2 BIOLOGY OF *Odontopus varicornis*

The material used in the present investigation is *Odontopus varicornis*, a hemipteran bug of the family Pyrrhocoridae. Information on the distribution of this insect species and observation on its host plants, feeding activities, cannibalistic nature, longevity, nature of eggs and nymphal instars, adult male and female insects and sexual dimorphism have been reported by Kamalakannan (1977); Sabesan (1980); Padmaja (1984); Ranganathan and Sriramalu (1984); Kathirvel (1985); Jayakumar (1988); Selvisabhanayakam (1995) and Lousia (2010).

2.1 Systematic position

The systematic position of the insect under the present investigation is given below:

- Phylum - Arthropoda
- Class - Insecta
- Order - Hemiptera
- Suborder - Heteroptera
- Super family - Pyrrhocoridae
- Family - Pyrrhocoridae
- Genus - *Odontopus*
- Species - *varicornis*
2.2 Distribution

Pyrrhocorid bugs are distributed in Ethiopian and oriental regions. According to Distant (1940), the four species of this given genus viz., Odontopus variornis, odontopus nigricornis and Odontopus sanuinolens are found to have been distributed in different parts of India. Two species of the genus namely Odontopus varicornis and Odontopus sanguinolens are found in the state of Tamil Nadu, South India. The adult of Odontopus varicornis are available almost throughout the year especially abundant during winter in the gardens of the Annamalai University campus and Botanical garden, Pondicherry. However, the present field observation indicate that the level of this insect population is maximum during the months of December, January and February and minimum during March and April.

2.3 Sexual dimorphism

Odontopus varicornis is bright red in colour with partly black coloured wings and it exhibits sexual dimorphism. The sex of adult insect readily distinguished from their external features. The adult male has a narrow, long abdomen with pointed aedeagus and it is relatively smaller than the female. The female on the other hand, has somewhat broader abdomen with ovipositor bisected by a median depression.
The body of male and female measures about 19mm and 22 mm in length and 5.3 and 6.0 mm in width, respectively. These insects are distinguished from lygaeids by lack of ocelli and possession of more branched veins and cells in the hemelytra as reported by Kadirvel (1985).

2.4 Host plants

*Odontopus varicornis* is a phytophagous insect and is found on the host plants of *Sterculia foetida* (Sericula) and *Bombax ceiba* (*Gasipium*).

2.5 Feeding

Since the bug is phytophagous, feeding on plant juice, it possess sucking type of mouth parts. The insects are fed daily with cotton seeds (*Bombax ceiba*) soaked in water and *Sechium edule* (Chow – Chow). The bugs exhibit feeding during hot hours of the day. The insects are more active during day time, but do not fully active during night time.

2.6 Cannibalism

Although these bugs are phytophagous, sometime they exhibit cannibalism. The eggs as well as newly moulted insects are found to be subtle to this activity. Field observations have shown that these insects are cannibalistic occasionally and moreover feed on wasps, large ants and dead decayed animals.
2.7 Longevity

Under laboratory conditions of $8\pm2^\circ C$ with $85 \pm 5\%$ RH, the normal adult male is found to live for about 75 days and the female about 70 days.

2.8 Mating

The female begins to mate with the male three to four days after imaginal moult. Ranganathan and Sriramulu (1984) have investigated the mating behaviour and oviposition in *Odontopus varicornis* with more details in relation to activity of male accessory reproduction gland, by extirpating gonad and accessory reproductive glands. The following activities are considered as sexual behaviours.

1. Chasing – the male after perceiving a female, activity follows the female from the fourth day.

2. Mounting – the male crawls over the body of the female and simultaneously protrudes its sharp aedaegus.

3. Mating – after gripping the female tightly, the male inserts its aedaegus forcibly into the genitalia and remain in an end to end position. This is known as “copula” position. In natural and controlled conditions. The characteristic behaviour of *Odontopus varicornis* is that they are found mostly in pairs, copulating in “end to end position” from the fourth day of
adult life. All normal and usual activities like roaming, feeding etc., are carried out by the pair in copula with ease. According to Selvisabhanayakam (1995), this insect exhibit mating on the seventh day of adult life under laboratory condition.

### 2.9 Oviposition

It is observed that only at the time of oviposition, the female detaches (separates) from the male by forcibly pushing it aside with its hind legs. Then it scope out the sand, lays eggs covers them with sand and then joins the male again. The female breaks away from the male on the 11th day and oviposits about 120 eggs in about 3-4 hours. After ovipositing, the last few eggs, the female rests. It does not move about actively or feed. After 2-3 hours of oviposition they respond once again to a male and begin to copulate. The pair remains in copula for another week. On the 17 or 18th day, the female once again breaks away finally from the male and oviposits about 80-90 eggs. After this second oviposition, the female and male lead a senescent life. Ranganathan and Sriramulu (1984) have demonstrated that the gonads are not necessary for mating or for oviposition behaviours. They of further showed that the accessory reproductive gland in male in essential for normal mating.
2.10 Eggs

The eggs are oval in shape and cream yellow in colour. Each egg measures about 1.8mm in length and 0.8 mm in width at the widest region under the laboratory conditions, the nymphs hatch out from the egg in about 7 days at 29±1°C.

2.11 First nymphal instar

The newly hatched nymphs is 3.0mm in its length and 1.0mm in width. Nymphs are oval in shape and orange in colour and gregarious in behaviour. After 20 hours of hatching, the colour changes from orange to red. The eyes become dark red, antenna four segmented and club shaped and the proboscis four segmented. A distinct segmented thorax and abdomen with ten segments can be seen. The first moulting takes place in about 4 to 5 days after hatching.

2.12 Second nymphal instar

The second nymphal instar measure 3.00 mm in length and 1.2 mm in width. Tip of the proboscis turns from dark brown to yellow colours antenna turns from red to light brown; setose hairs are well formed in the antennae and legs. Prothorax is larger than the other two thoracic segments; eight segments are found in the abdomen further last two segments are partially fused with eighth segments. The second moulting takes place in about 6-7 days after the first moulting.
2.13 Third nymphal instar

If measures 7.0 mm in length and 2.0 mm in width. Two black line appear on the medial dorsal axis of the head; colour of the eye changes from red to black; proboscis extends further; fore-wing rudiments appear on the mesothoracic target plate as black patches; first segment of each leg appears as dull red while, the other segment remain black brown; three spherical median black spots appear in a linear order between 3-4, 4-5, 5-6 tergal plates of the abdomen; claws become sclerotised. The third nymphal stadium lasts for 7 to 8 days.

2.14 Fourth nymphal instar

The fourth nymphal instar measures 10.0 mm in length and 3.00 mm in width. First segment of the antennae turns red; the second and third segments remain black, while the distal segment appears yellow; wing rudiments extent further; black spots of the tergal plates of the abdomen show gradual increase in size; leg turns red in colour; the proboscis extends ventrally upto the second abdominal segment. The fourth moulting takes place in about 10-11 days after the third moulting.

2.15 Fifth nymphal instar

If measures 15.0 mm in length and 5.0 mm in width. Hind wing rudiment appear on the mesothoracic tergal plates: medium
dorsal side covered by a black patch. Thoracic segmentation on the ventral side is marked by a black lines. The fifth nymphal stadium lasts for 15-17 days.

2.16 Adult

The fifth nymphal instar on its final moulting becomes an adult which attains sexual maturity in about six to seven days (Fig. 1, 2 and 3).