

iNaturalist observations document the biology of *Napata terminalis* (Walker) (Lepidoptera, Erebidae, Arctiinae, Arctiini, Ctenuchina) in Trinidad, West Indies

iNaturalist (<https://www.inaturalist.org>) is an image-sharing platform that facilitates the sharing and identification of images of animals and plants. In the last two years, this has brought together images that document the previously unreported biology of *Napata terminalis* (Walker) (Lepidoptera, Erebidae, Arctiinae, Arctiini, Ctenuchina) in Trinidad.

Napata terminalis is the type species of *Napata* Walker, 1854. Hampson (1898) treated *Uranophora* Hübner, 1831 as a synonym of *Napata*, overlooking that *Uranophora* is the older name and should have precedence. Nevertheless, *Napata* remained in use until Grados (1999) switched to treat *Napata* as a junior synonym of *Uranophora*. Since then, Cerda (2017) clarified that both genera are valid, and so the combination *Napata terminalis* is appropriate.

Kaye and Lamont (1927) recognized two species of *Napata* from Trinidad: *N. terminalis* and *N. leucotelus* Butler. Based on a series of 60 males and 21 females from Trinidad, Fleming (1959) concluded that these should be treated as one species – at least in Trinidad, for which the oldest available name was *N. terminalis*. However, subsequent authors continued to treat the Central American *N. leucotelus* as a valid species. Cerda (2017) treated *N. terminalis* as widespread in South America, but as he had not dissected any material from Central America for comparison, maintained *N. leucotelus* as a valid species. Matthew J.W. Cock (MJWC) compared Trinidad material with the type of *N. terminalis* (♂ Pernambuco, Brazil) and specimens curated as this species in the collection of the Natural History Museum, London.

This identification was further refined by obtaining a *cox1* DNA barcode (Hebert *et al.* 2003) from a specimen collected by Tarran P. Maharaj (TPM) (South Oropouche, 11 December 2021, iNaturalist observation 102902387, Fig. 14). The Trinidad sequence (MJWC-523) was compared with sequences in the Barcode of Life database (Hebert *et al.* 2003; www.boldsystems.org). It formed part of Barcode Index Number BOLD:AAA4698, (Ratnasingham and Hebert 2013, Miller *et al.* 2016), which includes sequences from Mexico, Costa Rica, Panama, Colombia and Peru, those from Costa Rica and Panama being mostly identified as *N. leucotelus*. This result supported Fleming's (1959) conclusion, and we maintain the use of the name *N. terminalis* for the species in Trinidad.

Napata terminalis is a common and widespread moth in Trinidad, although it is not known from Tobago (Cock 2017). It is frequently seen in suburban areas and is the most frequently photographed species of Ctenuchina on

iNaturalist (2022). Adults can be recognised by their small size (wingspan 24–25 mm), black colour with extensive hyaline areas on the forewing, white tip to the forewing, metallic green markings on dorsal body and base of dorsal forewings, and a broad white ventral stripe from head to just short of the end of the abdomen. We have not located any previous accounts of the life history.

On 20 November 2020 at mid-day, Venkata Siva Gosula and Aditya Gosula observed a female *N. terminalis* oviposit (iNaturalist observation 65333474, Fig. 1) on a leaf of a small, low-growing sedge (*Kyllinga pumila* Michx., Cyperaceae) in the lawns at Mt. Hope (iNaturalist observations 65333474, 129029672, Figs. 3–4). The egg was laid singly, adjacent to the leaf margin, and it was small, whitish and domed (iNaturalist observation 65333474, Fig. 2).

Margaret Chin Sue Min (MCSM) found a small caterpillar on a different sedge, *Cyperus simplex* Kunth (Fig. 5–6), in her yard in St. Joseph on 18 July 2022 (iNaturalist observation 126856702, Fig. 7). When she searched for it again on 21 July, she found a larger caterpillar, which was probably a later instar of the same species, feeding on a sedge leaf (iNaturalist observation 127213181, Fig. 8). This caterpillar (Figs. 9–10) was taken into captivity for rearing and after feeding on sedge leaves, it formed a cocoon on 23 July (iNaturalist observation 127514730, Fig. 11) and a male emerged on 29 July (iNaturalist observation 128440870, Figs. 12–13).

Although we cannot be completely certain that the caterpillar of 18 July belongs to the same species, it does resemble the immature caterpillars of other Ctenuchina, so there is a strong probability that it is the same species, if not the same individual. It was about 9 mm long, brownish with mixed short and long white hairs, longest at the anterior and posterior ends (Fig. 7).

