

THE DIGGER AND SAND WASPS OF BONAIRE (HYMENOPTERA: SPHECIFORMES)

Wim Klein

Some digger wasps and sand wasps (Crabronidae) and thread-waisted wasps (Sphecidae) are rather large, colourful and conspicuous, but most are small and easily overlooked. Despite their interesting biology as parasitoids of other insects hardly any work has been done on these families occurring on the Dutch Caribbean islands. The inventory of Crabronidae and Sphecidae on Bonaire carried out in 2022 and 2023 is the first in its kind and resulted in a strong increase in the number of species known to occur in the Dutch Caribbean.

INTRODUCTION

Prior to the Bonaire Estafette Expeditie (BEE) (Kalkman et al. 2025) virtually no information on digger and sand wasps was available for Bonaire. The Dutch Caribbean Species Register (Dutch-caribbeanspecies.org) mentions no species and on iNaturalist.org a few records of some species, mostly large and colourful, can be found. Most digger wasps, however, are not large and colourful and it was expected that the diversity of Crabronidae and Sphecidae of Bonaire was much higher than previously known.

Most Crabronidae and Sphecidae found on Bonaire are parasitoids and hunt for insects as food for their offspring. The genus *Microbembex* is the exception, they search for dead insects. Most of them make ground nests, some make mud nests and some use existing holes in walls, trees or bushes.

METHODS

The author collected Crabronidae and Sphecidae on Bonaire from 22 October to 6 November 2022. In addition, several other participants of the BEE collected a small number of wasps. Most species of Crabronidae and Sphecidae are small, ranging from 2 to 11 mm, tend to be active near the ground or under bushes and generally fly very fast. Due to this, most species are rarely caught

with an insect net and a large portion of the records published here are based on specimens caught with a malaise trap (fig. 1) or with a yellow pan trap (fig. 2). Specimens collected by the author were mounted in the evening at the Kas Sientifiko in Washington Slagbaai NP and identified to genus level. At Naturalis Biodiversity



Figure 1. Malaise trap near Lagadishi trail, 26.X.2022. Photo Wim Klein.



Figure 2. Yellow pan trap near Put Bronswinkel, 31.X.2022. Photo Wim Klein.

Center (Leiden, the Netherlands) all material was identified to species level. Identification was based on the keys mentioned in the literature section. Available descriptions and keys for the Caribbean species of the genera *Trypoxylon*, *Cerceris* and *Liris* are poor, due to which identification to species level for these genera was not possible. At least one of the species of the genus *Nitela* is likely to be new to science.

One of the sites which was intensively explored for Crabronidae and Sphecidae was Tera Barra, a nursery for native plants and trees of Bonaire. Tera Barra is free of goats and donkeys and has a very varied vegetation with relatively many flowering plants. Due to this, the abundance and diversity of insects was higher than elsewhere on the island, resulting in high diversity of Crabronidae and Sphecidae.

Information on collection localities and dates has been inserted in the Collection Registration

System of Naturalis and from there will become available on GBIF.

RESULTS

During the fieldwork on Bonaire 19 species of Crabronidae (11 genera) and Sphecidae (2 genera) were encountered. Table 1 gives an overview of the number of records and specimens found per species. Table 2 presents a list of Crabronidae and Sphecidae reported from the Dutch Caribbean islands.

Crabronidae

Digger and sand wasps

Bicrytes Lepeletier, 1845

Bicrytes variegatus (Olivier, 1789) (fig. 3) looks similar to *Stictia signata*, but can be recognised by being slightly smaller and by the yellow markings on the abdomen being straight. In contrast to most other sand wasps which hunt for flies, this species preys on stink bugs. After having caught their prey, they fly to the nest, holding the prey with their mid legs close to the body. On arrival they use their forelegs to open the nest while holding the prey with their mid legs. By doing so they prevent parasitoid flies from laying their eggs on the prey. The species was found in Washington Slagbaai NP and Rincon.

