

Development draft of BMP. Upon completion of the revised BMP outline, a FORA committee began writing each of the proposed chapters. Additional regional public workshops served as an avenue for seeking industry participation for the writing of the BMP manual. Others recommendations were received via mail. Following receipt of comments, a 3-day work session was held to coordinate the writing of all chapters of the manual. To assist in this process, a technical writer-editor was obtained to review and revise the entire document. The draft BMP manual was disseminated to 450 individuals and a second series of workshops were held in West Palm and Gainesville providing an opportunity for additional input. Following a series of technical reviews, the Florida's BMP will be submitted to FDEP for finalization in Dec. 1995.

Conclusion

Recent state legislation encouraging resource recovery and recycling provided incentive for communities to recycle yard trash into mulch, compost or fuel production. Deregulation of the yard trash recycling industry now calls on the in-

dustry to make sound operational decision with emphasis on environmental and quality assurance measures. The basis of sound management decisions depends on understanding the principles of best management practices. Now that BMP recommendations are being established for the yard trash recycling industry, this information must be disseminated to the industry to create an awareness and understanding of the procedures and parameters for creating a safe usable product while protecting public health, safety and the environment. Consistent BMP for the yard trash recycling industry are vital if a quality, environmentally safe product is to be processed, marketed and utilized throughout Florida.

Literature Cited

- Composting Council. 1993. Composting facility growth. Alexandria, VA.
Fla. Dept. Environ. Prot. 1995. Solid waste management in Florida. Tallahassee, FL.
Kashmanian, R. 1993. Predicting the tonnage of yard on trimmings to be composted in 1996. Biocycle: J. Composting and Recycling. 9:51-53.
Pinellas County Dept. Solid Waste. 1994. Solid waste recycling annual report. Clearwater, FL.

Proc. Fla. State Hort. Soc. 108:38-40. 1995.

THE ROLE OF THE PROFESSIONAL SCOUT IN ORNAMENTAL IPM

S. A. SHIVES

*University of Florida, IFAS
1303 17th Street West
Palmetto, Florida 34221*

G. J. CASHION

*Manatee County Cooperative Extension Service
University of Florida, IFAS
1303 17th Street West
Palmetto, Florida 34221*

Additional index words. Pest control, monitor, ornamentals.

Abstract. IPM scouting of ornamentals is relatively new in Florida. An IPM scout can be beneficial to the grower because the grower may be able to reduce the use of pesticides while producing a healthy crop. In addition, regular monitoring of the crop will allow problems to be discovered and addressed before they become insurmountable. A successful IPM program in an ornamental nursery requires teamwork between the scout and the grower/nursery owner. Pest control decisions should be based on the scouting report and should be carried out in an efficient manner that is compatible with the IPM plan. We will discuss why regular scouting is an essential component of a successful ornamental IPM program.

The nursery IPM trials in Manatee County are being conducted in an effort to demonstrate the successful use of IPM techniques in ornamental nurseries. A major emphasis in these pilot programs is the illustration of the professional scout's function and importance. Regular monitoring or scouting is the basis of an effective integrated program for

pest management. It is one of the most critical components in an information intensive approach that uses every available technique to control pest populations (Cashion, 1994).

There are five main objectives in a nursery scouting program. The first is to reduce pesticide load through wise application decisions based on crop consideration and pest life cycles rather than on a rigid, calendar-based schedule. The second important objective is to increase control of pests and to manage resistance of pests to chemicals. The third is to maintain a high level of quality in the crop plants so that economic losses to the grower are avoided or minimized. Better management of pesticides through improved selection and evaluation of application techniques is the fourth objective of an ornamental scouting program. The fifth objective is to permit the use of alternative controls such as beneficial insects or entomopathogenic fungi (Cashion and Osborne, 1993).

The method used by a professional scout is a straightforward one, in which the scout monitors the crop by examining a representative sample of the plants. First the area to be scouted is mapped and, if large, divided into sections. When the map is complete, a decision should be made as to how many plants will be sampled. Accuracy increases with sample size, as do scouting costs; therefore it is important to maintain a cost effective sample volume. The completed map and corresponding sections of the nursery are marked and any special treatments are noted on the map.

There are many different sampling techniques which can vary with the individual scout and the crop. Our preferred method is usually to examine five leaves on 20 plants in each section to total 100 leaves. Then the percentage of leaves infested with a pest is easily determined, and this percentage is considered to be representative for the entire section. For ex-

ample, if five plants in a section are each found to have one leaf infested, then we consider the infestation to be at five percent. This method may be less accurate than actual arthropod counts, but we have found that it is easily adopted and used by commercial growers.

When the scout monitors the crop, he looks at plants that are at high risk of being infested: along walkways, by doors, along outside rows and in areas where infestations have been previously found. The rest of the section is covered in a zig zag random pattern. As the scout moves between the plants to be examined, he looks for obvious signs of infestation such as stressed plants, feeding scars, cast skins, and easily observed arthropods. When he selects a plant to examine, he looks for these obvious indicators of infestation. Then using a hand lens, he examines the leaves, since many pests can be found on the foliage, especially on the underside of the leaves. The part of the plant the scout examines is determined by the behavioral characteristics of the pests most common to the plant.

