

# Contribution to the knowledge of the preimaginal stages of *Suana concolor* WALKER, 1855

(Lepidoptera, Lasiocampidae)

by

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**Abstract:** A description of the preimaginal stages and the rearing peculiarities of *Suana concolor* WALKER, 1855, are given for the population of northern Vietnam. The distribution of the species is discussed; the Vietnamese population is considered within the nominotypical subspecies.

**Zusammenfassung:** Von der Population aus Nordvietnam von *Suana concolor* WALKER, 1855 werden die Präimaginal-Stadien beschrieben, dazu wird über die Besonderheiten der Zucht berichtet. Im Rahmen der Gesamtverbreitung der Art wird die Population aus Vietnam zur namenstypischen Unterart gezogen.

With this article we are starting a circle devoted to preimaginal instars of Bombycoid moths. The main aim is to study their biology and morphology, so that the data obtained, can be used to define the status and taxonomic score of individual taxa. For many species of the Bombycoidea such data are very fragmental and completely unknown, with knowledge confined only to genera. Also, rearing can be especially helpful in matching the sexes of some tropical species having distinct sexual dimorphism.

The genus *Suana* WALKER, 1855, now includes the following species: the nominate *concolor* WALKER, 1855 from India including Sri Lanka through Nepal, southern China, Laos, Thailand, Vietnam and Malaysia to Borneo, Java and Sumatra (fig. 1), the Sundanian *riemsdyki* HEYLAERTS, 1889 (= *sundana* HOLLOWAY, 1987), *zahmi* HOLLOWAY & BENDER, 1990 (its status is not clear, probably is also synonymic to the previous species), the very special Sulawesian *aeolida* ZOLOTUHN & HOLLOWAY, 2006, and two at present undescribed species from the Philippines and China.

The ♀ of *S. concolor* Wlk. was collected from nature in northern Vietnam, Vinh Phuc province, Phuc Yen district, Ngoc Thanh village, Me Linh biodiversity station (21°23'03"N, 105°42'44"E), 60±22 m, 11-13.X 2008, by V. ZOLOTUHN. It laid about 150 eggs (col. pl. 1: 1-2), and caterpillars (col. pl. 1: 3) hatched in Europe in 3,5 weeks. The caterpillars were reared in captivity under temperatures between 20-26°C.

Caterpillars for species, belonging to Indian populations, were already known and were described and illustrated by MOORE (1883) and HAMPSON ([1893]), but no such data have been so far known for Vietnamese or for South-east Asian populations. We hope this information will help to decide its nomenclatorial attribution more precisely. The transformations for the Java population (for *S. riemsdyki* HEYLAERTS but originally given as *concolor* Wlk.) are figured by HORSEFIELD & MOORE (1857).

The caterpillars of *S. concolor* Wlk. are relatively unpretentious, with high viability; mortality was observed mostly at the first instar. Therefore, the species can be a potential pest, especially because of its wide trophic spectrum.

The larvae from the fourth instars (col. pl. 1: 7-8, 11-18, 20) and the cocoons (col. pl. 1: 9) are covered with needle-shaped chaetae that can break on contact with human skin and penetrate inside. Experience shows that no allergic reactions, itching or skin reddening are usually observed; no toxic or irritant influence was evident.

## Description of the preimaginal stages

**Egg** (col. pl. 1: 1-2): Ellipsoid, lightly brown to off-white, with a single lateral ovoid brown spot. Diameter is about 1.5 mm. Chorion sculpture is described elsewhere in this issue (ZOLOTUHN & KURSHAKOV, 2011) for south Indian populations.

**Larvae:** 1. instar (col. pl. 1: 3), 7-15 mm. Head is black, shining, thoracic segments are coloured with an interleaving of white (sometimes with bluish hue) and black transverse bands. The third thoracic segment bears two subdorsal orange spots. Abdominal segments are mostly dark-grey with very slender black intersegmental rings. All the body is covered with body-length, ash-grey elastic setae which are lost at the end of the instar. The caterpillars take no food in the first three days, and the eggshell is not eaten; they are very active during this time and probably disperse during the period.

2. instar (col. pl. 1: 4-5), 12-30 mm. Head becomes matt-black with two longitudinal grey fasciae. The 2. and 3. thoracic segments have needle-shaped chaetae on the dorsal transversal fold; the 3. segment has pale yellow setae around this fold. Every segment has lateral sparse tufts of long light setae; these are 1.5-2 times longer on thorax. Abdominal segments have a mosaic patterning consisting of black, blue, red and orange dots. The 4. abdominal segment bears two semilunar light spots. The 5. segment is completely black with two supralateral orange spots. The last abdominal segment is dark, with hairy pyramidal protrusions.

