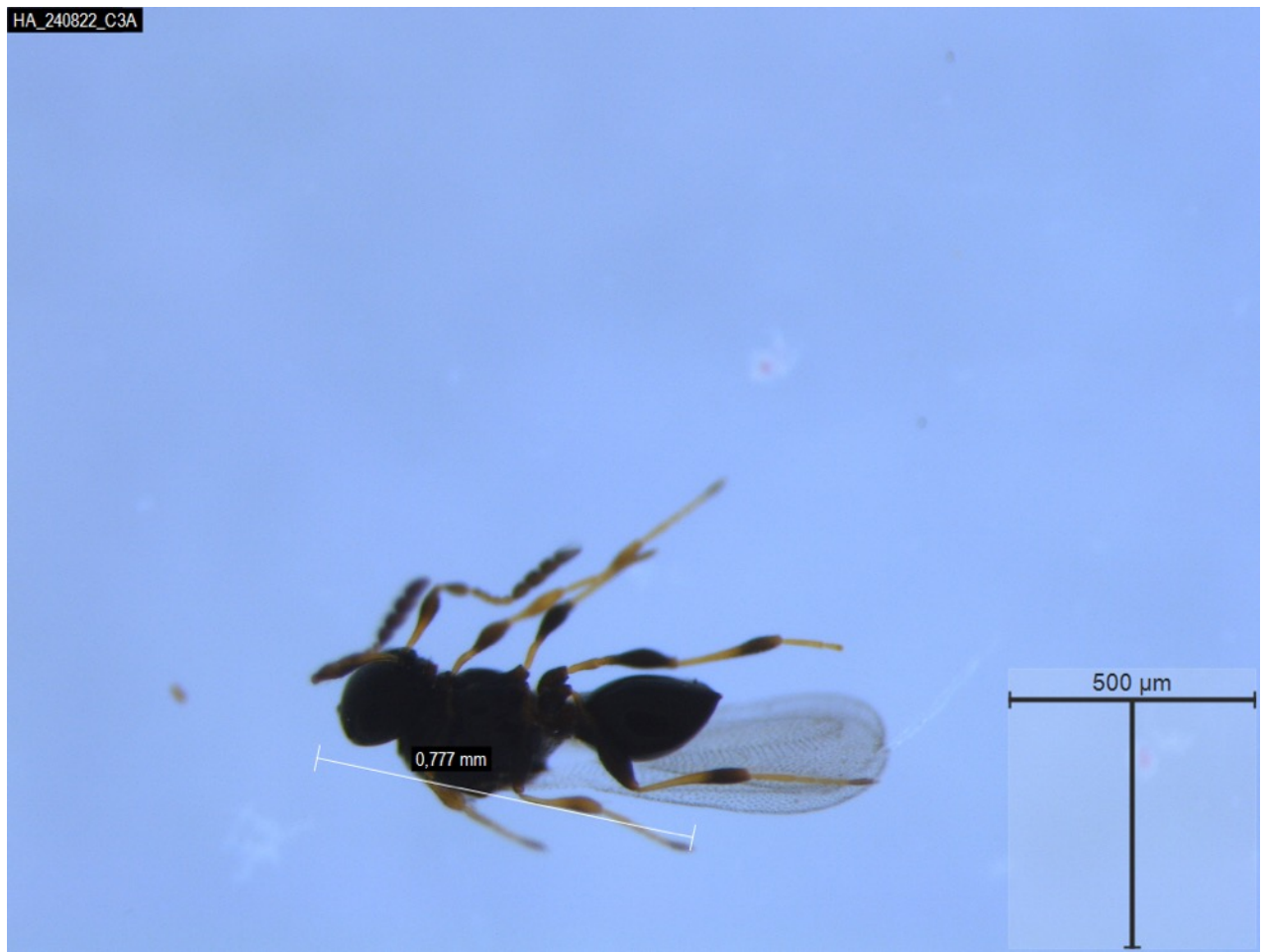


Figure S153: *Synopeas* sp.

