

PARASITOID WASPS FROM BONAIRE (HYMENOPTERA: PARASITICA)

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Hardly anything has been published on the parasitoid wasps from the Dutch Caribbean island Bonaire. Only one species from this group is mentioned on the Dutch Caribbean Species register. The current paper constitutes the first serious contribution to the knowledge on this group of Bonaire. Only material of the families Braconidae, Evaniidae, Ichneumonidae and Mymaridae has been identified to the species level, where possible. For a selection of other families a simple list of number of specimens per location is given.

INTRODUCTION

From October 2022 to March 2023 an inventory of the terrestrial invertebrates of the Dutch Caribbean islands of Bonaire was conducted. Several of the participants of the, so called Bonaire Estafette Expedition (BEE) (Kalkman et al. 2025), focused their attention on Aculeata resulting in a series of papers on Vespidae (Klein 2025a), Spheciformes (Klein 2025b), Pompilidae (Bouma et al. 2025), Formicidae (Boer & Wetterer 2025) and Anthophila (Apidae, Colletidae, Halictidae, Megachilidae) (Devaléz et al. 2025). No paper is available on the Symphyta (sawflies and woodwasps), as, surprisingly, no species belonging to this group were encountered. Records of the Aculeata families Bethyridae (125 specimens), Tiphidae (1 specimen) and Mutillidae (2 specimens) will be published at a later date. Together with Wim Klein, the first author participated in the BEE and visited the island between 22 October and 6 November 2022 focusing on Hymenoptera in general and parasitoid wasps in particular. Peeters (2024) gives a trip report. In the current paper the records of parasitoid wasps are presented. As far as we know only one species from Bonaire, *Evania appendigaster* (fig. 1), belonging to these groups is published (Werner 1925) and also listed on the Dutch Caribbean Species Register (Dutchcaribbeanspecies.org). The current paper therefore constitutes the first major contribution to the knowledge of this group from Bonaire. Most families of parasitoid

wasps are poorly studied and identification keys are lacking. Therefore, many of the taxa were only identified to the genus level.

METHODS

The material on which this paper is based was collected in the period October 2022 to March 2023 by numerous participants of the BEE. Most material was collected using a malaise trap which was operational from 26 October 2022 to 10 March 2023 and was placed on various localities across the north of the island (Kalkman et al. 2025). The material collected with the malaise trap was sorted by the first author and sent to various experts. In addition to the material from the malaise trap material was collected with pan traps, sweeping nets, pitfalls, and at light. The material was identified by Kees van Achterberg

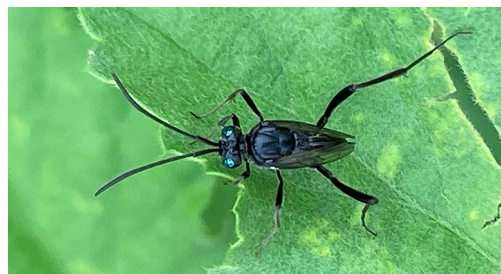


Figure 1. *Evania appendigaster*, 5.XI.2022, Kralendijk. Photo Theo Peeters.

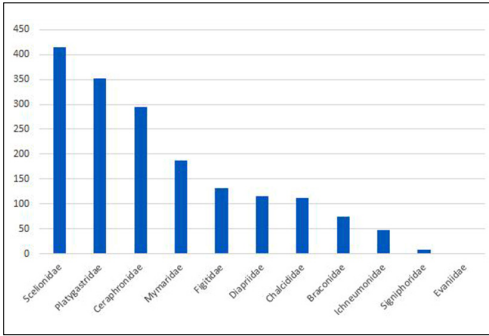


Figure 2. Number of specimens collected at Bonaire between 26.X.2022 and 7.III.2023 for eleven families of parasitoid wasps.

(Braconidae), Kees Zwakhals (Ichneumonidae) and Liekele Sijstermans (Mymaridae). The remaining material was sorted to family and counted by Theo Peeters.

The order Hymenoptera currently consists of over 140 families (Van Noort & Broad 2024). We follow Zhang et al. (2024) for the names and taxonomy of the superfamilies and families. The literature used for identification is mentioned in the introductory text of each family. All the photos are from specimens collected or seen on Bonaire.

