

Fumigation Practices in Oregon Ornamental Plant Nurseries

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Fumigation is a pest management component of nursery crop production. The upcoming phase out of methyl bromide will impact the industry. Methyl bromide is used for field soil preparation, potting media treatment, container sanitation, and treating living plants. For the most part, alternative materials and/or practices are available to nursery managers. The following information presented in this paper was compiled from informal interviews with many of the ornamental plant nurseries in western Oregon in the spring of 1996.

FIELD SOIL PREPARATION

Fumigation is not a routine practice for nursery crop production, but instead, is used for very specific purposes. Weeds and nematodes are the primary pest targets when field soil is fumigated with methyl bromide. Chloropicrin is usually combined with methyl bromide to help reduce plant pathogens such as *Phytophthora* and *Verticillium*. Soils used for the Oregon Department of Agriculture Virus Certification Program are fumigated with methyl bromide to reduce nematode populations that vector certain virus pathogens. Fumigants are also used when preparing propagation beds for seeds, cuttings, and transplants. Methyl bromide is often avoided when planting deciduous broadleaf trees, especially *Acer*, due to the poor growth thought to be associated with the loss of beneficial mycorrhizia.

There are other preplant fumigation materials used by nurseries instead of methyl bromide. For general pest management, dazomet (Basamid) and metham-sodium (Vapam) are commonly used in propagation greenhouses and field seedbeds. Nematodes and soil insect infestations are treated with 1,3-dichloropropene (Telone II). Chloropicrin is a general fumigant that also has good activity against soil pathogens. Nursery managers will also alter their pest management strategies instead of using preplant fumigation. In addition to using post-plant pesticides, crop rotation and resistant varieties can play an important role in reducing plant losses. Current research with soil solarization and biocontrol show some promise as alternative practices.

POTTING MEDIA

The potting media used for container-grown plants must be free of plant pathogens and weeds. Most potting media consists of organic matter that can support propagules of *Phytophthora*, *Pythium*, *Rhizoctonia*, and *Fusarium* and seeds or rhizomes of numerous weeds. Recycled plant material incorporated into the potting media is often contaminated and must be treated. Occasionally, plant pathogens have been discovered in peat moss, while other raw materials like Douglas-fir bark are relatively free of pests. Although few nurseries fumigate their potting media, methyl bromide is the common material selected. It is an effective treatment that is economical and easy to use.

Two other materials, Vapam and Basamid, are also used to fumigate potting media. One

specific use of Vapam, is to apply it through the mist/irrigation booms, in propagation greenhouses to fumigate the rooting media. Steam pasteurization of potting media is not as popular as it was twenty years ago. One of the contributing factors to this has been the change in heating systems. Steam boiler systems have been replaced with heated air, or circulated hot water. Composting of potting media is another alternative to fumigation but must be done correctly. Nurseries that explored this option have found that equipment costs and the space (land) needed for composting are prohibitive. One of the best practices is to only use raw materials that are free of pests and to keep the potting media clean. It should be stored on concrete under a tarp or cover.

CONTAINER SANITATION

Many types of plant containers are reused in nurseries. They range from small pots for liners to large containers for caliper size trees, and flats used for propagation. Container sanitation regarding plant pathogens has always been a concern of nurserymen and several reported cases of plant disease have been related to infested containers. New containers are preferred, but are not always used due to economical or resource conservation reasons. Methyl bromide is only occasionally used to fumigate containers. Since most nurseries do not have a fumigation chamber, to use methyl bromide, containers are stacked in a pile and covered with a tarp. Worker safety issues arise because the fumigation tarp can easily be torn by the sharp edges of plastic containers.

Most of the containers that are used more than once are propagation flats and small pots for liners (less than 4 in.). These types of containers can be rinsed with high pressure water to remove most of the adhering media. At some of the nurseries, containers are stored in direct sunlight for the summer. This form of solarization appears to work quite satisfactory for most pests. For the more difficult pathogens, such as *Cylindrocladium*, the containers should be disinfected. Chlorine and Phisan are the most popular disinfectants used by woody plant nurseries.

LIVING PLANTS

To ship certain plants into specific markets, plant fumigation with methyl bromide is required. For the most part, this is done in off-site fumigation chambers. Although there is some risk for plant damage, there are no alternatives for shipment into these markets and the loss of methyl bromide for this type of use creates concern. If changes in quarantine requirements cannot be made, nurseries would have to find new markets for their plants, or stop growing those plants.

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