

SHORT COMMUNICATION

BIOLOGICAL NOTES ON PLASSEY BORER *CHILO TUMIDICOSTALIS* HAMPSON (LEPIDOPTERA: CRAMBIDAE) IN SUGARCANE**Arun Baitha*, M.R. Singh and B.D. Singh****Abstract**

Chilo tumidicostalis Hampson is observed damaging sugarcane internodes at Motipur, Bihar. The mean number of internodes damaged by the larvae in primary infested cane varied from 2.0 to 2.6 in canes with 6-11 internodes of the ISH/IGH line SA-04-245. The maximum number of internodes damaged (2.60) was observed in cane with 11 internodes followed by seven and 10 internodes. The migratory larvae move in upper direction while few of them move in the opposite direction in the same internode by making several punctures/holes (5-7) in one internode and making the cane hollow. The maximum extent of internodes damaged was 37.14% in cane with seven internodes followed by 33.22% (cane with six internodes) and 28.12% (cane with eight internodes). The minimum damage varied from 21.00 to 23.63% in canes with 9, 10 and 11 internodes.

Key words : Sugarcane, Plassey borer, *Chilo tumidicostalis*, biology

Plassey borer *Chilo tumidicostalis* Hampson (Lepidoptera: Crambidae) is one of the important regional pests of sugarcane in India occurring in Bihar, West Bengal, Assam, Nagaland and U.P. states (Anonymous 2015). It is distributed in Asian countries like India, Burma, Nepal, Thailand and Eastern Africa (Bleszynski 1970; Karim and Islam 1977; David et al.1986; Suasard 2000) and damages only sugarcane (Williams et al. 1969). The cane damage, and reduction in yield and sucrose content due to this borer have been estimated as 40-60, 8.2-12.6 and 10.75-48.55%, respectively in primary and secondary infestation throughout the cropping period (Butani 1961; Rajmedhi et al.1998). Several workers have reported that the larvae cause primary and secondary infestation in canes (Khanna et al. 1957; Gupta and Avasthy 1959). In the primary

infestation, the larvae after hatching from egg masses bore the few top internodes, feed on the internal tissues gregariously and make the cane hollow leading to drying up of the central spindle and crown leaves (Anonymous 2016). In view of its increasing importance, the present study was conducted on the biology of Plassey borer in primary infested canes.

A survey was conducted in various fields at the Research Center of ICAR-Indian Institute of Sugarcane Research, Motipur (Muzaffarpur), Bihar, in July 2015. During the survey, Plassey borer was found to damage SA-04-245, an ISH/IGH line. The damaged canes of primary infestation alone were collected and grouped into six categories based on the number of internodes in each cane. In each category, 10 damaged canes were sampled, canes were split, and the numbers

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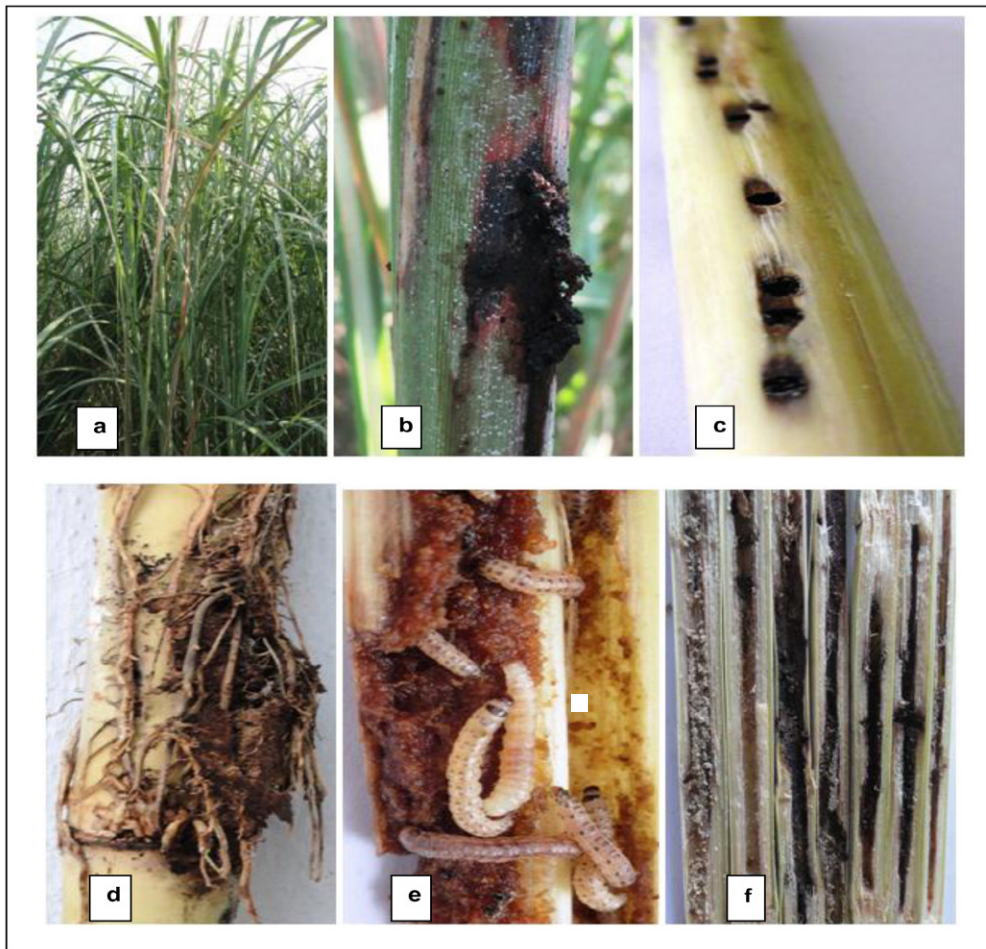