Cerceris Latreille, 1802

Cerceris wasps (fig. 4) are colorful wasps which are often seen at flowering bushes, where males defend their territory and females hunt for prey. Most *Cerceris* wasps hunt for weevils as food for their offspring and make nests in the ground. Two species have been collected, but identification to the species level is not possible due to the confused state of the taxonomy of *Cerceris* from the Caribbean area. *Cerceris* spec. 1 differs from *Cerceris* spec. 2 by lacking the yellow band on the propodeum. *Cerceris* spec. 1 was found in Tera

Barra and *Cerceris* spec. 2 in Washington Slagbaai NP and in Rincon.

***Liris* Fabricius, 1804**

Liris wasps (fig. 5) hunt for crickets and drag their prey by its antennae over the ground to their nests in the ground. As the taxonomy of *Liris* in the Caribbean is not settled, identification to species level was not yet possible. *Liris* wasps are commonly found throughout the island, and it seems likely that more than one species occurs on the island.

***Microbembex* Patton, 1879**

Microbembex cubana (Cresson, 1865) (fig. 6) are strikingly coloured black and yellow wasps that look like the larger sand wasps. They are the only digger wasps that do not hunt for living prey. They are scavengers looking for all kinds of dead insects. They make their nests in the ground. This species seems to be restricted to beaches where they can find dead insects: Lagun, Playa Chikitu, Boka Washikemba and Klein Bonaire. Three specimens from Klein Bonaire, caught by Cobben in 1957 and identified by Bohart were found in the collection of Naturalis.

***Nitela* Latreille, 1809**

Nitela wasps (fig. 7) are tiny (2-3 mm) and are difficult to spot in the field and all the specimens have been collected in pan traps. Most *Nitela* species use existing cavities for their nest and hunt for Psocoptera as food for their offspring. One Neotropical species is known to weave its nest from fungi. The specimens collected on Bonaire do not fit with described species and it seems likely that they represent an undescribed species. They were found in Washington Slagbaai NP, at BOPEC and Pos Gurubu.

***Oxybelus* Latreille, 1797**

Oxybelus (fig. 8-9) hunts for flies and makes nests in the ground. They have a special way to bring the flies they have caught to their nests: pinned at the sting. Neither of the two species found on Bonaire fits with described species from elsewhere in the Caribbean. *Oxybelus* spec. 1 differs from *Oxybelus* spec. 2 by having yellow apical bands on the first five tergites (only two whitish lateral spots on the first tergites in *Oxybelus* spec. 2). *Oxybelus* spec. 1 was found at Salina Slagbaai and Lac cai and *Oxybelus* spec. 2 at Tera Barra and Kaminda Sorobon.

***Pluto* Pate, 1937**

Two *Pluto* species have been found: *Pluto medius zuliensis* Van Lith, 1979 and *Pluto* spec. (fig. 10). No observation on the biology of these species is available. They probably hunt for leafhoppers and dig their nests in the ground. *Pluto* spec. differs from *P. medius* by having silvery hairs on the clypeus (golden in *P. medius*). Both species were found at Tera Barra while only *Pluto* spec. was found in Washington Slagbaai NP, Rincon and at the Sewage Works in Kralendijk.

***Stictia* Illiger, 1807**

Stictia signata (Linnaeus, 1758) (fig. 11) are large yellow and black sand wasps, which are found at sandy places. Here the males patrol their territory, defending it against other males. They have a typical behaviour: flying very fast, resting for a moment on a plant and then speeding off again. The females hunt for flies. Their front legs have a row of spines forming a kind of rake with which they can dig very fast. The species was found in Washington Slagbaai NP, at the Wayaka Trail and at the Kaminda Sorobon.



Figure 3-11. Digger and sand wasps of Bonaire. Photos Yvonne van Dam, 3. *Bicyrtes variegatus* ♀, RMNH.5133664, 4. *Cerceris* spec. 1, ♂, RMNH.5133678.1, 5. *Liris* spec., ♀, 6. *Microbembix cubana*, ♀, RMNH.INS.1573107, 7. *Nitela* spec., 8. *Oxybelus* spec. 1, ♀, 9. *Oxybelus* spec. 2, ♀, 10. *Pluto* spec. ♀, 11. *Stictia signata* ♂, RMNH.5133728.

