NOMINATING PARTY: The United States of America

FILE NAME: USA CUN11 SOIL **NURSERY STOCK—FRUIT, NUT, AND ROSE** Open Field

BRIEF DESCRIPTIVE TITLE OF NOMINATION:
Methyl Bromide Critical Use Nomination for Preplant Soil Use for Nursery Stock—Fruit, Nut, And Rose in Open Fields (Submitted in 2009 for 2011 Use Season)

CROP NAME (OPEN FIELD OR PROTECTED): Nursery Stock—Fruit, Nut, And Rose Open Field

QUANTITY OF METHYL BROMIDE REQUESTED:

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

Year	NOMINATION AMOUNT
2011	**7,955 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 NURSERY STOCK—FRUIT, NUT, AND ROSE Open Field	11	
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 NURSERY STOCK—FRUIT, NUT, AND ROSE Open Field		

* Identical to paper documents

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

NURSERY STOCK—FRUIT, NUT, AND ROSE

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

Nursery producers provide pest-free stock plants that are used for the establishment of orchards and gardens. Nurseries in this sector provide plants to commercial growers of rose bush stock plants, and such diverse fruit crops as apricots, peaches, prunes, nectarines, cherries, plums, apples, pears, Asian pears, and ornamental pears. Nut trees produced by these nurseries include almonds, walnuts, pistachios, pecans, and chestnuts. Approximately 95% of the trees are fruit and nut varieties sold to commercial producers; the other 5% are ornamental types used for landscaping. Deciduous trees are primarily produced in the Sacramento and San Joaquin valleys of California.

Nurseries provide pest-free stock plants in order to meet state-mandated certification requirements for plant material (CDFA, 2003). Compliance with federal regulations for movement of plant material may also be required (USDA-APHIS, 2007; USDA-APHIS, 2004). To achieve pest-free status, nurseries have relied on methyl bromide to provide effective fumigation on soils in diverse locations with various soil types and moisture conditions. In some situations the use of 1,3-dichloropropene (1,3-D) can provide an effective alternative to methyl bromide for nematode control to enable nurseries to attain certification for stock. However, use of 1,3-D is restricted by township cap regulations and, for optimal efficacy, requires a soil type and moisture level that is compatible with the chemical activity (e.g., Hanson et al., 2008; Hanson et al., 2007). Moisture restrictions for 1,3-D may be more limiting than township caps. Nurseries with heavy soils or moisture greater than 12% (especially common in clay soils at depths of 1 to 1.5 meters) may not use 1,3-D to reduce nematode populations. Currently, where pathogens and nematodes are key pests, as in most nurseries, methyl bromide is critical.

Deciduous tree nurseries range in size from 15 to over 600 hectares in field beds. A typical operation ranges between 80 and 120 hectares. The climate and soil is ideal for fruit and nut tree nurseries (as well as for fruit and nut production). While some nurseries concentrate on specific tree crops, most nurseries grow and sell a variety of different trees. Nursery stock is grown on a cropping system that includes crop rotation or cover cropping between tree production cycles; therefore, not all of the nursery area is in tree production in a given year. The tree production cycle can be anywhere from a single year to several years depending on the type of tree crop being produced. Nursery production of trees takes from one to four years in the ground depending on the type being produced. In order to prepare the ground for planting, the fields are disked, deep ripped, leveled, and then fumigated to meet certification standards set by the California Department of Food and Agriculture (CDFA, 2003). Methyl bromide is applied by shank and treated area is usually covered with a tarp. The fumigation is carried out around August and September, and planting begins in October, and may continue through January.

Nursery roses are grown in open field plots. A typical crop rotation for a two-year rose crop

includes one year fallow, followed by one or two years of rotational crops, and then a two-year rose crop. The two-year rose crop cycle begins with land preparation (removing the cover crop, deep cultivation, and fumigation with methyl bromide), followed by planting the rootstock and T-bud grafting. In late winter of the first year, the rootstock tops are removed. The rose crop matures by the second autumn and is then harvested. This cycle varies depending on the type of rose crop being produced (e.g., two-year roses, one-year minis and patio trees, or 18-month mini bushes).

Where soil conditions and regulations allow, 1, 3-D may be used as an alternative to methyl bromide, but it appears to have a relatively limited use due to regulatory restrictions and soil moisture requirements (Hanson et al., 2007).

2. SUMMARIZE WHY KEY ALTERNATIVES ARE NOT FEASIBLE

The only alternative allowed by regulation for open field nursery stock in California is 1,3-D (CDFA, 2003). However, 1,3-D is restricted by township cap regulations and requires a soil type and moisture level that are compatible with the chemical activity (e.g., McKenry, 2000; Schneider et al., 2004). Moisture restrictions for 1,3-D may be more limiting than township caps. Nurseries with heavy soils or moisture greater than 12% (especially common in clay soils at depths of 1 to 1.5 meters) do not receive certification of nursery stock. In these situations methyl bromide is critical.