The material is largely kept in 70 % alcohol. All material will be stored in the collection of Naturalis Biodiversity Center (RMNH), Leiden (the Netherlands).

RESULTS

In total 1,738 specimens of 11 families of parasitoid wasps are sorted and counted (fig. 2). The highest numbers are found in families of egg parasites, such as Mymaridae, Scelionidae and Platygasteridae. Also the family Ceraphronidae, whose larvae feed on different life stages of insects, was well represented. The numbers of Braconidae and Ichneumonidae caught in the malaise trap were relatively low.

Superfamily Ichneumonoidea

Family Braconidae

braconid or shield wasps

In total 13 species of Braconidae were recorded, of which 12 species and 10 genera are new to both Bonaire and the Dutch Caribbean islands. *Alphomelon nigriceps* is the only species that had been recorded from the Dutch Caribbean islands before (Curaçao, Deans et al. 2003). Only three species could be identified to the species level.

Subfamily Agathidinae

Neocremnops spec. (fig. 3)

Tera Barra, 1-6.XI.2022, 4 ♂, malaise trap, W. Klein & T. Peeters.

Only females can be identified to the species level.

Zelomorpha arizonensis Ashmead, 1900

(fig. 4)

Washington Slagbaai NP, 26-31.X.2022, 1 ♀, at light, W. Klein & T. Peeters.

Subfamily Cheloninae

Phanerotoma spec. (fig. 8)

Washington Slagbaai NP, 26-31.X.2022, 12 ♀, malaise trap, W. Klein & T. Peeters. Tera Barra, 1-6.XI.2022, 4 ♀, 5 ♂, malaise trap, W. Klein & T. Peeters.

This species is probably new to science and seems to be related to *P. terebralis* Zettel, 1989, a species described from Mexico.

Chelonus spec. (fig. 9)

Tera Barra, 1-6.XI.2022, 2 ♂ ♀, 1 ♂, malaise trap, W. Klein & T. Peeters.

No keys for the Neotropical species of this genus are available.

Subfamily Doryctinae

Aphelopsia annulicornis Marsh, 1993 (fig. 6)

Washington Slagbaai NP, 26-31.X.2022, 1 ♀, colour traps, W. Klein & T. Peeters.

Subfamily Microgastrinae

Alphomelon nigriceps (Ashmead, 1900) (fig. 5)

Kralendijk, Pos Gurubu, 26.1-2.11.2023, 1 ♀, malaise trap, S. van Leeuwen c.s.

Apanteles spec. A (fig. 13)

Tera Barra, 1-6.XI.2022, 6 ♀, 11 ♂, malaise trap, W. Klein & T. Peeters.

Apanteles spec. B

Bolivia, 7-18.XI.2022, 1 ♀, insect net, M.C. d'Oliveira.

Apanteles spec. C

Tera Barra, 1-6.XI.2022, 1 ♂, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, 26-31.X.2022, 1 ♂, malaise trap, W. Klein & T. Peeters.

Dolichogenidea spec. (fig. 11)

Washington Slagbaai NP, 26-31.X.2022, 15 ex., malaise trap, W. Klein & T. Peeters. Tera Barra, 1-6.XI.2022, 4 ex., malaise trap, W. Klein & T. Peeters.

Cotesia spec. (fig. 12)

Tera Barra, 1-6.XI.2022, 1 ♀, malaise trap, W. Klein & T. Peeters.

Subfamily Orgilinae

Orgilus spec. (fig. 7)

Washington Slagbaai NP, 26-31.X.2022, 1 ♀, at light, W. Klein & T. Peeters.

A small species that cannot be identified due to the lack of a key to the species of South America.

Subfamily Telengaiinae

Pseudognaptodon spec. (fig. 10)

Washington Slagbaai NP, 26-31.X.2022, 1 ♀, 1 ♂, malaise trap, W. Klein & T. Peeters.

The material seems to belong to an undescribed species.