Tachysphex Kohl, 1883

Tachysphex ruficaudis (Taschenberg, 1870) (fig. 12-13) is often difficult to tell apart from *Liris*, as they have the same size, habitus, and colour. They even share the habit of running on the ground or flying low above the ground. The female differs from *Liris* by the last segments of the abdomen being red (black in *Liris*) The males are completely black and differ from *Liris* by the long hairs on head and thorax (almost no hairs on head and thorax in *Liris*). *Tachysphex ruficaudis* hunts for grasshoppers. It was found at Tera Barra and in

Washington Slagbaai NP at the Kas Sientifiko and the Lagadishi Trail.

Tachytes Panzer, 1806

Three species of *Tachytes* were found: *T. chryso-pyga* (Spinola, 1841), *Tachytes excellens* Cameron, 1912 (fig. 14-15) and *Tachytes fraternus* Taschenberg, 1870 (fig. 16). *Tachytes* species hunt for grasshoppers and crickets and bring them to their nests. Their nest consists of complex burrows with multiple cells, each cell packed with up to ten



Figure 12-19. Digger and sandwasps of Bonaire. Photos Yvonne van Dam, 12. *Tachysphex ruficaudis* ♀, RMNH.5133737-2, 13. *Tachysphex ruficaudis* ♂, RMNH.5133694.1, 14. *Tachytes excellens* ♀, 15. *Tachytes excellens* ♂, 16. *Tachytes fraternus*, ♀, 17. *Trypoxylon* spec. 2, ♀, 18. *Prionyx thomae* ♂, RMNH.5133700, 19. *Sceliphron asiaticum* ♂, RMNH.5133713.

preys. Males guard their territory against intruders. *Tachytes chrysopyga* was found at Tera Barra and the Sewage Works; *T. fraternus* at Kas Sientifiko, the Wayaka trail, Lagun, Tera Barra and in Rincon and *T. excellens* at Tera Barra, Lac Cai, Kaminda Sorobon, Kralendijk and near Salina Frans.

Trypoxylon Latreille, 1796

Trypoxylon spec. 1 (*marginatum*-species group) and *Trypoxylon* spec. 2 (*scutatatum*-species group) are black digger wasps (fig. 17), which hunt for spiders. Males of some *Trypoxylon* species guard the nest while the female hunts for small spiders. Two different species have been found on Bonaire, one species from the *marginatum*-group and one

Table 1. Species of Crabronidae and Sphecidae recorded on Bonaire in 2022 and 2023.

	Records	Specimens	♂	♀
Crabronidae				
<i>Bicyrtes variegatus</i>	3	3		3
<i>Cerceris</i> spec. 1	2	7	5	2
<i>Cerceris</i> spec. 2	3	7	6	1
<i>Liris</i> spec.	32	147	87	60
<i>Microbembex cubana</i>	3	10		10
<i>Nitela</i> spec.	7	8	2	6
<i>Oxybelus</i> spec. 1	2	3	1	2
<i>Oxybelus</i> spec. 2	3	5	1	4
<i>Pluto medius zuliensis</i>	1	1		1
<i>Pluto</i> spec. 1	7	20	5	15
<i>Stictia signata</i>	4	5	3	2
<i>Tachysphex ruficaudis</i>	4	8	4	4
<i>Tachytes chrysopyga</i>	2	2		2
<i>Tachytes excellens</i>	11	21	8	13
<i>Tachytes fraternus</i>	5	5	1	4
<i>Trypoxylon</i> spec. 1	2	16	1	15
<i>Trypoxylon</i> spec. 2	6	31	12	19
Sphecidae				
<i>Prionyx thomae</i>	3	4	2	2
<i>Sceliphron asiaticum</i>	5	5	3	2

from the *scutatum*-group, but identification to species level is currently not possible. Both species were found in Washington Slagbaai NP near the Kas Sientifiko and at Tera Barra and *Trypoxylon* spec. 2 was also found at the Wayaka trail and the Lagadishi trail.

