The parasitic wasp, *Edovum putteri* Grissell, was successfully reared on *Leptinotarsa decemlineata* (Say) in the laboratory and increased in sufficient numbers for inoculative release studies in the spring and summer. The effects of temperature on parasite development, and host-parasite ratios in the laboratory are presented. The sex ratio of parasites reared in the laboratory are compared to those released and recovered in the field.

KEY-WORDS: *Edovum putteri*, Colorado Potato Beetle, egg parasite, rearing.

The eulophid wasp, *Edovum putteri* Grissell, is a newly discovered egg parasite of the Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say) (Grissell, 1981; Puttler & Long, 1983). Field studies conducted in Delaware, Maryland and Missouri beginning in 1980, showed that the parasite is unable to overwinter in these states. This necessitates the propagation of the parasite and the CPB throughout the year. The parasite colony must then be increased in time for release in the spring. This paper describes methods developed for the propagation of the parasite.

MATERIALS AND METHODS

Potato (*Solanum tuberosum* L.), egg-plant (*Solanum melongena* L.), and tomato (*Lycopersicon esculentum* Mill.) serve as hosts of the CPB (Hsiao, 1981). Based on our studies and the work of Latheef & Harcourt (1972) potatoes were chosen as the food source in our CPB rearing program.

The propagation of the CPB was generally the same as the methods developed by de Wilde (1957), and where modifications were introduced, they are noted. Our laboratory colony was established annually from CPB adults collected in the fall from potato fields at Beltsville, Maryland. A stock colony of approximately 250 adult CPB were maintained in the laboratory to provide an adequate supply of host eggs for parasite studies during the fall and winter. This colony was replaced with new laboratory reared CPB every 60 days during that period to insure a continuous supply of eggs. In the summer months, eggs were obtained from field collected beetles held in the laboratory. The CPB colony was increased to
1,000 beetles in February to produce the eggs needed to expand the parasite colony for inoculative releases in the spring. Fifty to 60 adults were held in rearing units constructed of aluminum with screen sides (30.5 cm × 30.5 cm × 61 cm) into which a potted plant was added twice a week. Egg masses from the rearing units were collected daily by cutting off those sections of the foliage with eggs attached. Between 50 to 60 egg masses were placed in large Petri dishes (125 × 25 cm) that had a 2-3 cm patch of paper towel, soaked in a 80% honey-water solution, affixed to the lid. A 1-2 cm portion at the bottom of the dish was kept free of egg masses to facilitate parasite removal. Approximately 500-600 adult parasites less than 20 days old (peak ovipositional period) were then introduced to obtain parasitism (at a ratio of approximately 10 parasites/egg mass or ca. 1 parasite/3 eggs). The average number of eggs/mass were 35.1 (S.E. ± 2.89). We noted that with less than 500 parasites, the level of parasitism decreased, whereas numbers in excess of 600 adults resulted in increased egg feeding and higher loss of eggs due to dessication. The parasite ovipositional unit was placed in a growth chamber at 24°C and 60-70% RH with a 16L:8D photophase for 24 h.

The parental generation of wasps was removed from the ovipositional unit by placing it on a flat surface with the area free of egg masses directed toward natural light. The wasps congregated at the light and were collected with a mouth aspirator (5mm aperture) for transferral to fresh egg masses or to a holding cage.

Parasites not used immediately for parasitization were stored in plexiglass holding cages (30 × 30 × 60 cm). Two opposite sides of the cage were screened with organdy cloth and a cloth sleeve covered the entrance on the 3rd side. Each cage had 4 shell vials containing water and a cotton dental wick and 8 paper towel patches soaked in 80% honey-water, placed inside on the top of the cage. The cage was kept in a growth chamber at 24°C, and 60% RH and a 16-h photoperiod. Parasites were added by means of an aspirator or by placing an open Petri dish containing emerging parasites on the bottom of the holding cage. The dishes were removed when all the parasites dispersed. The wicks and patches were removed and replaced as needed (approximately 3 times per week).

**Effect of temperature on parasite development**

To determine the effect of temperature on parasite development, the ovipositional units were placed in growth chambers at 20, 23 or 27°C. The incubating eggs were checked daily and any CPB larvae were removed. If eggs showed evidence of mold, a .5% sodium hypochlorite solution (mist) was applied. At signs of wasp emergence, the parasites were tapped to the bottom of the dish and a paper towel patch soaked in 50% honey-water was quickly applied to the inside of the lid. The parasites were then left undisturbed for 24 h to allow for complete emergence and mating.

**Sex ratio of parasites**

Random samples of laboratory reared parasites were removed and sexed prior to releases in 1982-83. Also individual egg masses collected from the field where parasites were released in 1981-83 were isolated and the parasites that emerged were sexed.

**RESULTS AND DISCUSSION**

Maximum egg production in the colony of 1000 CPB began 13 days after the 1st eggs were laid and continued for the peak ovipositional period (29 days). During this period over 5,000 egg masses were produced. Production ranged from 22.5 to 312 egg masses/day, averaging 175 egg masses/day (S.E. ± 14.59) during the period. The laboratory colony of CPB adults was discarded in June and replaced by approximately 250 newly emerged 1st generation CPB adults from the field. The cycle was repeated for collecting, storing and rearing the CPB in the laboratory.