

Notes on the life history of *Epitoxis namaqua* de Freina & Mey, 2011 (Lepidoptera: Erebiidae: Arctiinae: Syntomini)

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Abstract: The final-instar larva and pupa of the South African Syntomini species *Epitoxis namaqua* de Freina & Mey are described and illustrated, and the life history of the species from egg to adult is illustrated. Notes are given on the habitats, host-plants and distribution of the species. Photographs are provided of the holo- and paratypes and of the male genitalia and antennae in comparison with those of *E. amazoula* (Boisduval, 1847), the type species of *Epitoxis* Wallengren (1863).

Key words: Lepidoptera, Erebiidae, Syntomini, larva, pupa, life history, host-plants, South Africa, Afrotropical region, Namaqua.

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INTRODUCTION

The syntomine species *Epitoxis namaqua* was described by de Freina & Mey (2011) from only a few specimens from seven localities in the Northern Cape Province of South Africa. At the time, nothing was known about its early stages and its larval host-plants. In 2014 and 2017, two of us (Silvia Mecenero [SM] and Andrew Morton [AM]) found some unknown larvae in the Namaqualand region of the Northern Cape Province, feeding on various plants, and reared them to pupation. The adults that eclosed from these pupae turned out to be *Epitoxis namaqua*. The final instar larvae and adults were illustrated and host-plant information of the species provided by Mecenero (2016). The purpose of this short paper is to describe the immature (early) stages of this species in more detail and provide some notes on its habitats, larval host-plants and life history. Figures are divided into two plates.

MATERIAL AND METHODS

The description of the species is based on the males that W. Mey collected in the Kamieskroon region in 2007 on lights, as well as on adults of both sexes that were deposited undetermined in the Ditsong Museum of Natural History, Pretoria, and evaluated by J. de Freina [JF] in 2009. Larvae were collected in the field by the authors SM and AM, between 2014 and 2017, and subsequently reared to adults as part of the Caterpillar Rearing Group project, a project of the Lepidopterists'

Society of Africa (Staude *et al.*, 2016). Observations were made in the field, including photographs taken, for host-plants, behaviour, habitat and life histories. Many of the host-plants were identified via iNaturalist. Also included are observations from JF in 2012, as well as rearing data (2018) and observations from H. Basson (pers. comm.).

RESULTS & DISCUSSION

Description of the immature stages of *Epitoxis namaqua*

Eggs (Fig. 16). Lemon yellow, deposited in clutches on woody parts of the host-plant.

Larva, final-instar (Figs 18–27, 32). Densely covered with short bicoloured setae set on segmental weals and tubercles, as follows (on each body half): dorsally an inner band of short upright rust-coloured setae surrounded by an outer row of longer subhorizontal white setae set on a short transverse weal; dorso-laterally an inner tuft of short upright rust-coloured setae surrounded by an outer circle of longer subhorizontal white setae; laterally with longer silvery-white setae set on three tubercles like pin-cushions. Head, mandibles and labrum deep black, body dark blue-grey, prolegs and crochets pinkish.

Pupa (Fig. 17). Pinkish-red, surface smooth but sparsely covered with loose larval setae, cremaster not pronounced; in laboratory formed on surface of sandy substrate, in the wild probably under dead leaves and detritus or half buried into the soil.

Distribution (Fig. 15)

Apparently limited to the Succulent Karoo biome of South Africa, along the coastal areas of the Northern Cape Province, from Port Nolloth in the north, southwards to Clanwilliam in the Western Cape Province and eastwards to the edge of the Nama-Karoo biome.

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Distribution data in Figure 15 are based on a map in de Freina & Mey (2011), modified and supplemented by additional data from JF, SM (Mecenero, 2016), AM and H. Basson (pers. comm.): Springbok, 29°40'0"S 17°53'0"E, 09.ix.2012, J. de Freina; Calvinia-Keiskie Road, 31°28'31"S 19°46'42"E, 15.ix.2015, A. Morton; Kotzersrus, 31°01'10"S 17°57'12"E, 30.viii.2017, A. Morton; Clanwilliam, 32°12'55"S 18°58'51"E; 20.viii.2018, A. Morton; Brand se berg near Klawer, 31°53'18"S 18°42'49"E, 08.ix.2018, H. Basson; Kamiesberg, 30°35'14"S 18°08'12"E, 6–10.vii.2018 & 2019, larvae, H. Basson.