Alysiinae sp. (Braconidae)

Sanger_ID: SQ_2022_057_095

Data_ID: HA_260722_C4A (tailored LED 2700K)



Figure S154: *Alysiinae sp.*

Temelucha (Ichneumonidae)

Sanger_ID: SQ_2022_057_099

Data_ID: KA_270622_C15A (conventional LED 4000K)

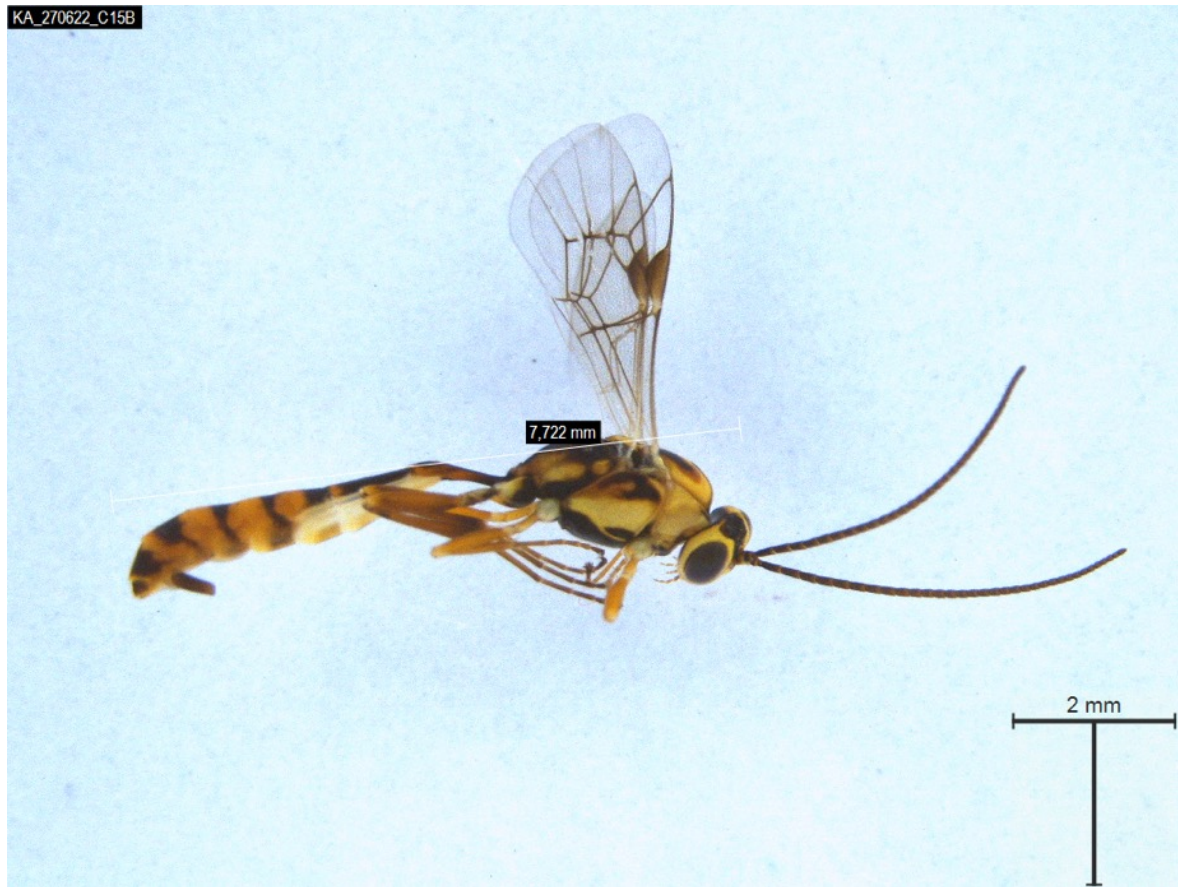


Figure S155: *Temelucha* sp.

