

NOMINATING PARTY: The United States of America

FILE NAME: USA CUN11 SOIL SWEET POTATO SLIPS OPEN FIELD

BRIEF DESCRIPTIVE TITLE OF NOMINATION:

Methyl Bromide Critical Use Nomination for Preplant Soil Use for Sweet Potato Slips Grown in Open Fields (Submitted in 2009 for 2011 Use Season)

CROP NAME: Sweet Potato Slips Open Fields

QUANTITY OF METHYL BROMIDE REQUESTED:

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

YEAR	NOMINATION AMOUNT
2011	14,515 kilograms

NOMINATING PARTY CONTACT DETAILS:

Contact Person: Hodayah Finman
Title: Foreign Affairs Officer
Address: Office of Environmental Policy
U.S. Department of State
2201 C Street, N.W. Room 2658
Washington, D.C. 20520
U.S.A.
Telephone: (202) 647-1123
Fax: (202) 647-5947
E-mail: finmanhh@state.gov

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).)

This form is to be used by holders of single-year exemptions to reapply for a subsequent year's exemption (for example, a Party holding a single-year exemption for 2005 and/or 2006 seeking further exemptions for 2007). It does not replace the format for requesting a critical-use exemption for the first time.

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.

CONTACT OR EXPERT(S) FOR FURTHER TECHNICAL DETAILS:

Contact/Expert Person: Jack E. Housenger
Title: Director, Acting
Address: Biological and Economic Analysis Division
Office of Pesticide Programs
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W. Mailcode 7503P
Washington, D.C. 20460
U.S.A.
Telephone: (703) 308-8200
Fax: (703) 308-7042
E-mail: jack.housenger@epa.gov

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 SWEET POTATO SLIPS Open Field		
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 SWEET POTATO SLIPS Open Field		

* Identical to paper documents

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

SWEET POTATO SLIPS

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

Sweet potato production in California has two distinct production components: transplant production and field production. This cultural requirement is similar to many other crops, e.g. strawberries, vineyards, and orchards, but for sweet potatoes the production of transplants and harvested roots is done by the same grower. Transplant and field production both utilize fumigation when possible, however, greater weed and disease control is required in the transplant nursery. This requirement is currently being met by using methyl bromide flat fumigation with plastic tarp. Field production utilizes low rate (12 to 15 gallons per acre) of 1,3-dichloropropene without tarping to control nematodes. Field production of sweet potatoes in California is concentrated in a relatively small geographic area in the central part of the state, and because of this exceeds the current use allotment of 1,3-dichloropropene allowed within a township (640 acres). Growers cannot use 1,3-dichloropropene in January and the township cap restrictions on 1,3-dichloropropene require an application factor of 1.9 in December, and the cap being exceeded in November (Cal DPR, 2002). Thus the choice of fumigants available to growers for the transplant production is limited by state regulations, 1,3-dichloropropene is essentially unavailable for use in the fall when fumigation occurs. Thus, growers use methyl bromide + chloropicrin combinations for the transplant production (nursery) areas.

This request is for the sweet potato transplant production area only, where plant production of sweet potato slips occurs. These areas are usually fumigated from November through January. Transplants are grown between February – May, and the cuttings (slips) from the transplant production area are transplanted between late April and early June. The majority of sweet potato roots are harvested in September and October. The total area Sweet potatoes are transplanted from plant propagules, called slips that are transplanted between late April and early June. The majority of sweet potato roots are harvested in September and October.

2. SUMMARISE WHY KEY ALTERNATIVES ARE NOT FEASIBLE:

This request is only for those growers who cannot use 1,3-dichloropropene due to regulatory constraints. Fumigation with 1, 3-dichloropropene is prohibited in California during December and January. The soil where sweet potato “slips” (transplants) is typically fumigated from November through January in order to meet a market window. In addition, those growers who fumigate in November do not have 1, 3-dichloropropene available because the township cap has been exceeded by other crops that fumigate earlier in the year (see Trout 2005). The combination of 1, 3-dichloropropene plus chloropicrin is highly rated for control of nematodes, certain diseases and some weed species. This is based upon years of grower experiences on other crops using the respective ingredients alone and in combinations. Prior to the delabeling of 1, 3-dichloropropene by Cal DPR in the early 1990’s, tarped 1,3-dichloropropene + chloropicrin was the main fumigation choice for the sweet potato nursery area. This combination would also

be the preferred drop-in replacement for MeBr if it were no longer available and 1,3-dichloropropene restrictions were not in place. Research results from the first year of a three year study are described in part 7 below.

California growers produce their transplants (slips) for propagation in open fields and initially cover plants with clear plastic row covers supported by hoops. Prior to being used for transplant production, fields are either fallowed or planted to rye or sweet potatoes the previous season. The transplants (slips) must be watered during establishment and the low rainfall amounts and public water restrictions that exist in the production areas make it imperative that fields are situated near private irrigation wells, which significantly limits the land available for growing transplants.

