

“BUG VACUUMS”

FOR ORGANIC CROP PROTECTION

PEST MANAGEMENT TECHNICAL NOTE

Abstract: Field vacuuming is a novel concept for pest management in organic cropping systems. Though heavily promoted, it has not been widely adopted. This publication provides an overview of the history and applicability of insect vacuum technology.

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Field Vacuums for Insect Pest Management

As the demand for organic produce expands, growers are seeking additional alternatives for managing insect pests without pesticides. Among the tools that have drawn interest are field vacuums, which suck pests from the growing crop and “batter” them to death. Interest in field vacuums peaked in the late 1980s through the mid-1990s. They are in limited commercial use at the present time.



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Growers and researchers have experimented with suction devices on a number of horticultural crops, including lettuce, strawberries, artichokes, grapes, potatoes, celery, and cole crops. The most successful application of insect vacuums appears to be control of lygus bugs in strawberries. The strawberry producer Driscoll Strawberry Associates, Inc., highlights their use of BugVac™ as a marketing tool (1) – one that makes them appear more environmentally responsible. The University of California’s 2001 Pest Management Guidelines feature specific guidelines for use of suction devices for lygus control in strawberries (2).

There has also been some success using vacuums for Colorado potato beetle control on potatoes (3). One machine designed specifically for use on potatoes is called the Beetle Eater™. Although the Beetle Eater is no longer being manufactured, there appear to be several still in commercial use (4). Despite their promise and promotion in the popular agricultural press, field vacuums have not achieved wide adoption. Problems cited include the high initial costs of machinery (5); the lack of residual pest control, requiring frequent passes over the field; soil compaction due to equipment weight and the frequency of use; and the spreading of pathogens like powdery mildew and gray mold.

Sometimes, the vacuums simply weren’t adequate for the job. When they tried them for aphid control on lettuce, California growers found that the pest hid mostly in the lower parts of the plant and escaped – a particularly serious problem because the aphids vector several serious diseases. Accommodating the vacuums also limited irrigation to alternate furrows, which further stressed the crop (6).

There has always been a worry that insect vacuums would be detrimental to beneficial predators, parasites, and pollinators in crop fields. This concern may be unwarranted (or at least overstated). Studies indicate that populations of beneficials do not suffer measurably from field vacuuming (3, 6, 7).

Sources for Insect Vacuums

In late 2001, NCAT Agriculture Specialists contacted twelve companies that had been listed as manufacturers or distributors of field-scale insect vacuums in the 1990s. None of these companies was currently producing new suction equipment for sale. Only Driscoll Strawberry Associates, Inc. (8) indicated they would produce an insect vacuum on special order.

The California supplier BioQuip Products (9) has several small vacuums that are mostly intended for insect monitoring and collecting, rather than control. One of the vacuums is a backpack unit, however, which might be useful for pest control in biointensive systems.

For very small-scale applications, the ‘Bug Vacuum’ – a battery-operated, hand-held unit may work. However, it appears designed primarily for removing individual insects like errant wasps, bees, and flies from the home. The ‘Bug Vacuum’ can be ordered on internet from at least three different sources (10). The base price ranges from \$38 to \$50.

Summary

Field vacuums are an interesting non-chemical approach to insect pest management. While promising, the concept has not received wide use because of a number of problems, including cost and efficacy. Sources for commercial machinery are limited.

References

- 1) Anon. No date. Driscoll’s Berry R & D. Driscoll Strawberry Associates, P.O. Box 50045, Watsonville, CA. <http://www.driscollsberries.com/html/berry_r_d.html>.
- 2) Zalom, F.G., P.A. Phillips, N.C. Toscano, and S. Udayagiri. 2001. UC Pest Management Guidelines: Strawberry: Lygus Bug. Publication 3339. University of California Department of Agriculture and Natural Resources, Berkeley, CA. February. <<http://axp.ipm.ucdavis.edu/PMG/r734300111.html>>.

- 3) Grossman, Joel. 1991. Organic potatoes in Wisconsin. IPM Practitioner. May-June. p. 16-17.
- 4) Birt, Kathy. 2000. Bug off! Spudman. May-June. p. 26-27.
- 5) One California company reportedly purchased a number of field vacuums for use in lettuce at a cost of \$100,000 each. Ref: Grossman, Joel. 1990. Aphids vex Bug Vac. IPM Practitioner. March. p. 12-13.
- 6) Grossman, Joel. 1990. Aphids vex Bug Vac. IPM Practitioner. March. p. 12-13.
- 7) Grossman, Joel. 1997. Vacuuming lygus. IPM Practitioner. September. p. 15.
- 8) Driscoll Strawberry Associates, Inc.
1750 San Juan Rd.
P.O. Box 111
Watsonville, CA 95077
(408) 726-3531
- 9) BioQuip Products
17803 La Salle Ave.
Gardena, CA 90248-3602
(310) 324-0620
(310) 324-7931 FAX
bioquip@aol.com
<http://www.bioquip.com>
- 10) Biocontrol Network (BIOCONET)
<<http://www.bioconet.com/tools/bugvac.html>>
Coolgadget
<<http://www.coolgadget.net/bugvacuum.html>>
PestDetour.com
<http://www.pestdetour.com/bug_vac.htm>

Popular and Technical Literature on Horticultural Pest Vacuums

The following is a list of popular and scientific articles relating to insect vacuums, their use, and their performance in the field. This list is not comprehensive.

Anon. 1991. Sukup bug beater to be demonstrated at Spudtacular '91. The Great Lakes Vegetable Growers News. July. p. 14.
Anon. 1990. Back to the future. The New Farm. p. 24-25.

Anon. 1990. Bugs hit the fan. CALS (University of Wisconsin College of Agriculture and Life Sciences) Quarterly. Summer. p. 2.

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Anon. 1988. Driscoll invention is sucker for 'bad' bugs. The Packer. August 13. p. 3A.

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Ogden, Frank. 1998. This vacuum does lettuce. Lessons From the Future—Volume 8. <<http://drtomorrow.com/lessons/lessons8/05.html>>.

Pickel, Carolyn, Frank G. Zalom, Douglas B. Walsh, and Norman C. Welch. 1994. Efficacy of vacuum machines for *Lygus hesperus* (Hemiptera: Miridae) control in coastal California strawberries. Horticultural Entomology. Vol. 87, No. 6. p. 1636-1640.

Pickel, Carolyn, et al. 1995. Vacuums provide limited Lygus control in strawberries. California Agriculture. March-April. p. 19-22.

Stockwin, Will. 1988. Sweeping away pests with BugVac. American Vegetable Grower. November. p. 34-38.

Street, Richard Steven. 1989. The bug sucker. Harrowsmith. January-February. p. 122.

Traupman, Michael. 1990. Sweeping the bugs out. The New Farm. July-August. p. 27-30.

Williams, Greg, and Pat Williams. 1999. Modified vacuum machine for snag-free bug collection. HortIdeas. November. p. 131.
Williams, Greg, and Pat Williams. 1991. "Houdini" hand-held vacuum for insects. HortIdeas. July. p. 82.

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Zalom, F.G., P.A. Phillips, N.C. Toscano, and S. Udayagiri. 2001. UC Pest Management Guidelines: Strawberry: Lygus Bug. Publication 3339. University of California Department of Agriculture and Natural Resources, Berkeley, CA. February. <<http://axp.ipm.ucdavis.edu/PMG/r734300111.html>>.

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