As the scout finds problems, he uses a record sheet to note his findings and he marks any infestations on the map. The form can be adapted to suit the specific scouting situation. Important information includes the date and the starting and completion times so that the grower can keep track of the expense incurred in scouting. The scout should also record the number of plants sampled and the number of pests found, their life stage, and any beneficial insects. Additional comments can be made by the scout on the sheet, such as spray history, release information and other observations of importance to the grower. When this information is all provided to the grower, it supplies the grower with data that can be used to identify problem-prone areas of the nursery where perhaps cultural practices can be altered to improve plant quality. In addition, the grower is provided with a record of pest populations that can be plotted to illustrate long-term trends. Such historical information is a valuable resource in planning for pest management strategies and their costs.

The infested plant is then tagged so that it can be easily located on subsequent scouting events. The date and other information can be put on the tag, allowing the scout to reinspect the plant and use it as an indicator to determine whether the pest population has increased or if control measures have been effective. When the scouting session is finished, the scout shares the information directly with the grower who makes timely decisions for crop treatment based on IPM principles. His choices may include spraying, releasing beneficials, or postponing action until a later date.

The grower needs to be strongly committed to the principles of IPM if his IPM program is to be successful. In our experience many failures of IPM programs have been due to the grower's inattention at critical times. IPM requires constant management and timely decisions because pest complexes and pressures are constantly changing (Cashion, 1994).

There are also certain guidelines the committed grower must follow to insure the success of his IPM program. It is critical that the grower does not move plants from one greenhouse or shadehouse to another indiscriminately or introduce new plants into an area that is in equilibrium regarding pest control. Such random plant movement is a major factor in the failure of IPM nursery trials. With new plants comes the risk of introducing pests into the area.

Another important grower responsibility is the timely implementation of control measures when needed, whether

they consist of releasing beneficial insects or using a chemical control. Between the time the scout discovers a problem and control measures are taken, the pest population can be increasing exponentially. If control measures are not taken quickly enough, the pests can reach a damaging level and more toxic chemicals may have to be used, thereby impacting any beneficial insects that may already be present.

If the grower is using beneficial insects, he needs to provide conditions to favor this investment such as watering before release and using compatible chemicals, if chemicals are used. If possible, the crop should provide continuous cover for the beneficials to move easily from plant to plant.

There are important advantages in maintaining a regular scouting program. Probably the most obvious advantage of scouting is the potential reduction in pesticide use mentioned above. Instead of routinely spraying on a schedule, using a scout at least once a week can enable a grower to make judicious applications based on pest number, developmental stages, damage potential and any existing beneficials (Cashion, 1994). These applications may include spot treatment on localized outbreaks (van de Vrie and Price, 1994). With reduced use of pesticides it may be possible to delay insect resistance to chemicals (Topliff et al, 1993). Furthermore, with fewer spray applications, fewer beneficial insects will be killed by the chemicals and their residue (van de Vrie and Price, 1994).

Another advantage of regular monitoring is that higher quality plants are produced. Routine spraying of chemicals often induces plant stress and can leave aesthetically undesirable residue. With weekly scouting, pests can be discovered in a timely manner and occasional pests can be found early before obvious damage occurs.

The use of a professional scout can provide advantages when compared to the use of an in-house scout. Scouting is the professional scout's only duty and he possesses more training and experience than most in-house scouts. When a grower needs extra help because he faces a deadline, he may often put an in-house scout on that detail. When that happens, the in-house scout may fall behind in his work, lose his place in his scouted block, and control of the pest population could be lost.

Some species of insects appear very similar to the untrained eye. A professional scout can point out the differences between a pest and a non-pest species, keeping the grower from using an unnecessary spray. An example is *Cryptolaemus montrouzieri* Mulsant, the mealybug destroyer, which strongly resembles several *Pseudococcus spp.* that are destructive pests on a wide range of nursery crops. A professional scout can also point out parasitized pests and prevent the grower from spraying in error and killing his allies.

In the short term a professional scout may be more expensive, but long term the costs are often lower due to the decreased need to spray. To illustrate the advantage of using a professional scout, we conducted an 8-month trial in which scouting was a major component in a integrated program of twospotted spider mite (*Tetranychus urticae* Koch) control on Areca palms, *Chrysalidocarpus lutescens* H. Wendl. Through weekly scouting and using beneficials when needed, the grower was able to eliminate spraying for spider mites in an area where he had routinely sprayed every 2 weeks. During the 8-month trial period, only two spray applications were required to control secondary pests. Professional scouting enabled the grower to closely track the condition of his crop so that 14