Family Ichneumonidae

Darwin wasps

The family Ichneumonidae is most species rich in the temperate regions of the world and, in contrast to most insect groups, is less species rich in the tropics. From the Western Palearctic 7200 species are known, from the Eastern Palearctic 5000 species, from North America 5000 species, while in South America and tropical Africa only

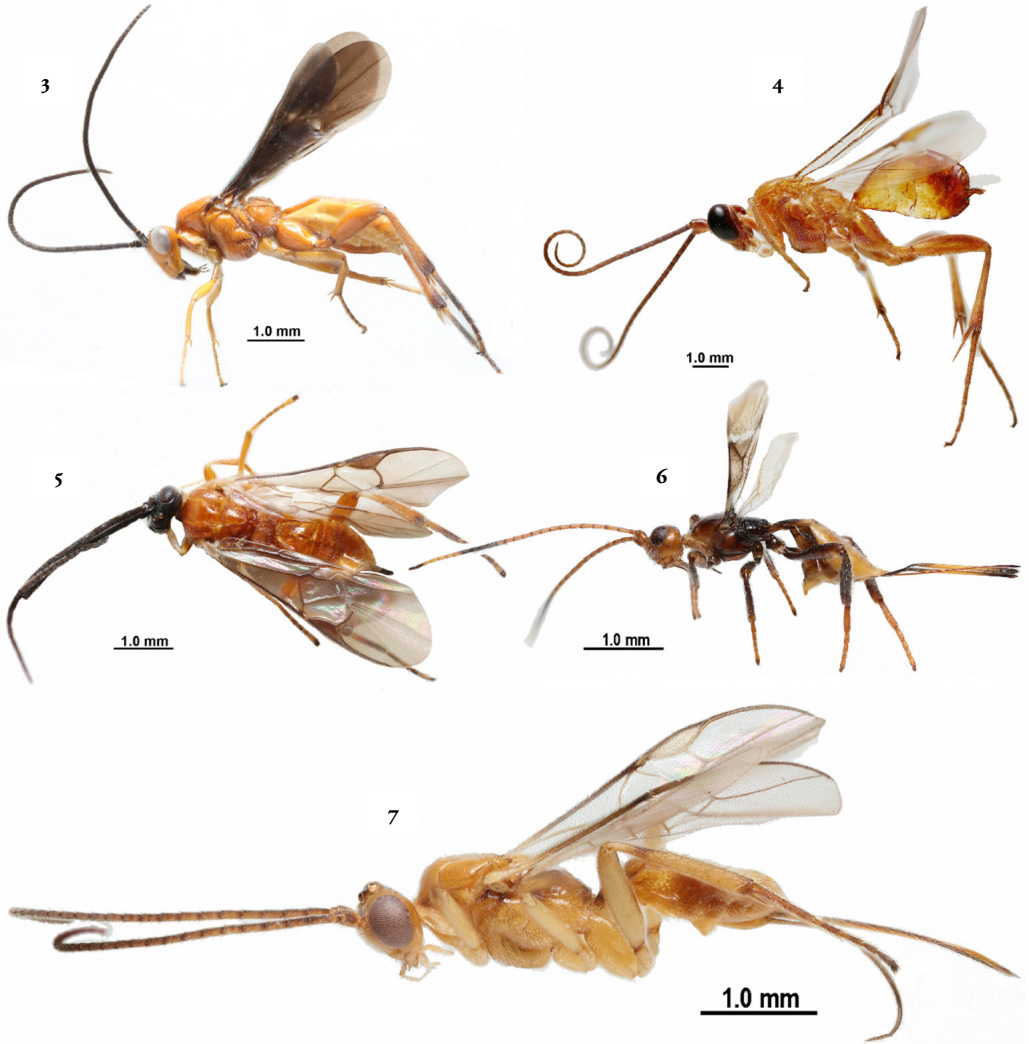


Figure 3-7. Braconidae, 3. *Neocremnops* spec., 4. *Zelomorpha arizonensis*, 5. *Alphomelon nigriceps*, 6. *Aphelopsia annulicornis*, 7. *Orgilus* spec. Photos Kees van Achterberg.

