National Nursery Issues

Methyl Bromide Fumigation - Update

As we have been discussing in FNN for the past several years, the future of methyl bromide fumigation is in jeopardy. Because it is thought to contribute to the depletion of the protective ozone layer in the earth's atmosphere, the US Environmental Protection Agency (EPA) has ruled that methyl bromide production be frozen at current levels until it is completely banned by the year 2001. See Watson and others *(General and Miscellaneous* in New Nursery Literature Section) for a very complete history of the basis for the ban. There are some rumors that to encourage early removal of the product from the market a $1 to $3.50 per pound tax will be added to the cost of methyl bromide fumigants. The typical cost of fumigating an acre is about $1300 and, if this tax does go into effect, the cost would increase to $1650 to $2500 per acre.

Soil fumigation is the most common use of methyl bromide and we in North America are among the principal users (Table 1):

Table 1 - Methyl bromide sales in tons by use category and region (Watson and others 1992)

Regions	Soil	Quarantine/ Commodity	Structural	Chemical Intermediates	Total	(%)
Africa	1,381	325	132	---	1,838	(2.8)
Asia	8,400	5,265	906	34	14,605	(21.9)
Australia	693	185	50	---	928	(1.4)
Europe	16,582	991	644	902	19,119	(28.7)
North Africa	367	65	---	---	432	(0.6)
North America	22,743	1,219	1,382	2,757	28,101	(42.2)
South America	1,140	361	120	---	1,621	(2.4)
Total	51,306	8,411	3,234	3,693	66,644	(100.0)
(%)	(77.0)	(12.6)	(4.9)	(5.5)	(100.0)	

Nurseries that have used methyl bromide fumigants have divided into 2 philosophies. The first group is convinced that the loss in inevitable, and so are already switching to other chemical or cultural alternatives. Others believe that new research and political pressure will result in a lifting or a modification of the EPA ban that would allow methyl bromide fumigation to continue. Let's take a look at both positions:

Methyl bromide alternatives - Methyl bromide is still the most effective and popular soil fumigant and comparisons with other chemicals have shown that nothing has such broad spectrum effectiveness. Some other alternative fumigants are already in operational use in forest and conservation nurseries, however. Dazomet (Basamid^{R}) is the most common and does an acceptable job, although it causes phytotoxicity with adjacent crops such as western white pine. Tests with pure chloropicrin show fair control of soil pathogens, but it does not kill weed seeds. Tests with Triform^{R} (a mixture of dichloropropene and chloropicrin) are underway in the South. Howard Ohr at the University of California-Riverside (909-7874140) is testing methyl iodide, a close chemical relative of methyl bromide, which may hold promise for soil fumigation. Although methyl iodide is currently expensive, the production costs would necessarily go down if the demand increases. The best part if that its ozone depleting potential less than 0.2, compared to 0.6 for methyl bromide.

Biological control alternatives, such as mycorrhizal fungi and antagonistic rhizobacteria, are also being tested and some show encouraging results. Other biological alternatives, such as brassica cover crops and organic matter amendments, have not lived up to expectations. Solar and heat sterilization are also being tested operationally and heat treatments seem particularly promising if the application technology can be worked out (See Integrated Pest Management section for more discussion).

Other studies on methyl bromide alternatives are currently underway. A comprehensive project to evaluate several alternative control technologies for soilborne pathogens is being conducted by the Forest and Insect Disease branch of the USDA Forest Service at nurseries across the US. The Southern Forest Nursery Management Cooperative at Auburn University is studying alternative fumigants and they have concluded that methyl bromide is hard to beat because it controls all soil pests for up to 2-3 years. They also analyzed 33 published articles on fumigation in forest nurseries and found that most fumigants gave better seedbed densities and an increase in seedling size compared to the controls. Methyl bromide fumigants consistently gave the best results and metham-sodium was second in efficacy. The USDA Agricultural Research Service (ARS) is also funding research into methyl bromide alternatives for soil fumigation. Several other recent publications are also listed in the New Nursery Literature Section.

