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Cranberry Station Best Management Practices Guide - 2010 revision

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Insect Management

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Insect Management

Minimizing injury to the plants and crop loss by insect pests is one of the greatest challenges in cranberry production. Failure to manage pest insects properly can result in severe crop loss, vine injury, or in extreme cases, the death of large areas of the bog. The most effective insect management strategy uses scouting techniques to monitor insect populations and an integrated approach combining cultural, biological, and chemical control measures that are applied only when the insect population reaches an action threshold. The action threshold is the 'break even' point where injury by a certain pest population is expected to exceed the cost of the management measure (usually a pesticide application). The threshold number varies depending on the potential of a given insect species to cause economic damage.

Recommended Practices

Properly identify the insects on the bog, both the pests and the beneficials.
The success on any management strategy depends on the correct identification of the players on the bog. There are many insect pests and, for any given species, management approaches may be very specific. Further, there are many species of insects that regularly appear on beds, but that have no pest status. Plus, there are many beneficial insects that prey on or parasitize pest species.

Natural populations of beneficial organisms can help to control insect pests.
Predators and parasites that coexist in the bog environment play an important role in regulating cranberry pest populations, particularly cranberry fruitworm and Sparganothis fruitworm. This role should be enhanced wherever possible by avoiding unnecessary insecticide treatments and encouraging growth of natural enemy populations through conservation. New compounds such as Intrepid and Avaunt preserve natural enemies. Broad-spectrum 'clean-up' sprays, particularly Lorsban, destroy natural enemies and applications should only be considered when numbers exceed the action threshold. Whenever possible, if there is a management option that will preserve beneficial species, use it.

Use appropriate cultural control methods
Late water floods affect many insects in the year of the flood. Emergence of insects is delayed and often synchronous (all individuals hatching over a short period of time rather than spread out over several weeks). Late water can be used to manage the following pests: cutworms, gypsy moth, cranberry fruitworm, and Southern red mite (SRM). Late water is especially effective against SRM; control often lasts for more than one season. It is best to limit the use of late water to every third year. For specific information regarding late water and management of insects and mites, see the Cranberry Chart Book (http://scholarworks.umass.edu/cranchart/).

Summer floods (May 12 to July 20) can be used to manage cranberry root grubs and other white grub species. The drawback to the summer flood is that the crop for that season will be lost, and there may be lowered yield the following year as well. The advantage is that a single season crop loss is less costly than renovation. Additional benefits of the summer flood include control of all insects and reduction of dewberry (bramble) populations.

Detrashing floods and sanding are important in the management of **cranberry girdler**. The girdler insect larvae live in the trash (leaf litter) layer on the floor of the bog. Regular removal of this layer by using detrashing floods and at harvest can aid in the management of this

insect. Sanding on a regular basis also suppresses cranberry girdler by burying the trash layer and insect pupae. Sanding has horticultural and disease suppression benefits as well. For further information see the Sanding BMP.

Adequate nutrition, irrigation, and care with herbicides on beds impacted by soil insect injury may be important to avoid further levels of stress on the vines.

Short floods may be used for effective insect control. **Cranberry girdler** can be controlled by flood of 6 days duration applied between September 20 and 30, beginning no later than September 25. A flood of 12-14 days duration applied immediately post-harvest controls **black vine weevil** and **strawberry root weevil**. A flood on or about May 18 for a duration of 10 hours controls **false armyworm and blossomworm.** A flood of 10 hour duration applied between June 1 and June 12 controls several insects, but crop reduction and impact on fruit quality should be expected if this flood is used.

When planting or renovating bogs, for each chemigation system, interplant only those varieties that bloom at the same time.

Timing of cranberry fruitworm management is based on the percent out-of-bloom of the cranberry plants and relies on determination of when the first berries begin to size up. To get the most effective levels of control, all of the plants being treated should be at the same growth stage. Avoid planting early and late varieties under the same irrigation system. Having all plants at the same developmental stage within each treatment unit (sprinkler system) will also increase fungicide efficacy.

Only apply insecticides if damaging numbers of insect pests are present.

Insecticide use must be restricted to situations where it is needed to avoid crop or plant loss. Intensive scouting and accurate pest identification should be used to measure insect infestations. Action thresholds (where economic loss due to insects is expected exceeds the cost of managing the pest) are then employed to ensure that only essential applications are made. Current standards allow zero tolerance for cranberry fruitworm larvae in fresh fruit. Standards may be slightly higher for processed fruit.

An effective scouting program for insect management should include: **sweep netting** the bog on a weekly basis to monitor populations of cutworms, cranberry weevils, gypsy moths, fireworms, spanworms, and SRM; **calculating percent out-of-bloom**; **inspecting cranberry fruit** for cranberry fruitworm eggs; **trapping and counting** *Sparganothis* fruitworm, cranberry girdler, and black-headed fireworm moth populations with pheromone traps.

The information gathered by sweep netting and counting eggs is used to make decisions regarding the need to apply pest management measures. Percent out-of-bloom and trap information are used to time management sprays. For threshold and timing information refer to the Cranberry Chart Book.

Consider spot-treating when insect pests are confined to small areas of the bog.

