

First records of Odonata from Sint Eustatius, Dutch Lesser Antilles

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Abstract. Six species of dragonflies are recorded for the island of Sint Eustatius, Lesser Antilles. Breeding records are established for four out of the six species, despite the lack of natural fresh water sources. DNA barcoding was used to match the larvae with the adults.

Further key words. Dragonfly, damselfly, Anisoptera, Zygoptera, exuviae, larvae, breeding, fresh water, cisterns, swimming pool

Introduction

Sint Eustatius is a small island in the northern Leeward portion of the Caribbean Basin. It is part of the Lesser Antilles, lies south of Sint Maarten, and is neighboured by Saba to the northwest and Saint Kitts to the southeast. Formerly a constituent country of the Netherlands Antilles, it became a special municipality of the Netherlands in October 2010.

The saddle-shaped island has a landmass of 21 square kilometres and comprises two volcanic areas separated by lowlands. The northern hills, called Boven, are covered in dry forest and scrubland, whereas the southern part consists of a dormant volcano called the Quill, which supports more diverse, lush forest, especially in the crater; this is classified as humid evergreen forest (VAN ANDEL et al. 2016).

There are no natural sources of fresh water on the island but rain is collected in cisterns for irrigation and private consumption. It is these manmade water collectors, as well as abandoned swimming pools, that harbour the majority of aquatic freshwater fauna of the island, although dragonflies were also observed at a drinking pool for cattle.

Material and methods

Specimens were collected and recorded during the Tropical Biodiversity and Field Methods course organized by Naturalis from 02–18-x-2015. Specimens collected had one leg removed for DNA barcoding and were deposited in the collection of Naturalis Biodiversity Centre, Leiden, The Netherlands (RMNH). Additional records were obtained from 09–14-iv-2018 by the second author.



Fig. 1. A potential breeding site for dragonflies at Venus Bay, a muddy pool used as a watering hole for cattle. Sint Eustatius, Dutch Lesser Antilles (09-x-2015). Photo BVDH



Fig. 2. A breeding site for dragonflies on Sint Eustatius near Zeelandia beach; an overgrown swimming pool at an abandoned construction site. Exuviae of four out of the six recorded species have been found here, as well as larvae of three of those. Sint Eustatius, Dutch Lesser Antilles (09-x-2015). Photo BVDH

List of collecting sites

(1) Botanical garden (17.47413, -62.95211), 80 m a.s.l. (2) Oranjestad, Caribbean Netherlands Science Institute building (17.48944, -62.98145), 59 m a.s.l. (3) Oranjestad, swimming pool near Old Gin House (17.482, -62.987), 23 m a.s.l. (4) Oranjestad, swimming pool at eastern edge of town (17.486, -62.968), 152 m a.s.l. (5) Oranjestad, swimming pool (17.483, -62.973), 155 m a.s.l. (6) Oranjestad, Big Stone (17.48555, -62.97233), 42 m a.s.l. (7) The Quill volcano NNW slope (17.48347, -62.96769), 276 m a.s.l. (8) Venus Bay, small pool (17.51563, -62.98788), 0 m a.s.l. (9) Zeelandia, swimming pool (17.50752, -62.98204) 6 m a.s.l.

Results

Altogether six odonate species were recorded at nine collecting sites. These data represent the first Odonata records from Sint Eustatius. Larvae and/or exuviae were found for four of the six species. All species were identified using ESQUIVEL (2006), GARRISON et al. (2006) and MEURGEY & PICARD (2011). Morphological identifications were corroborated using DNA barcoding, which has also been used to match the larvae with the adults. Two (potential) breeding sites were discovered: a muddy pool of water intended as a drinking pool for cattle at Venus Bay in Boven National Park (Fig. 1; loc. 8) and an overgrown swimming pool at an abandoned construction site near Zeelandia beach (Fig. 2; loc. 9). At both sites, adult males were seen patrolling the water and at the latter both larvae and exuviae of the majority of the species were found. Males of *Orthemis macrostigma*, *Pantala flavescens* and *Tramea abdominalis* were also observed patrolling a regular swimming pool in the town of Oranjestad, but they never lingered, unlike at the other two sites.

