

VARIETAL PREFERENCE OF COFFEE BERRY BORER *HYPOTHENEMUSHAMPEI* (FERRARI)

The coffee berry borer, *Hypothenemus hampei* (Ferrari) (Coleoptera : Scolytidae) is considered most serious pest on coffee world over (Lepelly, 1968). A native of Africa, this pest has now spread to 58 growing countries. In India pest was first noticed in a few coffee plantations in Gudalur Taluk of Tamil Nadu during 1990 (Kumar *et al.*, 1990). The biology, mode of attack and the symptoms of damage by this pest have been described by various authors (Lepelly, 1968; Mansingh, 1991).

Almost all the presently cultivated species of coffee are attacked by this pest. The feeding behaviour with respect to different varieties of coffee has been reported earlier (Lepelly, 1968; Johannesan and Mansingh, 1984). Considering the spread of pest to large areas of coffee in India, it is felt necessary to study its relative preference to various cultivars of coffee in India. The present study discusses some preliminary observations made in this direction using both parchment seed and whole coffee berries.

Laboratory studies: Experiment 1(a): A mixture of parchment seeds of *Coffea arabica*, *C. canephora*, *C. liberica* and *C. racemosa* was used to study the infestation. This experiment was replicated eight times and each replication contained 80 seeds, a mixture of 20 seeds each from the above varieties. These were kept in plastic trays after marking them with appropriate colours to distinguish the varieties. The plastic trays were covered with muslin cloth to prevent the escape of beetles. Pieces of water soaked filter papers were kept inside the trays to provide moisture and humidity. Eighty numbers of freshly collected female adult beetles that had been subjected to a pretest starvation for one week were released into each tray representing a replication. The

number of perforated berries, which are indicative of infestation, was recorded daily for 10 days.

(b) A similar laboratory experiment was conducted to study the fecundity of the borer using the same replications and number of seeds and beetles. Eighty mated females were released as described earlier to the different varieties. Observations were recorded on 5th, 10th, 15th and 25th day after cutting open five seeds of each variety. The grubs and pupae noticed were reckoned as 'advanced eggs'.

(c) In another test, berries of *C. canephora*, *C. arabica*, *C. liberica* and *C. eugenoides* were used to study the fecundity of the beetles using the same methodology and layout in experiment 1 (b). The counts of eggs were taken on the 5th, 10th and on the 15th day. It was not possible to continue the observations after the 15th day as the fruit started rotting. Here also grubs were reckoned as advanced eggs.

Experiment II(a): Mature fruits of *C. canephora*, *C. arabica*, *C. liberica* and *C. eugenoides* were collected from the field. There were eight replications with 10 fruits in each replication. The number of perforated berries was recorded daily for 10 days.

Field studies: Studies were conducted to assess the field infestation of coffee berry borer in different variety of coffee plants. Sixteen plants each of *C. arabica* cv. Cauvery (Catimor), *C. canephora*, *C. liberica*, *C. eugenoides* were selected at random and the infestation on three branches, each representing upper, middle and lower canopy was kept under observation.

Twelve plants at random were selected from robusta variety top grafted with Cauvery.

Table 1. Infestation and fecundity of coffee berry borer in seeds and fruits of different varieties of coffee

| Species | Average fecundity on | | | | | | | | | |
|----------------------|----------------------|-------|---------|-------|----------|-------|----------|-------|----------|-------|
| | Infestation | | 5th day | | 10th day | | 15th day | | 25th day | |
| | Seed | Fruit | Seed | Fruit | Seed | Fruit | Seed | Fruit | Seed | Fruit |
| <i>C. canephora</i> | 10.50 | 11.60 | 2.73 | 6.75 | 6.75 | 12.37 | 12.25 | 20.12 | 17.62 | - |
| <i>C. arabica</i> | 18.38 | 18.00 | 0.88 | 3.37 | 4.25 | 10.50 | 12.25 | 20.12 | 12.62 | - |
| <i>C. liberica</i> | 6.00 | 6.87 | 0.25 | 0.14 | 1.87 | 1.25 | 2.25 | 1.50 | 2.50 | - |
| <i>C. racemosa</i> | 6.13 | - | 0.00 | - | 0.75 | - | 2.00 | - | 2.37 | - |
| <i>C. eugenoides</i> | - | 1.62 | - | 1.12 | - | 2.75 | - | 1.75 | - | - |
| F test | * | ** | * | * | ** | * | ** | * | * | - |
| CD (0.05) | 3.43 | 2.33 | 1.08 | 3.96 | 3.75 | 3.16 | 4.62 | 3.15 | 5.50 | - |

Table 2. Percentage of infestation of coffee berry borer in different species of coffee in the field

| Species / cultivar | No. of fruits, mean | Infested fruits, mean | Infestation, % |
|----------------------|---------------------|-----------------------|----------------|
| <i>C. canephora</i> | 1417.8 | 64.8 | 4.57 |
| <i>C. arabica</i> | 1324.5 | 68.0 | 5.13 |
| <i>C. liberica</i> | 358.0 | 10.8 | 3.02 |
| <i>C. eugenoides</i> | 185.5 | 5.5 | 2.97 |
| F test | * | ** | - |
| CD (0.05) | 104.52 | 11.24 | - |

Considering the varietal difference of the different tiers of the grafted bush, (**Robusta** is the first in the first tier and **Cauvery** in the second), one branch was selected from north, east, south and west directions. The numbers of total fruits and perfect fruits in each branch were recorded every month from July to December.

The data on percentage of infestation and fecundity of *H. hampei* on the seeds and fruits

of four species of coffee under laboratory conditions are presented in Table 1. The percentage of infestation observed on fruits of different species of coffee in the field is given in Table 2. From Table 1, it is clear that there is an order of preference in feeding habit of coffee berry borer. The preference to the seeds of *C. arabica* was significantly higher, followed by *C. canephora*, *C. racemosa* and lastly *C. liberica*. However, the fecundity of the beetle was higher in *C. canephora* followed by *C. arabica*. In *C. liberica* and *C. racemosa* the fecundity was very low.

Studies conducted in laboratory using fruits collected from the field also showed a significant preference of beetles to *C. arabica* followed by *C. canephora*, *C. liberica* and *C. eugenoides*. However, there was no significant difference in fecundity between *C. canephora* and *C. arabica*. The fecundity in *C. canephora* and *C. arabica* was significantly higher than *C. eugenoides* and *C. liberica*.

Under the field conditions, it could be deduced that there was no significant difference in the preference of beetle to *C. canephora* and *C. arabica*. Thus, the above studies indicated that

there is no significant difference in susceptibility of *C. arabica* and *C. canephora* to the berry borer. However, among the species screened *C. arabica* and *C. canephora* are

more prone to borer attack than other species. It has been well documented that the insect fecundity is greatly influenced by host species differences.

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