

***BOTYODES ASIALIS* GUEN. (LEPIDOPTERA : PYRALIDAE) - A NEW ADDITION TO THE MOTH FAUNA OF ACHANAKMAR- AMARKANTAK BIOSPHERE RESERVE**

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Abstract: Achanakmar-Amarkantak biosphere reserve is a paradise of floral and faunal diversity, located in Chhattisgarh and Madhya Pradesh. Recent survey conducted in this biosphere reserve during the rainy season (August-October 2012), revealed the occurrence of defoliator, *Botyodes asialis* Guen. (Lepidoptera: Pyralidae), severely damaging *Casearia tomentosa* Roxb. (family Samidaceae). This is the first record of occurrence of this insect in Achanakmar-Amarkantak biosphere reserve. Some observations on the growth and development of this potential defoliator were recorded.

INTRODUCTION

Achanakmar-Amarkantak biosphere reserve is the 14th biosphere reserve of the country. It is an interstate biosphere comprises of Chhattisgarh and Madhya Pradesh. The total geographical area of BR is 3835.51 km² (Anon., 2007). The core area of the biosphere reserve is 551.55 km², falls in Chhattisgarh state. It is surrounded by buffer and transition zone area of 3283.96 km², out of which 2058.98 km² falls in Bilaspur and Marwahi forest divisions of Chhattisgarh and 1,224.98 km² in Dindori and Anuppur forest divisions of Madhya Pradesh (Anon., 2008). The topography, in combination with streams and valleys has created micro-climatic conditions in the area to provide diverse environmental conditions, encouraging luxuriant growth for several species of thallophytes, bryophytes, pteridophytes, gymnosperms, angiosperms and many species of wild fauna of economic importance (Anon., 2010, 2012). The relative humidity is fairly high in dense Sal forest throughout the year (Anon., 2008).

The Achanakmar - Amarkantak biosphere reserve is very rich with high density of flora and fauna. It comprises of 1527 species of identified flora, 324 species of identified fauna and many more floral and faunal taxa. Among the identified fauna, 114 species belong to invertebrate that include 5 species of Chilopoda (Khanna, 2006), 84 species of Lepidoptera (49 butterflies and 35 moths) (Gupta and

Mondal, 2005; Chandra *et al.*, 2006; Roychoudhury *et al.*, 2007; Singh and Chandra, 2008), 24 species of Coleoptera (Roychoudhury *et al.*, 2004; Joshi *et al.*, 2006; Anon., 2008) and only one species of Orthoptera (Chandra and Gupta, 2005). Joshi *et al.* (2008) have included two species of moths and two species of beetles. Recently, Kushwaha *et al.* (2012) have made a new addition of butterfly to the insect faunal composition of Achanakmar-Amarkantak biosphere reserve. Apart from these, nothing is known about the existence of other species of insects in Achanakmar-Amarkantak biosphere reserve. The present report is a new addition in this regard and the account is based on the field and laboratory observations of authors.

Recent survey conducted in Achanakmar-Amarkanatk biosphere reserve during the rainy season (August-October, 2012), it was observed that *Casearia tomentosa* Roxb. (syn. *C. elliptica* Wild) (family Samidaceae) (Anon., 1992), growing in Sal forests were severely attacked and defoliated by some lepidopteran larvae (Fig. 1). These caterpillars were then collected and reared on its host plant in laboratory under the prevailing environmental conditions of August-September (temperature 30-35^o C and RH 50-67%). Larvae were provided with *ad libitum* feeding until pupation. The observations, measurements and weight of different developmental stages were recorded throughout the rearing period till emergence of adult moths. The

moths emerged were killed, oven dried, studied morphologically and systematically to identify them with the help of available literature (Hampson, 1896) and determined specimen preserved for reference collection at Forest Entomology Division of this Institute.

The present survey revealed that *C. tomentosa* suffers seriously from the attack of a defoliator, identified after comparing the morphology of adult moth with determined specimen preserved for reference collection under the Accession No. 7 at Forest Entomology Division of this Institute as *Botyodes asialis* Guen. (Lepidoptera : Pyraustinae : Pyralidae). In regard to the genus, *Botyodes* Guen., that includes six species (Hampson, 1896). *B. asialis* has been reported from Africa, through Asia to the Pacific, including Fiji, Hong Kong, Thailand, India, Siam, Sri Lanka, the Philippines, New Guinea, Samoa, Malay Peninsula and Queensland (http://en.wikipedia.org/wiki/Botyodes_asialis).

The food plant of *B. asialis* is *Ficus* (Hampson, 1896; Lefroy, 1909). According to Beeson (1941), *B. asialis* is widely distributed in Asia and recorded as a defoliator of *Casearia graveolens*, *C. tomentosa*, *Diospyros tupra*, *Glycosmis pentaphylla* and *Urena lobata*. The damage intensity of this pest was found to be very high (more than 25% based on defoliation percentage/plant) and in a few cases leaves of the whole plant was noticed to be infested by *B. asialis*. The period of infestation of this defoliator was recorded to be August-October, the rainy season of the year.