Habitats, host-plants and life history (Figs 28–36)

The species inhabits sparsely vegetated, sandy to rocky biotopes, the larvae feeding on a variety of succulent and perennial plants from the following families (see also Mecenero, 2016): Aizoaceae such as species of *Carpobrotus*, *Dorotheanthus*, *Lampranthus*, *Amphibolia rups-arcuatae* and *Mesembryanthemum*; Asteraceae such as *Crassothonna cylindrica* and *Xerophila* spp.; Amaranthaceae such as *Atriplex semibaccatae* and the halophyte *Sarcocornia* spp.; Thymelaeaceae such as *Passerina truncata* (H. Basson, pers. comm.); Melianthaceae such as *Melanthus comosus* (H. Basson, pers. comm.); and Zygophyllaceae such as *Zygophyllum* spp., indicating that they are extremely polyphagous.

The larvae appear to feed mainly at night but, in cooler and overcast to foggy weather, also during the day but mainly in the morning. On hot and sunny days they retreat into the interior of their host bushes. At least in the later instars they feed individually and exposed on their host-plants, where their striking coloration of reddish and white setae appears to form an aposematic pattern that warns off potential vertebrate predators from attacking them. Whether they are prone to parasitism by Tachinidae or other parasitoids is unknown.

The pupal stage is short, in our rearings lasting between 16 and 34 days. In the population at Kleinsee, SM found seven mature (final-instar) larvae on 14.viii.2014, six of which pupated on 18.viii.2014 and four eclosed as adult moths (two males and two females) between 5 and 16.ix.2014, and one of which pupated on 11.ix.2014 and eclosed as a female imago on 29.ix.2014 (the pupal stage lasting 18–29 days) (Mecenero, 2016). At Kotzersrus, AM collected larvae on 30.viii.2017, they pupated on 10.ix.2017 and eclosed on 13.x.2017 (pupal stage lasting 34 days). Larvae collected from Brand se Berg on 8.ix.2018 pupated on 12.ix.2018 and eclosed on 28.ix.2018 (H. Basson, pers. comm.) (pupal stage lasting 16 days).

The winged adult males, despite their striking black-and-white colour pattern, have not been recorded as being active during the day and are predominantly nocturnal, but proven to be also crepuscular. AM observed a number of adults flying in the early morning around lights at a petrol station in Calvinia. As recorded, they are on the wing between the end of August and the middle of October, coinciding with spring and the rainy season in Namaqualand. The species is evidently univoltine.

Variability of the adults (Figs 1–8)

Epitoxis namaqua is relatively uniform in facies. The forewings of the males vary only slightly with regard to the intensity of the scattering of pale scales and the prominence of the white spots. Occasionally, spots 1 and 2 (Fig. 2) have a pale yellow colour. In the apterous females (Figs 9–10), the white cingulation of the abdomen segments varies slightly.

Taxonomy (Figs 9–14)

As noted in the description of *E. namaqua*, assignment of the species to *Epitoxis* (see de Prins & de Prins, 2020) is tentative, as it agrees with the characters of *Epitoxis* only to a limited extent. The male genitalia of *E. namaqua*, as illustrated by de Freina & Mey (2011), differ in several structures from those of *E. amazoula* (Boisduval, 1847), the type species of *Epitoxis*, and there are also clear differences in the structure of the antennae. More comprehensive morphological and molecular study is needed to clarify the taxonomic position of this species.

