

Comments

Tree Planters' Notes

is published quarterly by State and Private Forestry, Forest Service, U.S. Department of Agriculture, Washington, DC 20250. The Secretary of Agriculture has determined that the publication of this periodical is necessary in the transaction of public business required by law of this Department.

Editor-in-chief: Rebecca Nislev (Hamden, CT)

Assistant editors: James Barnett (Pineville, LA) and Thomas Landis (Portland, OR).

Associate editors: John Brissette (Orono, ME), Karen Burr (Coeur d'Alene, ID), Kasten Dumroese

(Moscow, ID), Steven Grossnickle (Vancouver, BC), Robert Karrfalt (Dry Branch, GA), Clark Lantz (Atlanta, GA), Laurie Lippitt (Davis, CA), Robert Mangold (Washington, DC), Vincente Arriaga Martinez (Mexico City, DR John Mexal (Las Cruces, NM), Ronald Overton (St. Paul, :VIN), Robin Rose (Corvallis, OR), William Schroeder (Indian Head, SK), Invin Smith (Thunder Bay, ON), David South (Auburn, AL), Richard Tinus (Flagstaff, AZ), and Denise Tousignant (St.-Modeste, QC).

Articles in all sections except the "Practical Tips" and "Little-Known Classics" are peerreviewed by two outside, anonymous referees. Articles in the "Practical Tips" section are reviewed by a technology transfer specialist and a scientist on the advisory board. "Little-Known Classics" are chosen by the editorial board from regional and state newsletters and publications already in print.

Cover: Loading Mexican pine seedlings for transportation to the outplanting site (photograph courtesy of John Mexal, New Mexico State University Las Cruces, NM).


Methyl Bromide in Forest Tree Nurseries: Imperative or Opiate?

For decades, the forest tree nursery industry has enjoyed the benefits of seedbed soil treatment with the biocidal soil fumigant methyl bromide. Use of methyl bromide has reduced the threat and actuality of negative impacts of soilborne plant pathogens, insects, and weeds, making successful crop production a relatively sure and worry-free process.

It might serve us well to remember, however, that not all has been well. Fumigation "failures" have occasionally resulted in boomerang or kick-back disease scenarios caused by fumigation-resistant pathogens operating with increased efficiency in post-fumigation, competition-free soil. Fumigation "successes" have sometimes created mycorrhizal deficiencies with concomitant and costly crop failures. In recent years, awareness of and concern regarding health risks associated with exposure to methyl bromide have been on the rise, and related worker protection and safety standards have added both complexity and costs to methyl bromide application. The handling/disposal of plastic tarping materials required for methyl bromide use is increasingly problematic, especially in areas where landfill operation policies refuse acceptance of such materials. And to this is now added concern over the ozone depletion potential of methyl bromide and its relationship to the earth's apparently fragile and diminishing stratospheric ozone layer. These and related political, administrative, and economic issues are forcing forest nursery managers, among a host of others, to examine and evaluate alternative strategies for the successful conduct of their business.

With these realities in mind, it is most appropriate to critically examine what I am at times inclined to *believe is* our psychological addiction to an *expensive, dangerous, and habit-forming drug*. I have practiced forest pathology in the southern United States for nearly 20 years. During that time, I have personally observed and worked with a variety of "forest nursery diseases" occurring under operational conditions. These diseases have included root rots *caused by Fusarium spp., Pythium spp., Phytophthora spp., and Macrophomina phaseolina*. In every case, disease occurrence and associated losses occurred in methyl bromide-fumigated seedbeds and in areas of same which were predictably disease prone due to either poor soil drainage and/or "management error". I have worked with diseases *caused by the "soilborne" pathogens Cyldrocladium scoparium and Rhizoctonia or Rhizoctonia-like spp., all of which were clearly related to disease-promoting cultural practices (habits?) and none of which was successfully controlled by soil "sterilization."* I have also observed poor crop performance-indeed crop failure-due to methyl bromide-incurred mycorrhizal deficiencies. Why do we fumigate?

In 1986, I suggested to the Southern Forest Nursery Association meeting in Pensacola, Florida, that pest management in forest tree nurseries often consists of detection, identification, and reaction *ex post facto* (that is, "crisis management") and that our reactions are often based more on fear of the unknown than on documented biological or economic realities. Is this



integrated pest management (IPM)? I further suggested that some "preventive" controls (for example, soil fumigation) are applied cost ineffectively in anticipation— or fear?— of pest problems that in actuality may never materialize. I still believe this to be true.

In recent years, an industrial forest nurseryman in Florida has successfully grown 4 successive pine crops in unfumigated seedbeds. The Florida Division of Forestry has successfully produced 2 successive pine crops in unfumigated soils at a savings to the taxpayer of about \$40,000 in fumigation costs. Over the past 4 years, we have successfully produced the equivalent of 7 pine seedling crops in forest nurseries in Florida and South Carolina in soils unfumigated for up to 6 years as part of a USDA Forest Service Technology Development Project. And, in a current Florida forest nursery study, germination of loblolly pine in unfumigated seedbeds is equivalent to that in fumigated seedbeds despite the fact that about 2 million seedlings failed in the same nursery block in 1996, possibly due to damping-off. Apparently, these are not stand-alone scenarios.

To be sure, the "to fumigate or not to fumigate" question is still on the table, and the answer(s) to same will likely vary from situation to situation. Decision criteria have included tradition, appearances or aesthetics, anticipated pest losses /prevention (and the related concept of "insurance" for which reliable actuarial figures are sparse, if not lacking altogether), and legitimate attempts at benefit/cost analyses. I, for one, am not convinced that methyl bromide (or other) soil fumigation is as necessary or essential as we used to-or still?-think. In some cases, it may be. In others, perhaps not. Discussions and analyses will continue, but I submit that at least within the forestry arena we may need to (and perhaps should) carefully reconsider the criteria and/or models we employ to define and determine our *need(s)*.

E. L. Barnard

Forest pathologist
Florida Department of Agriculture & Consumer Services
Division of Forestry
Gainesville, Florida

(This Commentary is adapted from a presentation given by the author to the 1995 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions on November 6-8, 1995, held in San Diego, California.)

Individual authors are responsible for the technical accuracy of the material mentioned in *Tree Planters' Notes*. The mention of commercial products in this publication is solely for the information of the reader, and endorsement is not intended by the Forest Service or the U.S. Department of Agriculture.

This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate state and/or federal agencies before they can be recommended.

Caution: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish and other wildlife-if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

Note: Our concept of this editorial space is that it should be a place to publish opinions and ideas relating to the nursery, reforestation, and restoration professions. We invite you to submit ideas for commentaries. The views expressed here are solely those of the author(s) and do not necessarily reflect those of the Tree Planters Notes editorial staff, the Forest Service, or the U.S. Department of Agriculture. — RN and the editorial board