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RESEARCH NOTE

First record of *Doleschallia tongana* (Lepidoptera: Nymphalidae) for Guam Island

[version 1; peer review: 2 approved]

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V1 First published: 23 Mar 2018, 7:366
<https://doi.org/10.12688/f1000research.14316.1>
Latest published: 23 Mar 2018, 7:366
<https://doi.org/10.12688/f1000research.14316.1>

Abstract



A single specimen of the butterfly, *Doleschallia tongana* Hopkins 1927, was collected on Guam Island on October 23, 2017 (13.430478°N, 144.800419°E). This is a new species record for Guam and Micronesia, indicating a geographical range expansion for *D. tongana*.

Keywords


Doleschallia tongana, Pacific orange leafwing, Guam, Micronesia, range expansion, invasive species, new country record

Open Peer Review

Approval Status

	1	2
version 1 23 Mar 2018	 view	 view

1. **Richard S. Zack**, Washington State University, Pullman, USA

2. **Niklas Wahlberg** , Lund University, Lund, Sweden

Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: Manuel J: Writing – Review & Editing; Tennent WJ: Writing – Review & Editing; Buden DW: Writing – Review & Editing; Moore A: Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: The author(s) declared that no grants were involved in supporting this work.

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How to cite this article: Manuel J, Tennent WJ, Buden DW and Moore A. **First record of *Doleschallia tongana* (Lepidoptera: Nymphalidae) for Guam Island [version 1; peer review: 2 approved]** F1000Research 2018, 7:366
<https://doi.org/10.12688/f1000research.14316.1>

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Introduction

On October 23, 2017, a butterfly was taken from the underside of a leaf of soursop, *Annona muricata*, by a student (JM) assembling an insect collection as a requirement for the General Entomology course at the University of Guam. The collection site was the University of Guam campus in Mangilao, Guam (13.430478° N, 144.800419° E).

The specimen was pinned, images were made (Figure 1), documented in iNaturalist¹ and deposited in the University of Guam insect collection (Accession code: iNat8515898).

This specimen does not match any of the descriptions in *Butterflies of Micronesia*², the standard reference for Guam's butterflies.



(a) Dorsal



(b) Ventral

Figure 1. First specimen of *Doleschallia tongana* collected on Guam.

Identification

Digital images of the specimen were sent to DB and JT for identification. On 7 November 2017, DB tentatively identified the specimen as a species in the genus *Doleschallia*, and indicated it possibly belonging to the *bisaltide* complex. On 24 February, 2018 JT determined the butterfly as *Doleschallia tongana* Hopkins, 1927, based on images and comparison with the extensive collections of the Natural History Museum, London.

In common with other species in the “*bisaltide* species-group, *D. tongana* is individually variable.

The convex outer margin of the forewing; the general appearance of the specimen; and geography all suggest *D. tongana* (*tongana* Hopkins, 1927, is a name to replace *drusias* Fabricius, 1781, the type locality for which is Tonga). Some minor ‘unusual’ features include the fact that *tongana* usually has a sub-apical ‘half-moon’ series of 4–5 spots on the forewing, lacking in this specimen, which only has two, but this lies within the wide individual variation of the species. Considering a distribution of Papua New Guinea (including the Bismarcks), the Solomon Islands, Fiji, Samoa, Tonga and New Caledonia, we are confident of associating this specimen with *D. tongana*. No doubt further material will confirm this association in due course. The species-group is in need of some revision³. The GBIF Backbone Taxonomy lists the accepted name for this taxon as *Doleschallia bisaltide* subsp. *tongana* Hopkins, 1927⁴. However, the taxon record is tagged as a “name parent mismatch” issue.

D. tongana is listed in the iNaturalist database⁵ and has been assigned the vernacular name ‘Pacific orange leafwing’.

Geographical distribution

D. tongana, as it is currently understood, occurs throughout much of New Guinea, including the island groups in the east (see above).

Occurrence of *D. tongana* in Samoa is a relatively recently recorded range expansion. It was first detected on Tutuila Island in American Samoa in 1997⁶. Cook and Vargo 2000⁶ state that “The inclusion of Samoa in this species’ range by Parsons, 1998⁷ appears to be based on a misreading of Hopkins (1927).”

Description of caterpillar

Cook and Vargo 2000⁶ provide a description of a last instar *D. tongana* caterpillar:

“Just prior to pupation, the caterpillar measured ca. 50 mm in length. It possessed a black ground color with light speckling dorsally and prominent cream colored stripes running longitudinally, located dorso-laterally and ventro-laterally. Each body segment had seven prominent black spines, with numerous smaller secondary spines. The base of each primary spine was pale metallic blue. From a distance, the most prominent features of the caterpillar are the black ground color with metallic blue spots, and the pair of light parallel stripes running longitudinally on each side.”

Only a few larval host plants have been recorded for *D. tongana* (Table 1).

Table 1. Larval host plants of *Doleschallia tongana*.

Larval host plant	Reference(s)
Acanthaceae	
<i>Graptophyllum</i>	
<i>Graptophyllum insularum</i>	8
<i>Graptophyllum pictum</i>	6,7
<i>Pseuderanthemum</i>	
<i>Pseuderanthemum carruther</i>	6
<i>Pseuderanthemum laxiflorum</i>	8
<i>Pseuderanthemum</i> sp.	9
Moraceae	
<i>Artocarpus</i>	
<i>Artocarpus altilis</i>	8
Fabaceae	
<i>Erythrina</i>	
<i>Erythrina</i> sp.	8

Discussion

An informal survey has been initiated on Guam to search for more specimens of *D. tongana* and to record host plants.

This insect has the potential to do economic damage because it has been reported to feed on breadfruit, *Artocarpus altilis*⁸.

Data availability

All data underlying the results are available as part of the article and no additional source data are required.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

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Open Peer Review

Current Peer Review Status:  

Version 1

Reviewer Report 23 May 2018

<https://doi.org/10.5256/f1000research.15578.r33973>

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Niklas Wahlberg 

Department of Biology, Lund University, Lund, Sweden

This is a simple report on a range extension of a butterfly species. What makes it interesting is that the range extension is to the island of Guam, which is relatively isolated. It seems this species is on a rampage through the South Pacific, colonizing new isolated islands! The only reference I missed was the relatively recent book by Patrick and Patrick (2012) "Butterflies of the South Pacific". I unfortunately do not have access to my copy at the moment to see what it says about the species. Perhaps good to look at that?

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

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Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

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expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 28 March 2018

<https://doi.org/10.5256/f1000research.15578.r32407>

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Richard S. Zack

Department of Entomology, Washington State University, Pullman, WA, USA

A well-written report and discussion of a new species of butterfly to Guam. The record is a significant range extension for the species. Introductions to islands such as Guam are of concern because of potential economic and environmental effects and reports such as this are important to document. It will be interesting to see if the species has established or if this was a one-time occurrence.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

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Not applicable

Are all the source data underlying the results available to ensure full reproducibility?

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