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The breeding of *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981 and description of the pre-imaginal stadia (Lepidoptera : Nymphalidae : Satyrinae)

Theo GARREVOET

Samenvatting. De kweek van *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981 en beschrijving van de jeugdstadia (Lepidoptera : Nymphalidae : Satyrinae).

Voor de eerste keer lukte het om *Pseudochazara orestes* DE PRINS & VAN DER POORTEN (Satyrinae) te kweken vanaf het ei. De auteur ontving 34 eitjes en slaagde erin om daaruit 4 imago's te kweken. Het eerste deel van het artikel bevat de gedetailleerde beschrijving van deze kweek. Daarna worden de verschillende jeugdstadia beschreven waarbij gewezen wordt op het onderscheid van deze stadia tussen *P. orestes* en *P. cingovskii* GROSS.

Résumé. L'élevage de *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981, et la description des stades préimaginaux (Lepidoptera : Nymphalidae : Satyrinae).

L'auteur réussit pour la première fois un élevage ab ovo de *Pseudochazara orestes* DE PRINS & VAN DER POORTEN (Satyrinae). Il obtint 34 oeufs et réussit à mener 4 imagos à bien. La première partie de cet article contient la description détaillée de cet élevage. Vient ensuite la description de stades larvaires et la différence entre *P. orestes* et *P. cingovskii* GROSS à ces stades.

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1. Breeding report

In the third week of July 1985 Mr J. DILS collected some females of *Pseudochazara orestes* DE PRINS & VAN DER POORTEN at Drama (N. Greece). Eight animals were kept alive and produced approximately 300 eggs. Only a part of these was posed upon the provided grass-blades. At the beginning of August the author received 34 of these eggs. Each egg was kept separately in a plastic box with blotting-paper and some pieces of a grass-blade. They were kept

under these conditions at room-temperature and controlled daily for hatching. A few days before hatching the eggs turned from grey-white to grey-brown. All eggs hatched between 10 and 13 August. The caterpillars (length ca. 3 mm) stayed near the empty egg-shell, most of them consumed more than half of it. Because the natural foodplant was not known, an arbitrary strong grass-species, *Agrostis stolonifera* L., also available during the winter, was selected as foodplant. Only the fresh green tops of the grass, entwined in humidified cotton and wrapped up with aluminium-foil, were provided. The caterpillars moved very slowly. They had a tendency to creep to the top of the grass-blade, however, they did not eat. The breeding was divided in two groups of 12 and 22 caterpillars and placed in two petri dishes (9 cm Ø). Concomitant to the daily change of food the petri dishes were humidified with a very fine spray of distilled water. Petri dishes were thereafter immediately closed. The animals often crept to a drop of water and apparently drank of it.

Only after 2 weeks (on 24.VIII.1985) some little caterpillars began to eat. This was ascertained by the presence of minuscule excretions underneath the grass-blades. True glutton-traces were not found. The breeding temperature was kept at approximately 20°C. On 2.IX.1985 the first moultings were noticed (largest caterpillar ± 8 mm). On 13.X.1985 the largest animal moulted for the second time, and measured then approximately 10 mm. Two other caterpillars measured 9 mm and the rest was remarkably smaller (± 4 mm). To avoid the little caterpillars to go in hibernation, they were spread over several other petri dishes and placed in a warmer site on the light-shade from an aquarium ($\pm 25^\circ\text{C}$ during the day and $\pm 18^\circ\text{C}$ during the night). The three largest caterpillars kept their growing-lead compared to the others during the whole breeding-time. See table 1 for the data of the other moultings.

Just before the moulting, the head of the caterpillar was dark brown and much too small compared to the size of the body. There was also a deep constriction between head and body. Moreover, at the moulting, the caterpillars threw off the skin of the head apart from the rest of the skin. After the moulting and till the next one, the head was of a much lighter colour. The constriction between head and body had disappeared. A considerable time before the pupation, the caterpillars began to creep around very unquietly and they ate moderately. Then the caterpillars were placed apart in larger plastic boxes containing 5 cm humid *Sphagnum* on the bottom. The animals submerged soon into the *Sphagnum* and from time to time, especially in the evening and at night, they returned to the surface to eat.