Methyl bromide promoters - Other people are convinced that the EPA is overreacting and have organized to defend methyl bromide fumigation. The Methyl Bromide Working Group, a consortium of companies that produce and distribute fumigants, is mounting a vigorous campaign to educate policy makers and support more scientific research. They have filed a lawsuit in the US Court of Appeals that challenges the EPA decision to ban methyl bromide, and plan to file other legal petitions directly with that agency. According to their director, Peter Sparber, they believe that they have an excellent chance of exempting methyl bromide from the Clean Air Act well before the final ban takes effect. The Methyl Bromide Global Coalition is an international group of methyl bromide manufacturers who are supporting research to investigate the possible contribution of methyl bromide generated by human activities to stratospheric ozone depletion. All of this

research will be completed within the next 3 years so that it can have the greatest impact on policy makers. The Coalition is also publishing an informational newsletter that discusses what is currently known about methyl bromide in the atmosphere (Figure B), its use around the world, and regulatory considerations in the development of alternatives. For a copy of the newsletter or just for more information, contact:

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I'll continue to remain neutral as to the pros and cons of methyl bromide use, but I am pleased to see that we will finally get the basic research to answer the question of whether forest and conservation nurseries can use methyl bromide fumigants with a clear conscience.

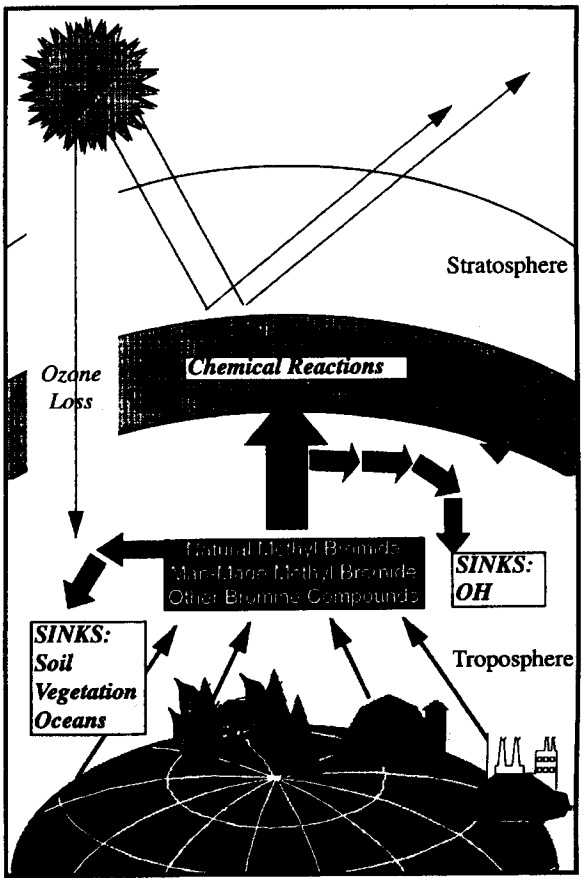

Figure B. Sources and sinks of methyl bromide in the environment. (Used with permission from the Methyl Bromide Global Coalition; prepared by Julie Bedford, Science and Policy Associates, Inc.)

Sources:

Carey, B. 1994. Fumigation trials/Historical efficacies of fumigants in forest tree nurseries. Southern Forest Nursery Management Cooperative Newsletter, Fall, 1994. Auburn, AL: Auburn University. 10 p.

James, R.L.; Hildebrand, D.M.; Frankel, S.J.; Cram, M.M.; O'Brien, J.G. 1994. Alternative technologies for management of soil-borne diseases in bareroot forest nurseries in the United States. In: Landis, T.D. tech. coord. Proceedings: Northeastern and Intermountain Forest and Conservation Nursery Associations. 1993 August 2-5; St. Louis, MO. General Technical Report RM-243. Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station: 91-96.

Methyl Bromide Global Coalition. 1994. Methyl bromide global monitor 1(1), Spring/Summer. Washington; DC: Methyl Bromide Global Coalition. 4 p.

Watson, R.T.; Albritton, D.L.; Andersen, S.O.; Lee-Bapty, S. 1992. United Nations Environmental Programme. Montreal Protocol Assessment Supplement No. 41. Nairobi, Kenya: United Nations Environment Programme, Ozone Secretariat. 41 p.