3. instar (col. pl. 1: 6), 30-50 mm. Similar in coloration and patterning to the preceding instar but both semilunar spots are fused together. Needle-shaped setae on the fold are outlined with a violet band.

4. instar (col. pl. 1: 7-8), 50-70 mm. The patterning becomes less contrasting. Two fused spots on the 5. abdominal segment are transformed into a prominent whitish «V».

5. instar (col. pl. 1: 11-12), 70-80 mm. Sexes can be distinguished. ♀♀ caterpillars are larger and more robust, with lighter and less contrasting patterning. ♂♂ caterpillars have a dominance of brown colouring. The V-shaped dorsal spot becomes hardly visible. Lateral tubercles now bear very characteristic, white, oar-like scales.

6. instar (col. pl. 1: 13-16), 80-100 mm in ♀♀ and 80-90 mm in ♂♂. Patterning is not changed. Light and dark ♀ forms are known; the ♂♂ are only dark coloured. ♂♂ caterpillars are slender and darker, with brown segments and grey folds.

7. instar (♀♀ only) (col. pl. 1: 17-18, 20), 100-130 mm. No colour or patterning changes were observed. The most prolonged instar, that lasts more than 3 weeks.

Generally the larval development lasts 60-80 days for the ♂♂ and 85-100 days for the ♀♀.



The caterpillars of *S. concolor* Wlk. are polyphagous and more than 60 plants from 45 genera are known to be hosts (ROBINSON et al., 2001; PHILBOON, 1965; KUROKO & LEWVANICH, 1993; ZOLOTUHIN, 2009). The caterpillars of the Vietnamese population were fed (in spite of some intelligibility to hosts) on *Rosa*, *Salix*, *Rubus*, *Quercus*, *Euphorbia*, *Betula*, *Mahonia*, *Chrysanthemum*, *Pinus sylvestris*, but rejected completely *Hibiscus*, *Avocado*, *Acer*, *Parthenocissus* and *Schefflera*. The caterpillars accepted *Pinus* only from the 2. instar. In winter, they readily accept fresh apple slices in the absence of the usual food plants.

The caterpillar ceases feeding for a day before transferring into the pupation phase. It becomes very active and restlessly wanders around for some hours. It begins the cocoon's construction on a twig, as well as between leaves, and finishes it in 12-15 hours; the cocoon is always situated in a vertical position. The cocoon is slender, elongate, of spindle-shaped form, consisting of a single opaque silk layer, solid, off-white to a light brown colour. In the final stage of its construction, strong raised thoracic chaetae are interwoven into its cover. Pronymphal stage lasts 3-4 days.

**Pupa** (figs 3-4): ♀ (fig. 4), 4.5-6 cm, of elongate bean-shaped form. Generally it is dark brown to black to the tip of abdomen, with a shining cover. Head, antennae, legs and wings do not protrude and are densely fused to the body. The length of the labial palpus cases is a half that of the forelegs case, and the galea case is half the length of that of the labial palpi. The metathorax has two dorsal mounds. The stigmal opening on the first abdominal segment is closed with the case of the hind wings. Forewing cases cover the 4. abdominal segment on 2/3 of its length. 5. and 6. segments are moveable, 7. segment is hardly moveable and 8., 9. and 10. are fused together. Each segment from 4. to 6. bears wrinkled tubercles on the line of the lower stigmal margin and reaching caudally the membranous intersegmental ring. A wrinkled depression is typical for the segments 4.-6. between the stigmal opening and the remaining abdominal prolegs. Short reddish chaetae cover the 5. segment laterally, around the stigmal openings, and dorsally on the segments these setae become visible from 6. segment and ventrally from 7. segment. These chaetae have a hook-shaped form on the top of 10. segment. All abdominal segments dorsally and laterally are with fine punctulate sculpture. Chaetae are absent on the head, thoracic segments and basal abdominal segments.

The pupa of the ♂ (fig. 3) is much shorter, 3-3.5 cm. It is dark brown, sculpture is not shining but matt wrinkled. The case of the antennae is somewhat raised. Mounds on the metathorax are more protruded, with pectinate sculpture. The case of the forewing covers the 4. abdominal segment on 3/4 of its length. 5. and 6. abdominal segments are well moveable, 7. is hardly moveable, all remaining segments are fused together. All other characters and peculiarities of sculpture are similar to those of the ♀.

Pupal development lasts from 14 to 24 days. Generally, preimaginal development lasts, therefore, 2-3 months for ♂♂ and 3-4 months for ♀♀. Hatching from a pupa was observed in the evenings, from 18-00 to 23-00 local time (~5 hours from Vietnamese). Mating (col. pl. 1: 19) took place from midnight and lasts some hours until sunrise.

