Further notes on the African Lunar Moth *Argema kuhnei* Pinhey (Lepidoptera: Saturniidae)

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A male of this spectacular moth was first described in 1969 by Dr E. Pinhey, Curator of the National Museum, Bulawayo, who also in 1972 described the female. The larvae are now described from observations made immediately prior to pupation.

Four caterpillars were found at Mbala (formerly Abercorn, Zambia) on the previously described (Little, 1972) food plant. It is of interest to note that these were found not only on *Monotes katangensis*, but also on *M. angolensis* and on another as yet undetermined *Monotes* sp. tree. All these *Monotes* types have provided cocoons from which 10 moth specimens were obtained in August 1972.

These adult larvae were plump lime-green smooth-skinned caterpillars between $6\frac{1}{2}$ and 7 cm. long, with 9 pairs of well-formed scoli side by side on the crescent of each segment except the 8th body segment which had a single centrally positioned scolus. These scoli were armed at the tips with short black bristles and some long sparse hairs (Figs. 1 & 2). Between each segment when extended there are pale to dark yellow bands shaded darker from above towards the underside. The tips of the four pairs of prolegs and of the claspers were dark yellow edged with brown. The upper and lower edges of the spiracles on the sides are marked by tiny silver spots.

These caterpillars, although well camouflaged against detection by their close resemblance in outline and colouring to the fresh leaves of the *Monotes* trees against predators, were found during the period 5th to 19th October 1972. They were each placed in separate cages and provided daily with fresh food until it was noticed that the caterpillar had ceased to eat and had started wandering around on the ground under the foliage in a quite restless manner. This stage was reached shortly after collection by two of the larvae (one of which had incidentally been found on the ground at the base of a *Monotes* sp. tree) but for the other two after 13 and 14 days respectively after observation of a moult. The caterpillars then moved back on to the food plant and started making a shelter of leaves bound together with rough strands of silk before actually spinning their dense, firm pale straw-coloured cocoon. The colour of this cocoon weathers within a few days to silvery grey.

Once spinning commenced the cocoons were completed in 24 hours and the four caterpillars were all in their cocoons by 25th October 1972. A pale straw-coloured cocoon was, however, also found on a *Monotes* sp. tree on 12th October and another on 18th October thus indicating an earlier final moult and earlier entry into the pupal stage in the cocoon in which approximately 10 months of life cycle is spent. By analysis of the present

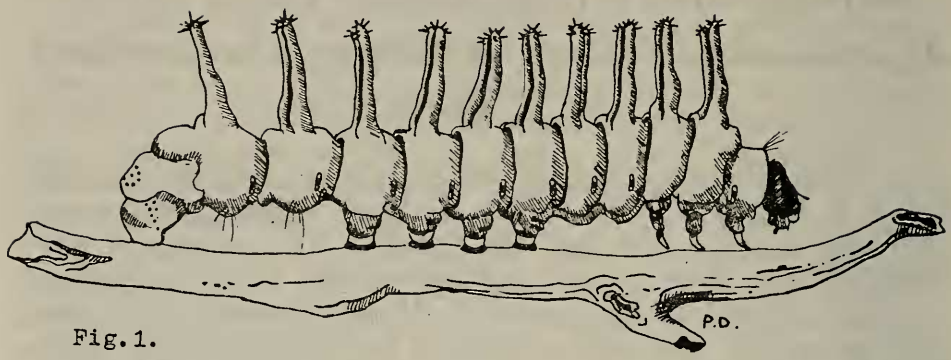

Fig.1.

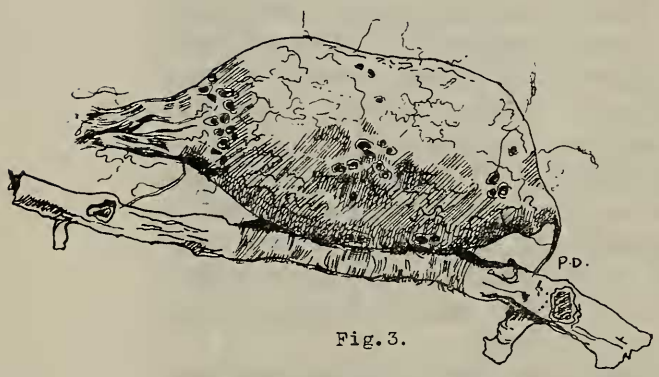

Fig.3.

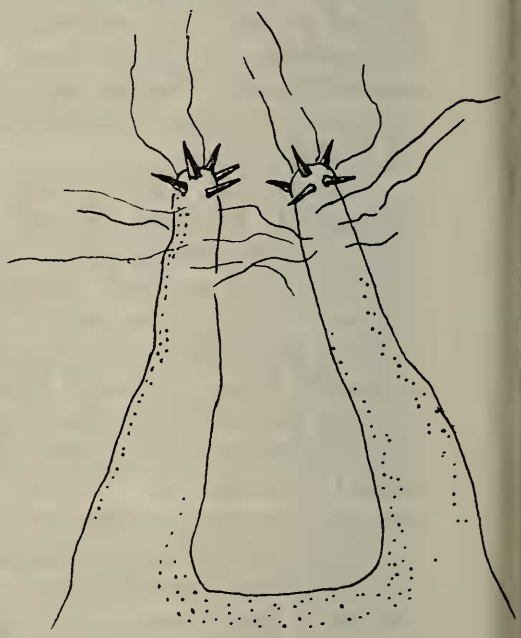

Fig.2.

