INCIDENCE OF NATURAL ENEMIES OF THE COLORADO POTATO BEETLE, *LEPTINOTARSA DECEMLINEATA* [COLEOPTERA: CHRYSOMELIDAE] ON A NATIVE HOST IN MEXICO (1)

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In central Mexico, the center of origin for *Leptinotarsa decemlineata* (Say) and its principal host plants, *L. decemlineata* is associated with a diverse complex of natural enemies. Observations during 2 years in Morelos, Mexico revealed 4 species of asopine pentatomids, 7 species of foliar searching carabids, and 2 coccinellids among the predators of *L. decemlineata*. Parasitoids include 3 species of tachinids and *Edovum puttleri* Grissel, an eulophid egg parasitoid. These natural enemies include several predators that have not previously been reported attacking *L. decemlineata*.


The Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say), and its host plant complex (*Solanum* species in the section *Androceras*) probably evolved in central and southern Mexico (Whalen, 1979; Tower, 1906), and until the mid-1800's, the range of the CPB was limited to Mexico and the U.S. southwest and Great Plains. Following its adaptation to potato, the CPB spread throughout the U.S., and much of Canada and Europe (Casagrande, 1985; Hsiao, 1985). Because the CPB is a serious pest, numerous investigators have studied the biological control potential of CPB natural enemies present in potato crops (Hare, 1990). These natural enemies include the predators *Perillus bioculatus* (Fab.) (Tamaki & Butt, 1978) and *Lebia grandis* Hentz (Groden, 1988), the tachinid parasitoid, *Myiopharus doryphorae* (Tamaki et al., 1983), and the fungal pathogen *Beauveria bassiana* (Bals.) Vuill. (Ferron, 1978). *Edovum puttleri*, an exotic parasitoid of CPB eggs, reared from *Leptinotarsa undecimlineata* Stal in Columbia has been studied extensively in recent years (Lashomb et al., 1987).

Despite the fact that the CPB is exotic throughout most of its modern range, little effort has been made to study endemic natural enemies within its original range in Mexico. The potential for classical biological control using CPB natural enemies is suggested by recent collections of CPB natural enemies from a wide range of Mexican climate and habitat (Logan et al., 1987). Eighteen species of natural enemies were encountered feeding upon the CPB and its congeners. Logan et al. (1987) noted that Mexican CPB populations were
typically at low density, and they suggested that natural enemies may effectively limit native CPB populations. In order to further evaluate the relative abundance, phenology, and virulence of CPB natural enemies, we conducted a 2 year study of the CPB on the native host *Solanum angustifolium* Mill. in central Mexico.

**METHODS**

**PREDATOR INCIDENCE**

Predators were sampled on *S. angustifolium* hosting CPB at Xoxocotla, 30 km south of Cuernavaca in the state of Morelos. The climate of this area is semi-tropical (mean annual temperature of 22 °C). Rain falls mainly during June-October (800-1 000 mm). *S. angustifolium* is abundant along roadsides, in fallow fields, and in other disturbed sites.

We sampled insects from three sample plots of *S. angustifolium* twice weekly during 1987 and 1988. In 1987, we collected predators from 58 plants at an “early site” from June 25 (beginning of the first CPB generation) until July 25. Because these plants were then defoliated by CPB, sampling was continued on 78 plants at a “late site” until October 30 (when CPB adults entered diapause). In 1988, CPB emergence was delayed by later onset of rains and population density was sharply decreased from the previous year; sampling did not begin until August 16, when 70 plants just being colonized by CPB were discovered; these plants were sampled until October 6.

For each sample, entire plants were examined. All spiders and predatory insects encountered were identified at least to family and any predation was noted. Ground-dwelling arthropods and nocturnally active predators were not represented in the count.

**PREDATOR FEEDING TRIALS**

Suspected CPB predators collected in July and August 1987 were transferred to a laboratory at Cuernavaca and held individually in 15 × 100 mm dia. Petri dishes overnight without food. CPB egg masses or larvae collected in the field were then introduced to the Petri dish and left for ca. 48 hours at ambient conditions (15-22 °C; 12 : 12 L : D). The number of prey (eggs or larvae) introduced exceeded estimated 48 h consumption, e.g., ca. 100 eggs or 2-3 fourth instar larvae. Larvae were provided with fresh *S. angustifolium* foliage. Numbers of undamaged CPB prey (alive or dead) were counted at the end of the 48 hour period and subtracted from the initial number to determine consumption. Predators were first offered CPB eggs; if these were consumed, they were maintained on eggs for 7 or more days to determine consumption rate. Predators that did not consume eggs were given CPB larvae for a second 48 hour trial.

**PARASITISM**

CPB egg masses, larvae, and adults were collected from *S. angustifolium* and held for emergence of parasitoids. Collections were made at Xoxocotla and 4 other sites in southern Morelos (for site descriptions see Cappaert, 1988). Whenever possible, at least 30 individuals of each life stage were collected, and up to 300 individuals were collected from high density populations. Collections were made each week from the end of June to late October 1987, and at irregular intervals from mid-July to late September 1988.

CPB samples were transferred to a laboratory at Cuernavaca, Morelos and placed in covered 15 × 100 mm dia. Petri dishes. Larvae and adults were fed with *S. angustifolium*