Developmental Stages

The linear measurements of larvae, pupae and wing expanse of male and female moths of *B. asialis* developed after rearing in laboratory are presented in Table-1. It was observed that the larvae are generally olive green with reddish lateral band, small hair bearing dorsal and sublateral and two series of large lateral black spots, head black and the yellow vertex (Fig. 2).

It was recorded that pupa is obtect and green in colour with short anal point and antennal sheath (Fig. 3). The pupal period was found to exist for

Table-1: Data on linear measurements of developmental stages of *Botyodes asialis* and wing expanse of adults developed after rearing in laboratory

| Stage | Length (mm) | |
|------------------|-------------|------------------|
| | Range | Mean \pm SE |
| Larva | | |
| Ante-penultimate | 15-20 | 17.50 \pm 2.50 |
| Penultimate | 18-30 | 22.50 \pm 3.99 |
| Ultimate* | 30-40 | 33.20 \pm 2.79 |
| Pupa | 17-22 | 20.25 \pm 1.11 |
| Adult** | | |
| Male | 42-45 | 43.20 \pm 1.25 |
| Female | 46-48 | 46.50 \pm 0.81 |

*Full grown. **Wing expanse of oven dried specimen.

Data based on 10 observations.

7-10 days (mean 8.40 ± 0.98 days). Beeson (1941) has mentioned that the pupal period is 12 days in October and as much as 19 days in November.

The diagnostic features of moth of this species have been described by Hampson (1896). It is characterised by orange-yellow moth (Fig. 4), male with black anal tuft, fore wing with fulvous speck below median nervure near base, an oblique maculate fulvous antemedial line, a speck in cell and discocellular ocellus, an interrupted sinuous postmedial line inwardly oblique from vein 5 to 2, a highly sinuous submarginal line, with the area beyond it fulvous except at apex, hind wing with discellular ocellus, a post medial sinuous line highly bent outwards between vein 5 and 3, the marginal area fulvous with a grey tinge, narrowing to anal angle and with its inner edge sinuous, both wings with the cilia fuscous and grey colour at tips.

Growth and Development

Concomitant growth and development proceed simultaneously in the ontogeny of insects, although the end of growth and the rate at which it proceeds is limited (Sehnal, 1985). Moulting is primarily a mechanism of growth (Wigglesworth, 1972) and larval moulting is an essential process for salutatory growth in insects (Williams, 1980), to gain the critical size necessary for subsequent metamorphosis (Nijhout, 1991). Growth shows a progressive increase throughout the larval instars, steady increase throughout a stage of development, then falls slightly at the time of moulting due to loss of body moisture and following the moult the



Fig. 1. Defoliated *Casearia tomentosa*



Fig. 2. Full grown larva of *Botyodes asialis*

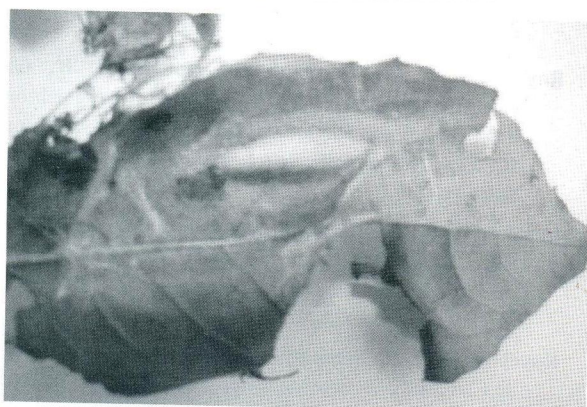


Fig. 3. Pupa of *Botyodes asialis*



Fig. 4. Moth of *Botyodes asialis*

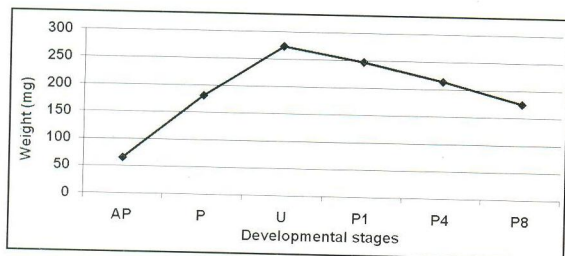


Fig. 5. Growth curve of *B. asialis*, based on live weight. AP=Ante-penultimate larva. P=Penultimate larva. U=Ultimate larva. P1, P4 and P8=Pupa 1st, 4th and 8th day old pupa

growth rapidly increases above its previous level (Chapman, 1982). In the present insect, *B. asialis*, the growth curve (Fig. 5) based on the live weight showed steady increase from ante-penultimate to penultimate instar then exhibited an exponential growth following food intake after last larval ecdysis with a peak on the ultimate instar, then a sudden fall occurred with the formation of pupa. This finding

corroborates the observations of Roychoudhury *et al.* (1994) on *Bombyx mori*.

Thus, the present information is a new addition of moth to the insect faunal composition of Achanakmar-Amarkantak Biosphere Reserve. Further, the study reports the pest status, outbreak period, growth and development and description of *B. asialis*, a major defoliator of *C. tomentosa*.

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