Many insect populations are distributed unevenly on the bogs. This is especially true of cranberry weevil, spanworm, and gypsy moth. Weevils fly in from surrounding uplands and gypsy moth larvae blow in from surrounding trees on wind currents. This often leads to a situation where sweep net counts are only high in a confined area of the bog, usually an edge or neck. Treating the population in the infested area may eliminate the need for spraying the whole bog. The earliest infestation of cranberry fruitworm occurs on the bog edges and populations could be limited over time by spot treating these early populations.

Incorporate environmental risk into insecticide selection. Consider the vulnerability of the site and the pesticide toxicity.

When an insecticide application is necessary, product selection should be designed to avoid any potentially adverse environmental effects. Factors such as risk to non-target organisms, toxicity, persistence, and leaching potential should be considered. If the potential for adverse aquatic impact exists (e.g., flow-through or sensitive aquatic sites downstream), use less toxic compounds.

When using insecticides, impound water to protect non-target organisms.

Holding water within the bog and ditch system is extremely important in reducing the potential for adverse aquatic impacts. Regardless of the pesticide, water should be held no less than the required minimum holding times noted on the pesticide label and longer if practical. Check the current Cranberry Chart Book for current holding times.

If chemical pesticides must be used to control insect pests, make every effort to minimize application to non-target areas.

For further information, see the Pesticide Application BMP.

Avoid inducing insecticide resistance in pest populations.

Repeated insecticide applications of the same compound or family of compounds can increase the likelihood of resistance in certain insects, especially to sequential generations in the same year. This may be avoided by integrating biological and cultural controls into management programs and reducing insecticide inputs as much as possible. Alternate materials with different modes of action to minimize resistance. Avoid 'cleanup' and calendar sprays.

Time management strategies properly to target the vulnerable life stage of the insect pest.

Use pheromone traps to time management of black-headed fireworm, cranberry girdler, and Sparganothis fruitworm. Follow the protocol in the Cranberry Chart Book.

Timing of the first fruitworm spray is critical. First fruitworm insecticide applications are timed based on the stage of the cranberry plants. For further information, see Cranberry Chart Book (http://scholarworks.umass.edu/cranchart/).

Do not spray insecticides to target cranberry fruitworm larvae already in the fruit. There is no evidence that such sprays are effective.

Do not spray compounds that are toxic to bees during bloom

If application of an insecticide during bloom is absolutely necessary, apply it by sprinkler after dark. Aerial applications should be delayed as late into bloom as possible and the bee keeper must be advised prior to application. Sevin-XLR+ has been formulated to have minimal toxicity to bees once the spray has dried. However, it is best to avoid all insecticide applications when bees are present.

Use proper techniques to maximize efficacy of nematodes against some soil pest species.

Nematodes may be available for the control of cranberry girdler, black vine weevil, and strawberry root weevil. Timing for the use of nematodes to manage cranberry girdler is based on moth flight data collected via pheromone trapping. For more information on use and timing of nematodes for insect management, see the Cranberry Chart Book.

For more information:

Averill, A. L., M. M. Averill, and C. J. DeMoranville. 1994. Alternative management strategies: impact of late water on cranberry fruitworm and mites. Cranberries Magazine 58(4):4, 23-25.

Averill, A. L. and M. M. Sylvia. 1998. Cranberry Insects of the Northeast. East Wareham, MA: UMass Amherst Cranberry Sta. Ext. Publ. 112 p.

Cranberry chart book-management guide for Massachusetts, UMass Cranberry Station. http://scholarworks.umass.edu/cranchart/.

Franklin, H. J. 1948. Cranberry insects in Massachusetts: part I. Bulletin #445. Massachusetts Agricultural Experiment Station. (Part I covers fireworms, cutworms, spanworms, gypsy moth, cranberry fruitworm, cranberry weevil, cranberry tipworm.)

Franklin, H. J. 1950. Cranberry insects in Massachusetts: part II-VII. Bulletin #445. Massachusetts Agricultural Experiment Station. (Part II covers Southern red mite, blunt-nosed cranberry leafhopper, cranberry flea beetle; Part III covers cranberry girdler; Part IV covers soil insects including grubs.)

Franklin, H. J. 1952. Cranberry insects in Massachusetts: supplement. Bulletin #445. Massachusetts Agricultural Experiment Station. (This volume covers less common pests.)

Integrated Pest Management and Pesticide Application BMPs in this series.

Sandler, H.A. and C.J. DeMoranville. 2008. Cranberry production: a guide for Massachusetts, CP-08. UMass Extension Publ.

Updated by Anne Averill and Marty Sylvia, 2010.

Insect Management Checklist

✓ Consult the most current Cranberry Chart Book for insect management recommendations. http://scholarworks.umass.edu/cranchart/.

✓ Regularly attend educational workshops on insect management.

✓ Use monitoring techniques, such as sweep netting, to estimate insect thresholds.

✓ Use crop phenology to time insect management strategies.

✓ Use reduced-risk insecticides whenever possible.

✓ Practice good plant nutrition to maximize plant health and defense against insect damage.

✓ Use cultural practices, such as flooding, pruning and/or sanding, to manage insect pests.

✓ Routinely maintain and inspect application equipment to ensure proper application of pesticides.