On 14.XI.1985 caterpillar nr 1 (for numbering see table 1) did no longer come to the surface. A sort chamber without any spinings was observed in the *Sphagnum*. The largest caterpillars then measured between 37 and 41 mm. There was no evident difference between males and females. All full-grown caterpillars, except one, pupated without problems. This way, on 8.XII.1985, 6 chrysalids were present together with 2 little caterpillars (10 and 11 mm). On 13.XII.1985 all six pupae were placed on humid *Sphagnum* into an incubator at 23°C. On 14.XII.1985 the temperature was increased to 25°C and the

following day to 26°C. This temperature was maintained day and night. Humidity was kept high by means of spraying.

On 16.XII.1985 chrysalid nr 1 began to colour. The great triangular basal spot and both black eyespots on the forewings were clearly recognisable. This colouration progressively became clearer until the chrysalid was almost black. On 19.XII.1985 the first butterfly (♂) emerged. Chrysalid nr 2 coloured completely but had not emerged yet after 5 days. A careful inspection showed that there were bursts on the appropriate sites of the chrysalid-skin, although the butterfly did not succeed in leaving the chrysalid. No problems were observed with chrysalid nr 3. The butterfly of pupa nr 4 emerged without difficulties but did not succeed to unfurl its wings completely. The process from the beginning of colouration till the emergence of the adult took always more than 3 days.

The butterflies of chrysalids nrs 5 and 6 had not yet emerged after the normal «colouration-time». A careful examination of chrysalids nrs 5 and 6 showed that a smooth touch was enough to make the chrysalid-skin burst. The skin was peeled off with a pincet. The rear pair of legs of the butterfly still appeared to be into a pellicle that could be easily removed. This was probably the reason why some animals were not able to leave their chrysalid. The other pair of legs was free under the chrysalid-skin. Approximately 30 minutes after removal of the skin, the animals began to unfurl their wings. A piece of the left hindwing of the butterfly of chrysalid nr 5 was missing, probably as a result of the «artificial» emergence of the butterfly from its pupa. The butterfly of chrysalid nr 6 was a perfect specimen. From the initial 34 eggs only four butterflies were obtained. This result can probably be improved at an eventual next breeding.

2. Description of the pre-imaginal stadia

2.1. The egg

The egg is grey-white turning to dark-grey approximately 2 days before the hatching of the caterpillars. It is tunshaped, 1,4 mm broad and 1,7 mm high. Longitudinally, there are ± 22 ribs that change into an irregular structure around the micropyle. At right angles to the longitudinal ribs there are ± 40 barely elevated transversal ridges (see fig. 3b). There are some clear differences with the egg of *P. cingovskii* (GROSS, 1973), which is significantly smaller and more slender, 1 mm broad and 1,2 mm high (AUSSEM & HESSELBARTH, 1980). The egg of *P. cingovskii* has normally less longitudinal ridges than the egg of *P. orestes*, but these are clearly more remarkable (see fig. 3a).

2.2. The caterpillar

Stage L1 : The just emerged caterpillar is grey-white and measures ± 3 mm. After a few days the caterpillar is ochreous with laterally a broad and a fine longitudinal brown stripe. On the dorsal part and on the legs there is also a small longitudinal brown stripe. The head is studded with little black spots. Just before the first moulting the caterpillar is doubled in length.

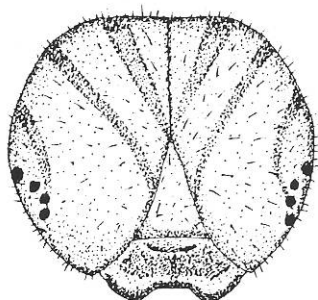


Fig. 1 : *Pseudochazara cingovskii* (GROSS, 1973), head of caterpillar (drawn after AUSSEM & HISSLEBARTH, 1980).