List of recorded species

Family Coenagrionidae

1. *Ischnura ramburii* Selys, 1850

(3) 1♂ 14-iv-2018 (8) 1♂ 18-x-2015, 6 adults 11-iv-2018 (9) 1 exuvia 09-x-2015, 1♂ 12-x-2015, 2♂ 10-iv-2018, 2♂ 12-iv-2018.

Family Libellulidae

2. *Brachymesia furcata* Hagen, 1861

(1) 1♂ 03-x-2015 (2) 1♂ 14-x-2015 (8) 2♂ 11-iv-2018 (9) 1♂, 2 larvae, 32 exuviae 09-x-2015, 2♂ 12-x-2015.

3. *Brachymesia herbida* (Gundlach, 1889)

(8) 1♂ 11-iv-2018.

4. *Orthemis macrostigma* (Rambur, 1842)

(1) 1♂ 03-x-2015 (2) 1♂ 04-x-2015, 1♂ 07-x-2015, 1♂ 14-iv-2018 (3) 5♂ 14-iv-2018 (4) 5♂ 12-iv-2018 (5) 1♀ 09-iv-2018, 1♂ 12-iv-2018 (6) 1♂ 15-x-2015

(7) 1♂ 11-x-2015 (8) 1♂ 15-x-2015, 2 adults 11-iv-2018 (9) 1 larva, 1 exuvia 09-x-2015, 2♂ 12-x-2015.

5. *Pantala flavescens* Fabricius, 1798

(2) 1♂ 03-x-2015, 1♂ 06-x-2015, 1♂ 14-x-2015, 1 adult 09-iv-2018 (3) 1 adult 14-iv-2018 (8) 1♂ 15-x-2015, 1♂ 11-iv-2018 (9) 1 adult 14-iv-2018.

6. *Tramea abdominalis* Rambur, 1842

(2) 1♂ 07-x-2015, 1♂ 14-x-2015 (4) 4 adults 12-iv-2018 (8) 1♂ 15-x-2015, 4 adults 11-iv-2018 (9) 4 larvae, 5 exuviae 09-x-2015, 1♂ 12-iv-2018.

Discussion

No dragonflies have previously been recorded from Sint Eustatius, but all species recorded here are common and widely distributed in both the West Indies overall and Lesser Antilles (MEURGEY & POIRON 2012) and could therefore be expected on Sint Eustatius. Little is known about the dragonfly fauna of the neighbouring islands. Only *O. macrostigma* has been recorded from St Kitts and none have been reported from Saba. The closest islands with more than one record are Sint Maarten, Anguilla and St Barthelemy (MEURGEY & POIRON 2012).

Erythemis vesiculosa has been recorded from all three islands and might therefore turn up on Sint Eustatius. *Lestes forficula* and *Tramea calverti* have been recorded from at least one of these islands and are otherwise widely distributed in the Lesser Antilles and might therefore be found at Sint Eustatius. Altogether 46 species are recorded to date from the Lesser Antilles, most of which occur on the larger islands (MEURGEY & POIRON 2012).

Brachymesia furcata prefers lacustrine habitats (MEURGEY 2009). On Sint Eustatius it is evidently able to develop in the murky waters of an abandoned swimming pool (loc. 8), for the majority of the exuviae collected belonged to this species.

Orthemis macrostigma was the most commonly observed species on the island. Males were observed patrolling both potential breeding sites (loc. 8, 9) as well as several swimming pools in Oranjestad on different occasions (see list of records). Oddly only one larva and one exuviae were found at loc. 8.

Though no larvae nor exuviae were found of *Pantala flavescens*, it is likely that this species does breed on the island, because it is known to develop in temporary water such as rain-filled ponds (MEURGEY & POIRON 2012).

Most of the species recorded on Sint Eustatius can develop in temporary pools. The random collection of a small batch of exuviae at the overgrown swimming pool at the abandoned construction site near Zeelandia (loc. 9) yielded four out of the six species recorded for the island. In addition, larvae of three of the species were found there as well, highlighting the importance of man-made breeding habitats for dragonflies in the absence of natural water bodies.

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