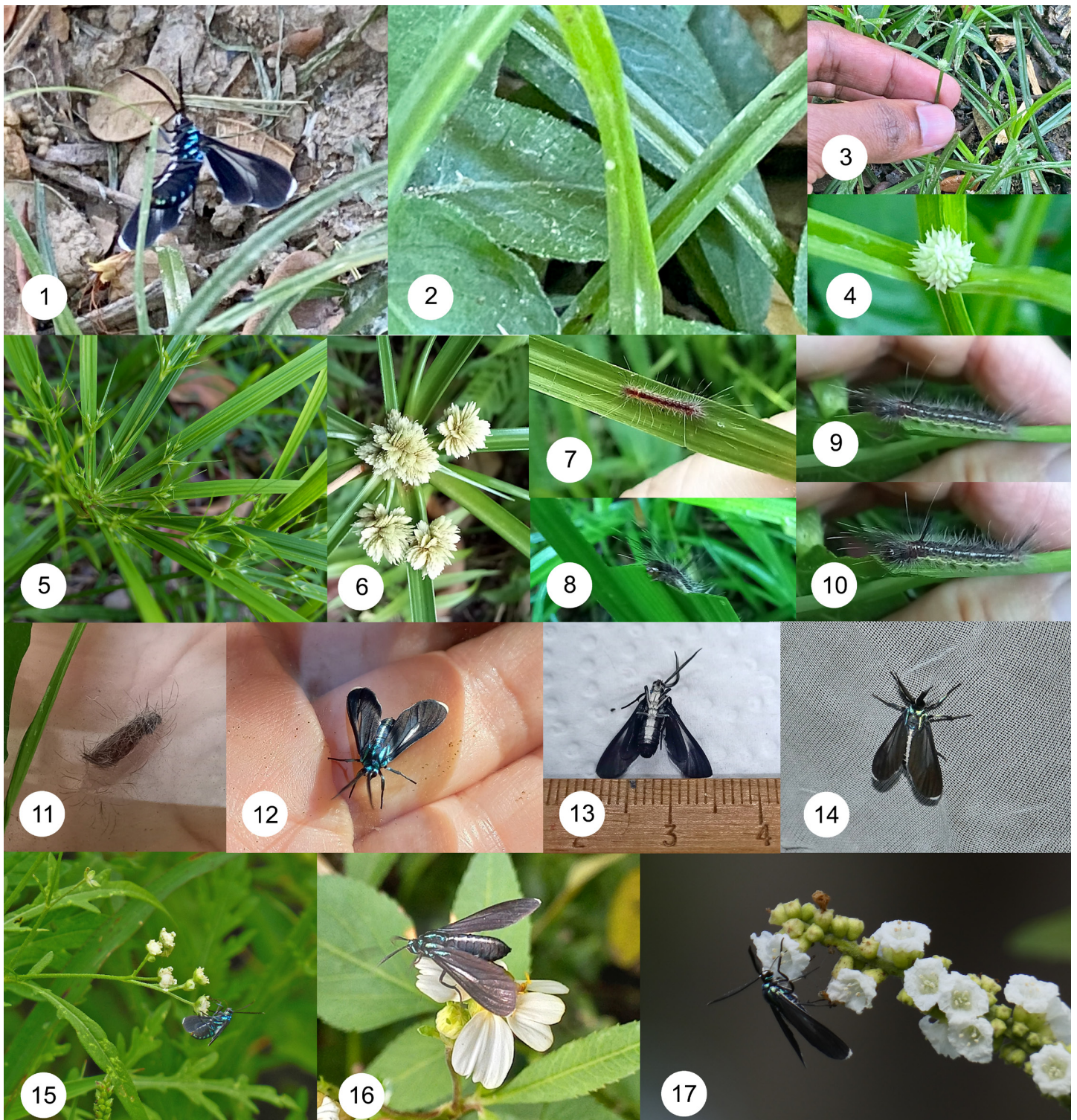
The caterpillar collected on 29 July (Figs. 8–10) was about 22 mm long; head black; body blackish, with a broken white dorsolateral line from thoracic segment 3 to abdominal segment 7, a matching irregular off-white ventrolateral line, and a dark spot on each segment above this; the hairs mixed white, dark or dark with the distal part white; grouped into a dorsal tuft of dark hairs on thoracic segment 3 and abdominal segment 7; true legs dark.

The cocoon was 12 mm long, very flimsy and incorporated the caterpillar hairs, some of which have been placed erect on the substrate around the edge of the cocoon (Fig. 11). The pupa was dark brown within the cocoon, but no details were visible.

Adults fly by day, when they are occasionally seen

attracted to flowers (Figs. 15–17) and drying heliotrope (Beebe 1955, MJWC observations), and at night when they are attracted to lights (MJWC observations, Fig. 14). Nectar flowers recorded in Trinidad include *Austro eupatorium*

inulifolium (Kunth) R.M. King & H. Rob. (♂ Cat's Hill, 24 September 2019, J. Morrall), *Bidens alba* (L.) DC. (St. Joseph, 20.xi.2021 15.30–14.00 h, MCSM; iNaturalist observation 101561586, Fig. 16), *Parthenium hysterophorus*



Figs. 1–17. Biology of *Napata terminalis*. 1, female ovipositing on *Kyllinga pumila*. 2, newly laid ovum arising from Fig. 1. 3–4, *Kyllinga pumila* details. 5–6, *Cyperus laxus*. 7, immature caterpillar, dorsal view. 8, final instar caterpillar feeding on leaf of *C. laxus*. 9, final instar caterpillar, lateral view. 10, final instar caterpillar, dorsolateral view. 11, cocoon with pupa visible in lateral view. 12–13, newly emerged male dorsal and ventral views. 14, male attracted to light by night. 15, adult nectaring on *Parthenium hysterophorus*. 16, adult nectaring on *Bidens alba*. 17, adult nectaring on *Varronia curassavica*.

L. (♀ South Oropouche, Mon Desir, 5 May 2021 14.04 h, TPM; iNaturalist observation 77598459, Fig. 15), and *Varronia curassavica* Jacq. (South Oropouche, Mon Desir, 11 January 2022, 09.38 h, TPM; iNaturalist observation 104760029, Fig. 17).

This may be the first partial documentation of the life history of *N. terminalis*. Janzen and Hallwachs's (2022) database of Lepidoptera rearing in Costa Rica indicated that *N. leucotelus* has been reared from sedges, *Scleria gaertneri* Raddi (= *S. melaleuca*) 19 times and once from *Cyperus esculentus* L. They included photos of a cocoon containing a prepupa, from which it can be seen that the caterpillar has dark hair tufts (as shown here, Figs. 8–10), but as the cocoon is not complete it is not clear how these hairs might be arranged in the completed cocoon.

Since we now know that the caterpillars feed on low-growing weedy sedges, it has become apparent why this species is so frequently seen and photographed around houses in Trinidad.

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