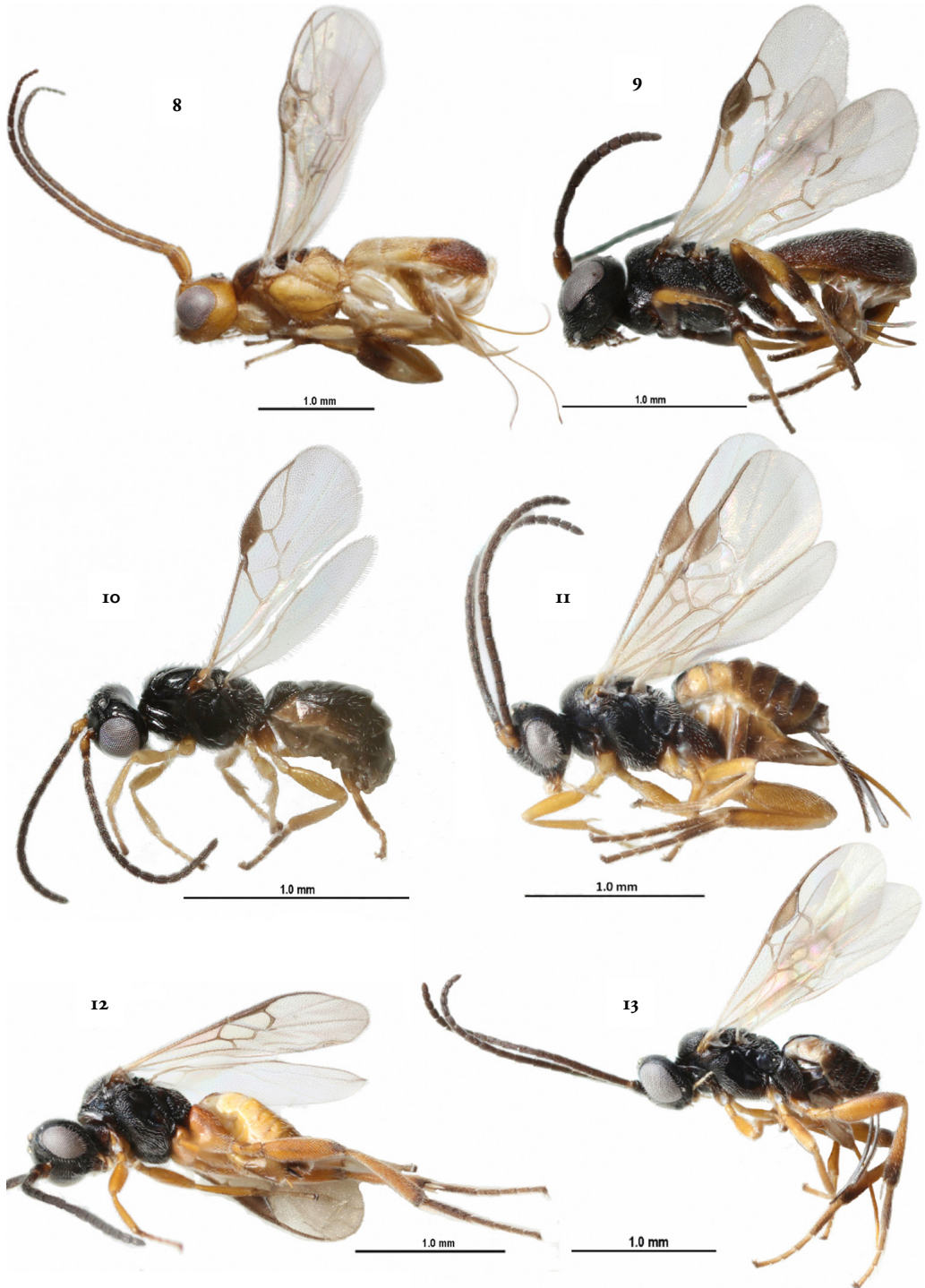


Figure 8-13. Braconidae, 8. *Phanerotoma* spec., 9. *Chelonus* spec., 10. *Pseudognaptodon* spec., 11. *Dolichogenidea* spec., 12. *Cotesia* spec., 13. *Apanteles* spec. A. Photos Kees van Achterberg.

