

(REVIEW ARTICLE)



Parasitoids collected on oceanic and river islands: Bibliographical summary

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Abstract

The islands, due to their discreet and isolated nature, offer excellent opportunities for understanding the origin, diversification and extinction of terrestrial biotas such as that of parasitoids. This study aimed to perform a bibliographic summary of the parasitoids collected on oceanic and river islands. For the elaboration of this study, researchers were carried out that contained published works reporting the main families, subfamilies and species. The mini review was prepared in Goiânia, Goiás, Brazil in the years 2007 to 2021, using the Online Electronic Scientific Library (SciELO). Parasitoids are important natural regulators of insects and are prominent groups of natural enemies. They are also considered as bioindicators of biodiversity.

Keywords: Biodiversity; Braconidae; Ichneumonidae; Figitinae; *Doryctobracon areolatus*

1. Introduction

The definition of an island is quite simple: it is a territory surrounded by water in its entirety. This is the main characteristic of all the islands on the planet, regardless of their size and other peculiarities. In addition to these shared characteristics, the differences presented are significant. There are islands that are located in the oceans and seas (marine islands), others in rivers (river islands) and even those that are located in lakes (lake islands). A group of nearby islands is called the archipelago.

Parasitoids, which include mainly taxa belonging to Hymenoptera, play an important role in maintaining other populations of arthropods, acting as regulators of host densities. However, the large-scale patterns of these insects and the factors that shape them are not yet well established [1].

The purpose of this bibliographic summary is to report some works related to those collected on oceanic and river islands.

2. Methods

For this study a bibliographic summary was used of parasitoids of the Order Hymenoptera (Hymenoptera Parasitica) collected from oceanic and river islands. Research was carried out on studies related to the concept, main families, subfamilies and species the mini review was prepared in Goiânia, Goiás, Brazil (Figure 1) in the years 2007 to 2021, using the Online Electronic Scientific Library (SciELO).

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Figure 1 Map of Brazil: Goiás (GO), [Source: <https://www.infoescola.com/geografia/mapa-do-brasil/>]

3. Studies of parasitoids of oceanic and fluvial islands (Hymenoptera)

In this paper, we develop a protocol for the identification of evenly inventoried areas from taxonomic databases. Of the 118 islands represented in Taxapad, 105 include records of braconid species. A total of 41 subfamilies and 5.255 species have been recorded for these islands. The number of common subfamilies used in the first criterion varied according to the biogeographic region, ranging from eight in both Indomalaya and the Neotropics, to 11 in the Palearctic, with the Agathidinae, Cheloninae and Microgastrinae being the only widespread subfamilies present in every biogeographic region [2]. In total, 48 islands full filled this criterion: three from the Afrotropics with 30.0% of all islands in this region, 8 from Australasia with 30.0%, 13 from Indomalaya with 62.0%, 2 from the Nearctic with 67.0%, 8 from the Neotropics with 33.0% and 14 from the Palearctic 70.0% [2].

One hundred and ten islands have records of Ichneumonidae (Figure 2), comprising 36 subfamilies and 7.406 species. The number of widespread subfamilies in each biogeographic region ranged from 5 (in the Neotropics) to 10 (in the Palearctic) and Campopleginae and Pimplinae were the only subfamilies present in every biogeographic region. Nevertheless, we believe this protocol might be adequate as a previous step for many analyses of macroecological patterns, as evenly inventoried areas identified this way can be reliably used for large-scale analyze [2].



Figure 2 A specimen of Ichneumonidae, [Source: <https://br.pinterest.com/pin/223561568980302140/>]

One of the biggest obstacles to the production and free commercialization of fresh fruits in Brazil and in the world is the presence of fruit flies (Diptera: Tephritidae) in commercial areas due to the direct damage caused by their larvae

developing inside the fruits and by quarantine restrictions imposed by countries that import these products. In the survey of fruit flies, their host plants and their parasitoids on Ilha de Santana, Amapá state, Brazil [3].

Forty-four samples of fruits from 13 plant species were collected, totaling 4,177 fruits and 78,753g. The fruits were collected from January to July 2005, obtaining 608 pupae, from which 225 fruit flies belonging to the genus *Anastrepha* and 42 parasitoids of the Braconidae (Figure 3) family emerged. Fruit flies emerged only from samples of Taperebá *Spondias mombin* L. (Anacardiaceae)(Guava) *Psidium guajava* L. (Myrtaceae) and (Abiu) *Pouteria caimito* Radlk (Sapotaceae).



Figure 3 A specimen of Braconidae, [Source: <http://tolweb.org/Braconidae>]

The registered species were *Anastrepha obliqua* Macquart, *Anastrepha striata* Schiner and *Anastrepha leptozona* Hendel (Diptera: Tephritidae) (Figure 4). From the taperebá samples, specimens of three species of parasitoids were obtained: *Doryctobracon areolatus* (Szépligeti), *Opius* sp. and *Asobara anastrepha* (Muesebeck) (Hymenoptera: Braconidae) associated with *A. obliqua*. Of the guava fruits, only one specimens of *D. areolatus* was obtained associated with *A. striata*. Parasitoid *D. areolatus* was predominant in taperebá with 65.9%, in Ferreira Gomes 50.0% and Itaubal do Pírim 57.1% [3].



Figure 4 Specimens of *Anastrepha* spp. [Source: https://www.agrolink.com.br/problemas/mosca-das-frutas_53.html]

4. Conclusion

Two important biological differences between oceanic and river islands are that the former usually have lower species richness and a higher degree of taxonomic disharmony than the latter. Although there is some evidence of less complex interaction networks on oceanic and river islands, only a few studies have compared island communities with each

other or with mainland communities [4]. Parasitoids are important natural regulators of insects and are prominent groups of natural enemies. They are also considered as bioindicators of biodiversity.

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