

Field Evaluation of a Novel Lure for Trapping Seedcorn Maggot Adults

Thomas P. Kuhar, Department of Entomology, Eastern Shore AREC, Virginia Tech, Painter 23420; **W. D. Hutchison**, Department of Entomology, University of Minnesota, St. Paul 55108; **Joanne Whalen**, Department of Entomology & Wildlife Ecology, University of Delaware, Newark 19716; **David G. Riley**, Department of Entomology, Coastal Plain Experiment Station, University of Georgia, Tifton 31793; **Jan C. Meneley**, AgBio Inc., Westminster, CO 80031-2689; **Helene B. Doughty**, Department of Entomology, Eastern Shore AREC, Virginia Tech, Painter 23420; and **Eric C. Burkness**, and **Suzanne J. Wold-Burkness**, Department of Entomology, University of Minnesota, St. Paul 55108

Corresponding author: Helene B. Doughty. hdoughty@vt.edu

Kuhar, T. P., Hutchison, W. D., Whalen, J., Riley, D. G., Meneley, J. C., Doughty, H. B., Burkness, E. C., and Wold-Burkness, S. J. 2006. Field evaluation of a novel lure for trapping seedcorn maggot adults. Online. Plant Health Progress doi:10.1094/PHP-2006-0606-01-BR.

Seedcorn maggot (SCM), *Delia platura* Meigen (Diptera: Anthomyiidae), can be a damaging pest of many crops including corn, bean, cucurbits, onion, and potato. Larvae injure plants by feeding and burrowing into seeds, roots, and seedlings often causing rot (Fig. 1). Other undesirable effects of SCM occur when pupae are attached to harvested plant material in crops such as onion, leading to emergence of adult flies in markets. Growers typically control SCM with the use of preventative (seed-treatment or soil-applied) insecticides. However, a highly efficacious trap for SCM adults could aid in the integrated pest management (IPM) of this pest by serving as a monitoring tool to assess pest infestation levels around fields (3,4), or perhaps, as an alternative control tactic by reducing adult populations before they can reproduce and deposit eggs in the field.



Fig. 1. Damage by seedcorn maggot, *Delia platura*, on snap bean (photo courtesy of University of Minnesota).

White to yellow-tinted sticky cards have been shown to be an effective and efficient trap for SCM adults (1). However, olfactory stimulants such as decaying plant matter, yeast and molasses, enzymatic yeast hydrolyzate, blood and bone meal, or fish meal may be even more important than visual stimuli for attracting SCM adults (3, 4). Researchers in Japan analyzed the chemical constituents of decomposing onion pulp, and identified 2-phenylethanol and *n*-valeric acid as potent attractants for both seedcorn maggot and onion maggot flies (4). These compounds were synthesized into a slow-release lure (5), which was recently produced by Chemtica Internacional S.A. (San Jose, Costa Rica).

