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Considerations for Purchasing and Releasing Biological Control Products

Bastiaan M. Dress and Allen Knutson
Texas A&M University

Purchasing and releasing natural enemies for control of insect and mite pests is an attractive alternative to the potential hazards associated with chemical insecticides (i.e., toxic effects on nontarget organisms, development of pesticide resistance, and persistence in the environment). Furthermore, releasing natural enemies, such as lady beetles, is educational and fun for children and adults alike. However, consumers are sometimes disappointed with the level of pest control achieved by releasing natural enemies. Successful use of natural enemies requires the use of appropriate species under proper conditions. A better understanding of this method of biological control can help improve your chances of success.

Appearing Within . . .

What type of biological control is augmentation?
The release of natural enemies (predators, parasites, and pathogens) to control pests is a type of biological control called *augmentation*. This approach uses commercially-available species that are applied in a timely manner to prevent population increases, or to suppress a pest population. Other types of biological control include *importation* (use of exotic natural enemies for pest control) and *conservation* (use of selected control tactics that spare natural enemies and cultural practices that modify the environment to favor natural enemies).

What are augmentative biological control products?
Commercial products available for use in augmentative biological control include microbial insecticides containing living pathogens (bacteria, fungi, and viruses) and multicellular animals (nematodes, parasites, and predators). Other products occasionally used with biological control agents include synthetic honeydew, flowers to attract and conserve beneficial insects in and around pest-prone or pest-infested sites, and traps using colors or scents as attractants.

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How can I best use these products?

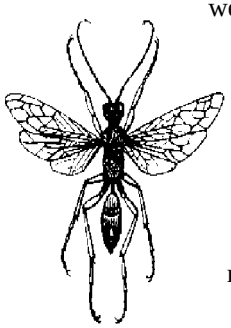
Purchasing and releasing natural enemies for pest suppression is a rapidly developing technology, but much is still to be learned to assure effective use of these products. Results are often difficult to evaluate and can be inconsistent because of differing conditions (e.g., environmental, meteorological, etc.). Natural enemies are living, and their behavior under varying environmental conditions can influence the degree of pest control. Cost-effective use of augmentative releases requires an understanding of the pest(s), natural enemies, economic goals, and the environment. Commercial uses often demand intensive monitoring or scouting of the cropping system.

- Augmentative releases are meant to reduce populations at points in time. Releases at low pest-densities are more effective than attempts to reduce high pest-densities. Action levels or economic thresholds for release of natural enemies and effective release rate(s) have often not been established through scientific research.

- Timing of the release of natural enemies is critical since most require some time to affect the pest population. In addition, many natural enemies attack only certain life stages (e.g., egg or larval stage) of the pest. Multiple releases may also be necessary to maintain pest suppression.

- Biological control using parasites is generally pest-specific. When multiple pests occur (e.g., aphids, thrips plus beetles), natural enemies are needed for each pest. In cases where natural enemies are unavailable for augmentation, use of a selected pesticide that spares other natural enemies may be necessary.

- Environmental conditions change dramatically, and outdoor releases of natural enemies can be negatively affected by high winds, rain, hot or cold weather, and other insects in the ecosystem (e.g., imported red fire ants). These factors are often unpredictable and result in erratic results from releases. Release of appropriate natural enemies in greenhouses and interiorscapes often provides more consistent results.



- Insecticide residues on the crop or site, or insecticide drift from adjacent areas, can remain toxic to natural enemies long after the pesticide was applied. Residues should be mitigated prior to releases.

What support can I expect from the companies selling these products?

Companies selling products and promoting their use should provide the consumer with directions on how to use their products, and support their claims of product performance. Insectaries and brokers, the companies producing and marketing parasites and predators, assure the delivery of viable natural enemies of the stated species or strain. They usually do not guarantee results from releases of these biological control agents, even when used as directed. Although researchers and Extension faculty in The Texas A&M University System are involved in evaluating some of these products, suggestions for their most effective use are still being developed.

From an article appearing in ***Entomology Notes: Management of Insects and Related Pests****, TAEX. Vol. 26, No. 6*

Broccoli Goes Iceless

This article by Chuck Harvey, Staff Writer, appeared in ***The Packer,*** *January 15, 1996*

Scottsdale, Arizona. Martori Farms officials say the company's new cooling and packaging system will take broccoli out of the ice age. The grower-shipper has developed a new iceless distribution and handling system for bunched and crown broccoli; the product is cooled with a high-humidity forced-air system and then shrink-wrapped in a special film before shipment. Steve Martori, co-owner of Martori Farms, says the film-wrapped broccoli arrives at the supermarket in better shape and with less shrink. Consumer grading, broken stalks, floret shedding, and unsightly displays are reduced or eliminated by the new package, he said. Also, unprotected broccoli bunches can be pulled apart or damaged by consumers, said Paul Fleming, head of Martori Farms' value-added section. But consumers rarely tear shrink-wrapped bunches, he said.

Martori said the new system eliminates the need for ice; it's just one process in a system to keep broccoli cool and moist as if it were chilled by ice. But Martori Farms believes the system does a better job than ice in keeping broccoli fresh. Because moisture is maintained, fewer nutrients are lost to evaporation, Martori said. Martori Farms, which has been using the process for six months, cools its freshly picked broccoli to between 34 degrees and 36 degrees. Once in transport and in the market, it should be kept below 40 degrees, Martori said.