4500 and 2100 species respectively are found (Yu et al. 2016). This pattern can only partly be explained by the fact that the temperate areas have been better explored. The relative scarcity of Ichneumonidae on Bonaire is therefore not totally unexpected. No records of Ichneumonidae have been published from the Dutch Caribbean islands and the six species (from five genera) listed here are thus all new to both Bonaire and the Dutch Caribbean islands. The following publications were used as primary source for identification: Dasch (1979), Gauld et al. (1997), Gauld (2000).

Subfamily Anomaloniinae

Ophionellus arayai Gauld, 1997 (fig. 14)

Tera Barra, malaise trap, 6-13.XI.2022, 2 ♀, M.C. d'Oliveira & M. de Haas.

This species is only recorded from Costa Rica.

Ophionellus nr. *carlosi* Gauld & Bradshaw, 1997

Kralendijk, Pos Gurubu, 26.I-2.II.2023, 1 ♀, malaise trap, S. van Leeuwen. Rincón, Dos Pos,



Figure 14. Female *Ophionellus arayai*. Photo Kees Zwakhals.

27.II-2.III.2023, 1 ♀, malaise trap F. & M. Groenen. Kralendijk, Wayaka trail, 6-II.II.2023, 1 ♀, malaise trap, A.M. Bouma & J.J. Wieringa.

Subfamily Brachycyrtinae

Brachycyrtus cosmetus (Walkley, 1956)

Rincón, Dos Pos, 27.II-2.III.2023, 1 ♀, F. & M. Groenen.

Subfamily Cremastinae

Eiphosoma nr. *dentator* (Fabricius, 1804) (fig. 15)

Washington Slagbaai NP, Pos Mangel, 4-7.I.2023, 7-13.I.2023, 13-19.I.2023, 6 ♀, 30 ♂, malaise trap, J.-J. Mekkes & M. Boeken.

Subfamily Mesochorinae

Mesochorus spec.

Washington Slagbaai NP, Put Bronswinkel, 28.XI-5.XII.2022, 1 ♂, 5-12.XII.2022, 1 ♂, malaise trap, J.-J. Mekkes & M. Boeken. Washington Slagbaai NP, Pos Mangel, 13-19.I.2023, 1 ♀, malaise trap, J.-J. Mekkes & M. Boeken.



Figure 15. Female *Eiphosoma* nr. *dentator*. Photo Kees Zwakhals.

Subfamily Metopiinae

Triclistus spec.

Rincón, BOPEC, 19-27.XII.2022, 27.XII.2022-2.1.2023, 2 ♀, 1 ♂, malaise trap, V.J. Kalkman. Kralendijk, Pos Gurubu, 26.1-2.II.2023, 1 ex., malaise trap, S. van Leeuwen.

Superfamily Platygastroidea

Family Platygastridae

platygastrid wasps (fig. 16)

In total 352 specimens of this family were recorded.

Washington Slagbaai NP, Lagadishi trail, 24-31.X.2022, 14 ex., colour traps, W. Klein & T. Peeters. Another 338 ex. from malaise trap placed on various locations on Bonaire.

Family Scelionidae

scelionid wasps

In total 414 specimens of this family were recorded.

Washington Slagbaai NP, Kas Sientífico, 24-31.X.2022, 4 ♀, 7 ♂, colour traps, W. Klein &



Figure 16. Sample showing specimens belonging to the family Platygastridae. Photo Theo Peeters.

T. Peeters. Washington Slagbaai NP, Kas Sientífico, 6.XI.2022, 1 ♀, light trap, M.C. d'Oliveira. Washington Slagbaai NP, Kas Sientífico, 4-19.I.2023, 1 ♀, 2 ♂, pitfalls, M. Boeken. Rincón, Dam Grandi, 6-19.I.2023, 5 ♀, 1 ♂, pitfalls, M. Boeken. Washington Slagbaai NP, Lagadishi trail, 2-7.III.2023, 2 ♀, malaise trap, F. & M. Groenen. Another 391 ex. from malaise trap placed on various locations on Bonaire.

