Scientific Notes

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TOMATO PINWORM (LEPIDOPTERA: GELECHIIDAE): AN INCREASING PEST ON TOMATOES IN SINALOA, MEXICO

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The tomato pinworm (TPW), Keiferia lycopersicella Walsingham has become the most important key pest affecting tomatoes grown in Sinaloa, Mexico, surpassing the tomato fruitlet, Heliotis zea (Bodie), the tobacco budworm, Heliotis virescens (Fabricius), and the beet armyworm, Spodoptera exigua (Hübner) in importance in the state (Anonymous 1983). This has been especially true for the last two growing seasons.
spring crop 1986 and spring crop 1987. Several fields were so heavily infested by TPW that harvesting was unprofitable. Damage to fruit in these fields ranged from 25 to 100%, despite frequent use of broad-spectrum insecticides. From 10 to 25 applications of fenvalerate and permethrin were applied for TPW control during this time. This problem threatens the entire tomato production system in Sinaloa if prompt solutions are not implemented. This study was designed to analyze the TPW adult population dynamics as recorded with pheromone traps for the six seasons, and to develop a better understanding of TPW phenology.

In view of this increasing problem, Sinaloa growers supported a research program for the development of an integrated pest management (IPM) program on tomatoes during 1988 and 1989. A report on the results of this program are in preparation and will be presented later and elsewhere.

Tomatoes are grown commonly in Sinaloa during the fall, winter and spring seasons which correspond with three discrete planting dates: early in October, intermediate in November and late in January (Anonymous 1988). Harvest ranges from early January through the middle of June. Typically, a tomato-free period lasts from late June through August. However in the 1986 and 1987 growing seasons, tomatoes have been planted during the host-free period, condition that probably favored TPW reproduction as the host was available all year around.

From 1981-1982 to 1986-1987 growing seasons, the TPW male population was monitored with Pherocon IC (Zoecon) pheromone traps in commercial fields (Steenwyk et al 1983). Several fields located in the Guasave and Del Fuerte Valleys of Sinaloa, Mexico, planted at different dates, were monitored all year to determine population dynamics. For the tomato-free periods in seasons 1982-1983, 1985-1986 and 1986-1987, populations were monitored by placing pheromone traps along irrigation canals. The number of traps varied according to field size. One trap for every five hectares was placed around edges of field on wooden stakes ≥ 10 m from the field edge. All insects and debris were removed at weekly basis. The pheromone dispenser and bottoms of the traps were replaced every third and sixth week, respectively.

TPW adults were active year round (Fig. 1). Some solanaceous weeds (Elmore & Howland 1943, Batiste & Olson 1973) and wild tomatoes that grow along drainage ditches and irrigation canals during the summer may be important alternate hosts for TPW reproduction during the tomato-free period. Temperature is not a limiting factor with TPW as temperatures in Sinaloa rarely fall below the TPW lower thermal threshold of 11°C (Lin & Trumble 1985).

TPW moth activity in all seasons, except the 1986-1987 season, remained below the 10 moths/trap/night (m/t/n) threshold level proposed by Van Steenwyk et al (1983), from early season through middle March. A steady increase then was generally observed for the rest of growing seasons, reaching maximum peaks in April and May. Low moth catches throughout the first half of the growing season are correlated with the relatively low damage by TPW usually observed when harvesting early and intermediate plantings. In contrast, high fruit damage is commonly seen in late plantings.

Interestingly, TPW moth activity during the 1984-1985 season was the lowest recorded in this study and never exceeded 10 m/t/n during the growing season. Rain (30 inches of rain from September through February) prevailed during most of the growing season and may have limited TPW reproduction.

In the 1985-86 season, moth captures were fairly high in April and May with 70 to 83 m/t/n, respectively. These outbreaks were attributed to a massive adult infestation from “abandoned” fields located 5 and 1300 m from these fields, respectively. An “abandoned” field is regarded here as one in which insecticides are no longer applied, due in part to drastic price reductions that make harvests the crop unprofitable. These abandoned fields serve as excellent breeding sites for TPW; extremely high populations can develop and act as a source of infestation for adjacent tomato fields.
Fig. 1. Mean number of TPW adults captures/trap/night at the different seasons under study in Sinaloa, Mexico. Solid lines indicate the normal growing season. A broken line the tomato-free period.
The TPW moth population recorded during the tomato-free period (dotted lines in Fig. 1) for the 1985-86 and 1986-87 seasons were about 1.5 and 3 times higher than the 1982-83 season, respectively. The presence of commercially grown tomatoes during the host-free period in the last two seasons probably contributed to those results. The tomato plant is the preferred host by TPW over other alternate hosts (Elmore & Howland 1943).

TPW moth activity recorded during the 1986-87 season was quite different from the others in this study. The high TPW catches that were recorded early in the season were mainly attributed to having a tomato crop year round. Although there was a population decline in early December, moth activity remained above 10 m/t/h throughout most of the growing season.

In order to reduce the potential adverse impact of tomato pinworm on future tomato production in Sinaloa, the following sanitation practices as proposed by Elmore & Howland (1943) should be implemented: 1) disk and plow under the crop residues promptly after harvesting of fields, 2) clean drainage ditches and irrigation canals where TPW alternate hosts grow, and 3) establish a tomato-free period during the summer.

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REFERENCES CITED


SUPPRESSION OF DIAPREPES ABBREVIATUS (COLEOPTERA: CURCULIONIDAE) ADULT EMERGENCE WITH SOIL APPLICATION OF ENTOMOPATHOGENIC NEMATODES (NEMATODA: RHABDITIDAE)

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The sugarcane rootstalk borer weevil, Diaprepes abbreviatus (L.), is an important pest of sugarcane, citrus, and vegetable crops in the West Indies. It was first observed in central Florida in 1964 (Woodruff 1964) and is now found in the major citrus-producing areas of the state. Adults feed on new foliage and the larvae feed on roots causing damage that leads to host decline (Schroeder & Beavers 1977).