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A journal of world insect systematics

INSECTA MUNDI

0795

New state and island records of Coccinellidae (Coleoptera)
in Hawai'i, USA

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Date of issue: September 25, 2020

Center for Systematic Entomology, Inc., Gainesville, FL

Hesler LS, Perreira WD, Yee DA, Silva JHS. 2020. New state and island records of Coccinellidae (Coleoptera) in Hawai'i, USA. *Insecta Mundi* 0795: 1–4.

Published on September 25, 2020 by
Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
<http://centerforsystematicentomology.org/>

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New state and island records of Coccinellidae (Coleoptera) in Hawai‘i, USA

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Abstract. Three new records of Coccinellidae (Coleoptera) are recorded within the state of Hawai‘i, USA. *Diomus roseicollis* (Mulsant, 1853) is newly recorded from the state based on four specimens collected on the island of O‘ahu. *Cycloneda sanguinea sanguinea* (Linnaeus, 1763) and *Brumoides suturalis* (Fabricius, 1789), both already established in the state, are newly recorded from the island of Hawai‘i. Additional sampling is recommended to determine the distribution of *D. roseicollis* within the island of O‘ahu. Further surveys are warranted to determine particular habitats and prey for *D. roseicollis*, *C. sanguinea sanguinea*, and *B. suturalis* in Hawai‘i, as well as their impact on the insect fauna there.

Key words. Lady beetles, non-indigenous species, new geographic distribution records.

ZooBank registration. urn:lsid:zoobank.org:pub:B5DFA460-E9DB-4146-9FDA-EA04C3CF8DB8

Introduction

The 48 species of lady beetles (Coleoptera: Coccinellidae) on the Hawaiian Islands of the USA have accrued over time from purposeful and accidental introductions since the 1800s (Leeper 1976, 2015; Nishida 2002; Hesler et al. 2019). Purposeful introductions of predators such as lady beetles for biological pest control in Hawai‘i have become generally disfavored and highly scrutinized due to unwitting effects on non-target organisms (Howarth 1985, 2001). However, inadvertent introductions of lady beetles are still possible because of Hawai‘i’s high annual volume of sea and air traffic, and thus additional species may be newly recorded in the future. In addition, the distribution of lady beetles already established in Hawai‘i may be extended because of additional introduction or inter-island movement. Indeed, we report here on a species of lady beetle newly recorded in Hawai‘i and two established species with new island records in the state.

Materials and Methods

Various insects were collected during 2017–2020 as bycatch on yellow sticky board traps (YSBT) used in surveys for assorted invasive plant pests on the islands of O‘ahu and Hawai‘i. Lady beetles were sorted from other insects in the samples and identified using keys in Gordon (1976) and Leeper (2016) and checked against records of lady beetles in Hawai‘i according to Leeper (1976, 2015), Nishida (2002) and Hesler et al. (2019). Label information for specimens was reported verbatim. Pinned specimens of the lady beetles newly recorded in this paper were

labeled as voucher specimens and deposited indefinitely at the USDA-ARS North Central Agricultural Research Laboratory, Brookings, SD, USA. Nomenclature is based on Seago et al. (2011).

Results

***Diomus roseicollis* (Mulsant, 1853) (Coleoptera: Coccinellidae: Coccinellinae: Diomini)**

Hawai'i (**new state record**), Honolulu County, O'ahu Island, Barbers Point, 0–5 ft elev., 27-III to 5-IV-2017, W. D. Perreira and D. A. Yee, YSBT, 1 ♀; Honolulu County, O'ahu Island, Barbers Point, 0–5 ft elev., 5-12-IV-2017, W. D. Perreira and D. A. Yee, YSBT, 1 ♀; Honolulu County, O'ahu Island, Barbers Point, 0–5 ft elev., 28-VI to -2-VIII-2017, W. D. Perreira and D. A. Yee, YSBT, 1 ♀; Honolulu County, O'ahu Island, Waimanalo, UH Ag Res Sta, 70 ft elev., 25-VIII-2017, W. D. Perreira and D. A. Yee, 1 ♀ (Figure 1).

***Brumoides suturalis* (Fabricius, 1789) (Coleoptera: Coccinellidae: Coccinellinae: Chilocorini)**

Hawai'i, Hawai'i County, Hawai'i Island (**new county and new island record**), UH Mealani Res. Sta., 20°02'12"N, 156°36'28"W, el 2880 ft, sweeping, 6-XII-2019, W. D. Perreira, 2 specimens.