Fig. 1. (a) Leaf crown drying in primary infestation by Plassey borer; (b) red colour frass pushed out; (c) bore holes in the top internode; (d) sett-roots from the node; (e) gregarious phase of larvae; (f) damaged hollow canes

of healthy/damaged internodes and larvae in each cane were recorded. In primary infestation, the leaf crown was found either dried or drying and reddish fresh wet frass was pushed to the exterior through bore holes in top internodes and in a few canes sett-roots developed from the nodes (Fig. 1a, b, c, d, e & f). The data were analysed statistically.

The mean number of internodes damaged by the larvae in primary infested canes varied from 2.0 to 2.6 in canes with 6-11 internodes (Fig. 2). The maximum number of damaged internodes (2.6) was observed in canes with 11 internodes followed

by seven and 10 internodes. The migratory larvae move in the upper direction while a few of them move in the opposite direction in the same internode by making several punctures/holes (5-7) in one internode and making the cane hollow. The variation in the number of internodes damaged appears to be due to the gregarious feeding of the larvae in the primary infested canes.

The mean number of larvae was the highest (3.24) in canes with nine internodes followed by 2.79 (eight internodes) (Fig. 2). The larvae usually prefer the upper half of the cane. As many as 89

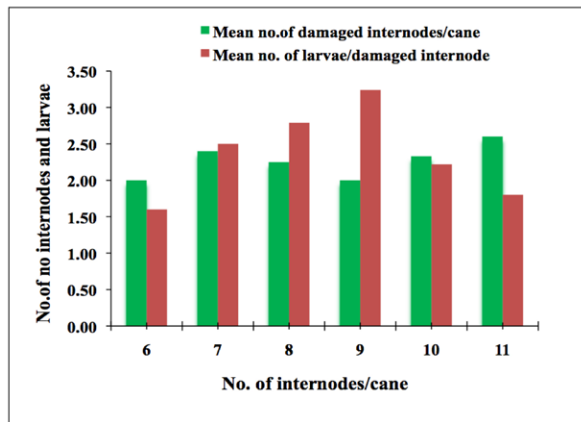


Fig. 2. Number of damaged internodes and larvae of Plassey borer in sugarcane

larvae were found in 2-3 internodes of a single cane and in a majority of canes 2-7 larvae and 2-3 pupae were observed in the present study.

The larvae are parasitized by natural enemies such as *Cotesia flavipes* Cameron and *Stenobracon deesae* (Cameron) (Hymenoptera: Braconidae) while migrating from infested internodes to healthy ones. The extent of natural parasitism by *C. flavipes*, *S. deesae* and an unidentified parasitoid was found to be 9.8, 3.6 and 2.1%, respectively. Several workers reported that 40-65% larvae were parasitized by *C. flavipes* and parasitism increased with increase in incidence (Singh et al. 1999; Pandey et al. 2005; Borah et al. 2009).

