1996

Integrated Pest Management

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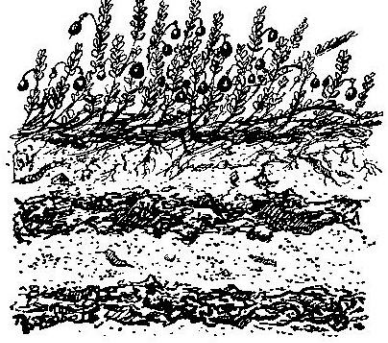

BEST MANAGEMENT PRACTICES GUIDE FOR MASSACHUSETTS CRANBERRY PRODUCTION

Integrated Pest Management

The Concept of Integrated Pest Management

Integrated Pest Management (IPM) is an ecological approach to pest control based upon sound biological knowledge and principles. Integrated pest management has also been defined as the intelligent selection and use of pest control actions that will ensure favorable economic, ecological and sociological consequences. Cranberry IPM integrates biological, cultural, and chemical control practices to manage pest problems. An integrated approach to pest management is based upon dynamic principles rather than a definitive set of rules for control of a particular pest situation.

IPM combines specific cultural, chemical, and horticultural needs of a particular crop to develop a broad-based approach to controlling the most economically threatening pests. Cultural practices, such as late water floods, sanding, and the use of more resistant varieties, can greatly influence the severity of a pest problem. Pesticides are used in IPM programs, tempered by their compatibility with other control measures and their consistency with IPM philosophy. Though most programs experience a decrease in spray applications, participation in IPM does not inherently result in less pesticide use. Pesticide recommendations are based upon monitoring techniques which more accurately estimate current pest pressures, and in some cases, dictate an above average number of applications.

Integrated Pest Management (IPM) is difficult to define, not because it is so complex or abstract, but because it is an **approach** to pest control. It is a strategy rather than a specific and exact methodology. Its strength is in its adaptability in one form or another to all pest problems. IPM is the balanced use of cultural, biological and chemical measures appropriate to an individual situation.

"... IPM systems must be dynamic rather than static. There should be continuous monitoring and modifications as needed. In developing IPM systems, generally there is a continuance of activities and efforts from basic through applied research to field development and finally implementation by farmers or other users. This process is affected by many constraints which limit the development and implementation of IPM." (see 'Food, crop pests, and the environment' reference).

The Process of IPM

IPM is a process that relies heavily on judgment, adaptability, and the necessity to incorporate change. The process can be broken down into several basic components: education, monitoring, and decision-making. The first step is to become educated about the concepts of IPM. Education also includes mastering the techniques for monitoring pests, knowing what management options are available, and understanding what makes one site different from another. This can be achieved via workshop attendance, books, newsletters, etc. Once there is an understanding of IPM, the concepts can then be put into practice. Practicing IPM involves collecting information (monitoring) and making site-specific management choices (decision-making).

Overall vigor and nutrient status of cranberry vines play an critical role in the ability of the plant to defend itself against pests. Thus, nutrient management is included as an important component in cranberry IPM along with the traditional spheres of insect, disease, and weed management.

Recommended Practices

Education

Educating yourself about IPM techniques and philosophy can be done in a variety of ways. Utilize as many available resources as possible to keep your working knowledge of IPM up-to-date.

- **Newsletters.**

  Subscribe to University of Massachusetts extension newsletters and other industry newsletters as appropriate.

- **Workshops.**

  Attend at least one workshop on cranberry production, environmental concerns, IPM practices, etc., offered by the University of Massachusetts Cranberry Experiment Station, Cape Cod Cranberry Growers' Association, or handler-affiliated companies each year.

- **Cranberry Chart Book - Management Guide for Massachusetts.**

  Refer to the Cranberry Chart Book during the growing season for details on management options.

- **Insect Identification Chart / Symptoms Key / Weed Guide / IPM Notebook.**

  Use guides available through UMass Extension and industry resources. Refer to identification and production guides available from other growing areas as applicable.

Monitoring / Collection of information

The monitoring activities presented in the next column cover a wide range of opportunities for information collection. Growers are encouraged to include as many of these activities in their yearly production schedule as dictated by pest pressures and/or vine status.

Scouting Activity	Records kept
Sweep netting for: cutworms, cranberry, weevils, gypsy moth, fireworms, spanworms, and southern red mite	Sweep counts; location(s) of mite infestation(s).
Pheromone traps for: *Sparganothis* fruitworm, cranberry girdler, and black-headed fireworm	Moth counts.
Cranberry fruitworm egg monitoring	Egg counts.
Weed mapping	Yearly maps/notes.
Crop phenology Cranberry fruitworm	% out-of-bloom counts.
Fruit rot management	% bloom estimates.
Fertilizer applications	Length of growth / bloom timing.
Tissue & soil tests	Analysis results.
Other helpful records Action records (include pesticides and cultural practices)	When/how/what used for pest control.
Fertilizer records	Symptoms and response; upright length, density, color, yield, dates of application, rates used, etc.

