

NURSERY PEST MANAGEMENT
AT THE
VALLUNIA NURSERY

Philip T. Marshall ^{1/}

INTRODUCTION

Integrated pest management (IPM) is the use of any method, technique, and information to maintain pests at levels of damage that are economically acceptable. Detection and various control techniques are the tools used to achieve IPM. These tools are used at the Vallonia Nursery to manage its insect and disease problems. Through IPM, pest problems have been reduced, seedling production increased, and nursery operation costs reduced. To achieve these benefits, the cooperation and work of the nursery manager, the nursery staff, and the forest pest specialist was needed. Without this cooperation, the overall healthy condition of the tree species at the Vallonia Nursery would not have been achieved. To have a healthier condition in any nursery, IPM offers a method to accomplish this goal. And, many nursery managers may be using IPM in their normal nursery management without realizing it.

DETECTION

Surveys to detect pest problems should be the first and regular practice of the nursery pest management program. The nursery manager will have the primary responsibility for detection, but can accomplish greater detection of pests by training nursery workers and by requesting the assistance of forest pest specialists or entomologists and pathologists to make regular surveys.

The Vallonia Nursery has achieved the detection of pest problems through the nursery manager, the nursery staff, and the forest pest specialist who is stationed at Vallonia. This detection effort by the nursery manager and the forest pest specialist has helped to identify and reduce the damage from several pests. Also, this work has gradually made IPM an integral part of the nursery operation.

The detection surveys at Vallonia have identified herbicide damage to seedlings from herbicide pollution of the irrigation water from adjacent lands, bacterial leaf spot, Pseudomonas sp., on yellow poplar, Cylindrocladium root rot, Cylindrocladium sp., on yellow poplar and black walnut,

^{1/} Author: Forest Pest Specialist, Indiana Department of Natural Resources, Division of Forestry, Vallonia, Indiana.

and European corn borer, Ostrinia nubilalis, infesting sycamore, to name a few. By identifying these pests and other pests, preparations can be made to implement management techniques now and in the future.

PEST MANAGEMENT TECHNIQUES (CONTROL)

Detection surveys in past years have recorded many pest problems at Vallonia (nursery pests) and also recorded the location of these problems in the nursery. This basic information has been used to develop management techniques. The techniques employed at Vallonia involve preventative, cultural, and biological, and chemical practices.

Preventative practices should be the first pest management technique used for any pest. However, at Vallonia prevention is only a small part of the pest management program. Quarantine is a tool used in prevention and is implemented at Vallonia by removing dirt from equipment before going from an infected area to a noninfected area. Preventative measures employed at Vallonia are primarily education on various pests and the use of past pest problems to anticipate future problems.

Biological agents, also, are not a major aspect of pest management at Vallonia. However, some use of non-host cover crops has been employed to prevent build up of Cylindrocladium root rot. The primary purpose of cover crops at Vallonia is to improve soil conditions. This cultural practice provides a degree of pest management through changes in soil fertility. Cooperation with the U.S. Forest Service in the national evaluation of the mycorrhizal fungus, Pisolithus tinctorius, will provide pest management benefits from the pathological control that this mycorrhizal fungus provides the root system.

Cultural and chemical practices are the main practices used to achieve pest management at Vallonia. These practices are employed together or separately to control most of the pest problems. An example of chemical and cultural practices at Vallonia is the management of Phytophthora root rot on black walnut and Cylindrocladium root rot on yellow poplar. For both diseases, chemical control using methyl bromide fumigation and seed treatment of black walnut with Captan is the initial step in the management. Past detection and observation have identified areas in the nursery where the diseases are more troublesome. This information is used in the cultural practice of rotation, the second step in the management of Phytophthora and Cylindrocladium. The problem areas are not planted to black walnut and yellow poplar as often as in past practices. For Phytophthora root rot to black walnut, observations revealed that damage increased in the healing-in bed over the winter; however, the seedlings left in the nursery bed over the winter did not have an increase in infection. This observation led to change in nursery practice. Fall-lifting black walnut was limited to a small amount and limited to beds of least infection. Education of graders and root dips in Captan also helped to reduce damage in these fall-lifted trees. From this success

with black walnut seedlings in the nursery beds as is possible and continuing to cooperate with Purdue University, Department of Plant Pathology in the testing of fungicides for root dips.

Sanitation is another cultural practice used. When seedlings are lifted, all seedlings and as much of the root system is removed from the nursery beds. This removes sources of disease inoculum from the nursery beds. Recently, sanitation measures were recognized as a part of the management of Diplodia pinea infection of scotch and red pine seedlings located in nursery beds adjacent to a red pine windbreak. Infection resulted from red pine needles blowing on these beds. Recognizing the disease in the windbreak and realizing infection could spread to the seedlings occurred too late. With this early detection wind-blown needles could have been removed, infected windbreak trees pruned, and fungicides applied to the seedlings at the time infection occurred. Thus, the tools of detection, cultural sanitation, and chemical controls could have been integrated for the management of this disease.

NURSERY PESTS

IPM has helped to manage some of the following pests present at Vallonia before 1979.

<u>HOST</u>	<u>PEST</u>
Black walnut	Phytophthora root rot, <u>Phytophthora</u> sp., Cylindrocladium root rot, <u>Cylindrocladium</u> sp., Anthracnose, <u>Gnomonia leptostyla</u> Walnut caterpillar, <u>Datana integerrima</u>
Yellow poplar	Cylindrocladium root rot, <u>Cylindrocladium</u> sp., Bacterial leaf spot, <u>Pseudomonas</u> sp.,
European black alder	Stem canker, <u>Phoma</u> sp., Leaf spot, unknown
Sycamore	Anthracnose, <u>Gnomonia platani</u> European corn borer, <u>Ostrinia Nubilalis</u>
Ash	Leaf spot, <u>Mycosphaerella effigurata</u>
washington hawthorne	Stem cnaker, unknown
Red pine	Diplodia root collar rot, <u>Diplodia pinea</u>
Scotch pine	Diplodia root collar rot, <u>Diplodia pinea</u> Seedling chlorosis, <u>Pestalotia funera</u> Red-headed pine sawfly, <u>Neodiprion lecontei</u> Powdery mildew, unknown

white oak Powdery mildew, unknown

Following is a list of pest problems present in 1979.

<u>HOST</u>	<u>PEST</u>
Black walnut	Anthraxnose, <u>Gnomonia leptostyla</u> Phytophthora root rot, <u>Phytophthora</u> sp.,
Yellow poplar	Powdery mildew, unknown
European black alder	Leaf spot, unknown
Russian olive	Terminal stem canker, unknown
washington hawthorne	Stem canker, unknown
Red maple	Stem canker, unknown
Redbud	Leaf tier, unknown
Red and white oak	Linden looper, <u>Erannis tiliaria</u> Unknown looper
white oak	Powdery mildew, unknown
Scotch pine	Diplodia root collar rot, <u>Diplodia pinea</u>
Red pine	Diplodia root collar rot, <u>Diplodia pinea</u>

SUMMARY

IPM at the Vallonia Nursery has developed into a part of the total nursery management. This development has gone unrecognized because the tools and techniques of IPM have been incorporated as practical measures to control the pest problems. Other nursery managers may also have IPM as an unrecognized part of their total management program. To achieve the desired level of control. IPM will continue at Vallonia, but like other nurseries, the continuous efforts of the manager, his staff, and pest specialist will be needed to make the program successful.

LITERATURE CITED

Cordell, C.E., 1979. Pest management (control) practices. Unpublished paper. 4p.