

Scientific Note: Observations on the life history of *Hyalurga vinosa* (Lepidoptera: Erebidae)

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Abstract: *Hyalurga vinosa* (Drury, [1773]) (Lepidoptera: Erebidae) was observed over 15 months in the Dominican Republic. Adults and larvae were both found to be highly seasonal. Habits of adults and larvae are described.

Key words: *Hyalurga*, Erebidae

INTRODUCTION

The genus *Hyalurga* Hübner, [1819] (Erebidae: Arctiinae) contains some 41 species and ranges from Mexico and the West Indies to Bolivia and Paraguay, with many species endemic to a single country (records and maps compiled by Savela, 2020). Ecuador and Brazil are particularly rich in species. Among the few widespread species are *Hyalurga fenestra* (L., 1758), ranging from Nicaragua to Bolivia, and *H. sixola* Schaus, 1910, which occurs from Mexico to French Guiana and western Ecuador. Many *Hyalurga* have partly translucent wings, although an exception is *H. vinosa* (Drury, [1773]), which has an apparently aposematic ‘harlequin’ pattern. There are also several intermediate phenotypes, with clear wings overlain with black or red patterns similar to those found aposematic species. *Hyalurga vinosa* is the sole species without any wing translucence, with those patches being replaced with black in the basal parts of the wings and white in the distal parts. The basis for the apparent aposematism may be chemical defense; Trigo *et al.* (1993) found pyrrolizidine alkaloids in *Hyalurga sypa* (Walker, 1854), another brightly colored species, which feeds on *Heliotropium transalpinum* Vell. (Boraginaceae).

Hyalurga vinosa is a West Indian species, ranging from Cuba to Antigua, with one early record stating that also occurs in Honduras and Venezuela (Gundlach, 1891), and it shows geographic variation, with some island subspecies having black and white wing patterns, while others are black, white, and red (Todd, 1981). Records for this species in iNaturalist (2020) come from the West Indies, north-central Colombia, and western Mexico. Zagatti *et al.* (1995) described it as being “very rare” in Guadeloupe and Martinique, and identified the host plant there as *Heliotropium indicum* L. (Boraginaceae), a non-native species. On Cuba, however, it is common (Gundlach, 1881), and, the recorded host plant for the species there is *Tournefortia hirsutissima* L. (Boraginaceae) (Novoa *et al.*, 2006).

Most of the sources consulted on the biology of *H. vinosa* provided no information besides locality and host plant. The sole source providing life history information was that of Jones

(1914) from Puerto Rico. He found larvae in late November, and the pupal stage extending into early December. He noted five larval instars, of which the first three lasted three days each, the fourth instar four days, and the last, eight days. He found the pupal period to be two weeks.

As is the case with many tropical insects that are not known to be economically significant, little detailed information other than locality data are available for *Hyalurga vinosa*. Therefore, the main purpose of this note is to contribute life history data for this poorly known species.

METHODS

Observations of free-living adults and larvae were made over a 15-month period, from January 2017 to March 2018, in the coastal Magante District of Espaillat Province, Dominican Republic. The landscape comprised a mixture of pastures, shade-grown cacao, and remnant riparian woodland, with scattered houses. Additionally, larvae were reared in the laboratory under ambient temperature in glass jars on the same host plant species from which they were collected during the last three months of this period.

RESULTS

The sole host plant observed was *Tournefortia hirsutissima* (Boraginaceae: Heliotropoideae), a native, rambling shrub commonly occurring in pastures and brushy areas. This plant is considered an undesirable weed by local Dominican farmers. Larvae were highly seasonal: in 2017, they were seen in January in such numbers that they completely skeletonized the host plant leaves, but were not seen at all in other months. In 2018, the peak in larval abundance was later, in February and March. These months are those that follow the peak rainy season (NOAA, 2020).

Hispaniola’s subspecies has red in the wings in addition to black and white. A few individuals showed a small red dot near the distal end of the wing in addition to the red triangle

outlining the basal section.

The adult moths also fluctuated highly in abundance, although not so much as the caterpillars. In 2017, they were seen on 11 days in January, 3 days in February, 1 day in March, 1 day in July, 1 day in October, 5 days in November, and 3 days in December. In 2018, they were seen on 4 days in January, 5 days in February, and 5 days in March.

Adult moths were attracted to porch lights during the species's period of abundance, but was not seen at lights during its period of scarcity. Adults were seen at lights in 2017 in January and February, and then not seen at lights again until November, December, and into January 2018. During these times, moths would enter the author's house through the space under the eaves, and sometimes appeared to seek out the interiors of houses for shelter. The 10 January 2017 was a windy night, and many moths of various species came indoors, but in the morning, all departed except for the nine which were *Hyalurga vinosa*. Likewise, 29 December 2017 was a rainy day, and three *H. vinosa* entered the house at 06:00, remaining until daylight. Inside an abandoned house with vaulted ceilings and no electricity, 28 *H. vinosa* were seen in January, perched high in the vault, including four dead in a spider web. No other species of moth aggregated in this structure.