Growers of sweet potato slips face a difficult situation with the township caps because all of the fumigated areas fall within just four townships in Merced County. Merced county has already exceeded a 2x cap allowance, so growers have already reverted to the lower 1,3 -dichloropropene use limit. Additional evidence that the 1,3 -dichloropropene cap will be exceeded in 2011 is that in 2002, the California Department of Pesticide Regulation (CDPR) gave a special allowance to one of the Merced county townships, where sweet potato was the primary fumigant use, to exceed their cap by 16,500 adjusted pounds. Similar allowances have been given several times since 2002.

Iodomethane is not registered in California where these sweet potato slips are grown.

There are over 5,000 hectares (> 12,500 acres) acres in sweet potato production, 53 ha (131 acres) of plant beds of which are fumigated with methyl bromide, and 1987 ha (4908 acres), open field treated with 1,3-D. When the banked allowance is expended this will leave 2,227 acres (or 44%) that cannot use 1,3 -dichloropropene that otherwise would have. In 2003, for example, the cap (without any bank) only allowed for 316,554 pounds of 1,3-dichloropropene while there was demand for 583,807 pounds.

3. IS THE USE COVERED BY A CERTIFICATION STANDARD?

Methyl bromide is not used to meet a certification standard for sweet potato slip production.

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.

Organic sweet potato growers do not use methyl bromide, or any other fumigants, in their transplant beds. It has been observed that fewer and less vigorous transplants result. Since data are not available to address these options, the extent of these differences cannot be quantified. In addition, in order to produce their crops, organic producers of sweet potatoes must use significant amounts of hand weeding. Current costs are not available.

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?

The 1, 3- dichloropropene township cap limitation effectively limits the amount of 1, 3- dichloropropene that can be used on a sliding scale. This scale is a function of amount, method of fumigation, and time of year. To the extent that 1, 3- dichloropropene or a 1, 3- dichloropropene plus chloropicrin mixture can be used, it is being used. California growers prefer to use 1, 3- dichloropropene when possible (where the key pests are controlled and where the township caps are not binding) as it is less costly than mixtures using methyl bromide. The US nomination is for growers who will be denied the use of 1, 3- dichloropropene alone or in combination with chloropicrin as a result of 1, 3- dichloropropene township caps and regulations. Solarization is undergoing evaluation, however, it is not likely that solarization can completely replace fumigation. Solarization can only take place during the same time period as cropping (the non-cropping season is not warm enough to allow soils to reach the temperatures necessary to kill key pests to the required soil depths).

6. SUMMARY OF RECENT RESEARCH:

Scott Stoddard presented data from the first year of a three year study at the Methyl Bromide Alternatives Outreach conference (Stoddard, 2008). In his email (Oct. 28, 2008) Scott Stoddard indicated that the first year is complete; the second year has begun by implementing the fumigation treatments with data collection in 2009. He plans on continuing the project for three years with a completion in the fall of 2010. In his summary of the first years research (Table 7) the only alternatives that would provide adequate pest control and crop safety also contain 1,3- dichloropropene (Telone) whose label restrictions and townships caps are already a constraint on its use. There were no significant differences between treatments for *Pythium sp.* control (number of colony forming units) or root rotting. The methyl bromide: chloropicrin treatment had the fewest weeds. Weed control was improved when napropamide or Valor were added. 1,3-dichloropropene plus metam sodium and Valor caused some phytotoxicity but did not lead to significant yield reduction.

TABLE 2. SWEET POTATO SLIP RESEARCH IN CALIFORNIA – YEAR 1 OF 3 YEAR STUDY

MAIN PLOTS	SPLIT PLOTS
1. Methyl Bromide + Chloropicrin (53:47) at 350 lbs/acre tarped.	1. Untreated
2. Chloropicrin at 150 lbs/acre, tarped	2. Devrinol (napropamide) 4 lbs/acre
3. PicChlor 60 (60% Chloropicrin & 40% 1,3-D) at 45 gal/acre, tarped	3. Valor (flumioxazin)at 2 oz/acre
4. Solarization	4. Botran (dichloran) at 3.5 lbs/1000 sq ft
5. Telone (1, 3- dichloropropene) 20 gal/acre + Vapam (metam sodium) 75 gal/acre	5. Mertec (thiabendazole) at 30 oz/1000 sq ft
6. Untreated control	

Source: Stoddard, 2008 MBAO.