As a result it was confirmed that the presence of a white discal spot cannot be relied upon as a basis for the separation of any special form; in the reared Vietnamese siblings almost half of both sexes bore such a white discal spot and it was completely absent in the other half. The character was formerly used to separate a spotted population under the name *bimaculata* WALKER, 1855 and its synonymizing to the nominate race lacking such spot is objective.

No significant variability was found in siblings of one egg-cluster, with the exception of the presence or absence of such white discal spot.

All characters listed and discussed here are very similar to those of the Indian population, therefore we consider the population of Vietnam within the nominate subspecies *Suana concolor concolor* WALKER, 1855.

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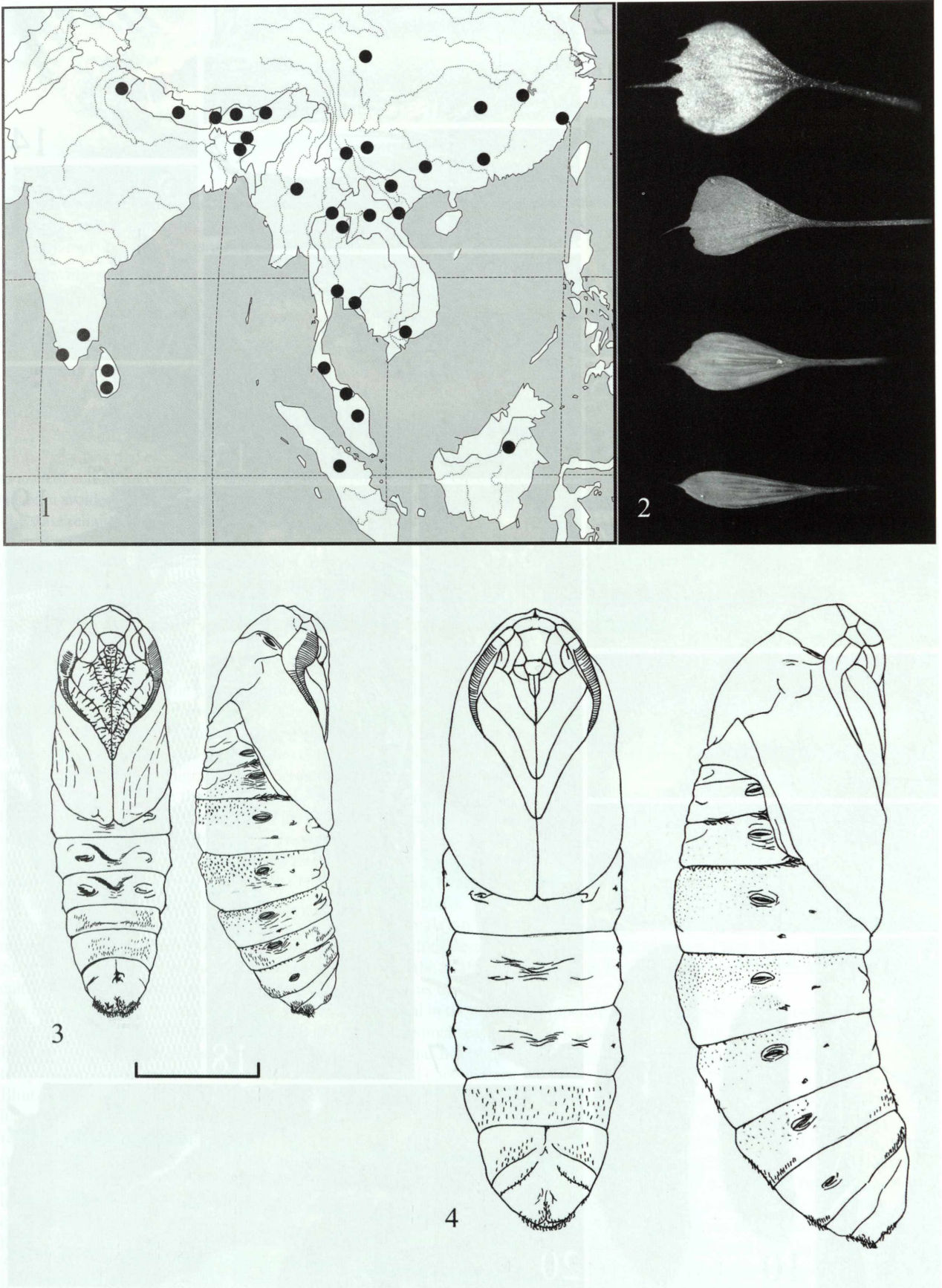
