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Dilocarcinus pagei Stimpson, 1861

foto: S. Drechsel

Aquatic habit of larval instars of *Paracles palustris* (Joergensen, 1935) (Lepidoptera: Erebidae: Arctiinae)

Ulf Drechsel*

Abstract: The immature stages of *Paracles palustris* (Joergensen, 1935) are described. In the wild a female was found in the Paraguayan department of Ñeembucú. Generation (oviposition to imago) lasted 65 days. Egg, larval instars, cocoon, pupa and adults are illustrated.

Resumen: Se describen los estadios inmaduros de *Paracles palustris* (Joergensen, 1935). En la naturaleza una hembra fue encontrada en el departamento paraguayo de Ñeembucú. Generación (oviposición a imago) duró 65 días. Huevos, estadios larvales, capullo, pupa y adultos se ilustran.

Zusammenfassung: Die Entwicklungsstadien von *Paracles palustris* (Joergensen, 1935) werden beschrieben. In freier Wildbahn wurde ein Weibchen im paraguayischen Departament Ñeembucú gefunden. Generation (Eiablage bis Imago) dauerte 65 Tage. Eier, Larvenstadien, Kokon, Puppe und Imagos werden abgebildet.

Key words: Paraguay, Erebidae, Arctiinae, Arctiini, *Paracles*, early stages, aquatic larva.

Introduction

Several species of the genus *Paracles* Walker, 1855 have become known to have aquatic larvae. So as *P. tenuis* (Berg, 1877a, *ibid.*), *P. azollae* (Berg, 1877a, *ibid.*), *P. burmeisteri* (Berg, 1877b, *ibid.*), *P. laboulbeni* (Bar, 1873 *ibid.*) (Adis, 1983), *P. palustris* (Joergensen, 1935) and *P. klagesi* (Rothschild, 1910) (Meneses et al., 2013). *P. palustris* is known to occur in Paraguay in the departments of Presidente Hayes, Paraguari, Ñeembucú and Caazapá and seems to be common.

*Gral. Aquino 694, Asunción, Paraguay (ulfdrechsel@hotmail.com)

Material and methods

The starting material for the breeding of the species were ova laid by a female (fig. 1) which was found in the department of Ñeembucú in the “Estancia Cambuchi” on the edge of the Tebicuary river. Larvae were kept under field conditions in an aquarium that was covered with a finely woven net to ensure unhindered access to rain and sun and prevented access of predators and parasitoids. They were fed with *Eichhornia crassipes* (Mart.) Solms 1883, which covered the water surface (fig. 5). The caterpillars fed on the spongy leaves and gnawed off the green surface of the inflated bulb-like petiole (fig. 12).

Course of breeding

Egg: The white globular ova are deposited in groups, have a diameter of 0.6 mm, and are embedded in a mass of orange yellow hair from the abdomen of the female (fig. 2).



Figs: 1-2: *Paracles palustris*; 1) female; 2) ova covered with abdominal hair

First instar: The first instar larvae hatched after five days since oviposition. Head and thoracic legs are maroon, body is tawny and has five rows of dark brown warts on abdominal segments and four rows on thoracic segments on each side of the body. Each wart of the lateral four rows wears one to three long black hairs, up to five times as long as the diameter of the body, warts of the first dorsal row, present on abdominal segments only, are displaced cephalad, slightly smaller than the other and bear one hair only (fig. 3,4,5). Duration of the first instar three days.

Second instar: Coloration as before. Each wart is now bearing up to six long black hairs (fig. 6). Duration of the second instar three days.

Third instar: Coloration as before. Warts are bearing dense tufts of long black hair (fig. 7). Duration of the third instar three days.



