NOMINATING PARTY: The United States of America

FILE NAME: USA CUN11 SOIL **FOREST SEEDLING NURSERIES** Open Field

BRIEF DESCRIPTIVE TITLE OF NOMINATION:
Methyl Bromide Critical Use Nomination for Preplant Soil Use for Forest Seedling Nurseries in Open Fields (Submitted in 2009 for 2011 Use Season)

CROP NAME (OPEN FIELD OR PROTECTED): Forest Seedling Nurseries Open Field

QUANTITY OF METHYL BROMIDE REQUESTED:

TABLE 1: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

Year	NOMINATION AMOUNT
2011	**106,043 kilograms**

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Following the requirements of Decision IX/6 paragraph (a)(1) The United States of America has determined that the specific use detailed in this Critical Use Nomination is critical because the lack of availability of methyl bromide for this use would result in a significant market disruption. ■ *Yes* ☐ *No*

____________________ ____________________ ____________

Signature Name Date

Title: ____________________________________

(Details on this page are requested under Decision Ex. I/4(7), for posting on the Ozone Secretariat website under Decision Ex. I/4(8).)

In assessing nominations submitted in this format, TEAP and MBTOC will also refer to the original nomination on which the Party's first-year exemption was approved, as well as any supplementary information provided by the Party in relation to that original nomination. As this earlier information is retained by MBTOC, a Party need not re-submit that earlier information.

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LIST OF DOCUMENTS SENT TO THE OZONE SECRETARIAT IN OFFICIAL NOMINATION PACKAGE:

1. PAPER DOCUMENTS: Title of paper documents and appendices	No. of pages	Date sent to Ozone Secretariat
USA CUN11 SOIL FOREST SEEDLING NURSERIES Open Field	17	

2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: *Title of each electronic file (for naming convention see notes above)	No. of kilobytes	Date sent to Ozone Secretariat
USA CUN11 SOIL FOREST SEEDLING NURSERIES Open Field		

* Identical to paper documents

METHYL BROMIDE CRITICAL USE RENOMINATION FOR PREPLANT SOIL USE (OPEN FIELD OR PROTECTED ENVIRONMENT)

FOREST SEEDLING NURSERIES

1. SUMMARY OF THE NEED FOR METHYL BROMIDE AS A CRITICAL USE

Forests are increasingly important as challenges to the environment have global implications. The first step in forest establishment is the production of tree seedlings by forest tree nurseries. These nurseries provide healthy starting material for newly planted forests. The U.S. nomination is for those nurseries where registered alternatives are not effective or sufficiently tested to enable commercial use. This comprises much of forest seedling nursery production land. The use of methyl bromide is considered critical where alternatives are not suitable because of regulatory, economic, or technical constraints.

Of the registered alternatives, iodomethane may offer forest seedling nurseries (except in Washington where it is not registered) the most immediate hope as a replacement of methyl bromide. The main concern regarding adopting this newly registered product is the lack of testing that has been done for this sector. Uncertain use rates, formulation type, application techniques, certification questions, and only now, the beginning of technology to allow gluing high barrier films has impeded a wholesale move to iodomethane for the short-term. The U.S. believes a transition period is necessary to resolve these issues.

Inconsistency in overall pest management performance by some alternatives (e.g. metam-sodium and dazomet) has been the primary concern for this sector, and the reason that methyl bromide continues to have some critical use. While direct yield losses, in terms of seedlings/hectare, may not be large on average, intensive seedling production relies on the ability of nursery managers to meet quality and yield goals as well as certification that plants are essentially pest-free.

Effective fumigation can manage fungal pathogens (e.g., *Fusarium*, *Alternaria*, *Phytophthora*, *Pythium, Rhizoctonia*, *Cylindrocladium* spp., *Cylindrocarpon*, and *Macrophomina*), nematodes (e.g., *Circonemoides*, *Helicotylenchus*), and yellow and purple nutsedges (species of *Cyperus*). Nutsedge species are generally considered among the major pests of forest seedling nurseries in the eastern U.S. and the pests most difficult to manage.