Superfamily Cynipoidea

Family Figitidae

figitid wasps (fig. 17)

In total 132 specimens of this family were recorded. Most of the collected specimens belong to the subfamily Eucoilinae.

Washington Slagbaai NP, Lagadishi trail, 30.X.2022, 1 ex., colour traps, W. Klein & T. Peeters. Rincón, Dam Grandi, 6-19.I.2023, 1 ex., pitfall, M. Boeken. Another 130 ex. from malaise trap placed on various locations on Bonaire.



Figure 17. Sample showing specimens belonging to the family Figitidae. Photo Theo Peeters.

Superfamily Diaprioidea

Family Diapriidae

self-faced wasps

In total 116 specimens of this family were recorded.

Washington Slagbaai NP, Lagadishi trail, 24-31.X.2022, 1 ♀, 2 ♂, colour traps, W. Klein & T. Peeters. Kralendijk, Tera Barra, 27-30.X.2022, 50 ♀, 1 ♂, colour traps, W. Klein & T. Peeters. Washington Slagbaai NP, Playa Chikitu, 4-19.I.2023, 1 ♀, pitfall, M. Boeken. Rincón, Dam Grandi, 6-19.I.2023, 1 ♂, pitfall, M. Boeken. Another 60 ex. from malaise trap placed on various locations on Bonaire.

Superfamily Chalcidoidea

The material of three families (Chalcididae, Mymaridae, Signiphoridae) belonging to this superfamily were counted and only the material of the family Mymaridae has been identified to genus level. The remainder of the material of this superfamily still needs to be sorted and counted. This material includes at least representatives of the families: Agaonidae, Aphelinidae, Encyrtidae, Eucharitidae (fig. 18), Eulophidae, Eupelmidae, Eurytomidae, Perilampidae, Pteromalidae s.l., Torymidae and Trichogrammatidae.

Family Chalcididae

chalcidid wasps (fig. 19)

In total 112 specimens of this family were recorded.

Washington Slagbaai NP, near Kas Sientífiko, 24-31.X.2022, 5 ♀, 5 ♂, colour traps, W. Klein & T. Peeters. Washington Slagbaai NP, Lagadishi trail, 24-31.X.2022, 3 ♂, colour traps, W. Klein & T. Peeters. Kralendijk, Tera Barra, 27-30.X.2022, 4 ♀, 2 ♂, colour traps, W. Klein & T. Peeters. Kralendijk, near ponds, 10.XI.2022, 1 ♂, insect net, M.C. d'Oliveira. Rincón, Dos Pos, 12.XI.2022, 1 ♂, insect net, M.C. d'Oliveira.



Figure 18. Specimen belonging to the family Eucharitidae, Kralendijk Wayaka trail, 17.XI.2022, leg. M.C. d'Oliveira. Photo Theo Peeters.

Kralendijk, Wayaka trail, 17.XI.2022, 1 ♀, insect net, M.C. d'Oliveira. Rincón, Dam Grandi, 6-19.I.2023, 1 ♀, pitfall, M. Boeken. Washington Slagbaai NP, Kas Sientífiko, 7-19.I.2023, 5 ♀, pitfall with bait, M. Boeken. Lac, 9.I.2023, 1 ♂,



Figure 19. Examples of specimens belonging to the family Chalcididae. Photo Theo Peeters.

insect net, M. Boeken. Washington Slagbaai NP, Kas Sientifiko, 21.II.2023, 1 ♀, light trap, J.T. Smit & T.B. Fernhout. Another 82 ex. from malaise trap placed on various locations on Bonaire.

Family Mymaridae

fairfly wasps

Twelve species belonging to nine genera were recorded during the BEE. The identification to genus level is provisional and work on the material is ongoing. Identifications are based on the keys of Annecke & Doutt (1961), Huber (1997), Huber et al. (2020), Schauff (1984) and Yoshimoto (1990). It is likely that some of these species are undescribed.

Alaptus spec.