The maximum internode damage was 37.14% in canes with seven internodes followed by 33.22% (six internodes) and 28.12% (eight internodes) (Fig. 3). The minimum damage varied from 21.00 to 23.63% with 9, 10 and 11 internodes. These variations may be due to low number larvae feeding in internodes at this damage intensity and/or some physiological changes. Internode damage varied from 5.94 to 46.10% in different varieties (Rajmedhi et al. 1998; Singh et al. 1999; Pandey et al. 2005).

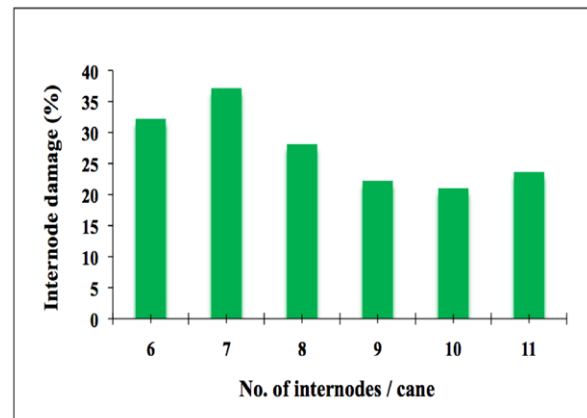


Fig. 3. Percent of internodes damaged by larvae of Plassey borer in sugarcane

The growth of canes with primary infestation is stopped as the growing point at the base of spindle is damaged completely but the neighbouring healthy canes with normal growth become taller in the later month which eventually leads to the easy boring of the internodes by the larvae instead of spindle. The above findings indicate that larvae cause severe damage to internodes in primary infested canes which begins just after internode formation in the cane. There is a need to study the detailed biology, damage pattern and population dynamics of parasitoids in different sugarcane areas in Bihar.

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References

- Anonymous (2015) Status of insect-pests of sugarcane at IISR, RC Motipur (Muzaffarpur), Bihar. ICAR-IISR Newslett 22(2):3-4.

- Anonymous (2016) *Chilo tumidicostalis*-Pest of Sugarcane. ICAR-IISR Newslett 23(1):5
- Bleszynski S, (1970) A revision of the world species of *Chilo* Zincken (Lep.: Pyralidae). Bull Br Mus Nat Hist (Ent) 25(4): 99-195.
- Borah BK, Sarma KK, Boruah BK (2009) Population fluctuations of Plassey borer, *Chilo tumidicostalis* Hampson and its parasitoid, *Cotesia flavipes* Cameron in sugarcane crop in Assam. J Biol Control 23(4):467-470.
- Butani D K (1961) Insect pests of sugarcane in Bihar. Indian Sug 11(1):649-654.
- David H, Easwaramoorthy S, Jayanti, R (1986) (eds) Sugarcane Entomology in India. Sugarcane Breeding Institute (ICAR), Coimbatore, India. 564p.
- Gupta B D, Avasthy PN (1959) Biology and control of stem borer, *Chilo tumidicostalis* Hampson. Proc Int Soc Sug Technol 10:886-901.
- Karim MA, Islam MN (1977) Stem borers of sugarcane in Bangladesh. Proc 22nd A Sci Conf, Bangladesh Ass Advmt Sci: pp.29-30.
- Khanna KL, Nigam LN, Puri VD (1957) *Chilo tumidicostalis* Hampson, serious stem borer pests of sugarcane in Bihar. Proc Indian Acad Sci (B) 46:75-95.
- Pandey KP, Pandey MN, Kumar V, Singh DN (2005) Occurrence of Plassey borer (*Chilo tumidicostalis*) Hampson in eastern U.P. Indian Sug 54(10):857-858.
- Rajmedhi J, Dev Roy TC, Gupta MK (1998) Biology of sugarcane Plassey borer, *Chilo tumidicostalis* Hampson on sugarcane. J Appl Zool Res 9(1&2):16-19.
- Singh S, Singh M, Jain JL (1999) Plassey borer (*Chilo tumidicostalis* Hampson) serious pests of sugarcane crop in Harinagar area. Bhartiya Sugar 25(3):41-43.
- Suasa-ard W (2000) *Chilo tumidicostalis* (Hampson) (Lepidoptera: Pyralidae) and its natural enemies in Thailand, In: Proceedings of the IV Sugarcane Entomology Workshop, ISSCT, Thailand, pp.10-16.
- Williams JR, Metcalfe JR, Montgomery RW, Mathes R (1969) Pests of Sugarcane. Elsevier, Amsterdam. 568p.