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Cover Photo by Parixit Kafley of *Samia canningi* ejecting fluid from tip of abdomen.

**TABLE OF CONTENTS**

SEVERE INFESTATION OF <i>PODAGRICA FUSCICORNIS</i> (CHEVROLAT, 1837) (CHRYSOSELIDAE) ON A NEW HOST PLANT <i>ACALYPHA INDICA</i> (L.) (EUPHORBIACEAE) FROM ODISHA, INDIA by Ashirwad Tripathy	2
<i>SAMIA CANNINGI</i> (INSECTA: LEPIDOPTERA: SATURNIIDAE) HAS A FUNCTIONAL PROBOSCIS AND ALIMENTARY CANAL by Parixit Kafley & Peter Smetacek	4
A NEW REPORT OF PARTIAL ALBINISM IN A HIMALAYAN BULBUL <i>PYCNONOTUS LEUCOGENYS</i> FROM UTTARAKHAND, INDIA by Paramjit Singh, Rajshekhar Singh, Devanshi Singh & Shankar Kumar	6
NEW RECORD OF <i>ILLEIS INDICA</i> TIMBERLAKE, 1943 (COLEOPTERA: COCCINELLIDAE) FROM ODISHA, INDIA by Ashirwad Tripathy	9
A COMPENDIUM ON MUSHROOM MITES IN INDIA by Reshma Parveen & Salil Kumar Gupta	11
FOUR NEW BUTTERFLY SPECIES FOR NEPAL: <i>ABISARA CHELA</i> , <i>TAGIADES JAPETUS</i> , <i>LETHE DURA</i> & <i>LETHE DISTANS</i> by Piet Van Der Poel, Colin Smith, Mahendra Singh Limbu & Surendra Pariyar	21
<i>EDESSENA GENTIUSALIS</i> (INSECTA: LEPIDOPTERA: EREBIDAE: HERMININAE): A NEW RECORD FOR INDIA by Shristee Panthee, Ambica Agnihotri & Peter Smetacek	24
FIRST RECORD OF JOKER BUTTERFLY <i>BYBLIA ILITHYIA</i> (INSECTA: LEPIDOPTERA: NYMPHALIDAE) FROM PAKISTAN by Muhammad Akram Awan, Wali Nohrio & Dileep Permar	26
CONFIRMATION OF THE EXTRA LASCAR <i>PANTOPORIA SANDAKA</i> IN ODISHA, INDIA by Sandeep Mishra & Daya Shanker Sharma	28
PRELIMINARY OBSERVATIONS ON VISITOR SPECTRUM OF <i>RHODODENDRON ARBOREUM</i> IN THE KUMAON HIMALAYA, INDIA by Ambica Agnihotri, Alfred Daniel & Piet Van Der Poel	29

# ***SAMIA CANNINGI* (INSECTA: LEPIDOPTERA: SATURNIIDAE) HAS A FUNCTIONAL PROBOSCIS AND ALIMENTARY CANAL**

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*Reviewer: Stefan Naumann*

## **Introduction**

The Saturniidae are a worldwide family of moths, in this family the proboscis is vestigial or absent (Hampson 1892; Barlow, 1982). The adults have a short life span and a very limited daily flight period in order to conserve their energy. They store fat in the abdomen from the larval stage to fuel activity in the adult stage. They are not known to ingest any food or liquid during the adult stage. The genus *Samia* Huebner, [1819] occurs from Pakistan through India to South-east Asia. It has been introduced in Europe, Africa and North America (Peigler and Naumann, 2003). *Samia* belongs to the tribe Attacini in the subfamily Saturniinae. This subfamily contains the largest moths in the world, although *Samia* specimens are generally only moderately large. Peigler and Naumann (2003) note that although published field observations on *Samia* are minimal, there is a large amount of literature in many languages in which *Samia* have been used as study animals in laboratories. These include physical properties and molecular structure of the silk, diapause, cytogenetic, immature and adult morphology, molecular genetics, insect physiology, comparative growth on various host plants, mating and ovi positional behavior, silk spinning behavior, and molecular structure of sex pheromones.

## **Observation**

On 27-06-2019 a male *Samia canningi* (Hutton, 1859) was observed sitting on the ground at a sandy seepage at around 11.00 pm

in Gangmouthan, Biswanath district of Assam, India. The moth was observed for around 15 minutes during which multiple photographs were taken using the camera flash to document its behaviour of imbibing liquids. The insect was then collected as a voucher specimen.

## **Result and Discussion**

Close examination of the photographs taken revealed that it had its vestigial proboscis immersed in the water and was squirting out excess water from the tip of its abdomen. The above observation clearly indicates that the proboscis, despite being vestigial, is functional as is the moth's alimentary canal. In butterflies such behavior is called mud puddling and is used by male butterflies to sequester mineral salts from water (Scoble 1992: 20). When the content of mineral salt is low they ingest large volumes of water and excrete the excess water from the tip of the abdomen exactly as the observed specimens of *S. canningi*. This behavior was observed for moths of the families Noctuidae, Geometridae, plus micromoths of Pyralidae, Pterophoridae and Tortricidae in detail by Downes (1973) already. Adler (1982) was the first to show some photos of puddling moths of the families Geometridae and Notodontidae observed in the United States of America, discharging jets of water from their abdomina. The evolution of the soil-visiting habits and their relationship to animal excreta were therein discussed.

Saturniidae and particularly *Samia* have been bred for silk production for centuries and possibly millennia in Assam and have been introduced to Korea, Japan, China, Egypt and Europe (Peigler and Naumann, 2003). The domesticated version of *Samia canningi* is *Samia ricini* which is the only wild silk moth to be totally domesticated, similar to the mulberry silk moth (*Bombyx mori*, (Linnaeus, 1758), family Bombycidae). It does not occur anywhere in the wild and the moths rarely fly (Peigler and Naumann, 2003). Despite the fact that these moths have been bred by humans for centuries, there is no record whatsoever of them imbibing liquid and no evidence to suggest that the vestigial proboscis and alimentary canal are, in fact functional. The only note at all on such a behavior for the family Saturniidae was published by Rougeot (1962: 183), he noted a similar observation for the African genus *Epiphora* Wallengren, 1960, also in the tribe Attacini, from Gabon. A specific determination was not given, but the observation was absolutely similar to ours of *Samia canningi*.

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We would like to thank Miss Nalini Kafley for bringing my attention to the moth following which the observation was made. I would also like to thank Miss Ambica Agnihotri for her help during the composition of this article. The

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Fig. 1&2: *S. canningi* imbibing and ejecting water



Fig. 3: *S. canningi* imbibing water