

Table S1: Detailed list of species studied with the DNA target enrichment approach. Listed is information about the sampled data, sampling site and date as well as the quantity of extracted genomic DNA. Taxonomic classification according to Pulawski (2016). We included two bees and the following apoid wasps: two Ampulicidae, 12 Sphécidae s. str., 78 Crabronidae, and one Heterogynidae.

Family	Subfamily	Tribe	Subtribe	Species	preservation date	preservation material	collection place	male / female	Amount of extracted DNA [ng/µl]
Ampulicidae		Ampulicini		<i>Ampulex compressa</i>	August 2013	96% ethanol	Qisselndorf, Germanv	m	3.1
Ampulicidae	Dolichurinae			<i>Dolichurus</i> sp.	22.29.10.2007	96% ethanol	Madagascar	m	0.8
Sphécidae s. str.	Ammophilinae			<i>Ammophila</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	8.1
Sphécidae s. str.	Ammophilinae			<i>Eremnophila melanaria</i>	January 2006	70% ethanol	Argentina, South America	m	7.7
Sphécidae s. str.	Ammophilinae			<i>Podolonia</i> sp.	February 2013	96% ethanol	Nicaragua, Central America	m	55.0
Sphécidae s. str.	Chlorini			<i>Chlorion</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	16.8
Sphécidae s. str.	Sceliphrinae	Podini		<i>Dynatus burmeisteri</i>	January 2006	70% ethanol	Argentina, South America	m	6.28
Sphécidae s. str.	Sceliphrinae	Podini		<i>Penepodulium berne</i>	unknown date	70% ethanol	unknown origin	f	5.2
Sphécidae s. str.	Sceliphrinae	Sceliphriini		<i>Chalybion</i> sp. I	February 2013	96% ethanol	Nicaragua, Central America	m	26.9
Sphécidae s. str.	Sceliphrinae	Sceliphriini		<i>Chalybion</i> sp. II	February 2013	96% ethanol	Nicaragua, Central America	m	28.2
Sphécidae s. str.	Sphécinae	Pionvchini		<i>Palmodus</i> sp.	August 2012	96% ethanol	Arizona, SW-USA	m	14.5
Sphécidae s. str.	Sphécinae	Pionvchini		<i>Pionvix subdratus</i>	August 2013	96% ethanol	Arizona, SW-USA	m	5.29
Sphécidae s. str.	Sphécinae	Sphécini		<i>Sphex funeralis</i> II	August 2013	96% ethanol	Arizona, SW-USA	m	14.0
Sphécidae s. str.	Sphécinae	Stanoellini		<i>Stanoella cvariventris</i>	January 2006	70% ethanol	Argentina, South America	m	30.9
Crabronidae	Astaginae			<i>Astata</i> sp. I	23.04.2013	96% ethanol	Israel ON 3882	m	0.42
Crabronidae	Astaginae			<i>Astata</i> sp. II	August 2013	96% ethanol	Arizona, SW-USA	m	15.2
Crabronidae	Astaginae			<i>Dryadella</i> sp.	August 2012	96% ethanol	Arizona, SW-USA	m	11.3
Crabronidae	Bembicinae	Alvsontini		<i>Didineis</i> sp.	01.07.2013	96% ethanol	Israel ON 5374	m	5.56
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Bicyrtes ventralis</i>	August 2012	96% ethanol	Arizona, SW-USA	m	11.5
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Microbembex</i> sp.	February 2013	96% ethanol	Nicaragua, Central America	m	16.1
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Rubrica nesula</i>	January 2006	70% ethanol	Argentina, South America	m	9.7
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Selman notatus</i>	January 2006	70% ethanol	Argentina, South America	m	24.5
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Stictia heros</i>	February 2013	96% ethanol	Nicaragua, Central America	f	92.0
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Trichosticta</i> sp.	May 2011	70% ethanol	Peru, South America	m	22.8
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Atogrytes</i> sp.	June 2003	70% ethanol	California, USA	f	5.69
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Gorytes albidulus</i>	July 2013	96% ethanol	Brandenburg, Germanv	m	3.3
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Pseudopisus (Gorytes) wilcoxi</i>	August 2012	96% ethanol	Arizona, SW-USA	m	4.91
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Hoplacauda</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	7.7
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Logogrytes</i> sp.	January 2006	70% ethanol	Argentina, South America	m	10.9
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Psammaecius versicolor</i>	26.05.2012	96% ethanol	Israel ON 2531	m	24.4
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Armatonius</i> sp. I	May 2009	70% ethanol	Thailand T4828	m	4.0
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Armatonius</i> sp. II	May 2009	70% ethanol	Thailand T4828	m	26.9
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Sphex spectabilis</i>	January 2006	70% ethanol	Argentina, South America	m	13.6
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Tanvoorninus moneduloides</i>	August 2001	70% ethanol	Arizona, SW-USA	m	22.8
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Tanygymnus</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	1.2
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Microsticta hundi</i>	August 2007	70% ethanol	Arizona, SW-USA	m	28.2
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Steniolia duplicata</i>	August 2012	96% ethanol	Arizona, SW-USA	m	14.8
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Stictiella</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	11.5
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Bembecinus</i> sp.	February 2013	96% ethanol	Nicaragua, Central America	f	10.6
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Stizus fovi</i>	August 2012	96% ethanol	Arizona, SW-USA	m	11.5
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Stizus aff. marthae</i>	May 2012	96% ethanol	Israel ON 2530	m	10.9
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Stizus vespidoides</i>	May 2012	96% ethanol	Israel ON 2528	m	32.4
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Helicocausina</i>	January 2006	70% ethanol	Argentina, South America	m	1.21
Crabronidae	Bembicinae	Bembicini	Bembicina	<i>Helicocausina</i>	January 2006	70% ethanol	Argentina, South America	f	16.1
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Acanthostethus</i> sp.	15.10.2014	96% ethanol	QL, Australien	m	21.9
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Brachystethus</i> sp.	October 2008	96% ethanol	Madagascar	m	7.87