The "no-ice" patented system -- developed by Pressure Cool of Indio, California -- requires a well-vented but sturdy cardboard carton. The broccoli is shrink-wrapped in film produced by Cryovac, Duncan, South Carolina. Cryovac has been producing produce wraps for years, but the film used for shrink wrapping at Martori Farms is considered unique. It is specially formulated for the iceless broccoli system. The film is tightly wrapped around each bunch of broccoli. It is not a vacuum-wrap process. Wrapping is currently done by hand, but it could be done by machine, Martori said.

"We have received a lot of comments from consumers," Martori said. "They said the broccoli taste is better than it used to be."

Dr. Ben Villalon Retiring After 29 Years

Dr. Benigno Villalon, of the Texas A&M Center in Weslaco, retired as of January 31, 1996, after 29 years of service to the agricultural vegetable industry and the people of Texas. Villalon is known worldwide as Dr. Pepper and has been instrumental in the development of disease-resistant pepper varieties. Villalon helped revolutionize the Salsa industry with the introduction of the TAM Mild Jalapeno-1 which allowed salsa processors to produce a very consistent product with regard to pungency (heat).

Trained as both a plant breeder and a virologist, Dr. Villalon has worked tirelessly through classical field-breeding techniques to improve the pepper's resistance to viral and fungal diseases and insects.

His work has resulted in the release of numerous pepper varieties, including jalapeno, bell, serrano, chile, and yellow-wax types. As a breeder, he strived to develop peppers that are capable of producing a commercial crop with little or no use of pesticides, no small feat given the pest pressure that vegetable crops face within the state.

Dr. Villalon is being retained by Texas A&M on a part-time basis to complete several new pepper varieties which he hopes to have ready for release in the near future.

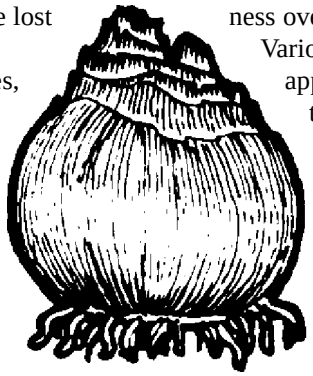
Excerpt from an article appearing in ***TAEX Valley Vegetable Notes****, Vol. 4, No. 2, February 21, 1996*

Short-day Onion Cold Hardiness

This article by D. F. Warnock and W. M. Randle, University of Georgia, and O. M. Lindstrom, Jr., University of Georgia Griffin Experiment Station, appeared in ***HortScience*** *28 (11):1092-1094. 1993*

Photoperiod, temperature, and plant age interact to affect short-day onion cold hardiness.

Commercial short-day onion cultivars normally are seeded or transplanted in the fall, overwintered, and harvested in the spring. Onions are lost often to cold stress when overwintered. Thus, in some areas of the United States, transplants are used in late winter or early spring. Winter temperatures can fluctuate and cause onion losses exceeding 50 percent. In Georgia, fall transplanting of onion seedlings into the field is preferred over direct seeding, since older plants are more cold hardy than younger ones. Transplanting, however, does not eliminate freeze damage to seedlings during extreme winter weather.



Benefits of increased short-day onion cold tolerance include greater winter survival, the ability to direct seed, reduced production costs, and improved crop quality. Because little is known about how the environment interacts with short-day onions to influence plant cold hardiness, scientists at the University of Georgia investigated the effects of various acclimation regimes and plant age.

Following acclimation at various photoperiod-temperature regimes, different-aged plants were frozen to various subzero temperatures in an ethylene glycol bath and evaluated for cold hardiness. Older plants were more cold hardy than younger plants. An 11-hour photoperiod-decreasing temperature (20/15 to 10/5 C day/night) treatment improved plant cold hardiness over other photoperiod-temperature regimes. Various photoperiods (8-, 11-, 14-, and 24-hours) applied during a 14-day, 3 C acclimation treatment before freezing had little effect on plant cold hardiness. However, day 7 foliar and day 14 root evaluations indicated that 81-day-old plants given an 8- or 11-hours photoperiod during the 3 C acclimation treatment were less cold hardy than older plants (91 or 112 days), given the same acclimation photoperiod.

Onion cold hardiness was affected by environmental and physiological factors. The 11-h photoperiod-decreasing temperature (20/15 to 10/5 C day/night) treatment provided greater cold hardiness than other PT treatments. Photoperiod length during 14 days of 3 C acclimation had little effect on the cold hardiness of roots once frozen. However, photoperiod duration during the 3 C acclimation affected foliar cold hardiness. Older plants were more cold hardy regardless of acclimation regime. Greater plant age (size) sometimes appeared to substitute for exposure to 3 C in providing increased seedling cold hardiness.

Frank J. Dainello
Extension Horticulturist
Commercial Vegetable Crops
The Texas A&M University System
College Station, TX 77843-2134

Charles R. Hall
Extension Economist-Horticultural Marketing
Department of Agricultural Economics
The Texas A&M University System
College Station, TX 77843-2124