The requested amount of methyl bromide in the U.S. nomination includes those areas where 1,3-D would not meet the certification requirements or would be limited by township caps. Under California regulatory laws, nursery crops must be "free of especially injurious pests and disease symptoms" in order to qualify for a CDFA Nursery Stock Certificate for Interstate and Intrastate Shipments (CDFA, 2003). If an approved fumigation is not used in the nursery, a nematode sampling procedure is imposed by CDFA, and if nematodes are found all nursery stock in an area are destroyed resulting in a complete loss. Methyl bromide meets the certification guidelines. Under certain soil conditions 1,3-D may also meet guidelines for nematode infestations. Control of pathogens and weeds, which are also important pests of nurseries and part of the pest-free certification requirements, requires rigorous multi-year testing of alternatives. This nomination is for the critical use of methyl bromide where alternatives cannot be used or are not effective.

3. IS THE USE COVERED BY A CERTIFICATION STANDARD?

Nurseries in this sector are covered by certification requirements as described in state (e.g., CDFA, 2003) and federal (e.g., USDA-APHIS, 2007; USDA-APHIS, 2004) regulations. For example, "Section 3640, CCR, makes it mandatory that nursery stock for farm planting be commercially clean with respect to economically important nematodes" (CDFA, 2003). The regulations list methyl bromide and 1,3-D as appropriate fumigants for control of nematodes. For other pests, methyl bromide currently may be the only acceptable fumigant.

The requested amount of methyl bromide in the U.S. nomination is for nursery soils that require methyl bromide to meet the certification requirements. Under California regulatory laws, nursery crops must be "free of especially injurious pests and disease symptoms" in order to qualify for a CDFA Nursery Stock Certificate for Interstate and Intrastate Shipments (CDFA, 2003). If an approved fumigation is not used in the nursery, a nematode sampling procedure is imposed by CDFA, and if nematodes are found all nursery stock in an area should be destroyed resulting in a complete loss. Also, while in certain soil conditions 1,3-D meets certification guidelines; California township caps may limit the use of 1,3-D.

If nematodes are found and the nursery stock is not "free of especially injurious pests and disease symptoms", then a total loss is likely because the nursery stock: 1) would not qualify for a CDFA Nursery Stock Certificate for Interstate and Intrastate Shipments, 2) would likely not be marketable since resale for planting is severely restricted by the CDFA, and 3) should be destroyed to prevent further infestation.

CALIFORNIA (CDFA, 2003)

California regulations (e.g., CDFA, 2003—NIPM #3) for nursery standards (reg. 3060.2-a) include:

> "All nursery stock shall be kept 'commercially' clean with respect to established pests of general distribution. Commercially clean shall mean that pests are under effective control, are present only to a light degree, and that only a few of the plants in any lot or block of nursery stock or on the premises show any infestation or infection, and of these none show more than a few individuals of any insect, animal or weed pests, or more than a few individual infestations of any plant disease."

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.

Methyl bromide is used on nurseries where effective pest management and regulatory constrains preclude the use of 1,3-D. Regulatory restrictions on 1,3-D, can limit the use for a portion of nurseries of this sector. For example, depending on the season, the deciduous fruit and nut tree growers may use 1,3-D as an alternative on approximately 35% of nursery land. These areas are able to achieve less than 12% moisture (up to 1.5 m) on light soils. Sites on which 1,3-D is used are not included in the nomination.

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?

According to the requesting consortium, advances using alternatives are being made. Some deciduous tree nurseries use a double application of 1,3-D where moisture of less than 12% can be achieved on light soils, although weeding costs may be higher. This is allowed by California certification regulations, except where township restrictions apply or where plantback restrictions prevent the planting of a rotational crop.

6. SUMMARY OF RECENT RESEARCH

Raspberry nurseries did not repeat their request for a critical use of methyl bromide for 2011.

Reasons for the critical need for methyl bromide include: 1) 1,3-D is not an approved treatment for fine-textured soils; 2) greater inputs are required for soil preparation and moisture management; 3) township caps and buffer zone requirements; 4) weed management efficacy; and 5) air quality standards related to volatile organic compounds.

Research is continuing in order to identify and develop an alternative methodology for nurseries (Hanson et al., 2007). The only treatment other than methyl bromide sanctioned for field-grown stock is 1,3-D (CDFA, 2003; Hanson et al., 2008). Until methods have been identified that can ensure that nursery stock will receive certification with comparable efforts and costs to methyl bromide, methyl bromide is considered critical for this sector.