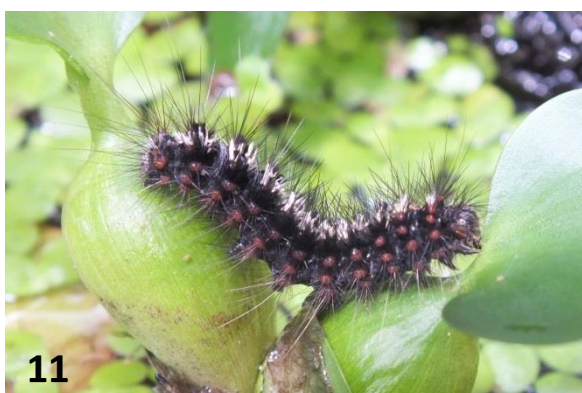
Figs: 3-8: *P. palustris*; 3) first instar larvae hatching; 4) first instar larva; 5) first instar larvae feeding on swimming *Eichhornia crassipes* seedlings; 6) second instar larva; 7) third instar; 8) fourth instar

Fourth instar: Coloration and hair as before (fig. 8). Duration of the fourth instar four days.

Fifth instar: Head, thoracic legs and body black, warts red, wearing a tuft of long black hair. The smaller warts of the first dorsal row wear a dense tuft of short white hair with a woolly appearance, caused by the fact that the hair of the left warts are directed to the right and the right to the left (fig. 9,10). Duration of the fifth instar seven days.

Sixth instar: Coloration and hair as before (fig. 11). Duration of the sixth instar eight days.

Seventh instar: Coloration and hair as before (fig. 12). Duration of the seventh instar twelve days.



Figs. 9-14: *P. palustris*; 9-10) fifth instar; 11) sixth instar; 12) seventh instar; 13) cocoon; 14) pupa in the open cocoon

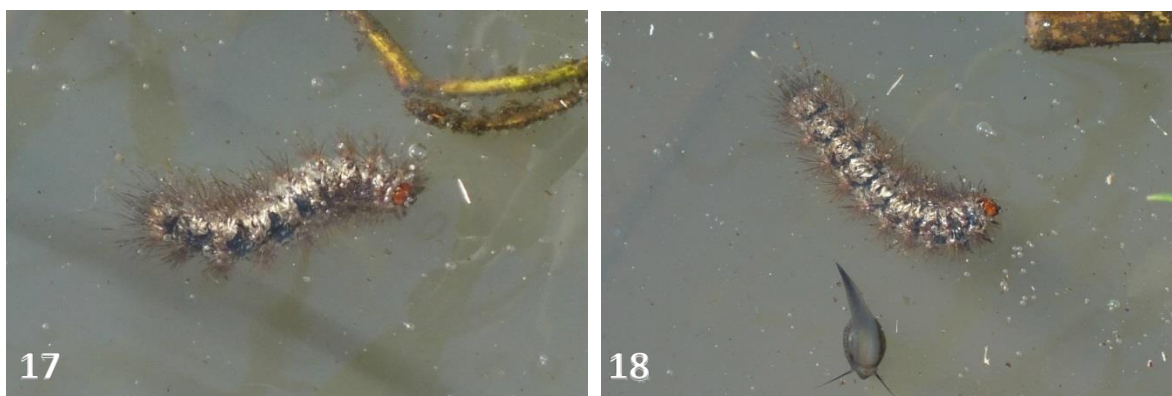
Cocoon: The cocoon is made of grey silk, the longer black hairs of the caterpillar are woven into the outer layer (fig. 13) and with the shorter white hairs, the inner layer is padded (fig. 14).

Pupa: Three days after the start of spinning the cocoon pupation takes place. The pupa is reddish chestnut brown, between the segments slightly darker. Eyes are dark brown.

Imago: The first adult moths, a male, hatched 20 days after the start of spinning.



Figs. 15-16: *P. palustris* adult moths; 15) male; 16) female



Figs: 17-18: *P. palustris*; “wild” last instar larvae in their natural habitat in a flooded area in the department of Ñeembucú

Discussion

The caterpillars are extremely polyphagous in all instars and feed beside *Eichhornia* on all other aquatic plants. Even the fallen flowers of a nearby palm were eaten (figs. 8.10). From the fourth instar also an avid cannibalism became noticeable, molting larvae were attacked and eaten. The suspicion arises that the aquatic life of the larvae is more facultative than obligatory. It appears to be an adaptation to periodic flooding of the landscape and larvae develop in non-aquatic circumstances as well. I hope to be able to prove this in the near future with the help of breedings under different conditions.

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