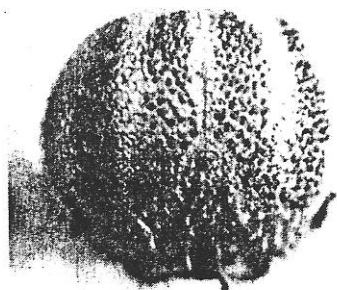


Fig. 2 : *Pseudochazara orestes* DE PRINS, & VAN DER POORTEN, 1981, head of caterpillar.

Table 1 : Dates of hatching, moulting, pupation and emergence of six specimens of *Pseudochazara orestes* DE PRINS & VAN DER POORTEN.

	caterpillar 1	caterpillar 2	caterpillar 3	caterpillar 4	caterpillar 5	caterpillar 6
hatching of the eggs	10/13.08.85	10/13.08.85	10/13.08.85	10/13.08.85	10/13.08.85	10/13.08.85
1st moulting	02.10.85	02.10.85	02.10.85	?	?	?
2nd moulting	13.10.85	13.10.85	14.10.85	01.11.85	02.11.85	02.11.85
3rd moulting	20.10.85	21.10.85	23.10.85	09.11.85	09.11.85	10.11.85
4th moulting	27.10.85	28.10.85	30.10.85	17.11.85	16.11.85	18.11.85
pupation	18.11.85	20.11.85	17.11.85	04.12.85	06.12.85	08.12.85
nr of the pupa	2	3	1	4	5	6
emergence of imago	-	22.12.85	19.12.85	28.12.85	30.12.85	02.01.86
sex	-	♀	♂	♂	♀	♀

Stage L2 : The caterpillar is then ± 8 mm. The groundcolour is grey. The two lateral stripes are now broader, dark-grey and corrugated from segment to segment. Above the leg-stripe there is a white line as well. The dorsal stripe is almost black. Between the dorsal stripe and the upper lateral band there is a fine brown stripe. The colour of the head remains ochre but the black spots have mostly disappeared. In this stage there are six vertical brown stripes on the head arranged differently than for *P. cingovskii* (GROSS) (see figs 1 and 2).

Stage L3 : The groundcolour of the caterpillars becomes somewhat paler. The caterpillar is then ± 12 mm. In this stage the dorsal stripe is not uniform dark-grey. On the first half of each segment the stripe is still dark-grey. On the