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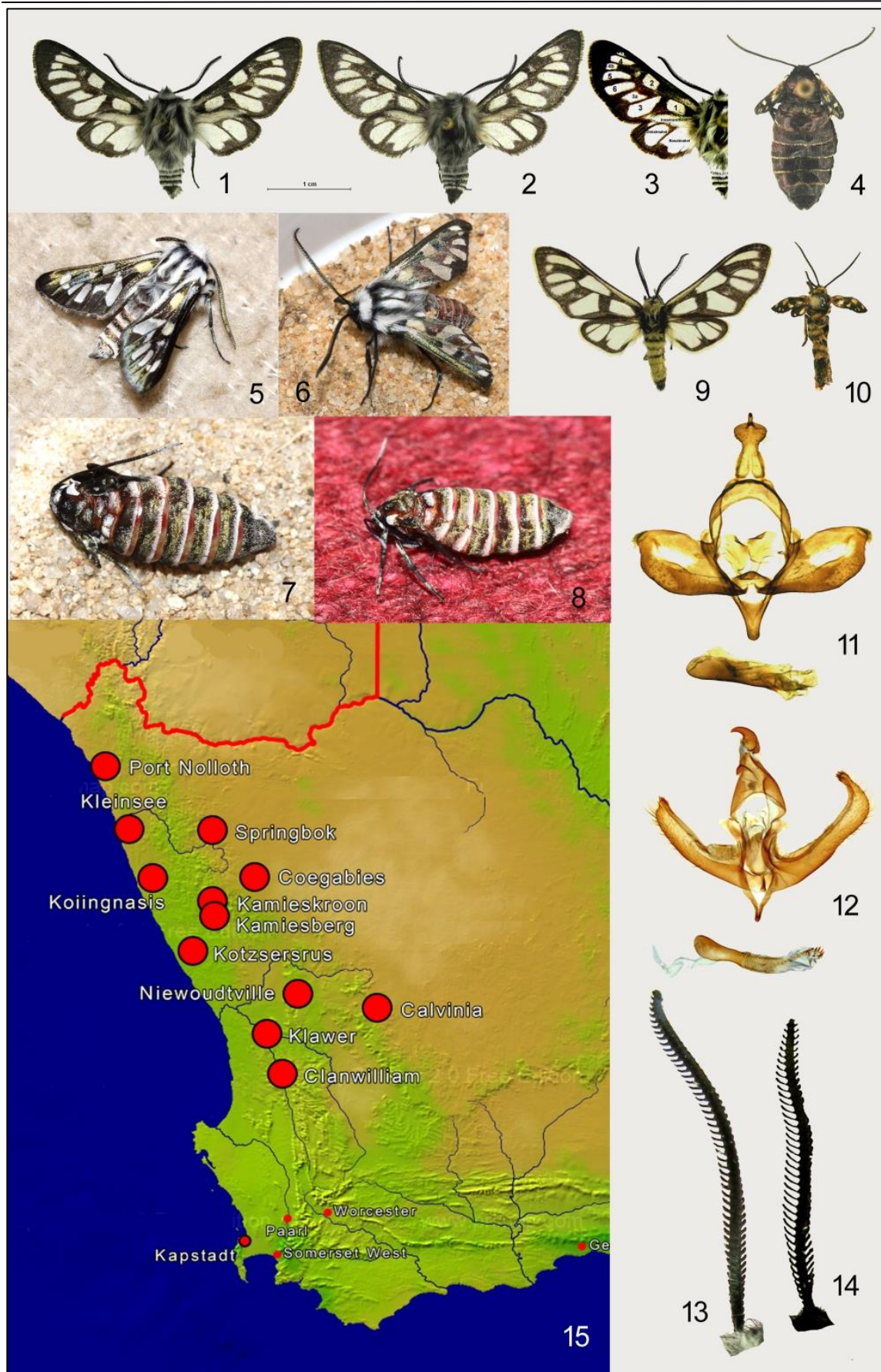


Plate 1 – *Epitoxis namaqua* de Freina & Mey, 2011, habitus of adults (Figs 1–8): holotype ♂ (1); paratype ♂ (2); wing spot pattern of male (3); paratype ♀ (4); males reared *ab larva*, Kleinsee population (5, 6); females reared *ab larva*, Kleinsee population (7, 8); *E. namaqua* and *E. amazoula* (Boisduval, 1847) in comparison (Figs 9–14): *E. amazoula* ♂ South Africa, Natal, Utrecht, 8.II.1968, leg. D.M. Kroon (9); *E. amazoula* ♀ South Africa, Limpopo, Marakele Nat. Lodge, 2050 m, 18.xi.2007, leg. M.C. Williams (10); ♂ genitalia: *E. namaqua*, paratype (11), *E. amazoula* (Boisduval, 1847), same data as for Fig. 9 (12); ♂ antenna: *E. namaqua* (13), *E. amazoula* (14); *E. namaqua*, known distribution (15; large red dots). (Photos: Figs 1–4, 9 de Freina; Fig. 10 Haynes; Figs 5–8 Mecenero).



Plate 2 – *Epitoxis namaqua* de Freina & Mey, 2011, eggs, larvae, pupae and larval host-plants (Figs 16–36): Egg cluster (16); pupae ventral (♂ above, ♀ below) (17); ultimate-instar ♀ larva on *Mesembryanthemum* sp., Kotzersrus-population (18), ultimate-instar larvae, Kleinsee population (19–26); structure of tubercles and setae on middle segments, enlarged (19); *Sarcocornia* host-plant, Clanwilliam population (27), Aizoaceae host-plants (28, 31–34), *Atriplex* host-plants (29, 30); *E. namaqua* habitats: Near Kamieskroon (35), surroundings of Kleinsee (36). (Photos: Fig. 35 Mey, Figs 17, 19–26, 28–31, 33, 34–36 Mecenero, Figs 16, 18 Morton).