CHAPTER I
GENERAL BIOLOGY OF GRYLLODES SIGILLATUS

The house cricket Gryllodes sigillatus (Walk) is distributed throughout the tropical and subtropical regions of the world (Chopard, 1969). In warmer regions, it is generally a household pest, and in cold countries it is of economic importance as a pest of greenhouse (Ghouri, 1965). This cricket is a common insect available in the houses of Dharwad area and also found in the groundnut fields near the vicinity of the city. Adult insects are available throughout the year but they occur in abundance during the months of October, November and December.

Habits

It is a well known fact that crickets are nocturnal in habit. The house crickets G. sigillatus are nocturnal they live mostly in a concealed sites of crevices, cool and moist places. During nights they can easily be spotted out as the males produce chirping sound. But the females do not produce any sound. They feed on dead and decaying matter when food is...
scarce the cannabolism is invariably noticed in the rearing jars. *G. sigillatus* can not survive long without either free water or food of high water content. Under optimal conditions an average life span of female is about 60-75 days. Generally the males survive a little longer than females i.e. for about 80-90 days (Biradar, 1984).

These crickets were reared in the laboratory as described by Mathad and Dasrayani (1972) with some modifications by Biradar (1984). In the laboratory maintained culture the crickets are found to eat their exuviae completely after each moult and this renders difficult to determine accurately the number and stages of the nymphal instars. However, this difficulty was overcome by observing round the clock. A just hatched nymphs one or two were left in the rearing jar covered with lids. Soon after each moult the exuviae were collected and preserved for future identification and comparision. Thus the number of nymphal instars were identified. Further, it was easy to distinguish by experience the instars by mear observation of their size and appearance. *G. sigillatus* may breed throughout the year depending upon the environmental conditions and there may be 3-4 generations in a year.
Sex dimorphism

Adult male *G. sigillatus* is relatively smaller than the female in size (Fig. 1, A & B). Normally the male attains a length of 15 to 18 mm and a width of 3-5 mm between the pronotal angles. The female measures 17-21 mm in length and 5-7 mm in width between pronotal angles. In nature, the brackyopterous forms of *G. sigillatus* is more common. In case of male, the wing tegmina cover only half the abdomen. While in case of the female, they are not developed but remain as rudiments. But when in the laboratory conditions at a particular temperature and photoperiod, during development of post embryonic period winged forms were obtained. The relevant investigations were made by Mathad (1966) on wing polymorphism in this cricket and were furnished detailed informations. Ghouri and McFarlane (1958) have briefly described the micropterous and macropterous forms and detailed taxonomic and morphological description of the two forms of *G. sigillatus* have published. Besides size and tegmina differences between males and females the presence of external genitalia, the oviposition in females is distinguishing feature. The ovipositor is distinguishable from the 5th instar onwards. In adult females it is long measuring about 1.3±0.02 cm in length, brownish in colour and little bulged at the terminal end.
EXPLANATION TO FIGURES

Fig. 1: The adult house cricket of *Gryllodes sigillatus* (Walker) A. Male; B. Female, X 6
Oviposition

Oviposition occurs throughout the year. First oviposition is noted in the virgin female between 8-10 days after the imaginal ecdysis. But when mated the female start ovipositing between 3-4 days only and continue to lay the eggs for about ten days (Itgi et al., 1984). The females continue to lay eggs after conjuctive mating for about 50-60 days. Each female lay about 2100-2700 eggs provided it is paired with male throughout the adult stage (Biradar, 1984). Eggs are laid separately but close to one another 0.5 to 1.00 cm deep in moist sand or soil. Most females prefer oviposition at night but some do oviposit at day time also. The oviposition pattern in this cricket is elaborately described by Sharma (1976).

Eggs

The freshly laid eggs are white in colour, cylindrical in appearance and with smooth rounded ends. Normally each egg measures about 2.00 mm in length and 0.5 mm in width. The chorion is thin, soft and membranous when eggs were just kept for incubation. As embryogenesis progresses, the colour of the egg becomes brownish yellow and two black eye spots can be clearly noticed at 120 h of incubation at 36±1°C.
(Yaragamblimath et al., 1978). Under optimal laboratory conditions the eggs hatch between 9-10 days after oviposition.

Nymphal stages

One of the fundamental feature in insect is the metamorphosis i.e. the insect passes through nymphal stages before emerging into an adult. This cricket *G. sigillatus* passes nymphal stages before emerging into an imaginal adult. Under optimal laboratory condition the stadium of the first nymphal instar lasts for about 6 to 8 days. The second instar lasts for 6-8 days, the third last for about 8-10 days, like the fourth instar for 10-12 days, the fifth nymphal stage is about 10-12 days and the seventh instar last for 10-12 days. When the nymph emerged from one instar to the next its body colour is turning from chockalate to black before 5-6 h and the nymphal activity is very sluggish. The nymph when ecdysied it is white in colour and after 20-30 minutes the body colour turns into its original.

LABORATORY REARING OF THE HOUSE CRICKET *Gryllodes sigillatus* (WALKER)

According to Chopard (1969) this species is distributed throughout the world and is being reared in our laboratory since 1991 for experimentation. The rearing
techniques outlined by Mathad and Dakshayani (1972) for the field cricket, *Plebeio Gryllus guttiventris* were adopted for the house cricket *Gryllodes sigillatus* with some modification by Biradar (1984). For rearing and experimental purpose the Bell® electric egg incubator is used (Fig. 2). The rearing plastic jars about 850 ml capacity were kept in Bell® electronic egg incubator having three trays and each tray holding 36 rearing jars. Adult crickets in groups of 8-10 and nymphs 10-12 were maintained in 850 ml capacity jars. Each jar contained a folded filter paper strip (14 cm x 5 cm) which increased the area and sheltered the crickets, an inverted distilled water vial plugged with aseptic cotton as a water source and a plastic food cup with concentrated poultry feed as food. The rearing jars were tightly covered with perforated plastic lid which provide air and prevented the escape of crickets. Bell® electric incubator equipped with a heating unit (H) thermostat and ventilating fan (F) maintained the temperature within ±1°C. Humidity was regulated in the range of ±5% by adding the required quantity of water in humidity tray (HWT) and a fluorescent tube lamp (FL) synchronised with time switches (TS) that switched automatically on and off at 6.00 am and 6.00 pm respectively which is maintaining the photoperiod.
G. sigillatus adult crickets were reared at 30±1°C, whereas nymph and eggs were maintained at 36±1°C. In both the cases the humidity was 80±5% RH and photoperiodic conditions were 12L:12D. For the stock culture, the eggs laid in the aseptic cotton plug of the water vial were regularly collected and incubated at 36±1°C in 500 ml ogale glass jar tightly covered with a plastic lid. After 8-10 days, newly hatched nymphs were transferred to 850 ml jars provided with poultry feed and water maintained at 36±1°C. Each jar was provided with an adequate food and water for the duration of each nymphal stage. Male and female nymphs were isolated every day from the nymphal colony and placed in groups of 10-12 nymphs/jar. Male and female crickets after their imaginal moult were separated from these jars for the experimental purpose and further for building up of the stock culture also. To maintain hygienic conditions, every week the rearing jars, food cups and water vials were regularly sterilised and replaced.