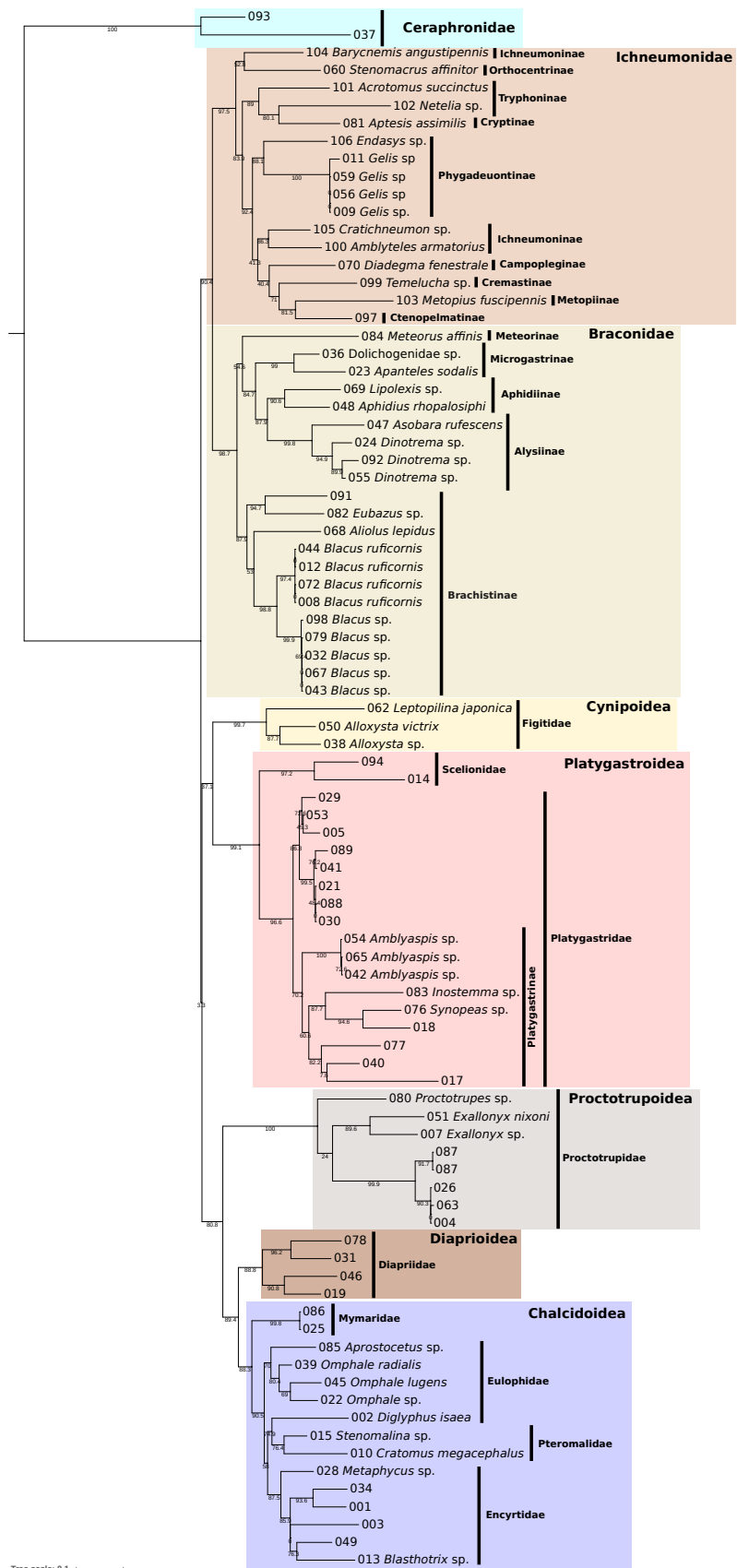


Figure S156: Phylogenetic trees showing genetic relationships between CO1 Sequences (black numbers represent ID numbers) of parasitoid wasps. The tree was constructed using IQ-TREE version 1.6.12, based on the maximum optimality criterion. Numbers on branches represent bootstrap support. The inferred tree was rooted by selecting two *Ceraphronidae* specimens as phylogenetic outgroup.