2. SUMMARIZE WHY KEY ALTERNATIVES ARE NOT FEASIBLE

For the 2011 use season, methyl bromide remains a critical need for forest seedling nurseries to produce plants free of pests in order to meet state certification standards, as well as customer expectations. The use protocols for the effective alternatives have not been developed sufficiently to provide effective control of the key pests to depths of 1 m. In addition, there are few, if any, markets for plants that do not meet the certification standards, which mean that losses up to 100% are possible when inadequate pest control occurs. Failure to adequately manage pests in transplants will jeopardize the viability of the planted forests.

A new registration for iodomethane presents an additional alternative (it is currently registered in all states except California, New York, and Washington). Before iodomethane replaces methyl bromide for forest seedling production it will have to be accepted as an appropriate treatment for pest-free certification. Iodomethane use rates and formulations (98:2 or 50:50) are being tested by seedling nurseries to determine what rates are the most effective and cost-feasible. Chloropicrin appears to be a possible alternative, but strict regulations make its future uncertain when used at the high rates that have been shown to be effective (South, 2007; Enebak, 2007).

According to nursery specialists from requesting consortia (Enebak, 2008; Lowerts, 2008; Talbert, 2008; Overton, 2008), iodomethane holds promise as an effective alternative to methyl bromide. However, the following comments highlight concerns by nursery experts of potential problems with a transition to iodomethane for the forest seedling nursery industry:

- Research has been scant for testing the efficacy of iodomethane in forest seedling nurseries. One two-year study conducted in the southeast U.S. (Starkey et al., 2007) indicated that the size of pine seedlings with iodomethane were similar to that with methyl bromide for both years. Weed populations were significantly greater in one of the two years of the study. There is a need to validate the studies to determine if iodomethane manages weed populations sufficiently for commercial production.

- The limited number of field studies that have been conducted is not sufficient to confirm that iodomethane is a suitable alternative to methyl bromide; the industry cannot afford to risk production until the new product is rigorously tested. One consortium stated that "most researchers consider 3 years of trials over several locations are needed to develop reliable data for pesticide guidelines." Trials for this sector have not been completed or reported. Trials conducted in the northeast are limited to a few vegetable crops with custom applicators from outside the region.

- Research trials with iodomethane conducted in Washington (where iodomethane is not currently registered for commercial use) have found encouraging results.

- Cost estimates for the southeast for application and tarp removal of 350 lb/acre [392 kg/ha] of 98:2 methyl bromide was approximately $4,450 per hectare. The cost of 175 lb/acre [196 kg/ha] of 98:2 iodomethane was approximately $6,280 per hectare. Cost in the northeast for iodomethane products range from $15 per kg (50:50) to $20 per kg (98:2). This compares to $7 per kg for methyl bromide (98:2). Estimated costs of fumigation per hectare for northeastern nurseries average $8,300 for iodomethane (98:2), $10,500 for iodomethane (50:50), and $4,820 for methyl bromide (98:2). If these cost differences are maintained the industry would find iodomethane to be economically infeasible.

- Regional fumigation contractors do not currently have the equipment to broadcast iodomethane. According to the iodomethane label, *"The treated ground must be* *sealed using closing shoes, roller, compaction roller, cultipacker or other equivalent equipment that will sufficiently cover chisel marks left after soil injection. The equipment shall cover the chisel marks with soil immediately prior to the placement of the tarpaulin being laid down (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor."* Demand for the product may change this situation, but the industry is not able currently to broadcast iodomethane.

- Use of iodomethane resulted in a reduction of beneficial *Trichoderma* fungi populations in soil 12 and 18 months following treatment in both years of a two-year study (Starkey et al., 2007). This effect will have to be confirmed by additional studies, but would result in long-term reduced production quality.

- Methyl bromide is accepted by state control boards as meeting phytosanitary requirements for nursery shipments. Iodomethane will require the same acceptance, but as yet, this certification standard has not been addressed by the registrant of iodomethane or state regulators.

- According to the consortium representing northeast nurseries, Arysta (manufacturer of MIDAS iodomethane) has no representatives or dealers of the iodomethane product in northeastern states.

- The iodomethane label (MIDAS) does not make clear if use is allowed for production of deciduous tree seedlings ("*strawberries, stone fruits, tree nuts, and conifer trees*"). Deciduous seedlings are generally more valuable than conifer seedlings and have greater pest management requirements.