Treatments Application Dates

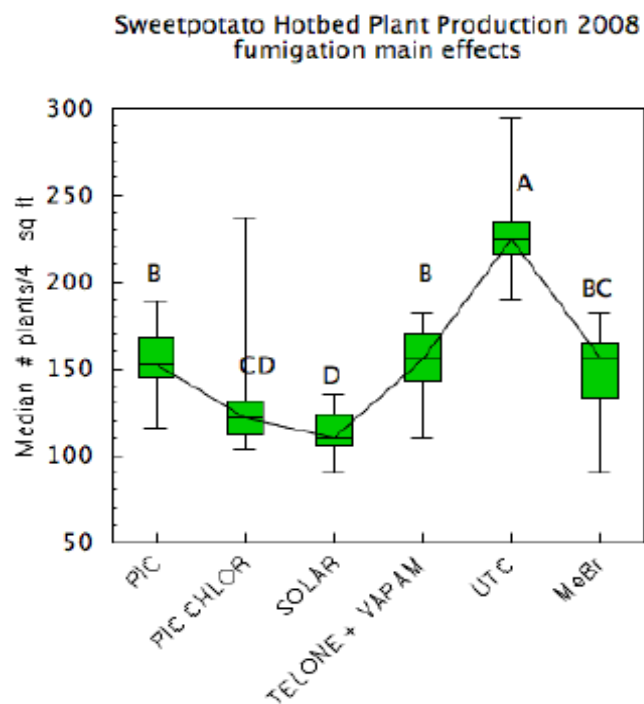
Solarization	June 26, 2007
MeBr:Pic, Chloropicrin, & PicChlor	August 20, 2007
Telone & Vapam	November 12, 2007
Botran & Mertec	February 28, 2008 at planting
Devrinol & Valor	March 7, 2008
Film – Std LDPE 1.5 mil	

TABLE 3. SWEET POTATO SLIP PLANT PRODUCTION IN 2008

SLIP TREATMENT	PLANTS PER 4 SQUARE FEET
1. MeBr + Chloropicrin	160 bc
2. Chloropicrin	155 b
3. PicChlor	120 cd
4. Solarization	110 d
5. Telone & Vapam	160 b
6. Untreated control	230 a

Source: Stoddard, 2008 MBAO.

FIGURE 1. SWEET POTATO SLIPS (PLANTS PER 4 SQUARE FEET)

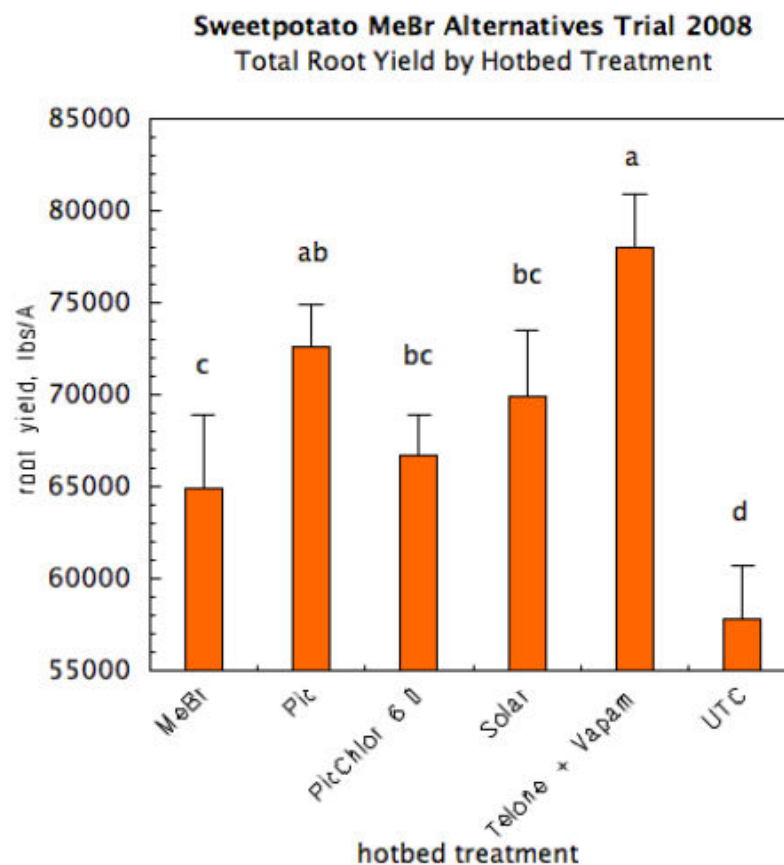


Source: Stoddard, 2008 MBAO.

TABLE 4. SWEET POTATO CROP PRODUCTION FROM TREATED SLIPS IN 2008

SLIP TREATMENT	LBS/ACRE OF ROOTS
1. MeBr + Pic	65,000 c
2. Chloropicrin	72,000 ab
3. PicChlor	67,000 bc
4. Solarization	69,000 bc
5. Telone & Vapam	78,000 a
6. Untreated control	57,000 d

Source: Stoddard, 2008 MBAO.