References

1. Woelke, J. B., Pham, K. & Humala, A. E. New species of *Stenomacrus* (Hymenoptera: Ichneumonidae: Orthocentrinae) reared from *Bradysia impatiens* (Diptera: Sciaridae) in The Netherlands. *Journal of Natural History* **54**, 1603–1616 (2020).
2. Schmidt, K. & Zmudzinski, F. 3. Beitrag zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae). *Carolinea* **61**, 119–132 (2003).
3. Broad, G. R. Checklist of British and Irish Hymenoptera - Ichneumonidae. *Biodiversity Data Journal* **4**, (2016).
4. Klopstein, S., Riedel, M. & Schwarz, M. Checklist of ichneumonid parasitoid wasps in Switzerland (Hymenoptera, Ichneumonidae): 470 species new for the country and an appraisal of the alpine diversity. *Alpine Entomology* **3**, 51–81 (2019).
5. Zwakhals, K., Blommers, L. & Kaaistoep, D. Tryphoninae (Hymenoptera : Ichneumonidae) reared from sawflies (Hymenoptera : Symphyta) in the Netherlands. *Entomologische Berichten* **82**, 9–17 (2022).
6. Van Achterberg, C. The European species of the subgenus *Aliolus* Say of the genus *Eubazus* Nees and of the genus *Dicyrtaspis* van Achterberg (Hymenoptera: Braconidae: *Zoologische Mededelingen Leiden* **77**, 301–320 (2003).
7. Belokobylskij, S. A., Taeger, A., Van Achterberg, C., Haeselbarth, E. & Riedel, M. Checklist of the Braconidae of Germany (Hymenoptera). *Beiträge zur Entomologie = Contributions to Entomology* **53**, 341–435 (2003).
8. Holler, C., Borgemeister, C., Haardt, H. & Powell, W. The Relationship between Primary Parasitoids and Hyperparasitoids of Cereal Aphids: An Analysis of Field Data. *J Anim Ecol* **62**, 12 (1993).
9. Ferrer-Suay, M., Selfa, J. & Pujade-Villar, J. Palaearctic species of charipinae (Hymenoptera, figitidae): Two new species, synthesis and identification key. *European Journal of Taxonomy* **2018**, 1–110 (2018).
10. Ferrer-Suay, M. *et al.* Nuclear and mitochondrial markers suggest new species boundaries in *Alloxysta* (Hymenoptera: Cynipoidea: Figitidae). *Arthropod Syst Phylogeny* **76**, 463–473 (2018).
11. Sivell, O. & Broad, G. R. The genome sequence of an ichneumonid wasp , *Amblyteles armatorius* (Forster , 1771) [version 1 ; peer review : 1 approved] Natural History Museum Genome Acquisition Lab , Darwin Tree of Life Barcoding collective , Wellcome Sanger Institute Tree of Life. 1–10 (2023).
12. Aydoğdu, M. Parasitoid abundance of *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae) in organic cherry orchards. *North West J Zool* **10**, 42–47 (2014).
13. Ye, Z., Vollhardt, I. M. G., Tomanovic, Z. & Traugott, M. Evaluation of three molecular markers for identification of European primary parasitoids of cereal aphids and their hyperparasitoids. *PLoS One* **12**, 1–20 (2017).
14. Goulet, H. & Huber, J. T. *Hymenoptera of the World: An Identification Guide to Families*. *American Entomologist* (1993). doi:10.1093/ae/40.2.115.
15. Schmidt, K., Zmudzinski, F. & Riedel, M. Beiträge zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae) 8. Metopiinae, Tersilochinae und neun weitere Unterfamilien. *Carolinea* **68**, 61–78 (2010).
16. Abram, P. K. *et al.* New records of leptopilina, ganaspis, and asobara species associated with *Drosophila suzukii* in North America, including detections of *L. japonica* and *G. brasiliensis*. *J Hymenopt Res* **78**, 1–17 (2020).
17. Khalaim, A. I. A review of the Palaearctic species of the genera *Barycnemis* Först., *Epistathmus* Först. and *Spinolochus* Horstm. (Hymenoptera: Ichneumonidae, Tersilochinae). *Proceedings of the Russian Entomological Society* **75**, 46–63 (2004).