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Symnevis</i> sp.	March 2009	70% ethanol	Thailand	m	17.4
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Anacrabronina</i>	January 2006	70% ethanol	Argentina, South America	m	9.73
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Entomopanthus</i> sp.	01.07.2013	96% ethanol	Israel ON 5421	m	0.38
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Crabroscutellatus</i>	June 2004	70% ethanol	Schwed. Germanv	m	16.3
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Dasyproctus</i> sp.	May 2008	96% ethanol	Madagascar	m	9.4
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Ectemnus xenorhynchus</i>	August 2012	96% ethanol	Arizona, SW-USA	m	19.7
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Foxita bara</i> sp. pater I	September 2012	96% ethanol	Arizona, SW-USA	f	8.02
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Foxita bara</i> sp. pater II	August 2012	96% ethanol	Arizona, SW-USA	f	14.7
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Lesticallata</i>	July 2013	96% ethanol	Brandenburg, Germanv	m	3.97
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Lindenius ganzeri</i>	July 2013	96% ethanol	Brandenburg, Germanv	m	3.99
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Moniaecera</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	f	2.2
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Neodasvoroctus</i> sp. I	October 2008	96% ethanol	Madagascar	m	1.54
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Neodasvoroctus</i> sp. II	October 2008	96% ethanol	Madagascar	m	1.51
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Queus</i> sp.	August 2012	96% ethanol	Ecuador, South America	f	17.3
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Rhopalum clavipes</i>	August 2012	96% ethanol	Arizona, SW-USA	f	2.14
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Holotachysphex</i> sp.	January 2009	96% ethanol	Madagascar	f	1.54
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Laropsis</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	1.16
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Proctoscastra nearctica</i>	24.08.2007	70% ethanol	Arizona, SW-USA	f	2.71
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Tachysphex</i> sp.	12.10.2014	96% ethanol	NSW, Australien	m	0.86
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Tachytes amazonus</i>	January 2006	96% ethanol	Argentina, South America	m	1.87
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Tachytes</i> sp.	12.08.2013	96% ethanol	Arizona, SW-USA	m	7.77
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Laris</i> sp.	February 2013	96% ethanol	Nicaragua, Central America	m	1.41
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Laris</i> sp. II	January 2009	70% ethanol	Thailand (T4288)	f	4.41
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Lvroda</i> sp.	11.10.2014	96% ethanol	NSW, Australien	f	0.15
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Paranysson</i> sp.	01.09.2012	96% ethanol	Gabon	f	0.33
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Sohodates</i> sp.	13.10.2014	96% ethanol	NSW, Australien	f	2.98
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Belomicrus</i> sp.	August 2013	96% ethanol	Arizona, SW-USA	m	0.38
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Pison</i> sp.	15.10.2014	96% ethanol	QL, Australien	m	0.97
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Trypoxylon (Trypoxylum) lactitarse</i>	February 2013	96% ethanol	Nicaragua, Central America	f	1.35
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Odontostichus paradoxus</i>	January 2006	70% ethanol	Argentina, South America	m	1.18
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Ammodanellus</i> sp.	November 2008	96% ethanol	Madagascar MG 548 03	m	0.3
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Ammodanellus</i> sp.	October 2008	96% ethanol	Madagascar	m	0.47
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Polemistus</i> sp.	August 2012	96% ethanol	Arizona, SW-USA	m	0.12
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Stigma</i> sp.	June 2012	70% ethanol	Ecuador	m	0.42
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Carnostigma</i> sp.	5.12.3.2009	70% ethanol	Thailand Khuean Srinagarindra NP (T477)	f	0.67
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Mimesa lutaria</i>	July 2013	96% ethanol	Brandenburg, Germanv	f	0.51
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Psenulus dilectus</i>	24.31.12.2007	96% ethanol	Madagascar	m	0.13
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Psenulus</i> sp.	August 2013	96% ethanol	California, SW-USA	m	0.56
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Clypeadon sculleni</i>	August 2012	96% ethanol	Arizona, SW-USA	m	29.8
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Clypeadon taurulus</i>	August 2012	96% ethanol	Arizona, SW-USA	m	10.9
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Cerceris acanthophila</i>	August 2012	96% ethanol	Arizona, SW-USA	m	0.26
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Cerceris arenaria</i>	July 2013	96% ethanol	Brandenburg, Germanv	m	2.69
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Eucerceris arenaria</i>	August 2007	70% ethanol	Arizona, SW-USA	m	3.86
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Philanthus albosus</i>	August 2012	96% ethanol	Arizona, SW-USA	m	1.82
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Trachypus</i> sp.	February 2013	96% ethanol	Nicaragua, Central America	f	5.24
Crabronidae	Bembicinae	Nyssonini	Nyssonina	<i>Pseudoscolia</i> sp.	May 2012	96% ethanol	Israel	m	2.5
Heterogynidae				<i>Heterogyna nocticola</i>	December 2003	70% ethanol	Oman, Arabian Peninsula	m	0.57
Aoidae (sensu lato)	Aoidae			<i>Aus mellifera</i> II	August 2013	96% ethanol	Halle, Germanv	m	142
Aoidae (sensu lato)	Stenotritidae			<i>Ctenocletes rufescens</i>	09.03.2011	96% ethanol	Australia, Credo Station	m	17.4