

An Agricultural Pest Few Know About

Throughout the 2000s the author conducted research and experiments regarding development of innovative pest control methods to be directed against a little-known invasive soybean pest species in Japan. The study started with basic research on the potential speciation stimulated by host plants. The study then ranged from: 1. confirmation of local adaptability and pest resistance on the genetically modified (GM) soybean, 2. development of an index to evaluate and select insect-resistance varieties introduced from Asian Vegetable Research & Development Center (AVRDC), Taiwan. 3. plant histomorphological resistance analysis of plants, 4. measurement of pest control effects of seed covering with phenyl-pyrazole insecticide, applied through seed coating and soil injection methods.

Dectes stem borer (*Dectes texanus* LeConte) is the larvae of Coleoptera, Cerambycid beetles and originated in the US and are distributed across North America's Great Plains, east of the Rocky Mountains to the Mississippi River. Its native wild hosts are of the family Asteraceae including cocklebur (*Xanthium strumarium*) and ragweeds (*Ambrosia spp.*). Commercial sunflower (*Helianthus annuus*) is also infested by the Dectes stem borer.

Dectes stem borer is recognized as a potential threat to soybean (*Glycine max*) production in North America. A 10% reduction in seed weight may result from the plant physiological losses when damaged by "stem tunneling," but most yield loss occurs from the opportunity loss of machine harvesting caused by "plant lodging." During July and August, larvae hatched from eggs laid on the petiole pith, soon move to the main stem and stay about six months in the plant body. When soybean on the field starts drying, the larva girdles (scraping plant tissue girdle-like inside the stem) the inside the main



Cannibalism left only one larva surviving in a plant stem

stem near ground level, makes an overwintering chamber where it remains in pupae form in the plant residue.

Soybean production in North America is generally done by leaving the plant in the field to dry and then harvesting it mechanically. The inside of the soybean plant is girdled and filled with feces, so it easily falls over ("lodging") in rain or strong winds at the girdled point, making it impossible to harvest mechanically.

Conventional pest control measures involved spraying pyrethroid insecticide and removing and/or plowing plant residues as cultural control. However, the larvae spend almost all of their lives inside the plant and its residues, making it difficult to apply contact chemical insecticides. Also, soybean producers prefer leaving plant residues on the fields until the next production season because of soil conservation with less plowing and to save fuel cost.

Several results and findings from the research and experiments have contributed further development and modification of pest control methods against the Dectes stem borer. On



Overwintering chamber is built near ground level

the other hand, several researches revealed that there were statistically significant differences on the machine harvested yield between non-lodged plant (treated) and lodged plant (un-treated) plots, however it found no significant difference in the physiological yield losses between both treatment plots.

I had some kinds of strange and odd feeling that the reason why Dectes stem borer was recognized as a soybean pest depended on the production methods (in this case, it was harvesting method), but not on the physiological pest damage which in general, are the major reason of yield reduction.

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