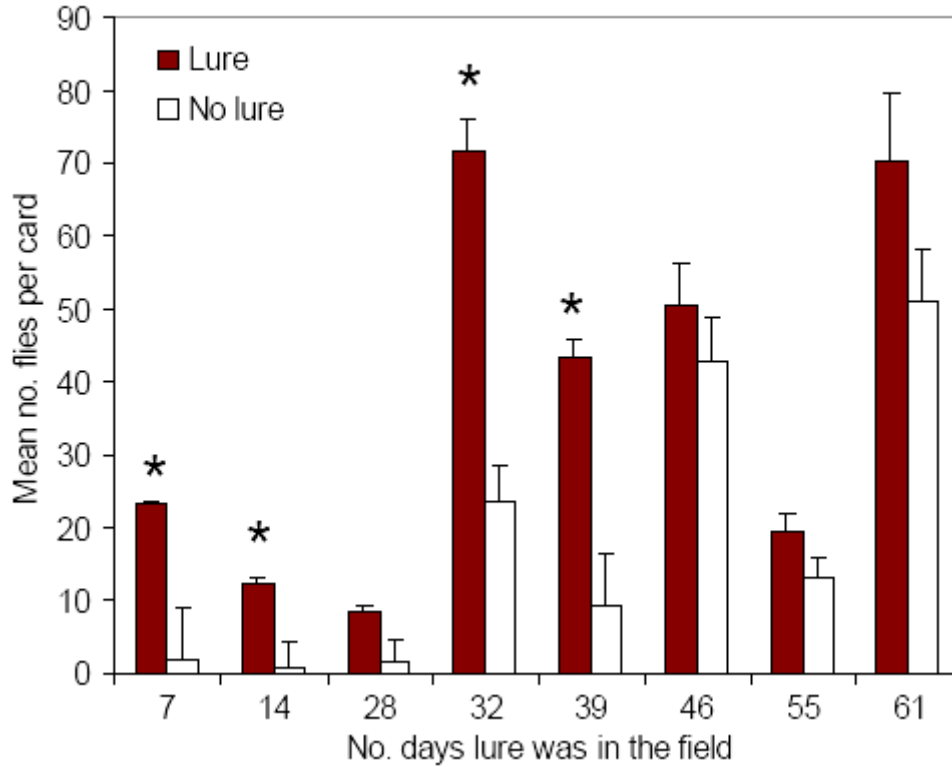
In spring 2005, we conducted field experiments at four locations in the United States: (A) Painter, VA; (B) Georgetown DE; (C) Rosemount, MN; and (D) Tifton, GA to evaluate the relative efficacy of this synthetic lure to attract *Delia* spp. flies. The ChemTica Internacional P316 Seedcorn and Onion Maggot lures were provided by AgBio, Inc. (Westminster, CO) and shipped to each location in late March. Field trials in Virginia, Delaware, and Minnesota took place on the perimeters of snap bean fields, while the trial in Georgia took place around the perimeter of a Vidalia onion field. In the spring, just prior to planting, ten 3- × 5-inch yellow sticky cards (Olson Products Inc., Medina, OH) were clamped to wooden stakes, which were placed around the perimeter of each field at equal distance apart such that traps were at a height of 10 to 12 inches from the ground. Every other stake (n = 5) also had a SCM lure clamped just above the sticky card. Adult *Delia* spp. caught on cards (Fig. 2) were counted and recorded periodically with a goal of biweekly counts for at least 3 weeks. Sticky cards were also replaced every week, or if covered with dust or insects. Mean numbers of adult SCM on each sample date were compared using Student's t-test at the $\alpha = 0.05$ level of significance.



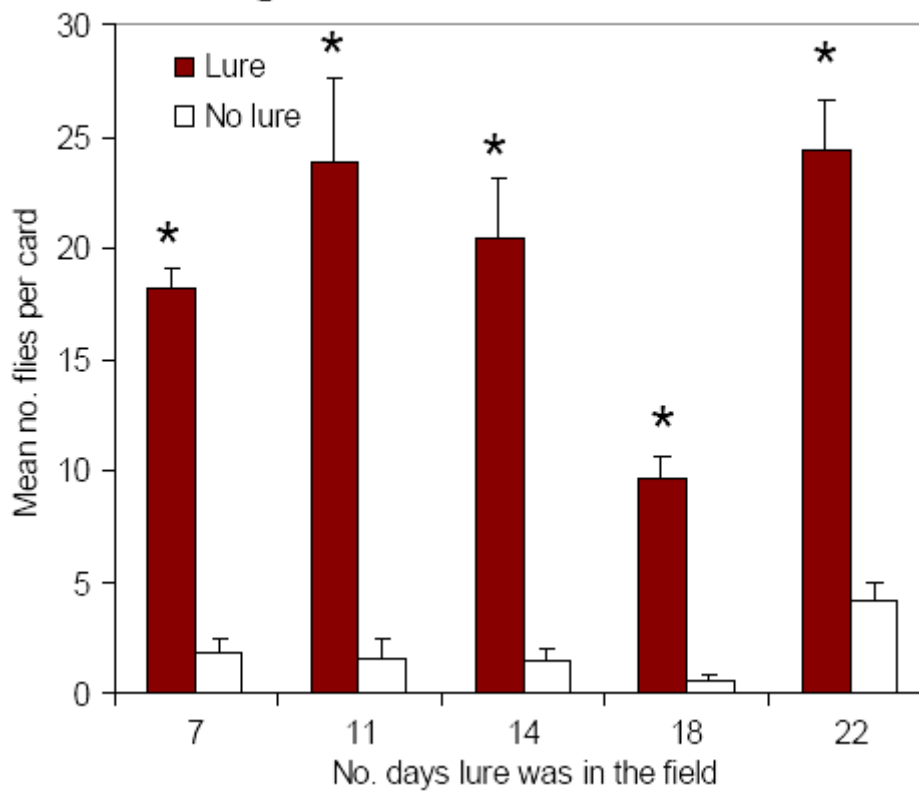
Fig. 2. Seedcorn maggot flies caught on yellow sticky cards.