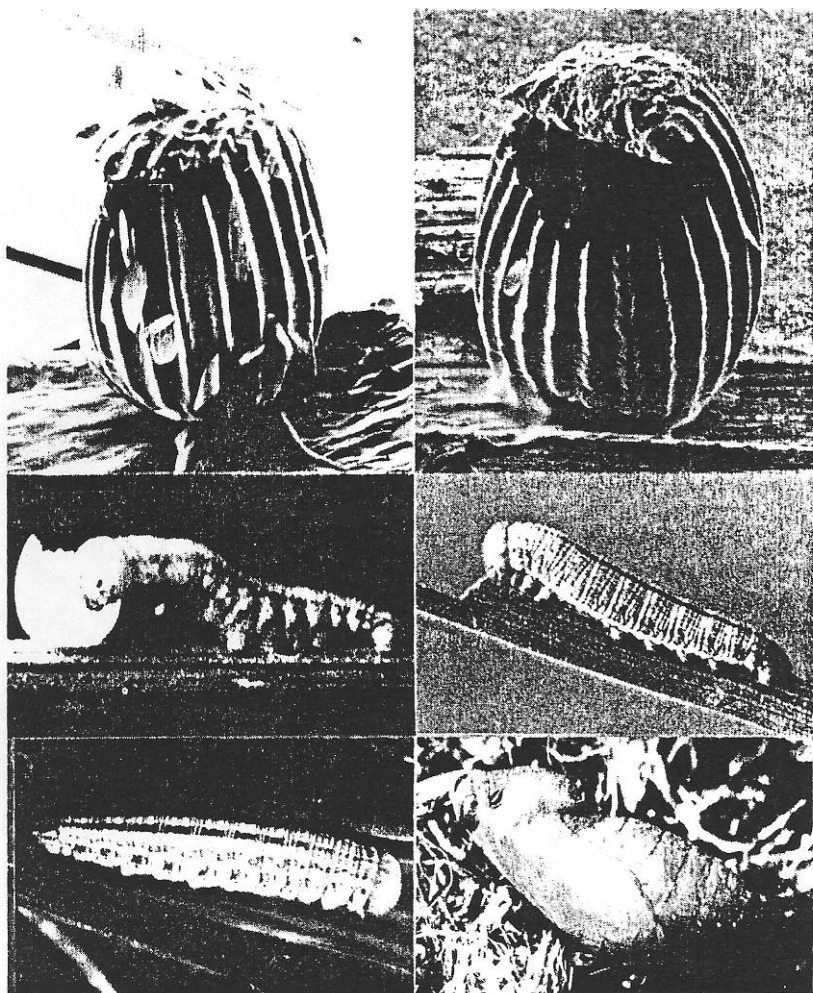


Fig. 3 : a: *Pseudochazara cingovskii* (GROSS, 1973), egg; b-f: *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981; b. egg, c. caterpillar just emerged (L1), d. caterpillar (L2), e. caterpillar (L3), f. pupa.

second half, the stripe is pale-grey. At this stage the caterpillar eats complete grass-blades instead of feeding at random (see fig. 3e).

Stage L4 : Length ± 20 mm. A fine brown line becomes clear between both lateral bands and also over the stigmata.

Stage L5 : The groundcolour of the caterpillar becomes somewhat paler with vague little white points (marbled appearance). When the caterpillar is

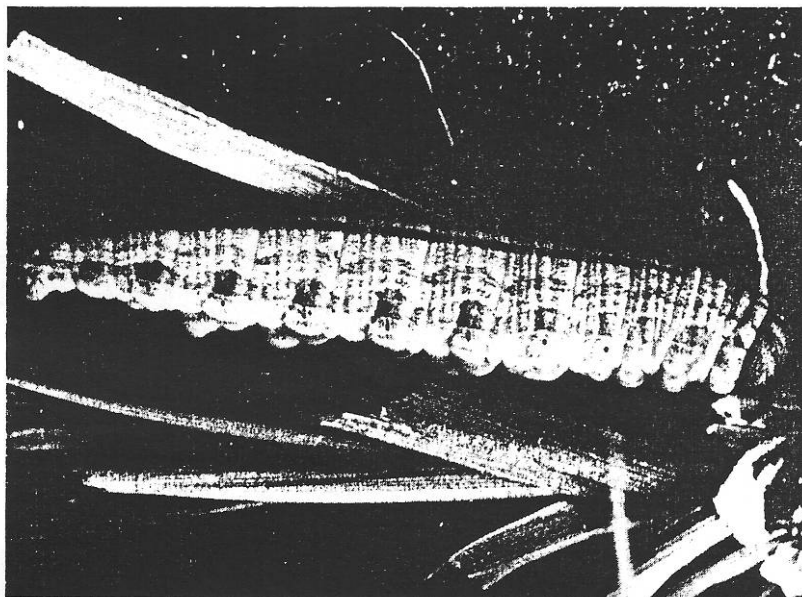


Fig. 4: *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981, full grown caterpillar (L5).