18. Haeselbarth, E. Die Blacus-Arten Europas und Zentral-Asiens. *Münchner Entomologische Gesellschaft, Veröffentlichungen der zoologischen Staatssammlung München* (1974).
19. Wisniowski, B. Catalogue of Hymenoptera (Arthropoda: Insecta) of the Ojców National Park. **26**, 95–146 (2016).
20. Vidal, S., Müller, J. & Schmidt, S. Critical checklist of the Chalcidoidea and Mymarommatoidea (Insecta, Hymenoptera) of Germany. *Biodiversity Data Journal* **10**, (2022).
21. Haas, M. *et al.* Tiny wasps, huge diversity – A review of German Pteromalidae with new generic and species records (Hymenoptera: Chalcidoidea). *Biodiversity Data Journal* **9**, (2021).
22. Mitroiu, M.-D. & Andriescu, I. A preliminary faunistic review of the pteromalids (Hymenoptera: Chalcidoidea, Pteromalidae) of the Romanian protected areas. *Analele Stiintifice ale Universitatii 'Al. I. Cuza' din Iasi Sectiunea de Biologie Animala* (2006).
23. Azidah, A. A., Fitton, M. G. & Quicke, D. L. J. Identification of the Diadegma species (Hymenoptera: Ichneumonidae, Campopleginae) attacking the diamondback moth, *Plutella xylostella* (Lepidoptera: Plutellidae). *Bull Entomol Res* **90**, 375–389 (2000).
24. Juric, I., Salzburger, W. & Balmer, O. Spread and global population structure of the diamondback moth *Plutella xylostella* (Lepidoptera: Plutellidae) and its larval parasitoids *Diadegma semiclausum* and *Diadegma fenestrale* (Hymenoptera: Ichneumonidae) based on mtDNA. *Bull Entomol Res* **107**, 155–164 (2017).
25. Schmidt, K., Zmudzinski, F. & Riedel, M. Beiträge zur Kenntnis der badischen Schlupf- wespenfauna (Hymenoptera, Ichneumonidae) 9. Unterfamilie Campopleginae. 95–122 (2011).
26. Xu, X. *et al.* Molecular identification of hymenopteran parasitoids and their endosymbionts from agromyzids. *Bulletin of Entomological Research* (2023) doi:10.1017/S0007485323000160.
27. Broad, G. R. Checklist of British and Irish Hymenoptera - Proctotrupoidea. *Biodiversity Data Journal* **4**, (2016).
28. Izadzadeh, M. *et al.* Review of the Family Proctotrupidae (Hymenoptera Proctotrupoidea) in Iran. *Redia* **105**, 37–58 (2022).
29. Martin, J., Vogel, J., Peters, R. S. & Herz, A. First record of *Leptopilina japonica* Novković & Kimura, 2011 (Hymenoptera: Figitidae) in Germany, a parasitoid of the Spotted Wing *Drosophila* *Drosophila suzukii* (Matsumura, 1931) (Diptera: Drosophilidae). *Journal of Applied Entomology* 1–7 (2023) doi:10.1111/jen.13182.
30. Puppato, S., Grassi, A., Pedrazzoli, F., De Cristofaro, A. & Ioriatti, C. First report of *leptopilina japonica* in europe. *Insects* **11**, 1–13 (2020).
31. Stigenberg, J. & Ronquist, F. *Revision of the Western Palearctic Meteorini (Hymenoptera, Braconidae), with a Molecular Characterization of Hidden Fennoscandian Species Diversity*. *Zootaxa* vol. 95 (2011).
32. Hansson, C. & Shevtsova, E. Revision of the European species of *Omphale* Haliday (Hymenoptera, chalcidoidea, eulophidae). *ZooKeys* **232**, 1–157 (2012).
33. Gijswijt, M. J. Notes on biology and distribution of the Genus *Omphale* Haliday 1833, with description of two new species (Eulophidae). *Bulletin Zoologisch Museum, Universiteit van Amsterdam* **5**, 77–83 (1976).
34. Englert, C. & Herz, A. Native predators and parasitoids for biological regulation of *Drosophila suzukii* in Germany. *Proceedings of the Ecofruit. 17th Intern. Conference on Organic Fruit-Growing: Proceedings* 284–285 (2017).