Results showed that sticky traps baited with lures consistently caught more (2× to 12×) SCM flies than unbaited sticky traps (Fig. 3). The lure appeared to remain effective over time in the field with only a decrease in potency after 39 days (Fig. 3A). Although flies trapped on cards were sexed only at the Minnesota location, results indicated that both male and female SCM adults were caught on cards with a 4:1 to 2:1 male sex ratio bias on baited and unbaited cards, respectively. This lure may prove efficacious in assisting growers with IPM trapping and sampling procedures for purposes such as determining fly-free periods for planting crops such as beans (2), and pre-harvest insecticide application needs for crops such as onion. In addition, this lure may have potential for organic farming purposes or home gardeners' applications where adult trapping may be the only acceptable control option for SCM and other *Delia* spp. populations.

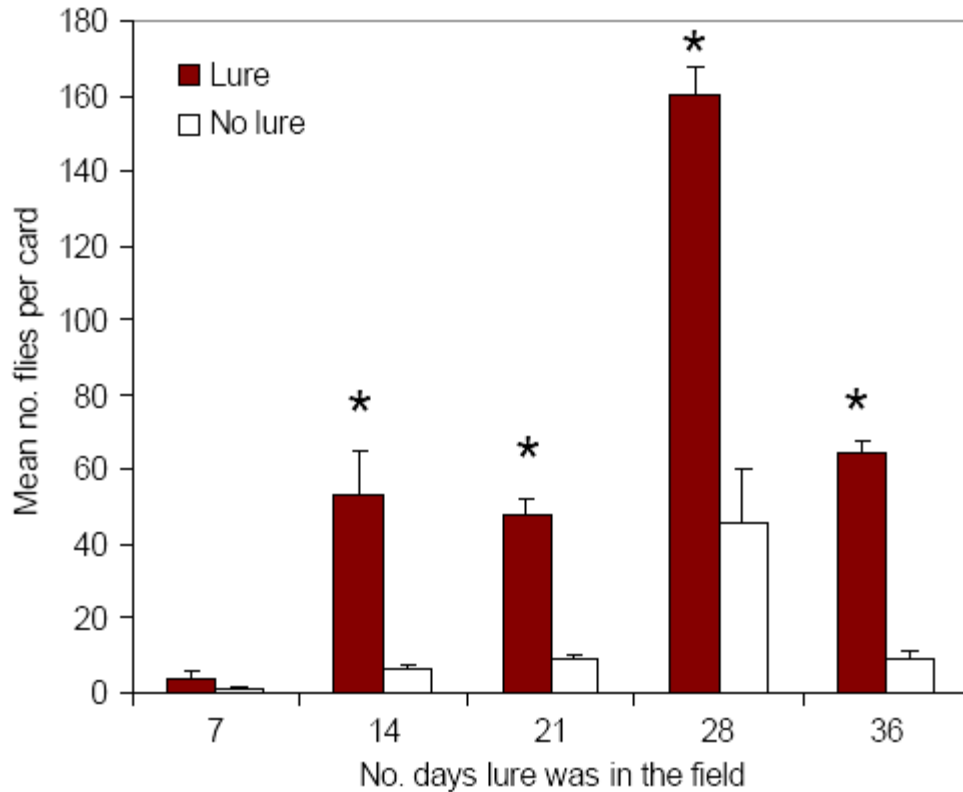
A. Painter, VA



B. Georgetown, DE



C. Rosemount, MN



D. Tifton, GA

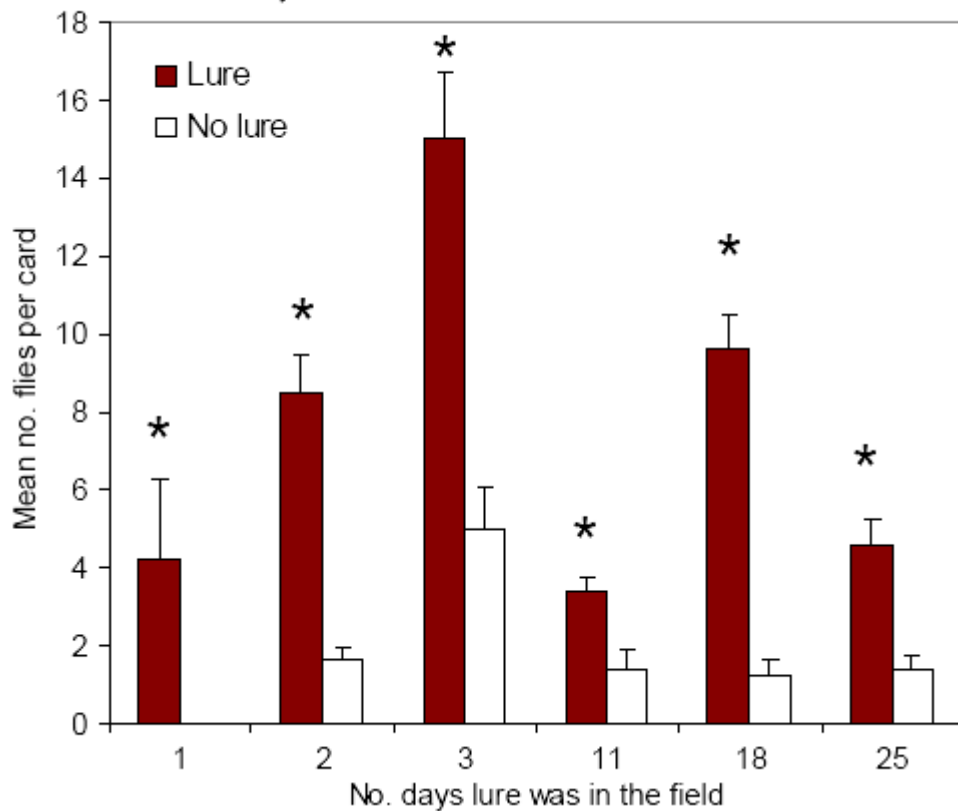


Fig. 3. Mean (\pm SE) numbers of seedcorn maggot flies caught on yellow sticky cards placed around the perimeter of snap bean fields (A, B, C) or a Vidalia onion field (D) in April and May of 2005. At each location five of ten