3. IS THE USE OF METHYL BROMIDE COVERED BY A CERTIFICATION STANDARD?

This sector is covered by certification requirements. All states have certification standards and all nurseries have additional internal quality control standards as well (NPB, 2008 for summaries of nursery plant regulations for all states). USDA-APHIS has guidelines for containment of sudden oak death through movement of nursery material (USDA-APHIS, 2004). An example from Mississippi, "All nursery stock shipped into Mississippi must carry on each container or bundle a valid nursery inspection tag (inspection certificate) of the State of origin. Containers should also be plainly marked with the names and addresses of shipper and consignee" (MDAC, 2003). Similarly from Alabama, "Nursery stock entering the State of Alabama must be certified as being apparently free from plant pests. Certificate tags issued by the official certifying agency of the state of origin stating such must be firmly attached to each box, bundle or package of nursery stock moved into the state" (ADAI, 2004). In addition, "No inspection certificate shall be issued for the sale, offering for sale, or movement of any nursery stock until the stock in question shall have been inspected by the Commissioner and found to be apparently free from seriously injurious plant pests" (ADAI, 2004). Other states have similar regulations (NPB, 2008).

4. IF PART OF THE CROP AREA IS TREATED WITH METHYL BROMIDE, INDICATE THE REASON WHY METHYL BROMIDE IS NOT USED IN THE OTHER AREA, AND IDENTIFY WHAT ALTERNATIVE STRATEGIES ARE USED TO CONTROL THE TARGET PATHOGENS AND WEEDS WITHOUT METHYL BROMIDE THERE.

All nurseries currently treat production beds with methyl bromide due to certification and production requirements. Where weeds are of primary pests, methyl bromide has been the most effective treatment and accepted by state inspectors. Methyl bromide allows conifer seedling beds to be fumigated after two or three crops (as opposed to after every crop) because of the effectiveness of methyl bromide, which usually makes a second-year treatment unnecessary. Iodomethane is a new fumigant and may be an effective alternative, but multi-season information on its use for forest nurseries is lacking.

5. WOULD IT BE FEASIBLE TO EXPAND THE USE OF THESE METHODS TO COVER AT LEAST PART OF THE CROP THAT HAS REQUESTED USE OF METHYL BROMIDE? WHAT CHANGES WOULD BE NECESSARY TO ENABLE THIS?

Preliminary results of research suggest iodomethane has value as a replacement for methyl bromide, but it first must be tested to prove efficacy and acceptability for certification. In addition, as with all new products, adjustment of use rates and application experience with iodomethane will require a few seasons where nurseries can transition from methyl bromide, assuming costs do not limit the use of iodomethane.

6. SUMMARY OF RECENT RESEARCH

The amount of methyl bromide nominated for 2011 has been reduced from the previous nomination. This is due to a reduction in rates or a change in the proportion of methyl bromide in the formulation by some nurseries. Impacts for nurseries that have a critical need for methyl bromide would be significant without the fumigant for 2011. Research is ongoing to develop commercially feasible protocols for likely alternatives, such as iodomethane, 1,3-D and chloropicrin, chloropicrin, and/or metam-sodium.

Research with low permeability films and methods to glue them for broadcast fumigation appears to be progressing towards resolving technical problems. The feasibility for commercial broadcast with high barrier films is still questionable. The standard width of film used in the nursery industry (400 cm) is not available for the film that currently can be glued, which may slow adoption, according to a representative of Pliant Corporation, a major manufacturer of high barrier films in the U.S. Research trials with VIF have primarily been conducted with bed, rather than the standard broadcast fumigation due to problems gluing film. Glues are apparently proprietary and manufacturing information is difficult to attain. Ajwa (2008) reported some preliminary successes in strawberry research trials gluing VIF and totally impermeable film (TIF). He cited reports that researchers in Florida had had difficulty gluing TIF.

In 2008, iodomethane was registered in all states requesting a critical use of methyl bromide, except Washington, for use in forest seedling nurseries. Unfortunately, research on iodomethane use for this industry is minimal and rates, formulation, and application techniques will have to be optimized for commercial applications. The registrant, Arysta, has not yet completed work to support pest-free certification with the product. Fumigant trials have been conducted with conifers, not hardwoods, which constitute a valuable portion of many nurseries.

