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BIOLOGY OF THE BROWN PLANT HOPPER, *NILAPARVATA LUGENS* (Sta!.) (Delphacidae, Hemiptera)

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Among (he various insect pests of rice, the brown plant hopper *Nilaparvata lugens* (Stal) had been known only as a minor pest. But in recent years it has assumed major proportions. Pathak (1968) reported N. *lugens* and *Sogatella furcifera* (Horv.) causing serious loss to rice cultivation in Southern China and several tropical Asian countries and Rai and Zutrchi (1969) recorded these plant hoppers as assuming the status of major pests with the introduction of high yielding varieties. Devastating outbreaks of the brown plant hopper occurred on the 'Punja' rice crops of the Alleppey District and the Kole lands in the Trichur District, the two major rice producing tracts of Kerala, in 1973 and 1974. Information gathered on the biology of N. *lugens* in laboratory studies are presented in this paper.

Materials and Methods

Brown plant hopper used in the studies was collected from the infested rice fields of Thucklay, Tamil Nadu. Mass multiplication of the insects was done on potted paddy plants kept in field cages. Rice seedlings needed for biology studies were raised in paper cups and in flower pots. IR-8 was the paddy strain used. For life history studies one month old paddy seedlings were planted singly in paper cups kept in long beakers and the whole enclosed in glass chimney and closed with muslin cloth. Pairs of virgin males and females were introduced singly on these plants. For studying fecundity of the hopper fresh seedlings were exposed to insect pairs daily till the death of the females. The leaf sheaths of the exposed plants were teased out carefully and the number of eggs laid counted.

Life history of *N. lugens.*

Mating commences from the day of emergence of the adults and it takes place generally during night and rarely in day time. Oviposition starts from the second day of emergence and extends upto 4 days. Eggs are thrust within the t'.ssue, generally in the mid region of the outer leaf sheath in rows of 2 to 12 eggs and with the operculum projecting out. Number of eggs laid by a female ranges from 151 to 305, the average being 232.4. The egg-laying period varies from 10 to 28 days. The fecundity of the brachypterous female is 83 and its previposition period and the egg laying period being one day and 4.6 days respectively.

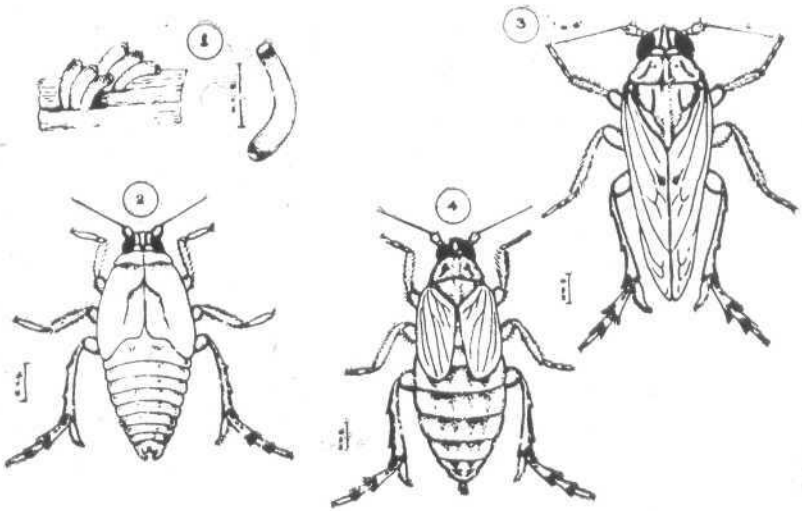

Fig*. I. Egg 2. Nymph 3. Adult 4. Brachypterous female

Eggs (Fig. 1) are elongate and curved and measure 0,9 mm in length and 0.12 mm in width. The incubation period is 8.1 days on an average. Eggs whitish when freshly laid and become darker during the course of development.

Eggs hatch during the early hours of the day. The cottony white nymphs, measuring 0.675 mm m length, just after emergence move towards the base of plants near the water level and start feeding on the sap. First instar stage lasts for 2 to 3 days. The brownish black second stage nymphs measuring 1.275 mm in length has a duration of 2 to 4 days. The third instar nymph is light yellow in colour and measures 2.105 mm m tength. Wing pads appear in this instar and this lasts for 2 to 4 days. The fourth instar nymph is yellowish brown and measures 2.265 mm in length. This stage lasts for 2 to 4 days. The fifth instar nymph also is yellowish brown and it measures 2.858 mm in length.

On emergence, the adults (Fig. 3) are yellowish white in colour which later changes to yellowish brown. Adult female measures 5 mm in length and the male 4.5 mm. In brachypterous females (Fig. 4) the tegmina are atrophied into brownish-black scale like, leathery structures without any clear venation and they cover only the basal portion of the abdomen.

The total life cycle of the hopper from egg to adult takes from 19 to 23 days for completion, the average being 21.6 days.

Longevity of aduits: The longevity of males varies from 14 to 21 days with an average of 18.4 days and that of females from 14 to 30 days with an average of 21 days. Longevity of brachypterous females is very short, being 5.6 days on an average.

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സംഗ്രഹം

കുട്ടനാട്ടിലെ പുഞ്ചപ്പാടങ്ങളിലും തൃശ്ശൂർ കോൾ നിലങ്ങളിലും വ്യാപകമായി നാശം ഉണ്ടാക്കിയ തുള്ളന്റെ (Brown hopper) ജീവിത ദശകം വിശദമായി പരീക്ഷണശാലയിൽ പഠിക്കപ്പെട്ട. ഈ പക്കിയുടെ വിവിധ ദശകം വിവരിക്കപ്പെട്ടിട്ടുണ്ട്. മുട്ടവിരിയുന്ന കുഞ്ഞുങ്ങം പൂർണ്ണവളർച്ചയെത്താൻ 19 മുതൽ 23 വരെ ദിവസങ്ങം എടുക്കും. ആൺ പക്കികം ശരാശരി 18.4 ദിവസങ്ങളം പെൺപക്കികം 21 ദിവസങ്ങളം ജീവിച്ചിരിക്കും. എന്നാൽ കുറിയ ചിറകുള്ള പെൺപക്കികം 5.6 ദിവസങ്ങം fflo^SM ജീവിക്കുന്നുള്ള.

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