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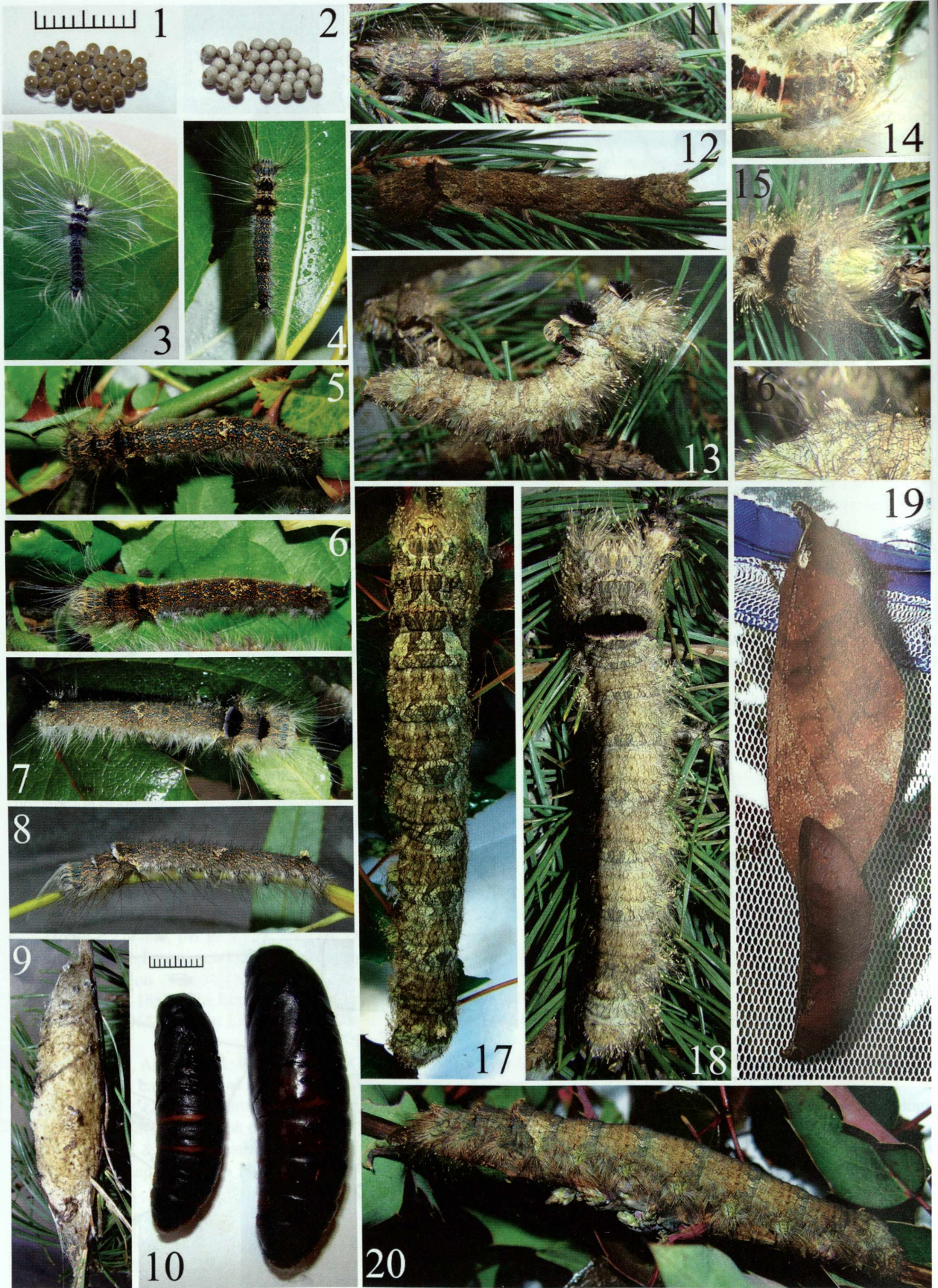




Figs 1-4: *Suana concolor* WALKER, 1855. (1) Map of distribution; (2) Variability in shape and size of oar-like scales; (3) Pupa of a  $\sigma$  (ventral and lateral); (4) Pupa of a  $\varphi$  (ventral and lateral). Scale bar for the pupae is 1 cm.



# Colour plate 1



Figs 1-20: *Suana concolor* WALKER, 1855, N. Vietnam, Me Linh biodiversity station. (1) eggs; (2) eggs (ventral view); (3) L1 larva; (4-5) L2 larva; (6) L3 larva; (7-8) L4 larva; (9) cocoon; (10) pupa (♂ left, ♀ right); (11) L5 larva (light form); (12) L5 larva (dark form); (13) L6 larva (♂); (14) L6 larva (ventral view); (15) L6 larva (head); (16) L6 larva (11<sup>th</sup> segment); (17) L7 larva (♀, dark form); (18) L7 larva (♀, light form); (19) mating; (20) L6 larva (♂).



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