- In a two-year study conducted in Georgia, Starkey et al. (2007) found that iodomethane:chloropicrin (168 kg/ha of 98:2) produced seedlings with characteristics (density, diameter, height, root and shoot biomass) comparable to methyl bromide-treated beds. Methyl bromide and chloropicrin (168 kg/ha of 98:2) with VIF produced seedlings comparable to methyl bromide:chloropicrin (336 kg/ha of 98:2) with standard films. Weeds in iodomethane-treated beds were comparable to methyl bromide in a 2006 trial and more than in methyl-bromide-treated beds in a 2005 trial. This was attributed to the rate of iodomethane that was used. The regeneration of the beneficial fungus *Trichoderma* was reduced under VIF and with iodomethane treatments compared to methyl bromide.

- Quicke et al. (2008) studied two nursery sites in South Carolina. Randomized blocks were treated with one of seven fumigants (98:2 methyl bromide at both 450 kg/ha and 264 kg/ha; 70:30 methyl bromide at 450 kg/ha; Pic+ at 336 kg/ha; chloropicrin at 336 kg/ha; Chlor60 at 450 kg/ha; DMDS/Pic at ~820 kg/ha). At both sites, all treatments provided comparable seedling densities. No nematodes were detected in any fumigated soil. *Trichoderma* populations were greatest in soil that had been treated with a high rate of chloropicrin.

- Results from experiment-sized plots conducted in Mt. Vernon Research Center, Washington (Talbert, 2008) in 2007 in cooperation with USDA, found that iodomethane treatments generally provided acceptable weed and pathogen control. Concerns were raised about the effectiveness of spring fumigation with iodomethane and consistency throughout different locations. Additional testing is planned for western nurseries and two to three seasons is considered necessary to gauge efficacy and feasibility.

- Research (Weiland et al., 2008) to study the efficacy of reduced doses of fumigants (methyl bromide, iodomethane, and DMDS) under VIF and their effects on soil pathogens and weeds is underway in Oregon and Washington. Trials will be analyzed in the fall of 2009.

7. ECONOMIC FEASIBILITY OF ALTERNATIVES

Please note that in this study net revenue is calculated as gross revenue minus operating costs. This is a good measure as to the direct losses of income that may be suffered by the users. It should be noted that net revenue does not represent net income to the users. Net income, which indicates profitability of an operation for an enterprise, is gross revenue minus the sum of operating and fixed costs. Net income is smaller than the net revenue measured in this study, often substantially so. We did not include fixed costs because they are difficult to measure and verify.

The economic analysis of the tomato application compared data on yields, crop prices, revenues and costs using methyl bromide and using alternative pest control regimens in order to estimate the loss of methyl bromide availability. The alternatives identified as technically feasible - in cases of low pest infestation[1] – for different regions by the U.S. are: (a) Iodomethane and (b) 1,3-Dichloropropene and Chloropicrin followed by Metam sodium (otherwise referred to as the Georgia 3-Way).

The economic factors that really drives the feasibility analysis for nursery stock production uses of methyl bromide are: (1) yield losses, referring to reductions in the quantity produced, (2) increased production costs, which may be due to the higher-cost of using an alternative, additional pest control requirements, and/or resulting shifts in other production or harvesting practices (3) quality losses, which generally affect the quantity and price received for the goods, and (4) missed market windows due to plant back time restrictions, which also affect the quantity and price received for the goods.

The economic reviewers then analyzed crop budgets for pre-plant sectors to determine the likely economic impact if methyl bromide were unavailable. Various measures were used to quantify the impacts, including the following:

(1) **Loss per Hectare.** For crops, this measure is closely tied to income. It is relatively easy to measure, but may be difficult to interpret in isolation.

(2) **Loss per Kilogram of Methyl Bromide**. This measure indicates the value of methyl bromide to crop production.

(3) **Loss as a Percentage of Gross Revenue.** This measure has the advantage that gross revenues are usually easy to measure, at least over some unit, *e.g.*, a hectare of land or a storage operation. However, high value commodities or crops may provide high revenues but may also entail high costs. Losses of even a small percentage of gross revenues could have important impacts on the profitability of the activity.

(4) **Loss as a Percentage of Net Operating Revenue**. We define net cash revenues as gross revenues minus operating costs. This is a very good indicator as to the direct losses of income that may be suffered by the owners or operators of an enterprise. However, operating costs can often be difficult to measure and verify.