Tera Barra, 1-6.XI.2022, 1 ♀, 6-13.XI.2022, 1 ♀, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, Put Bronswinkel, 28.XI-5.XII.2022, 1 ♂, malaise trap, J. van der Beek & J. Devalez. Rincón BOPEC, 19-27.XII.2022, 1 ♂, malaise trap, V.J. Kalkman. Washington Slagbaai NP, Pos Mangel, 7-13.I.2023, 1 ex., malaise trap, J.-J. Mekkes & M. Boeken.

Anagrus spec. (several species)

Washington Slagbaai NP, Lagadishi trail, 26-31.X.2022, 2 ♀, 1 ♂, malaise trap, W. Klein & T. Peeters. Tera Barra, 1-6.XI.2022, 4 ♀, 1 ♂, 6-13.XI.2022, 6 ♀, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, Put Bronswinkel, 14-21.XI.2022, 4 ex., 21-28.XI.2022, 7 ♂, 11 ♀, malaise trap, R. Kleukers et al. Washington Slagbaai NP, Put Bronswinkel, 28.XI-5.XII.2022, 2 ♀, 5-12.XII.2022, 1 ex., malaise trap, J. van der Beek & J. Devalez. Rincón, BOPEC, 27.XII.2022-2.I.2023, 4 ♀, malaise trap, V.J. Kalkman. Washington Slagbaai NP Pos Mangel, 7-13.I.2023, 15 ex.,

malaise trap, J.-J. Mekkes & M. Boeken. Kralendijk, Pos Gurubu, 20-26.I.2023, 5 ♀, malaise trap, S. van Leeuwen & B. van Tooren. Kralendijk, Pos Gurubu, 26.I-2.II.2023, 4 ♂, 23 ♀, malaise trap, S. van Leeuwen c.s.

Calldicopus/Dicopomorpha spec.

Tera Barra, 1-6.XI.2022, 1 ♀, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, Put Bronswinkel, 14-21.XI.2022, 1 ♀, 21-28.XI.2022, 1 ♀, malaise trap, R. Kleukers et al.

Erythmelus spec. (fig. 20)

Washington Slagbaai NP, Lagadishi trail, 26-31.X.2022, 1 ♀, malaise trap, W. Klein & T. Peeters. Tera Barra, 1-6.XI.2022, 22 ♀, 6-13.XI.2022, 1 ♀, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, Put Bronswinkel, 14-21.XI.2022, 2 ♀, 21-28.XI.2022, 1 ♀, malaise trap, R. Kleukers et al. Washington Slagbaai NP, Put Bronswinkel, 5-12.XII.2022, 2 ♀, malaise trap, J. van der Beek & J. Devalez. Rincón, BOPEC, 19-27.XII.2022, 6 ♀, 27.XII.2022-2.I.2023, 4 ♀, malaise trap, V.J. Kalkman. Washington Slagbaai NP, Pos Mangel, 7-13.I.2023, 4 ♀, malaise trap,



Figure 20. Female *Erythmelus* spec. (family Mymaridae). Photo Kees Zwakhals.



Figure 21. Examples of specimens belonging to the family Ceraphronidae. Photo Theo Peeters.

J.-J. Mekkes & M. Boeken. Kralendijk, Pos Gurubu, 26.I-2.II.2023, 2 ♂, 3 ♀, malaise trap, S. van Leeuwen c.s.

***Gonatocerus* s.l. spec.**

Tera Barra, 1-6.XI.2022, 1 ♀, malaise trap, W. Klein & T. Peeters. Rincón BOPEC, 19-27.XII.2022, 7 ♀, 27.XII.2022-2.I.2023, 4 ex., malaise trap, V.J. Kalkman. Washington Slagbaai NP, Pos Mangel, 4-7.I.2023, 1 ex., malaise trap, J.-J. Mekkes & M. Boeken. Washington Slagbaai NP, Kas Sientífiko, 4-19.I.2023, 1 ♀, pitfall, M. Boeken. Kralendijk, Pos Gurubu, 26.I-2.II.2023, 2 ♀, malaise trap, S. van Leeuwen c.s.

***Mymar taprobanicum* Ward, 1875**

Washington Slagbaai NP, Pos Mangel, 13-19.I.2023, 1 ♀, malaise trap, J.-J. Mekkes & M. Boeken.

