

Biodiversity Record: Julia heliconian butterflies at Pandan Reservoir

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Subjects: Julia heliconian, *Dryas iulia* (Lepidoptera: Nymphalidae: Heliconiinae).

Subjects identified by: Anuj Jain.

Location, date and time: Singapore Island, Pandan Reservoir, along access road to Singapore Rowing Association from Jalan Buroh; 28 April 2022 at around 0830 hrs, 29 April 2022 between 0840 and 0900 hrs, 30 April 2022 between 0915 and 0945 hrs, 3 May 2022 between 1440 and 1510 hrs.

Habitat: Open strips of shrubbery and grasses along small isolated patches of secondary forest and mangrove (Fig. 1), at the periphery of an artificial freshwater lake which is flanked by industrial and housing estates on one side and an estuary on the other. The habitat supported nectar plants such as *Sphagneticola trilobata* and *Lantana camara*, as well as several individual *Passiflora suberosa* and *Passiflora foetida*.

Observers: Anuj Jain and Saloni Swaminathan.

Observations: *Dryas iulia* were observed on the following days — one on 28 April, five (two of which were mating) on 29 April, four (two of which were mating) on 30 April (Figs. 2 & 3), six (two of which were mating) on 3 May. At least two tawny coster (*Acraea terpsicore*) butterflies were also observed in the period.



Fig. 1. The habitat at Pandan Reservoir where Julia heliconian butterflies were observed. (Photograph by: Anuj Jain)

Remarks: The presence of the Julia heliconian in Singapore was announced on iNaturalist, with the first sightings at Hort Park in June 2021 (iNaturalist, 2021). Subsequent records are from Gardens by the Bay and Lazarus and St. John's Islands, Tampines Eco Green, Coney Island and Changi Bay (iNaturalist, 2022a). The observation made on 30 April 2022 at Pandan Reservoir was also recorded on iNaturalist (2022b). Apart from these, there appears to be no previous record of the species in the country (see Jain et al., 2018).

The Julia heliconian is native to the warmer regions of the Americas in countries such as Brazil, Costa Rica, Mexico, the southern United States, as well as the Caribbean islands (Lamas, 2004). With a wing length of about 43 mm, this mid-sized butterfly is a fast flyer that frequents forest clearings and edges. In Southeast Asia where the species is believed to be introduced, it has been recorded in Thailand since 2007 where individuals were thought to have escaped from a butterfly house in Phuket (Burg et al., 2014), and in Peninsular Malaysia since 2009 (Khew, 2009; Khew, 2015).

How the Julia heliconian arrived in Singapore is a mystery. It could have been introduced with imported agricultural or horticultural produce from its native range, or spread over from Malaysia where it has become established. Observations of mating pairs and records from many parts of Singapore imply that this species has established populations there, no doubt aided by the local presence of its larval host plants *Passiflora suberosa* and *Passiflora foetida*. This presents a unique opportunity to document and understand the rate and geographical expansion of a non-native butterfly, as well as record the ecological impact the butterfly may have on Singapore's native biodiversity.

Passiflora suberosa and *Passiflora foetida* are non-native species that are also larval host plants for two other non-native butterflies in Singapore: the tawny coster (*Acraea terpsicore*) and the leopard lacewing (*Cethocia cyane*). A potentially positive outcome of the presence of these non-native butterflies could be the natural control of these introduced flora that are already widespread in Singapore. Understanding the interactions and population dynamics between these non-native butterflies and their shared host plants can be of immense ecological value as it can provide insights towards the management of non-native flora and fauna in Singapore.



Figs. 2 & 3. Julia heliconian feeding on flowers of *Sphagneticola trilobata*, 30 April 2022. Fig. 2. Lateral view of butterfly with undersurface of open right wings. Fig. 3. Dorsal view of butterfly. (Photographs by: Anuj Jain)

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