In January of both years, external spraying of a neighboring house for ants and termites was followed the next day by accumulations of dead moths that had come to the porch light. These were all found with the tips of their abdomens burst. Thirteen *Hyalurga vinosa* were found dead in this manner on 28 January 2017, an additional 16 on 31 January, and in 2018, four were likewise found killed this way on 24 January.

Despite their aposematic coloration, adults of this species are subject to predation: an *Anolis* lizard living inside the author's house was observed to eat an adult that was resting on the wall. The lizard exhibited no ill effects.

As is the case with many brightly colored moths, *Hyalurga vinosa* frequently flies during the day. Of six days when the time of the earliest flight was recorded, the earliest was 13:30, and the latest 16:45, with a mean of 15:37. One individual was observed to fly all the way across a meadow with only momentary rest-stops. In the early morning, resting moths could be flushed from the undersides of vegetation at the meadow-woodland interface.

Larvae were diurnal, and appeared to vanish at night from host plants that they covered conspicuously in the afternoon. One was observed to go underground, apparently simply by crawling into spaces between soil particles, and this is likely where they go when not on the host plant. They did not exhibit any social behavior, but were dispersed across the host plant leaves. They did not produce any webbing, nor modify the leaves in any way beyond the skeletonization resulting from feeding. A predatory Hemiptera was observed with a caterpillar impaled, but still alive. Of 12 last instar caterpillars collected for rearing, four adults emerged, two pupae died, two caterpillars died, and the remaining four disappeared. Since no larva was raised from the egg, the larval period is unknown, while the pupal period for the four surviving adults was 23-24 days.

DISCUSSION

Hyalurga vinosa is clearly much more abundant in the Dominican Republic than it apparently is in Guadeloupe and Martinique. Its native host plant, as expected, is in the same family and subfamily as the non-native one recorded on those islands, and the same as that recorded on Cuba. This host plant likely contains similar alkaloids to those in related plants fed upon by related moths (e.g., Trigo *et al.*, 1993), and Boraginaceae are known to provide pyrrolizidine alkaloids to adults of ithomiine butterflies (Beccaloni, 1997). However, the observation of predation by an *Anolis* lizard shows that these chemicals are not effective against all vertebrate predators. *Tournefortia hirsutissima* is listed as Endangered in Florida (USDA, 2020), yet the plant is common enough on Hispaniola to be considered a troublesome weed. The moth's highly seasonal life cycle, however, precludes it being an effective biological control.

This population in the Dominican Republic showed a different seasonal cycle than that observed by Jones (1914) in Puerto Rico: the Puerto Rico larvae were found in November and adults emerged in December, whereas those observed in the present study occurred in January in 2017 and February in 2018. This population also had a longer pupal period than that of Puerto Rico: three weeks, as compared with two weeks. Jones (1914) did not describe the temperature conditions of his rearing jars, so it is not known whether this difference reflects geographical variation or a temperature effect.

A Brazilian species, *Hyalurga rica* (Hubner, [1831]), was also found to be highly seasonal in Minas Gerais by Andrade & Teixeira (2017), who recorded it only "in the hottest months", and in their study it was the most abundant arctiine. In the study region there is little temperature variation through the year, but the peak rainy season typically occurs from Nov-Dec (NOAA, 2020), and *H. vinosa* becomes abundant shortly afterwards. So, where does *H. vinosa* go in the months when caterpillars are absent and adults rare? A few adults were seen throughout the year, for example in July and October, so it could be that this is a long-lived species, with the new generation founded by those adults that survived through the year. However, adults began to increase in abundance in November and December, before the new generation of caterpillars appeared. Could they migrate to and from another region or habitat, as has been suggested for some tropical Lepidoptera in seasonal habitats (Janzen, 1983)? That remains an open question. The iNaturalist distribution data are also unexpected, because other available sources show this species occurring only in the West Indies (e.g., Gundlach, 1881; Todd, 1981; Barcode of Life Data System, 2020), but there are two hypotheses worth testing. One is that *Hyalurga vinosa* occurs in Colombia, Mexico, and also in the intermediate areas, but has not been adequately recorded. Another is that some of these records are misidentifications of similar-looking species, although none of the available sources suggest any species that could be easily confused with this one. Barcode of Life Data System (2020) shows no collections of any *Hyalurga* in those regions.

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