Sphecidae

Thread-waisted wasps and mud daubers

Prionyx Vander Linden, 1827

Prionyx thomae (Fabricius, 1775) (fig. 18) is a thread-waisted wasp which can be easily recognised in the field by its red abdomen and black thorax. They hunt for grasshoppers which they drag to the nesting site by holding its antennae between the mandibles. They make the nest after they have caught a grasshopper. They were found in Kralendijk at the Kaya Barakuda, in Rincon and near the NP at Kaya Piedra Pretu.

Sceliphron Klug, 1801

Sceliphron asiaticum (Linnaeus, 1758) (fig. 19) are mud-daubers which make mud nests on walls, which they fill with spiders. They were found in Washington Slagbaai NP at the Kas Sientifiko, in Rincon and at Lagun.

DISCUSSION

Table 2 gives an overview of the Crabronidae and Sphecidae of the Dutch Caribbean islands. In total 22 species of Crabronidae and seven species of Sphecidae are known from the islands. In total 19 species are known from Bonaire. With respectively two and six species, Aruba and Curaçao have hardly been explored and it seems likely that many of the species found on Bonaire also occur on these islands. Of the 14 species recorded from the sss islands ten are not known from the ABC islands indicating that these islands clearly have a different faunal composition.

Table 2. Occurrence of Crabronidae and Sphecidae on the Dutch Caribbean islands based on Dutchcaribbeanspecies.org per 1.ix.2024 and some unpublished specimens in the collection of Naturalis Biodiversity Center.

	Aruba	Curaçao	Bonaire	Sint Eustatius	Sint Maarten	Saba
Crabronidae						
<i>Bicyrtes variegatus</i>			x			
<i>Cerceris</i> spec. 1			x			
<i>Cerceris</i> spec. 2			x			
<i>Liris antilles</i>					x	
<i>Liris apicipennis</i>					x	
<i>Liris argentata</i>					x	
<i>Liris</i> spec.			x		x	
<i>Microbembex cubana</i>		x	x			
<i>Nitela</i> spec.			x			
<i>Oxybelus analis</i>					x	
<i>Oxybelus</i> spec. 1			x			
<i>Oxybelus</i> spec. 2			x			
<i>Pluto medius zuliensis</i>			x			
<i>Pluto</i> spec. 1			x			
<i>Stictia signata</i>		x	x	x	x	x
<i>Tachysphex ruficaudis</i>			x			
<i>Tachytes chrysopyga chrysopyga</i>			x			
<i>Tachytes chrysopyga argentipes</i>						x
<i>Tachytes excellens</i>		x	x			
<i>Tachytes fraternus</i>		x	x		x	
<i>Trypoxylon</i> spec. 1			x			
<i>Trypoxylon</i> spec. 2			x			
Sphecidae						
<i>Prionyx thomae</i>	x	x	x	x		x
<i>Sceliphron asiaticum</i>	x	x	x			
<i>Sceliphron assimile</i>					x	
<i>Sceliphron caementarium</i>					x	
<i>Sceliphron fasciatum</i>					x	
<i>Sphex caliginosus</i>					x	x
<i>Sphex dorsalis</i>					x	

ACKNOWLEDGEMENTS

I would like to thank the Uyttenboogaart-Eliassen Stichting for providing a travel grant, the Rangers of Stichting Nationale Parken Bonaire (STINAPA) for their support during the stay at the Kas Sientifiko, Yvonne van Dam for making the specimen images and the members of the BEE team for collecting wasps during their stay at Bonaire.

LITERATURE

* References which were consulted for identification purposes, but are not mentioned in the text, are indicated with an asterisk.