***Cycloneda sanguinea sanguinea* (Linnaeus, 1763) (Coleoptera: Coccinellidae: Coccinellinae: Coccinellini)**

Hawai'i, Hawai'i County, Hawai'i Island (**new county and new island record**), 19°47'46"N, 155°37'37"W, Saddle Rd. Rte. 200, 5480 ft, Golden Rod, 22-XI-2019, W. D. Perreira, 3 specimens; 19°47'45"N, 155°37'37"W, Saddle Rd. Rte. 200, el 5500 ft, Golden Rod, 3-I-2020, W. D. Perreira, 1 specimen.



Figure 1. One of four specimens of *Diomus roseicollis* (female) collected from the island of O'ahu constituting a new state record for Hawai'i, USA.

Discussion

Diomus roseicollis joins two other diomine lady beetles, *Diomus debilis* (LeConte) and *Diomus notescens* (Blackburn), already established in Hawai'i (Leeper 2015). The external morphology of *D. roseicollis* includes a blackish-brown elytron with a tan apical spot that does not reach the elytral suture (Gordon 1976) (Figure 1). This characteristic distinguishes *D. roseicollis* from congeneric species, including *D. debilis* and *D. notescens* (Gordon 1976, Leeper 2016).

No prey or habitat data were recorded with the specimens of *D. roseicollis*. However, species of *Diomus* prey upon various kinds of Hemiptera, including Coccoidea and Aphidoidea (Gordon 1999; Hodék and Evans 2012). For instance, *D. roseicollis* is known to prey on the sugarcane aphid, *Melanaphis sacchari* (Zehntner) (Hemiptera: Aphididae) (Rodríguez-Vélez et al. 2019), a pest which is present in Hawai'i (Zimmerman 1948). Surveys should be conducted to determine the extent to which *D. roseicollis* may be preying upon *M. sacchari* and other hemipterans in Hawai'i. Surveys for *D. roseicollis* should be conducted in various habitats and extended to other islands of Hawai'i in order to determine its geographic extent and habitat preferences. The benefits and detriments of its predation on the Hawaiian insect fauna should be assessed.

Brumoides suturalis is native to southern Asia and preys on various insect herbivores, including aphids (Hemiptera: Aphididae) (Swaminathan et al. 2015; Shankar et al. 2015), coccids (Hemiptera: Coccidae) (Gautam 1990), and mealybugs (Hemiptera: Aleyrodidae) (Inayatullah 1984). It had been intentionally introduced into the state of Hawai'i more than once, but apparently established on the islands of Ni'i'hau and O'ahu from accidental introduction (Mau 1976; Leeper 2015). Means of its advent on the island of Hawai'i is unknown, but interisland movement is likely, either by natural dispersal or inadvertent importation by humans. Despite its relatively long period of establishment in the state of Hawai'i, we did not find published prey records for *B. suturalis*. Thus, further surveys are warranted specifically to ascertain its prey in Hawai'i and determine the benefits and detriments of its predation (Howarth 1985).

Cycloneda s. sanguinea is a Nearctic lady beetle (Vandenberg 2002) that has been introduced several times into Hawai'i to control pest aphids (Lai and Funasaki 1986; Leeper 2015). It has been recorded previously from the islands of Maui (Kumashiro et al. 2001) and O'ahu (Hesler et al. 2019). The origin of *C. s. sanguinea* on the island of Hawai'i is unknown, but interisland dispersal is likely, either naturally or facilitated by humans. *Cycloneda s. sanguinea* is principally aphidophagous (Hodék and Evans 2012), but was not associated with any particular prey in our sampling. Follow-up surveys are warranted to determine its prey and the utility and disadvantages of its predation in Hawai'i.

Acknowledgments

The work was funded through USDA-ARS CRIS Project Number 3080-21220-006-00D, The Dana Anne Yee Foundation, The Atherton Family Foundation, Landscape Association of Hawai'i, The O'ahu Nursery Growers Association, and Rick and Whitney Benedict of Beachside Lighting Hawai'i. Special thanks to the following individuals for allowing us to collect on parts of Hawai'i Island: Marla Fergerstrom, University of Hawai'i, Mealani Research Station; Robert Lee, State of Hawai'i, Department of Transportation; and Nahua Guilloz, Parker Ranch Foundation Trust and Parker Ranch, Inc. Eric Beckendorf produced the figure image. Eric Beckendorf, Lauren Hesler, John Leeper and Janakiraman Poorani reviewed drafts of this paper.

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Received June 8, 2020; accepted August 13, 2020.

Review editor Oliver Keller.