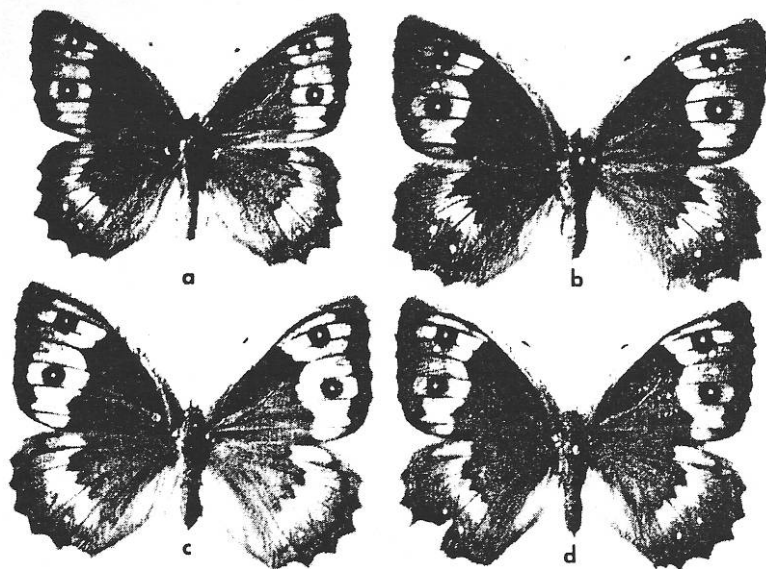


Fig. 5: *Pseudochazara orestes* DE PRINS & VAN DER POORTEN, 1981, adults; a. male, b-d. females.

full-grown it is 37 to 40 mm long. A few days before pupation, the marking of the skin fades strongly. One day before pupation, the extremity of the abdomen becomes grey-greenish (see fig. 4).

2.3. The chrysalid

The immovable chrysalid is light-brown with a dark-brown head and yellow-brown wing-sheats. The size of the pupae is between 18,2 and 20,6 mm. There is a clear relationship between the size of the chrysalid and the sex of the animal.

1. 18,6 mm	♂	4. 18,2 mm	♂
2. 19,0 mm	- not emerged	5. 19,3 mm	♀
3. 19,2 mm	♀	6. 20,6 mm	♀

On both sides of the chrysalid, between the neckshield and the shield of the thorax, there is a black, blunt fold (± 1 mm long). After the emergence of the pupa, the folds appeared to continue as fibrous structures at the inside part of the chrysalid. The structures are evident, even deep in the section between head and thorax of the butterfly. The function of these folds remains unknown. Three days before the emergence of the butterfly, the chrysalid begins to colour. The great dark triangular blot at the base of the forewings and both eyespots become visible through the skin of the chrysalid. The chrysalid progressively colours until it almost turns black just before the emergence. At emergence-time, the skin of the pupa falls apart in several pieces.

Acknowledgements

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Boekbespreking

Goot, V.S. van der : *Zweefvliegen in kleur (tevens aanvulling op het Zweefvliegenboek)* 16,5 x 23 cm, 40 p., 4 kleurplaten, Bibliotheek van de Koninklijke Nederlandse Natuurhistorische Vereniging, Uitgave nr. 32a, 1986, geniet, ledenprijs 10,- gulden (niet-leden 13,50), te bestellen door overmaking van het gepaste bedrag op postrekening 130.28 t.n.v. Bureau KNNV te Hoogwoud.

In 1981 verscheen het KNNV-Zweefvliegenboek. Ondertussen zijn nieuwe soorten beschreven, in Noordwest-Europa zijn extra soorten ontdekt, de levensloop van enkele vliegen is bekend geworden. Hierdoor diende het Zweefvliegenboek aangepast te worden aan de stand van de wetenschap. In deze aanvulling zijn tevens enkele correcties aangebracht en zijn er stukjes opgenomen over trek en naamgeving. Op de kleurplaten staan 105 Nederlandse zweefvliegsoorten afgebeeld (in totaal 112 afbeeldingen). De exemplaren zijn ongeveer tweemaal vergroot. Verder bevat deze aanvulling nog een aantal erg gedetailleerde pentekeningen.

Deze brochure is erg verzorgd uitgegeven en gezien de kleurplaten helemaal niet duur. Wie het Zweefvliegenboek bezit, zal ook deze aanvulling niet kunnen missen. En wie in deze publikatie leest, raakt zo geïnteresseerd dat hij er ook het Zweefvliegenboek bij wil hebben.

W.O. De Prins