35. Peters, R. S. New records and notes on the life history of *Pachycrepoideus vindemmiae* (Rondani , 1875) (Hymenoptera : Chalcidoidea : Pteromalidae). (2009).
36. Knoll, V., Ellenbroek, T., Romeis, J. & Collatz, J. Seasonal and regional presence of hymenopteran parasitoids of *Drosophila* in Switzerland and their ability to parasitize the invasive *Drosophila suzukii*. *Sci Rep* **7**, 1–11 (2017).
37. Komonen, A., Siitonen, J. & Mutanen, M. Insects inhabiting two old-growth forest polypore species. *Entomologica Fennica* **12**, 3–14 (2001).
38. Mohammadi-Khoramabadi, A., Talebi, A. A. & ... Study of three genera of the *Orthocentrus* genus-group (Hymenoptera: Ichneumonidae, Orthocentrinae) in northern Iran. *Journal of Entomological ...* **37**, 441–460 (2018).

Identification literature:

- Azidah, A. A., Fitton, M. G., & Quicke, D. L. J. (2000). Identification of the *Diadegma* species (Hymenoptera: Ichneumonidae, Campopleginae) attacking the diamondback moth, *Plutella xylostella* (Lepidoptera: Plutellidae). *Bulletin of Entomological Research*, 90(5), 375–389. <https://doi.org/10.1017/S0007485300000511>
- Boucek, Z., & Rasplus, J. Y. (1988). Illustrated Key to West-Palearctic Genera of Pteromalidae. January 1991.
- Buhl, P. N. (2015). Further new or little known Neotropical species of Platygasterinae (Hymenoptera: Platygasteridae). *International Journal of Environmental Studies*, 72(2), 316–330. <https://doi.org/10.1080/00207233.2014.994275>
- Buhl, P. N. (2016). New European species of Platygasterinae, with an updated list of Latvian species of Platygasterinae and Sceliotrachelinae (Hymenoptera: Platygasteridae). *Latvijas Entomologs*, 53, 3–13.
- Buhl, P. N. (2019). New species and notes on variation in Platygasterinae from Germany (Hymenoptera, Platygasteridae). *Entomofauna*, 40(1), 337–346.
- Ferrer-Suay, M., Selfa, J., Notton, D. G., & Pujade-Villar, J. (2013). Revision of the types of species of *Alloxysta* described by Cameron and Fergusson (Hymenoptera: Figitidae: Charipinae) and deposited in the Natural History Museum (London), including a key to the fauna of Great Britain. *European Journal of Taxonomy*, 53, 1–27. <https://doi.org/10.5852/ejt.2013.53>
- Ferrer-Suay, M., Selfa, J., & Pujade-Villar, J. (2015). New contribution to the knowledge of the genus *Alloxysta* (Insecta : Hymenoptera : Cynipoidea : Figitidae): revision of some type material. 117, 23–36.
- Ferrer-Suay, M., Selfa, J., & Pujade-Villar, J. (2018). Palearctic species of charipinae (Hymenoptera, figitidae): Two new species, synthesis and identification key. *European Journal of Taxonomy*, 2018(427), 1–110. <https://doi.org/10.5852/ejt.2018.427>
- Ferrer-Suay, M., Selfa, J., & Pujade-Villar, J. (2019). Keys to world charipinae (Hymenoptera, cynipoidea, figitidae). *ZooKeys*, 2019(822), 79–139. <https://doi.org/10.3897/zookeys.822.30151>
- Ferrer-Suay, M., Staverlökk, A., Selfa, J., Pujade-Villar, J., Naik, S., & Ekrem, T. (2018). Nuclear and mitochondrial markers suggest new species boundaries in *Alloxysta* (Hymenoptera: Cynipoidea: Figitidae). *Arthropod Systematics and Phylogeny*, 76(3), 463–473. <https://doi.org/10.3897/asp.76.e31963>
- Fouts, R. M. (1924). Revision of the North American wasps of the subfamily Platygasterinae. *Proceedings of the United States National Museum*, 63(2484), 1–145. <https://doi.org/10.5479/si.00963801.63-2484.1>
- Gijswijt, M. J. (1976). Notes on biology and distribution of the Genus *Omphale* Haliday 1833, with description of two new species (Eulophidae). *Bulletin Zoologisch Museum, Universiteit van Amsterdam*, 5(10), 77–83.
- Goulet, H., & Huber, J. T. (1993). Hymenoptera of the World: An Identification Guide to Families. In Agriculture Canada, Centre for Land and Biological Resources Research Ottawa, Ontario. <https://doi.org/10.1093/ae/40.2.115>
- Guerrieri, E., & Noyes, J. (2005). Revision of the European species of *Copidosoma* Ratzeburg (Hymenoptera: Encyrtidae), parasitoids of caterpillars (Lepidoptera). *Systematic Entomology*, 30(1), 97–174. <https://doi.org/10.1111/j.1365-3113.2005.00271.x>
- Haas, M., Baur, H., Schweizer, T., Monje, J. C., Moser, M., Bigalk, S., & Krogmann, L. (2021). Tiny wasps, huge diversity – A review of German Pteromalidae with new generic and species