(5) **Operating Profit Margin**. We define operating profit margin to be net operating revenue divided by gross revenue per hectare. This measure would provide the best indication of the total impact of the loss of methyl bromide to an enterprise. Again, operating costs may be

[1] It should be noted that the USG does not request methyl bromide for use in areas of low to moderate pest pressure. Only cases where key pests are present at moderate to high levels require methyl bromide for pest pressure.

difficult to measure and fixed costs even more difficult, therefore fixed costs were not included in the analysis.

These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for methyl bromide users, who are tomato producers in this case. Because producers (suppliers) represent an integral part of any definition of a market, we interpret the threshold of significant market disruption to be met if there is a significant impact on commodity suppliers using methyl bromide. The economic measures provide the basis for making that determination.

The economic analysis of the forest seedling application compared data on costs using methyl bromide and using the next best alternative pest control regimen, iodomethane, in order to estimate the loss of methyl bromide availability.

The economic reviewers then analyzed crop budgets for forest seedlings to determine the likely economic impact if methyl bromide were unavailable. Various measures were used to quantify the impacts, including the following:

(1) **Loss per Hectare.** For crops, this measure is closely tied to income. It is relatively easy to measure, but may be difficult to interpret in isolation.

(2) **Loss per Kilogram of Methyl Bromide**. This measure indicates the value of methyl bromide to crop production.

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(5) **Operating Profit Margin**. We define operating profit margin to be net operating revenue divided by gross revenue per hectare. This measure would provide the best indication of the total impact of the loss of methyl bromide to an enterprise. Again, operating costs may be difficult to measure and fixed costs even more difficult, therefore fixed costs were not included in the analysis.

These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for methyl bromide users, who are forest seedling producers in this case. Because producers (suppliers) represent an integral part of any definition of a market, we interpret the threshold of significant market disruption to be met if there is a significant impact on commodity suppliers using methyl bromide. The economic measures provide the basis for making that determination.

The results of the analysis of methyl bromide compared to iodomethane are shown in Tables 2 - 6 below. Iodomethane, is assumed to provide the same yields as methyl bromide. Therefore, the only losses shown in the tables below as a result of methyl bromide not being available are increased fumigation and hand weeding costs. Since one study (Starkey et al., 2007) indicated increased weed pressure with iodomethane compared to methyl bromide, almost $800 per hectare per year was added for hand weeding costs with the use of iodomethane.

Please note, that the yields, revenues, and costs in Tables 2-6 below are averages **per year** over fumigation cycles of 2 – 4 years. Most of the yields, revenues, and costs occur 1 – 2 years out of 2 – 4 fumigation cycles, while fumigations are usually done once during the fumigation cycle and sometimes twice for certain species. Since the costs are average annual costs, the increased costs will be less than the full increased cost of a single iodomethane fumigation compared to methyl bromide.

Also, revenues and costs will vary between regions due to different yields, species, and cultural and fumigation practices.

Furthermore, these tables do not show other possible losses discussed earlier in this nomination and summarized below, which include:

- **Efficacy**. While the analysis of economic feasibility assumed equal yields, the limited number of field studies that have been conducted is not sufficient to confirm that iodomethane has equal efficacy as methyl bromide. If efficacy is not equal there could be impacts on seedling quality and forest health.

- **Forest Health.** Seedlings free of pathogens and other pests help establish forests with less pest pressure, thus resulting in faster growth and less use of pesticides.

- **Certification**. Methyl bromide is accepted by state control boards as meeting phytosanitary requirements for nursery shipments. Iodomethane will require the same acceptance, but as yet, with limited efficacy studies, this certification standard has not been established. There are few, if any, markets for plants that do not meet the certification standards, which mean that losses up to 100% are possible when inadequate pest control occurs.

- **Equipment**. Regional fumigation contractors and nurseries do not currently have the equipment to broadcast iodomethane. Demand for the product may change this situation, but the industry is not able currently to broadcast iodomethane.

- **Deciduous trees**. The iodomethane label (MIDAS) does not make clear if use is allowed for production of deciduous tree seedlings, which are generally more valuable than conifer seedlings and have greater pest management requirements.