cards were baited with the ChemTica Internacional P316 Seedcorn and Onion Maggot lure. Asterisk indicates significant difference between baited and unbaited treatments according to Student's t-test at the $\alpha = 0.05$ level of significance.

Literature Cited

1. Broatch, J. S., and Vernon, R. S. 1997. Comparison of water pan traps and sticky traps for monitoring *Delia* Spp. (Diptera: Anthomyiidae) in canola. *Can. Entomol.* 129:979-984.
2. Hammond, R. B., and Cooper, R. L. 1993. Interaction of planting times following the incorporation of a living, green cover crop and control measures on seedcorn maggot populations in soybean. *Crop Prot.* 12:539-543.
3. Higley, L. G., and Pedigo, L. P. 1985. Examination of some adult sampling techniques for the seedcorn maggot. *J. Agric. Entomol.* 2:52-60.
4. Ishikawa, Y., Matsumoto, Y., Tsutsumi, M., and Mitsui, Y. 1984. Mixture of 2-phenylethanol and *n*-valeric acid, a new attractant for the onion and seedcorn flies, *Hylemia antiqua* and *H. platura* (Diptera: Anthomyiidae). *Appl. Ent. Zool.* 19:448-455.
5. Ishikawa, Y., Matsumoto, Y., Tsutsumi, M., Mitsui, Y., Yamashita, K., Yoshida, M., and Shirai, E. 1987. Controlled release formulation of attractant for the onion and seedcorn flies, *Hylemya antiqua* and *H. platura* (Diptera: Anthomyiidae). *Appl. Ent. Zool.* 22:303-309.