- records (Hymenoptera: Chalcidoidea). *Biodiversity Data Journal*, 9.
<https://doi.org/10.3897/BDJ.9.E77092>
- Hansson, C., & Shevtsova, E. (2012). Revision of the European species of *Omphale* Haliday (Hymenoptera, chalcidoidea, eulophidae). *ZooKeys*, 232, 1–157.
<https://doi.org/10.3897/zookeys.232.3625>
- Izadzadeh, M., Talebi, A. A., Kolyada, V., Farahani, S., Kazerani, F., & Ameri, A. (2022). Review of the Family Proctotrupidae (Hymenoptera Proctotrupoidea) in Iran. *Redia*, 105(June), 37–58. <https://doi.org/10.19263/REDIA-105.22.06>
- Japoshvili, G. O., & Noyes, J. S. (2006). New data on the European fauna of encyrtid wasps (Hymenoptera, Chalcidoidea, Encyrtidae). *Entomological Review*, 86(3), 298–304.
<https://doi.org/10.1134/s0013873806030067>
- Japoshvili, G., & Soethof, R. (2011). New records of Encyrtidae (Hymenoptera: Chalcidoidea) from the Netherlands, with a description of new species. *Zootaxa*, 40(May), 27–40.
- Khalaim, A. I. (2004). A review of the Palaearctic species of the genera *Barycnemis* Först., *Epistathmus* Först. and *Spinolochus* Horstm. (Hymenoptera: Ichneumonidae, Tersilochinae). *Proceedings of the Russian Entomological Society*, 75(1), 46–63.
- Masner, L. (1980). Key To Genera of Scelionidae of the Holarctic Region, With Descriptions of New Genera and Species (Hymenoptera: Proctotrupoidea). In *Memoirs of the Entomological Society of Canada* (Vol. 112, Issue S113, pp. 1–54). <https://doi.org/10.4039/entml12113fv>
- Masner, L., & García R., J. L. (2002). The genera of Diapriinae (Hymenoptera: Diapriidae) in the New World. *Bulletin of the American Museum of Natural History*, 268, 2–125.
[https://doi.org/10.1206/0003-0090\(2002\)268<0001:tgodhd>2.0.co;2](https://doi.org/10.1206/0003-0090(2002)268<0001:tgodhd>2.0.co;2)
- Mohammadi-Khoramabadi, A., Talebi, A. A. (2018). Study of three genera of the *Orthocentrus* genus-group (Hymenoptera: Ichneumonidae, Orthocentrinae) in northern Iran. *Journal of Entomological*, 37(February), 441–460. <https://doi.org/10.22117/jesi.2018.116455.1163>
- Pricop, E. (2013). Identification key to European genera of the Mymaridae (Hymenoptera: Chalcidoidea), with additional notes. *ELBA Bioflux*, 5(1), undefined-69-81.
- Riedel, M., Schmidt, K., & Zmudzinski, F. (2013). Beiträge zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae) 11. Nachträge und Korrekturen Matthias. 25–53.
- Schaefer, M. (2009). *Brohmer - Fauna von Deutschland*. Quelle & Meyers. ISBN:9783494014722
- Schmidt, K., & Zmudzinski, F. (2003). 3. Beitrag zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae). *Carolinea*, 61, 119–132.
- Schmidt, K., Zmudzinski, F., & Riedel, M. (2010). Beiträge zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae) 8. Metopiinae, Tersilochinae und neun weitere Unterfamilien. *Carolinea*, 68, 61–78. www.zobodat.at
- Schmidt, K., Zmudzinski, F., & Riedel, M. (2011). Beiträge zur Kenntnis der badischen Schlupfwespenfauna (Hymenoptera, Ichneumonidae) 9. Unterfamilie Campopleginae. 1924, 95–122.
- Shimbori, E. M., Costa, V. A., & Zucchi, R. A. (2020). Annotated checklist and illustrated key to parasitoids (Hymenoptera: Diapriidae, Eulophidae and Pteromalidae) of fruit flies (Diptera, Tephritidae) in Brazil. *Zootaxa*, 4858(1), 53–70. <https://doi.org/10.11646/zootaxa.4858.1.3>
- Stigenberg, J., & Peris-Felipo, F. J. (2019). Contribution to the knowledge of Swedish Dacnusiini (Hymenoptera, Braconidae: Alysiinae): checklist and seven new species records. *Journal of Insect Biodiversity and Systematics*, 5(3), 221–230. <https://doi.org/10.52547/jibs.5.3.221>
- Stigenberg, J., & Ronquist, F. (2011). Revision of the western Palearctic meteorini (Hymenoptera, Braconidae), with a molecular characterization of hidden Fennoscandian species diversity. In *Zootaxa* (Vol. 95, Issue 3084). <https://doi.org/10.11646/zootaxa.3084.1.1>
- Stigenberg, J., & Shaw, M. R. (2013). Western palaearctic meteorinae (Hymenoptera: Braconidae) in the national museums of Scotland, with rearing, phenological and distributional data,