***Omyomymar* spec.**

Rincón, BOPEC, 19-27.XII.2022, 5 ♀, 27.XII.2022-2.I.2023, 1 ♂, 4 ♀, malaise trap, V.J. Kalkman. Washington Slagbaai NP, Put Bronswinkel, 14-21.

XI.2022, 1 ♀, malaise trap, R. Kleukers et al. Tera Barra, 6-13.XI.2022, 2 ♀, malaise trap, W. Klein & T. Peeters. Washington Slagbaai NP, Put Bronswinkel, 28.XI-5.XII.2022, 1 ♀, malaise trap, J. van der Beek & J. Devalez. Kralendijk, Pos Gurubu, 20-26.I.2023, 1 ♀, malaise trap, S. van Leeuwen & B. van Tooren. Kralendijk, Pos Gurubu, 26.I-2.II.2023, 1 ♀, malaise trap, S. van Leeuwen c.s.

***Polynema* s.l. spec.**

Rincón, BOPEC, 19-27.XII.2022, 1 ♂, 1 ♀, 27.XII.2022-2.I.2023, 1 ♂, malaise trap, V.J. Kalkman.

***Mymaridae* spec.**

Rincón, BOPEC, 19-27.XII.2022, 5 ♀, malaise trap, V.J. Kalkman.

Family Signiphoridae

signiphorid wasps

In total eight specimens of this family were recorded.

Kralendijk, Tera Barra, 6-13.XI.2022, 2 ♂, malaise trap, W. Klein & T. Peeters. Rincón, BOPEC, 19-27.XII.2022, 1 ♀, 2 ♂, malaise trap, V.J. Kalkman. Rincón, BOPEC, 27.XII.2022-2.I.2023, 1 ♀, 1 ♂, malaise trap, V.J. Kalkman. Kralendijk, Pos Gurubu, 20-26.I.2023, 1 ♂, malaise trap, S. van Leeuwen & B. van Tooren.

Superfamily Ceraphronoidea

Family Ceraphronidae

ceraphronid wasps (fig. 21)

In total 293 specimens of this family were recorded.

Washington Slagbaai NP, near Kas Sientífiko, 24-31.X.2022, 3 ♀, 8 ♂, colour traps, W. Klein &

T. Peeters. Washington Slagbaai NP, Lagadishi trail, 24-31.X.2022, 2 ♀, colour traps, W. Klein & T. Peeters. Washington Slagbaai NP, Pos Mangel, 4-19.I.2023, 1 ♀, pitfall, M. Boeken. Another 279 ex. from malaise trap placed on various locations on Bonaire.

Superfamily Evanioidea

Family Evaniidae

ensign wasps

Evania appendigaster (Linnaeus, 1758)

An individual of this species was photographed on 5.XI.2022 at a ruderal field at Kralendijk (fig. 1) ([Observation.org/259800035](https://www.observation.org/259800035)). This egg parasite of cockroaches has a global distribution.

Family Gasteruptiidae

carrot wasps

Washington Slagbaai NP, 31.X.2022, 1 ♀, W. Klein & T. Peeters ([Observation.org/259795273](https://www.observation.org/259795273)).

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SAMENVATTING

Parasitaire wespen van Bonaire (Hymenoptera: Parasitica)

Tijdens de Bonaire Estafette Expeditie (BEE) werden naast Hymenoptera Aculeata ook Hymenoptera Parasitica waargenomen en gevangen. Hymenoptera Symphyta werden niet waargenomen tijdens de expeditie. Een malaiseval actief in de periode 26.x.2022 tot en met 7.III.2023 leverde de meeste vangsten voor de parasitaire wespen. De malaisevalvangsten werden gesorteerd tot op familie en de aantallen van diverse families werden geteld. In deze bijdrage presenteren we een overzicht van de aangetroffen aantallen per familie van de parasitaire wespen. Voor enkele families, Braconidae, Evanidae, Ichneumonidae en Mymaridae, zijn de taxa, voor zover mogelijk, verder op naam gebracht. Om een beter idee te krijgen van de soortenrijkdom aan parasitaire wespen die werden aangetroffen zijn diverse taxa geïllustreerd.

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