- Alayo, pastor D. 1968*. Estudios sobre los Himenópteros de Cuba, I. Subfamilia Philanthinae. – Poeyana, Seria A, 54 : 1-23.
- Alayo, pastor D. 1968*. Estudios sobre los Himenópteros de Cuba, II. Subfamilia Crabroninae. – Poeyana, Seria A, 58: 1-21.
- Alayo, pastor D. 1969*. Estudios sobre los Himenópteros de Cuba, III. Subfamilia Nyssoninae. – Poeyana, Seria A, 59: 1-34.
- Alayo, pastor D. 1976*. Introducción al estudio de los Himenópteros de Cuba. – Academia de ciencias de Cuba, Instituto de Zoología, Seria Biologica, 67: 1-19.
- Amarante, S.T.P. 2006*. Familia Sphecidae, Familia Crabronidae. – In: Fernández, F. & M.J. Sharkey (eds.), Introducción a los Hymenoptera de la Región Neotropical. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá: 449-469.
- Bohart, R.M. 1979*. *Tachytes* of South America (Hymenoptera, Sphecidae, Larrinae). – Transactions of the American Entomological Society 104: 435-505.
- Bohart, R.M. 1993*. South American *Oxybelus* II. The *emarginatus* group (Hymenoptera, Sphecidae). – Insecta Mundi 7: 19-26.
- Bohart, R.M. 1993*. South American *Oxybelus* III. The *unigliumis* and *scutellatus* groups (Hymenoptera, Sphecidae). – Insecta Mundi 7: 65-76.
- Bohart, R.M. 1993*. A synopsis of Central American and Caribbean *Oxybelus* (Hymenoptera, Sphecidae). – Insecta Mundi 7: 159-168.
- Bohart, R.M. 1994*. A key to the genus *Tachytes* in America north of Mexico with descriptions of three new species (Hymenoptera, Sphecidae, Larrinae). – Proceedings of the Entomological Society of Washington 96: 342-349.
- Bohart, R.M. & A.S. Menke 1976*. Sphecid wasps of the world. A generic revision. – University of California Press, Berkeley.
- Bohart, R.M. & E.I. Schlinger 1957*. Californian wasps of the genus *Oxybelus* (Hymenoptera: Sphecidae, Crabroninae). – Bulletin of the Californian Insect Survey 4: 103-144.
- Evans, H.E. 1972*. Bredin-Archibold-Smithsonian Biological Survey of Dominica: Aculeate Wasps (Hymenoptera: Scolioidae, Vespoidea, Pompiloidea, Sphecoidea). – Smithsonian Contributions to Zoology 115: 1-19.
- Ferguson, G.R. 1983*. An annotated synonymic list of North American and Caribbean wasps of the genus *Cerceris* (Hymenoptera: Philanthinae). – New York Entomological Society 91: 466-502.
- Fernandez, F. & V. Castro-Huertas 2014*. Las avispas del género *Sceliphron* Klug en Colombia (Hymenoptera: Sphecidae). – Caldasia 36: 393-408.
- Ferguson, G.R. 1984*. The types of some American *Cerceris* with lectotype designations (Hymenoptera: Philanthidae). – New York Entomological Society 91: 431-441.
- Giner Mari, J. 1941*. *Cerceris* Neotropicos III. Los *Cerceris* Latr. De Cuba (Hymen. Spheg.). – Boletín de la Real Sociedad Española de Historia Natural 39: 321-335.
- Hanson, P. & A.S. Menke 1995*. The sphecid wasps (Sphecidae). – In: Hanson, P. & I.D. Gauld (eds.), The Hymenoptera of Costa Rica. Oxford University Press, Oxford: 619-649.
- Hanson, P. & A.S. Menke 2006*. Las avispas apoideas: Ampulicidae, Sphecidae, Crabronidae. – In: Hanson, P. & I.D. Gauld (eds.), Hymenoptera de la Región Neotropical. Memoirs of the American Entomological Institute 77: 694-733.
- Kalkman, V.J., J. Sarpong, J. van Bleek & J. van der Ploeg 2025. Bonaire Estafette Expeditie, an inventory of the terrestrial invertebrates of Bonaire. – Nederlandse Faunistische Mededelingen 64: 1-21.
- Krombein, K.V. & S. Shanks Gingras 1984*. Revision of North American *Liris* Fabricius (Hymenoptera: Sphecoidea: Larridae). – Smithsonian Contributions to Zoology 404: 1-104.
- Lith, J.P. van 1979*. The New World genus *Pluto* (Hymenoptera, Sphecidae, Psenini). – Tijdschrift voor Entomologie 122: 127-239.
- Lohrman, E. 1948*. Die Grabwespengruppe der Bembicinen. Übersicht und Stammesgeschichte. – Mitteilungen der Münchner Entomologischen Gesellschaft 34: 420-471.
- Menke, A.S. 1969*. A new *Nitela*, subgenus *Tenila*, with a key to the species of the subgenus (Hymenoptera:

- Sphecidae). – Proceedings of the Entomological Society of Washington 71 (2): 197-201.
- Menke, A.S. & C. Fernando Fernández 1996*. Claves ilustradas para las subfamilias, tribus y géneros de esfécidos neotropicales (Apoidea: Sphecidae). – Revista de Biología Tropical 44, suplemento 2: 1-68.
- Parker, F.D. 1960*. A systematic study of North American *Priononyx* (Hymenoptera: Sphecidae). – The Pan-Pacific Entomologist 36: 205-208.
- Pulawsky, W. 1974*. A revision of the Neotropical *Tachysphex* Kohl (Hym., Sphecidae). – Polskie Pismo Entomologiczne 44: 3-102.
- Pulawsky, W. 1988*. Revision of North American *Tachysphex* including Central American and Caribbean species (Hymenoptera: Sphecidae). – Memoirs of the California Academy of Sciences 10: 1-212.
- Pulawsky, W. 2024*. Catalog of Sphecidae. – Calacademy.org/scientists/projects/catalog-of-sphecidae.
- Richards, O.W. 1934*. The American species of the genus *Trypoxylon* (Hymenopt., Sphecoidea). – Transactions of the Royal Entomological Society of London 82: 173-362.
- Richards, O.W. 1969*. Species of *Trypoxylon* Latreille (Hymenoptera: Sphecidae) from Cuba. – Proceedings of the Royal entomological Society of London (B) 338: 121-124.
- Sandhouse, G.A. 1940*. A review of the Nearctic wasps of the genus *Trypoxylon* (Hymenoptera: Sphecidae). – The American Midland Naturalist 24: 133-176.
- Scullen, H.A. 1972*. Review of the genus *Cerceris* Latreille in Mexico and Central America (Hymenoptera: Sphecidae). – Smithsonian Contribution to Zoology 110: 1-132.
- Simon Thomas, R.T. 1984*. Notes on the Hymenoptera aculeata from St. Martin, Saba, and St. Eustatius. – Studies on the fauna of Curaçao and other Caribbean Islands 67: 92-97.
- Valverde, J.B., P. Hanson & J.M. Carpenter 2019*. Keys to the Costa Rican species of paper wasps (Hymenoptera: Vespidae: Polistinae). – Revista de Biología Tropical 67 (2), supplement: 174-199.
- Willink, A. 1947*. Las especies Argentinas de Bembicini (Hym.: Sphecidae: Nyssoninae). – Acta Zoologica Lilloana 4: 509-651.
- Zuijlen, J.W.A. van 1994*. The *amazonica* species group of the genus *Nitela* Latreille (Hymenoptera: Sphecidae: Crabroninae). – Zoologische Mededelingen 68: 249-269.

SAMENVATTING

De graafwespen van Bonaire (Hymenoptera: Spheciformes)

Voordat de Bonaire Estafette Expeditie begon, was er nauwelijks bekend welke graafwespen op Bonaire voorkomen. Het Dutch Caribbean Species Register gaf geen enkele soort op. Door het eiland systematisch te onderzoeken en op verschillende manieren te verzamelen, zijn nu 19 soorten van het eiland bekend. De meeste graafwespen konden tot op soort worden gedetermineerd. Van enkele taxa was dat echter niet mogelijk, omdat de betreffende genera voor het Caribisch gebied aan een revisie toe zijn. Bonaire is nu het meest soortenrijke van de ABC-eilanden, wat vooral laat zien dat de andere twee eilanden voor graafwespen slecht onderzocht zijn.

W. Klein
Breda
wim.klein@icloud.com