TABLE 2 SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES PER YEAR

SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE	METHYL BROMIDE	IODOMETHANE
YIELD LOSS (%)	**0%**	**0%**
Yield (seedling) per Hectare ***Pine***	779,617	779,617
** Price per Unit (U.S. $/seedling)*	$0.05	$0.05
Gross Revenue per Proportion (88% of seedlings; 72% of acres)	**$25,234**	**$25,234**
Yield (seedling) per Hectare ***Longleaf Pine***	423,785	423,785
** Price per Unit (U.S. $/seedling)*	$0.09	$0.09
Gross Revenue per Proportion (3% of seedlings; 5% of acres)	**$1,759**	**$1,759**
Yield (seedling) per Hectare ***Hardwood***	243,399	243,399
** Price per Unit (U.S. $/seedling)*	$0.25	$0.25
Gross Revenue per Proportion (9% of seedlings; 24% of acres)	**$14,337**	**$14,337**
= GROSS REVENUE PER HECTARE (US$)	**$41,330**	**$41,330**
− OPERATING COSTS PER HECTARE (US$)**	**$23,401**	**$24,648**
= NET REVENUE PER HECTARE (US$)	**$17,929**	**$16,682**
LOSS MEASURES **		
1. LOSS PER HECTARE (US$)	**$0**	**$1,248**
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	**$0**	**$15**
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	**0%**	**3%**
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	**0%**	**7%**
5. OPERATING PROFIT MARGIN (%)	**43%**	**40%**

** Note that the measures in this table must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs.

TABLE 3. ARBORGEN: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES PER YEAR

ARBORGEN	METHYL BROMIDE	IODOMETHANE
YIELD LOSS (%)	0%	0%
YIELD (SEEDLINGS) PER HECTARE	741,315	741,315
* PRICE PER UNIT (US$)	$0	$0.05
= GROSS REVENUE PER HECTARE (US$)	$33,997	$33,997
− OPERATING COSTS PER HECTARE (US$)**	$20,946	$22,250
= NET REVENUE PER HECTARE (US$)	$13,051	$11,747
LOSS MEASURES **		
1. LOSS PER HECTARE (US$)	$0	$1,304
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$0	$20
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0%	4%
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	10%
5. OPERATING PROFIT MARGIN (%)	38%	35%

** Note that the measures in this table must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs.

TABLE 4. WEYERHAEUSER: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES PER YEAR

WEYERHAEUSER	METHYL BROMIDE	IODOMETHANE
YIELD LOSS (%)	0%	0%
YIELD (SEEDLINGS) PER HECTARE	55,006	55,006
* PRICE PER UNIT (US$)	$0	$0
= GROSS REVENUE PER HECTARE (US$)	$17,932	$17,932
− OPERATING COSTS PER HECTARE (US$)**	$12,131	$13,155
= NET REVENUE PER HECTARE (US$)	$5,801	$4,777
LOSS MEASURES **		
1. LOSS PER HECTARE (US$)	$0	$1,024
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$0	$22
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0%	6%
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	18%
5. OPERATING PROFIT MARGIN (%)	32%	27%

** Note that the measures in this table must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs.

TABLE 5. NORTHEASTERN FOREST AND CONSERVATION: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES PER YEAR

NORTHEASTERN FOREST AND CONSERVATION	METHYL BROMIDE	IODOMETHANE
YIELD LOSS (%)	**0%**	**0%**
Yield (seedling) per Hectare ***Conifer (1-0)***	247,105	247,105
** Price per Unit (U.S. $/seedling)*	$0.26	$0.26
Gross Revenue per Proportion (8% of acres)	**$5,140**	**$5,140**
Yield (seedling) per Hectare ***Conifer (2-0)***	185,329	185,329
** Price per Unit (U.S. $/seedling)*	$0.26	$0.26
Gross Revenue per Proportion (4% of acres)	**$1,927**	**$1,927**
Yield (seedling) per Hectare ***Conifer (3-0)***	123,553	123,553
** Price per Unit (U.S. $/seedling)*	$0.35	$0.35
Gross Revenue per Proportion (14% of acres)	**$6,054**	**$6,054**
Yield (seedling) per Hectare ***Deciduous Trees (1-0)***	123,553	123,553
** Price per Unit (U.S. $/seedling)*	$0.32	$0.32
Gross Revenue per Proportion (55% of acres)	**$21,745**	**$21,745**
Yield (seedling) per Hectare ***Deciduous Trees (2-0)***	123,553	123,553
** Price per Unit (U.S. $/seedling)*	$0.37	$0.37
Gross Revenue per Proportion (9% of acres)	**$4,114**	**$4,114**
Yield (seedling) per Hectare ***Deciduous Shrubs (1-0)***	123,553	123,553
** Price per Unit (U.S. $/seedling)*	$0.29	$0.29
Gross Revenue per Proportion (10% of acres)	**$3,583**	**$3,583**
= GROSS REVENUE PER HECTARE (US$)	**$42,564**	**$42,564**
− OPERATING COSTS PER HECTARE (US$)**	**$31,879**	**$33,418**
= NET REVENUE PER HECTARE (US$)	**$10,684**	**$9,146**
LOSS MEASURES **		
1. LOSS PER HECTARE (US$)	**$0**	**$1,538**
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	**$0**	**$16**
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	**0%**	**4%**
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	**0%**	**14%**
5. OPERATING PROFIT MARGIN (%)	**25%**	**21%**