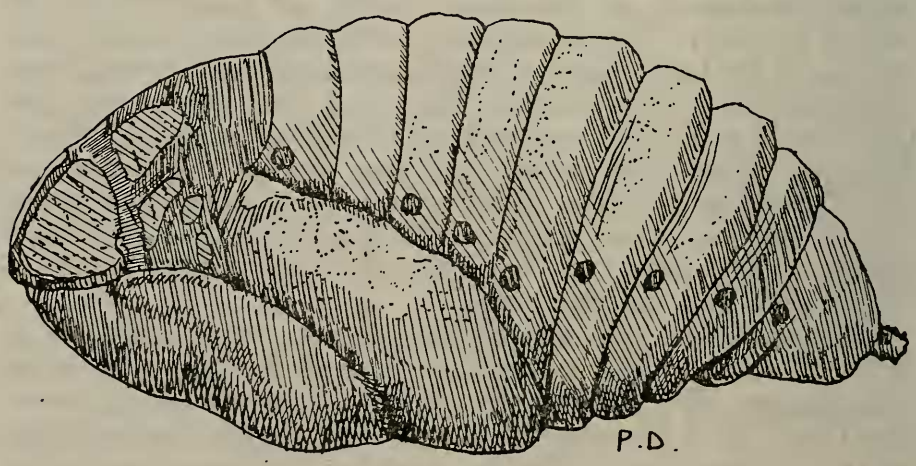

Fig.4.

available data it would appear that there is approximately 2 months from the emergence of the moth from the cocoon to the return of the caterpillar to the pupal stage in the life cycle of this insect. The typical *Argema*-type cocoon and the dark brown obtect pupa are illustrated (Figs. 3 & 4).

J. C. Little (1972) lists the emergence from cocoons in 1971 and refers to the 1968 and 1970 dates when specimens of this beautiful moth were first noticed. In 1972 the emergences from cocoons were earlier than usual although collections at a mercury vapour light trap gave virtually identical dates for the appearance of this moth. Emergence from cocoons in 1972: 10th August (1 ♂); 11th (1 ♂); 21st (1 ♀); 22nd (1 ♀); 23rd (1 ♀); 24th (1 ♂); 28th (2 ♀, 1 ♂) and taken at light trap 1st September (1 ♀); 10th (1 ♂).

Additional Notes

30th January 1972—first new season cocoon found on food plant.

10th August 1972—first moth emerged from cocoon—male.

11th August 1972—second moth emerged, also male.

The timing of the eclusion from pupa follows:

(*a*) fluffy funnel end of cocoon noticed to be moist—13.40 hrs.

(*b*) funnel of cocoon noticeably swollen and slightly open and yellow spot showing—13.50 hrs.

(*c*) gradual emergence of body—pulsing movement at irregular intervals of 5 to 15 seconds for next 10 minutes.

(*d*) front leg and both antennae shot out—14.00 hrs.

(*e*) followed a few seconds later by whole insect in compact bundle hanging on to twig by both front legs.

(*f*) front wings extended—14.30 hrs.

(*g*) hind wings extended—15.05 hrs.

(*h*) at this stage front and hind wings held close together.

A number of questions remain, the chief of these arising from paucity of numbers in specimens that have actually been caught. At what stage in the life cycle is any influence exerted to maintain the evidently very low population?

From personal observation, when the moth emerges, it is very well disguised to fit in with the end-of-dry season foliage and fruits of the *Monotes* sp. food plant. Particularly during the day and before the moth is able to fly it is not readily visible to predators. The golden yellow long-tailed moth is illustrated in colour by Pinhey (1972) in his recent book on the Emperor Moths. In the larva stage its lime-green colourings combined with the projecting scoli match very closely the green foliage of the food plant. It is possible that in its immediate pre-pupal state of agitated "wanderlust", described by Pinhey (1968) that some larvae are damaged in falling to the ground, they would certainly also be readily visible to birds and lizard predators when moving up the brown tree trunk to commence building their cocoons. It would seem that the most vulnerable stage is after the larva has spun its cocoon and towards the end of the dry season when

bushfires could take their toll of these cocoons which are usually found in the lower branches rather than in the upper third of the *Monotes* trees. The shape of the cocoon itself, with its holes for water drainage (ventilation?) lends itself to parasitization, possibly by some wasp. The writer has noted that in some cocoons from which there had evidently been no eclusion, that the pupa remaining within the case is purely skeletal. In a number of these instances ants have been found inside the cocoon, and in one instance a cricket was found. The fact that most, if not all specimens taken at light traps, are found to have been badly damaged can, it is believed, be put down to attack by bats and possibly nightjars, although there is no direct proof of this.

Acknowledgments

I am indebted to Dr Elliot Pinhey in the first place for describing and naming of the moth; to Field Assistants M. Sanane and A. Majembe of the International Red Locust Control Organisation, Mbala, for their diligence in searching for and the care of the caterpillars; to Jim Little for continued encouragement and finally to my wife for her sustaining interest in the investigations into the life cycle of this insect.

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Sympetrum tandicola Singh, 1955, a synonym of *Pantala flavescens* (Fabr.) (Odonata, Libellulidae)

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Among the unidentified odonata material preserved in the National Zoological collections of the Zoological Survey of India I came across a specimen from Calcutta, which was completely identical with *Sympetrum tandicola* Singh. This species was described by Singh (1955) from a single male specimen from the Upper chenab valley, Western Himalaya. The holo-type of *S. tandicola,* deposited in the Zoological Survey of India, was examined by me and, while agreeing perfectly with the specimen at my disposal, did not have the hairs on the posterior lobe of prothorax, a key character for determination of the genus *Sympetrum* Newman, 1833, according to Fraser (1936).