Decision-making and
Pest Management Strategies

- **Interpretation of scouting / monitoring information.**

  Use action thresholds when available for scouted pests.

  Do not apply control measures until threshold is reached.

  Understand how to use pheromone trap data to time insecticide sprays.

  Plan cranberry fruitworm control strategies/ applications based upon fruit monitoring.

  Use crop phenology to time fruit rot, nutrient, and cranberry fruitworm management.

  Use tissue and soil tests to help plan fertilizer and soil amendment program.

- **Possible / available actions.**

  The following boxes contain possible actions for specific pest/production situations. Individual activities may be more appropriate for some bogs and not for others, depending on the pest pressures and vine status. Development of an effective IPM program relies heavily upon selection of the most appropriate activities for each individual situation. Growers should select non-pesticide or reduced pesticide options when appropriate. Growers should also use the appropriate BMPs and the Cranberry Chart Book as reference sources throughout the growing season.

Weed management options	**Targeted weeds**
Preemergence herbicides	Many weed species (see Cranberry Chart Book).
Hand weeding	Weeds on new and established bogs.
Glyphosate wiping (standard wiping)	Most broad-leaved weeds.
Intensive hand wiping	Dewberries, sawbriers, wild bean.
Other postemergence herbicides	Grasses (see Cranberry Chart Book).
Late water	May reduce dewberry populations.
Postharvest trash flood	Removes dodder seed.
Summer flood	May reduce dewberries (brambles).
Vigorous vine growth	Reduces weeds through competition.
Cleaning harvest equipment	Reduces spread of weed seeds.
Raking	Reduces dodder seed production.
Renovation/scraping/ fumigation	Impacts established perennial weeds.

Insect / mite management options	**Targeted insect / mite pests**	**Options**	**Target pests**
Synthetic insecticides and miticides	Many cranberry pests (see Cranberry Chart Book).	Beneficial nematodes	Cranberry girdler, black vine/strawberry root weevil.
B.t. products	Small lepidopteran larvae.	Fall (September) flood	Cranberry girdler, black vine/strawberry root weevil.
B.t. & low rates of synthetic pesticides	Larger lepidopteran larvae.	Sanding	Cranberry girdler.
Late water	Mites, cutworms, cranberry fruitworm.	Other floods	Grubs, black-headed fireworm.

Disease management options	Targeted disease complexes
Synthetic fungicides	Many cranberry diseases (see Cranberry Chart Book).
Late water	Fruit rot organisms.
Remove attached fruit from edges	Fruit rot organisms.
Drainage improvement	*Phytophthora* spp.
Bog history/keeping quality forecast	Fruit rot organisms.
Timing of irrigation	Fruit rot organisms.
Postharvest trash flood	Fruit rot organisms.
Pruning	Fruit rot organisms.
Sanding	*Phytophthora* spp.
Tolerant / resistant varieties	Fruit rot organisms, *Phytophthora* spp.

Nutrient management	Impacts
Fish, other organics; Slow release fertilizer; Split applications	Reduces leaching loss.
Use ammonium forms over nitrate forms; Minimize off-target application	Protects groundwater.
Granular (inorganic) NPK formulations	Quick response.
Urea	Promotes runner growth on new bogs, quickly corrects N deficiencies.
Calcium-Boron supplements	May improve fruit set on some bogs.
P, K, Ca, or Mg supplements	Corrects nutritional deficiencies.
Soil conditioners (i.e., 0-0-22-11)	Ameliorates vine stress/winter injury.

- **Other important management practices.**

Flumes should be checked for water leakage on a regular basis.

Tailwater recovery systems should be implemented when possible.

High-efficiency nozzles, screens, or half-heads should be used in sensitive areas.

Annual calibration of irrigation system and other application equipment is recommended.

Adhere to chemigation/aerial/ground application guidelines.

Make appropriate modifications to irrigation system to maximize uniformity.

For further information:

Clark, W.F. and H.A. Sandler, (eds.), 1993. **Massachusetts cranberry production - an information guide.** University of Massachusetts Cooperative Extension Publication.

Cranberry chart book - management guide for Massachusetts, University of Massachusetts Cranberry Experiment Station.

Cranberry grower's environmental notebook, Ocean Spray Cranberries, Inc.

Cranberry IPM notebook, University of Massachusetts Cranberry Experiment Station.

Disease Management, Insect Management, Nutrient Management, Pesticide Application, and Weed Management BMPs in this series.

Glass, E.H. 1991. **Food, crop pests, and the environment: the need and potential for biologically intensive integrated pest management.** Cornell University Press.

Prepared by Carolyn DeMoranville (Project Leader), Hilary Sandler, and Tom Bicki. Production of this Management Guide was supported by Massachusetts Department of Food and Agriculture as part of the Agroenvironmental Technology Grants Program. Matching funds were provided by University of Massachusetts Extension (USDA cooperating), Cape Cod Cranberry Growers' Association, and Ocean Spray Cranberries, Inc. UMass Extension provides equal opportunity in programs and employment. Artwork by Meredith Albright, freelance scientific illustrator, Bellingham, MA. 1996