FIGURE 2. SWEET POTATO ROOT YIELD (POUNDS PER ACRE)

Source: Stoddard, 2008 MBAO.

TABLE 5. SUMMARY OF SWEET POTATO SLIP TRIAL TO DATE

TREATMENT	WEED CONTROL	PLANT PRODUCTION	FUMIGATION COST	HAND WEEDING	REGULATION ISSUES
1. MeBr:chloropicrin	A	A	\$ 2100	100	Phase out
2. Chloropicrin	BC	A	\$ 1900	400	VOC
3. PicChlor	A	B	\$ 2100	100	VOC, Caps
4. Solarization	C	C	\$ 1200	600	---
5. Telone + Vapam	AB	A	\$ 500	100	VOC, Caps
6. Untreated control	C	A	0	600	---

Source: Stoddard, 2008 MBAO.

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 reviewers 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 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 sweet potato slip 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.

Slips are produced for the sole purpose of transplanting into the open fields by growers and they are not sold commercially. Therefore, slip production is an input process to sweet potato production, with its associated costs. Thus, the yield loss of the final product, sweet potato, is the relevant yield loss that may result from the use of alternative to methyl bromide. Methyl bromide is used to fumigate hot beds for slip production. One acre of hot beds typically produces enough slips for transplanting into about 60 field acres to produce sweet potato.

For hot bed fumigation, there are four alternatives to methyl bromide (Tables 4 and 5). Of these, Telone + Vapam (1,3-D + Metam-sodium) cannot be used because of the township caps, and solarization only partially controls pathogens. Thus, chloropicrin is analyzed as the next best alternative to methyl bromide. Table 6 indicates that use of chloropicrin results in an 11% increase in production over methyl bromide. Hand weeding costs are greater with chloropicrin (Table 6), but overall, production increase outweighs the cost increases and results in positive economic impacts as shown in Table 6.

TABLE 6. CALIFORNIA SWEET POTATO SLIPS - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

CALIFORNIA SWEET POTATO SLIPS	METHYL BROMIDE	CHLOROPICRIN
YIELD LOSS (%)	0	-11
YIELD PER HECTARE (CWT/HECTARE)	737	818
* PRICE PER UNIT (U.S.\$)	28	28
= GROSS REVENUE PER HECTARE (U.S.\$)	20,632	22,902
- OPERATING COSTS PER HECTARE (U.S.\$)	14,200	15,060
= NET OPERATING REVENUE PER HECTARE (U.S.\$)	6,432	7,841
1. LOSS PER HECTARE (U.S.\$)	0	-1,410
2. LOSS PER KILOGRAM OF METHYL BROMIDE (U.S.\$)	0	-6
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0	-7
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0	-22

Source: Sweet potato Research Progress Report 2005.

Table 6 summarizes economic impacts of using chloropicrin. Yield increases by 11% with a gain of \$1,410/hectare with the use of chloropicrin. This gain is 7% and 22% of the gross revenue and net operating revenue, respectively.

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		SWEET POTATO SLIPS	
		Sweet Potato Council of California	Sector Total / Average
Quantity Requested for 2010:	Amount (kgs)	18,144	18,144
Quantity Recommended by MBTOC/TEAP for 2010 :	Amount (kgs)	14,515	14,515
Quantity Approved by Parties for 2010:	Amount (kgs)	14,515	14,515
	Area (ha)	81	81
	Rate	179	179
Transition from 2010 Baseline Adjusted Value	Percentage (%)	-20%	0%
Quantity Required for 2011 Nomination:	Amount (kgs)	14,515	14,515
	Area (ha)	81	81
	Rate	180	180

CITATIONS

- CDFA (California Department of Food and Agriculture). 2002. Recommended permit conditions for using 1,3-dichloropropene fumigants. September 12, 2002. Available online at <http://www.cdpr.ca.gov/docs/enfcmpli/penfltrs/penf2002/2002atch/attach37.pdf>
- CDFA (California Department of Food and Agriculture). 2005. Notice of Proposed and Final Decisions and Directors Findings . December 2005. Available online at <http://www.cdpr.ca.gov/docs/nod/2005-50.htm>
- Stoddard, C.S. 2005. Sweetpotato Research Progress Report 2005. UCCE Merced County. Provided by C.S. Stoddard.
- Stoddard, C.S. 2008. Research Progress Report: Fumigation and cover crop trial on sweet potatoes. University of California Cooperative Extension Service, Merced County.
- Stoddard, C.S. 2008. MeBr Alternatives for Sweet Potato Hotbeds in California. Available online at: <http://www.mbao.org/2008/027Stoddard.pdf>
- Trout, T. 2005. Impact of township caps on telone use in California. Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions, 2005. <http://www.mbao.org/2005/05Proceedings/127TroutT%20mb-pest-use-telone-rpt05-mbao.pdf>