Virginia Cooperative Extension
Virginia Tech • Virginia State University
www.ext.vt.edu

Diamondback Moth Mating Disruption

Authored by Taylore Sydnor, Ph.D. Student, Virginia Tech; Tom Kuhar, Professor, and Alejandro Del-Pozo, Assistant Professor, Department of Entomology, Virginia Tech

Introduction

Diamondback moth (DBM), *Plutella xylostella* (Lepidoptera: Plutellidae) is a destructive pest of brassica crops around the world. Its larvae feed on the tissues of cruciferous leaves (Fig. 1 & 2), creating holes which can reduce crop yield and marketability.

Description and Life Cycle

Adults are small, ~9 mm in length (Fig. 3). They are grayish brown with a distinct white diamond pattern on their wings when folded. The life cycle from egg to adult is around 21 days during the summer, and they can have numerous generations per season. One adult female moth can lay up to 300 eggs in her lifetime**.**

Figure 1. Late instar DBM larva feeding on green cabbage leaf. Photo credit: Taylore Sydnor.

Make sure you carefully review your copy after applying the style as special formatting that was in your original text will have to be applied, such as bold, italics, and subscript.

Insecticide Resistance

DBM populations are prone to rapidly develop resistance to insecticides. DBM populations have developed resistance to > 100 different insecticides globally, making it the hardest to kill lepidopteran pest in the world. Therefore, alternative pest management techniques such as mating disruption are needed to help resistance management.

Figure 2. DBM neonate larva. Photo credit: Taylore Sydnor.

Figure 3. DBM adult moth. About 1 cm long. Photo credit: Taylore Sydnor.

Mating Disruption

Mating disruption is an alternative pest control technique that uses the release of a synthetic sex pheromone and false plume following principle. This is a form of competitive attraction that prevents the male moths from effectively finding females and mating. Mating disruption is species-specific and is used alongside common insecticide spray regimens.

From 2021-2023, DBM mating disruption experiments have been conducted on commercial brassica farms in Virginia. In each location, we divided experimental fields were divided into treatment vs. control. The treatment fields received solid MESO pheromone dispensers (Fig. 4) following manufacturer proposed rate. In every field, three PHEROCON® baited sticky traps were placed to monitor and assess adult moth activity. Leaf damage and larval presence was also assessed weekly.

Figure 4. MESO pheromone dispenser in a cabbage field. Photo: Taylore Sydnor

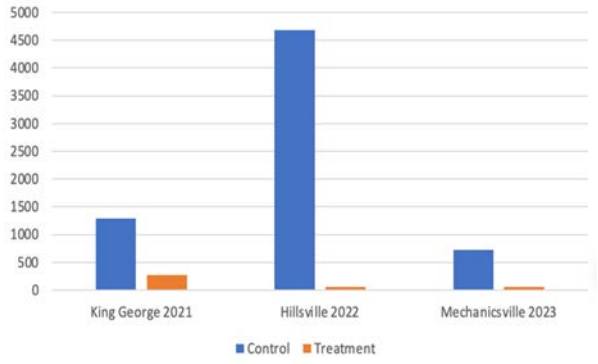

Figure 5. Comparing total adult moth captured over each season between treatment and control fields in different locations.

At each location, significant differences in moth capture between treatment vs. control fields were documented. The treatment fields showed significantly lower trap capture than the control fields (Fig. 5). In Hillsville 2022, we saw a significant difference in leaf damage between treatment and control fields. There has been no significant difference observed in larval presence between fields.

References Cited

Baker, P.B., Shelton, A.M., Andaloro, J.T., 1982. Monitoring of Diamondback Moth (Lepidoptera: Yponomeutidae) in Cabbage with Pheromones. J Econ Entomol 75: 1025-1028.

Munir, S., Dosdall, L.M., O'Donovan, J.T., 2014. Evolutionary Ecology of Diamondback Moth, Plutella xylostella (L.) and Diadegma insulare (Cresson) in North America: A Review. Annual Research and Review in Biology 5(3): 189-205.

Riley, D., Smith, H., Bennett, J., Torrance, P., Huffman, E., Sparks, Jr, A., Gruver, C., Dunn, T., Champagne, D., 2020. Regional Survey of Diamondback Moth (Lepidoptera: Plutellidae) Response to Maximum Dosages of Insecticides in Georgia and Florida. J. Econ. Entomol.113(5): 2458-2464.

Talekar, N.S., and Shelton, A.M., 1993. Biology, Ecology, and Management of the Diamondback Moth. Annual Review of Entomology 38: 275-301.

Visit Virginia Cooperative Extension: ext.vt.edu

2023 ENTO-571NP