** Note that the measures in this table must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs.

TABLE 6. MICHIGAN SEEDLING ASSOCIATION: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES PER YEAR

MICHIGAN SEEDLING ASSOCIATION	METHYL BROMIDE	IODOMETHANE
YIELD LOSS (%)	**0%**	**0%**
*Yield (seedling) per Hectare **Conifer Seedlings***	963,710	963,710
** Price per Unit (U.S. $/seedling)*	$0.14	$0.14
Gross Revenue per Proportion (60 % of acres)	**$80,952**	**$80,952**
*Yield (seedling) per Hectare **Conifer Transplants***	74,132	74,132
** Price per Unit (U.S. $/transplant)*	$0.60	$0.60
Gross Revenue per Proportion (10% of acres)	**$4,448**	**$4,448**
*Yield (seedling) per Hectare **Deciduous Seedlings***	296,526	296,526
** Price per Unit (U.S. $/seedling)*	$0.50	$0.50
Gross Revenue per Proportion (30% of acres)	**$44,479**	**$44,479**
= GROSS REVENUE PER HECTARE (US$)	**$129,878**	**$129,878**
− OPERATING COSTS PER HECTARE (US$)**	**$90,235**	**$91,898**
= NET REVENUE PER HECTARE (US$)	**$39,644**	**$37,980**
LOSS MEASURES **		
1. LOSS PER HECTARE (US$)	**$0**	**$1,663**
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	**$0**	**$6**
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	**0%**	**1%**
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	**0%**	**4%**
5. OPERATING PROFIT MARGIN (%)	**31%**	**29%**

** Note that the measures in this table must be interpreted carefully. Operating costs do not include fixed costs and net revenue equals gross revenue minus operating costs.

8. RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

TABLE 7. NOMINATION AMOUNT

2011 Methyl Bromide Usage Newer Numerical Index (BUNNI)

Transition Use Reduction Description Spreadsheet

SECTOR		FOREST SEEDLINGS						
		Southern Forest Nursery	International Paper	Weyer- haeuser (SE)	Weyer- haeuser (NW)	NE Forest & Conserv. Nursery	Michigan Seedling Assoc.	Sector Total / Average
Quantity Requested for 2010:	Amount (kgs)	66,340	5,050	13,889	15,302	13,971	6,301	120,853
Quantity Recommended by MBTOC/TEAP for 2010 :	Amount (kgs)	66,300	4,940	13,780	15,190	12,096	5,520	117,826
Quantity Approved by Parties for 2010:	Amount (kgs)	66,300	4,940	13,780	15,190	12,096	5,520	117,826
	Area (ha)	255	19	53	72	47	21	467
	Rate	260	260	260	211	257	263	252
Transition from 2010 Baseline Adjusted Value	Percentage (%)	-10%	-12%	-11%	-11%	-22%	-21%	-12%
Quantity Required for 2011 Nomination:	Amount (kgs)	**59,670**	**4,446**	**12,402**	**13,671**	**10,886**	**4,968**	**106,043**
	Area (ha)	**230**	**17**	**48**	**65**	**42**	**19**	**421**
	Rate	**259**	**262**	**258**	**210**	**259**	**261**	**252**

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