including six species new to Britain, and a discussion of a potential route to speciation. *Entomologist's Gazette*, 64(4), 251–268.

Van Achterberg, C. (2003). The European species of the subgenus *Aliolus* Say of the genus *Eubazus* Nees and of the genus *Dicyrtaspis* van Achterberg (Hymenoptera: Braconidae: *Zoologische Mededelingen Leiden*, 77(17), 301–320.
<http://www.repository.naturalis.nl/document/44277>

Verheyde, F., Hoekstra², P., Libert, P.-N., Meijer, H., De Ketelaere, A., Vandaudenard, T., Belgers, D., & Brosens, E. (2021). Belgian Journal of Entomology Two hundred and five ichneumonid wasps reported for the first time in Belgium and the Netherlands (Hymenoptera: Ichneumonidae). *Belgian Journal of Entomology*, 122, 1–142. www.srbe-kbve.be

Yu, F., Chen, F. Q., Yen, S. H., Tu, L. H., Zhu, C. D., Guerrieri, E., & Zhang, Y. Z. (2014). Preliminary phylogeny of the genus *Copidosoma* (Hymenoptera, Encyrtidae), polyembryonic parasitoids of Lepidoptera. *Systematic Entomology*, 39(2), 325–334.
<https://doi.org/10.1111/syen.12057>