Research is continuing to identify alternatives that will be effective and acceptable for certification. Methyl bromide has historically provided nurseries with an effective means of managing weeds. Few effective herbicides are available to nursery managers in California (Shrestha et al., 2008). Without methyl bromide California nurseries require alternatives that will allow certification of stock and not significantly increase costs due to hand-weeding. Shrestha et al. (2008) found that:

- The alternative fumigants (iodomethane:chloropicrin, 1,3-D, 1,3-D:chloropicrin (61:35) with HDPE or VIF), and drip 1,3-D/chloropicrin (InLine) generally provided similar weed control to soils treated with methyl bromide:chloropicrin (98:2)
- There were differences in weed species and weed densities at four locations; however, the efficacy of alternatives, with regard to weed seed germination and weed control, were generally comparable to methyl bromide treatments
- Alternative fumigants and methyl bromide, in general, resulted in similar hand-weeding efforts
- In general, there did not appear to be a difference between VIF or HDPE film in weed control or hand-weeding time

Fumigant trials previously reported (Hanson et al., 2007) in rose nurseries have continued to identify possible alternatives (Hanson et al., 2008). Recent results of rose nursery trials at two locations indicated that 1,3-D (373 kg/ha) used with standard or VIF films resulted in similar *Pythium*, *Fusarium*, and citrus nematode control compared to methyl bromide:chloropicrin (392 kg/ha of 98:2) used with standard HDPE film. Total weed populations in plots fumigated with alternatives were similar to plots treated with methyl bromide.

7. ECONOMIC INFEASIBILITY 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 nursery stock 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: 1,3-Dichloroporopene (or Telone®) plus Chloropicrin.

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

[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.

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 nursery stock 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.

Certification requirements. The requested amount of methyl bromide in the U.S. nomination includes those areas where 1,3-D would not meet the certification requirements or would be limited by township caps. Under California regulatory laws, nursery crops must be "free of especially injurious pests and disease symptoms" in order to qualify for a CDFA Nursery Stock Certificate for Interstate and Intrastate Shipments (CDFA, 2003). If an approved fumigation is not used in the nursery, a nematode sampling procedure is imposed by CDFA, and if nematodes are found all nursery stock in an area should be destroyed resulting in a complete loss. Methyl bromide meets the certification guidelines. Also, in certain soil conditions, 1,3-D meets certification guidelines; California township caps may limit the use of 1,3-D.

If nematodes are found and the nursery stock is not "free of especially injurious pests and disease symptoms", then a total loss is likely because the nursery stock:

- Would not qualify for a CDFA Nursery Stock Certificate for Interstate and Intrastate Shipments,
- Would probably not be marketable, since resale for planting is severely restricted by the CDFA.
- Should be destroyed to prevent further infestation.

Yield loss. It is likely that yield losses would also occur where soil conditions are not ideal, but little data are available. The yield loss could be 100% if the nursery stock cannot be certified as pest-free.

Reduced pesticide use. An effective fumigation results in a growth response that allows an initial growth spurt. This growth response helps maintain a healthy plant, which is able to better handle the stress induced by pathogens and pests. A healthier plant consequently requires a fewer number of pesticide sprays during the season.

Beyond the nursery. Healthier plants and trees provide benefits beyond the nursery in terms of higher yields of fruit and nuts and reduced infestations. One hectare of nursery stock provides these benefits to many hectares producing fruits and nuts.

California Rose Growers

We conclude that, at present, 1,3-Dichloroporopene (or Telone®) plus Chloropicrin would be the economically feasible alternative to methyl bromide for use in California Rose Production where Telone® restrictions do not apply. Telone® appears to have similar yields as methyl bromide yet is a cheaper alternative, thus, growers may prefer to use Telone®. However, township restrictions and certification restrictions hinder growers from using Telone® and render it technically infeasible.

TABLE 2. CALIFORNIA ROSE GROWERS: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

CALIFORNIA ROSE GROWERS	METHYL BROMIDE	1,3-DICHLOROPROPENE + CHLOROPICRIN
PRODUCTION LOSS (%)	0%	0%
PRODUCTION PER HECTARE (CWT)	38,112	38,112
* PRICE PER UNIT (US$)	$ 2	$ 2
= GROSS REVENUE PER HECTARE (US$)	$ 87,182	$ 87,182
- OPERATING COSTS PER HECTARE (US$)*	$ 72,511	$ 71,973
= NET REVENUE PER HECTARE (US$)	$ 14,671	$ 15,209
1. LOSS PER HECTARE (US$)	$ -	$ (537)
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$ -	$ (2)
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 (%)	17%	17%

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

California Deciduous Fruit and Nut Nursery Tree Growers

We conclude that, at present, 1,3-Dichloroporopene (or Telone®) plus Chloropicrin would be the economically feasible alternative to methyl bromide for use in California Deciduous Fruit and Nut Nursery Trees where Telone® restrictions do not apply. Telone® appears to have similar yields as methyl bromide yet is a cheaper alternative, thus, growers may prefer to use Telone®. However, township restrictions and certification restrictions hinder growers from using Telone® and render it technically infeasible.