IPM on Areca Palms 1995

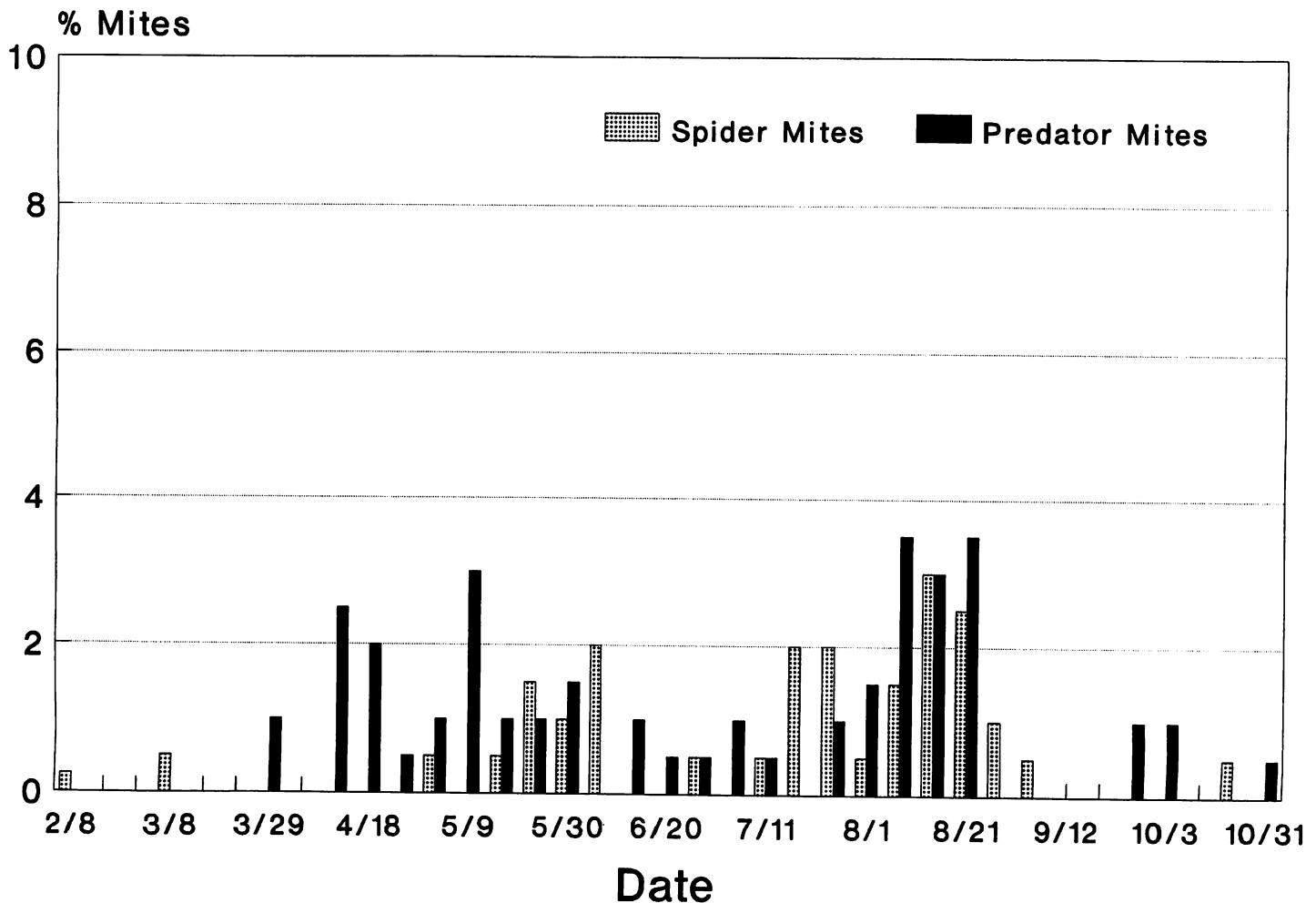


Figure 1. Percent of two-spotted spider mites and predator mites on Areca palms. On each sampling date 200 leaves were examined. Predator mites were released on 3/9, 3/22, 4/12, 5/2, 5/24, 6/6, 6/20, 7/11, 7/25, 8/17, 9/8, and 9/27/95.

spray applications could be eliminated. Figure 1 indicates the levels of spider mites and beneficial mites that were sampled during that trial.

In conclusion, a grower who chooses to use an IPM system must realize that it cannot be managed casually and that a professional scout is a valuable asset, as demonstrated by our pilot programs. We are aware that among our ornamental growers our programs have helped to initiate an attitude change that recognizes the value of the professional scout. With public demands for near perfect plants, the grower is challenged to provide them safely and economically. A professional scout can assist the grower by providing the information needed to help him reach these goals.

Literature Cited

- Cashion, G. J. 1994. The many benefits of scouting. *Ornamental Outlook* May/June 1994:15, 18.
- Cashion, G. J. and L. Osborne. 1993. Scouting for pests in the ornamental nursery. Univ. of Fla., Inst. Food Agr. Sci. Video SV457.
- Topliff, L. A., M. A. Schnelle, K. N. Pinkston, G. W. Cuperus and S. von Broembsen. 1993. Scouting and monitoring for pests in the commercial greenhouse. Ohio State Univ. Ext. Facts Bull. 6711:1-8.
- van de Vrie, M. and J. F. Price. 1994. Manual for biological control of two-spotted spider mites on strawberry in Florida. Univ. Fla. Dover Research Report DOV 1994-1:1-6.