TABLE 3. CALIFORNIA DECIDUOUS FRUIT AND NUT NURSERY TREE GROWERS: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

CALIFORNIA DECIDUOUS FRUIT AND NUT NURSERY TREE GROWERS	METHYL BROMIDE	1,3-DICHLOROPROPENE + CHLOROPICRIN
PRODUCTION LOSS (%)	0%	0%
PRODUCTION PER HECTARE (BOX 25LBS)	45,898	45,898
* PRICE PER UNIT (US$)	$ 5	$ 5
= GROSS REVENUE PER HECTARE (US$)	$ 228,801	$ 228,801
- OPERATING COSTS PER HECTARE (US$)*	$ 97,490	$ 96,214
= NET REVENUE PER HECTARE (US$)	$ 131,311	$ 132,587
1. LOSS PER HECTARE (US$)	$ -	$ (1,276)
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$ -	$ (4)
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0%	-1%
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	-1%
5. OPERATING PROFIT MARGIN (%)	57%	58%

*Note that the measures in the tables below 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 4. NOMINATION AMOUNT: 2011 Methyl Bromide Usage Newer Numerical Index (BUNNI) – Transition Use Reduction Description Spreadsheet**.**

SECTOR		NURSERY STOCK		
		California Rose Growers	California Assoc of Nursery and Garden Centers	Sector Total / Average
Quantity Requested for 2010:	Amount (kgs)	1,020	7,445	8,465
Quantity Recommended by MBTOC/TEAP for 2010 :	Amount (kgs)	955	7,000	7,955
Quantity Approved by Parties for 2010:	Amount (kgs)	955	7,000	7,955
	Area (ha)	5	35	40
	Rate	191	200	199
Transition from 2010 Baseline Adjusted Value	Percentage (%)	-6%	-6%	-6%
Quantity Required for 2011 Nomination:	Amount (kgs)	**955**	**7,000**	**7,955**
	Area (ha)	**5**	**35**	**40**
	Rate	**191**	**200**	**199**

CITATIONS

CDFA (California Department of Food and Agriculture). 2003. http://www.cdfa.ca.gov/phpps/PE/Nursery/NIPM.html Regulation for nursery and seed inspection (NIPM #3), http://www.cdfa.ca.gov//phpps/PE/Nursery/pdfs/nipm_3_regs_nsy_sees_insp.pdf; Approved treatment and handling procedures to ensure against nematode pest infestation of nursery stock (NIPM #7), http://www.cdfa.ca.gov/phpps/PE/Nursery/pdfs/NIPM_7.pdf;

Hanson, B. D., Gao, S., Gerik, J., Wang, D., and Qin, R. 2008. Pest control with California approved nursery stock certification 1,3-D treatments. Annual International Research Conference on Methyl Bromide Alternatives (2008). http://mbao.org/

Hanson, B. D., Gao, S., McKenry, M., Gerik, J., Wang, D., Klonsky, K., Cox, D., Correiar, B., and Yates, S. 2007. Efficacy and 1,3-D emissions with approved nursery stock certification treatments applied with two shank designs. 2007 Annual International Research Conference on Methyl Bromide Alternatives. http://www.mbao.org/2007/Proceedings/013HansonBMBAO2007PAWproject.pdf

McKenry, M. V. 2000. Evaluation of alternatives to methyl bromide for soil fumigation at commercial fruit and nut tree nurseries. Contractor for California Association of Nurseryman. Prepared for California Department of Pesticide Regulation. http://www.cdpr.ca.gov/docs/pestmgt/grants/98-99/finlrpts/98-0281.pdf

Schneider, S., T. Trout, J. Gerik, and H. Ajwa. 2004. Perennial crop nurseries—performance of methyl bromide alternatives in the field. Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions (2004). www.mbao.org

Shrestha, A., Browne, G. T., Lampinen, B. D., Schneider, S. M., Simon, L. and Trout, T. J. 2008. Perennial crop nurseries treated with methyl bromide and alternative fumigants: effects on weed seed viability, weed densities, and time required for hand weeding. Weed Technology 22:267-274.

USDA-APHIS (Animal and Plant Health Inspection Service), Plant Protection and Quarantine. 2007. Official regulatory protocol for wholesale and production nurseries containing plants infected with *Phytophthora ramorum*. http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/CNPv8.0-7-20-07.pdf

USDA-APHIS (Animal and Plant Health Inspection Service), Plant Protection and Quarantine. 2004. Sudden Oak Death. Amended order restricting movement of nursery stock from California nurseries, April, 2004. http://www.aphis.usda.gov/newsroom/hot_issues/sod/content/printable_version/SOD_Order_4-22-04.pdf