NOSB NATIONAL LIST
FILE CHECKLIST

CROPS

MATERIAL NAME: **Oils, Petroleum Based**

CATEGORY: Synthetic **Complete?:** _____

✓ **NOSB Database Form**

✓ **References**

_____ **MSDS (or equivalent)**

✓ **Date file mailed out:** 1/17/95

_____ **TAP Reviews from:** _____

Bill Wolf / Vivian Purdy

_____

_____

✓ **Supplemental Information:**

information sheet - Sun Company

MISSING INFORMATION: another TAP review

NOSB/NATIONAL LIST COMMENT FORM/BALLOT

Use this page to write down comments and questions regarding the data presented in the file of this National List material. Also record your planned opinion/vote to save time at the meeting on the National List.

Name of Material Oils, Petroleum Based

Type of Use: ✓ **Crops;** ____ **Livestock;** ____ **Processing**

TAP Review by:

1. Bill Wolf / Vivian Purdy
2. ____
3. ____

Comments/Questions:

My Opinion/Vote is:

Signature ____ **Date** ____

USDA/TAP REVIEWER COMMENT FORM

Petroleum Based Oils

Natural or Synthetic: While crude petroleum oil is a natural product, the extensive processing and refining required to produce a crop oil would suggest it should be considered a synthetic.

Accuracy of file: I don't see where the National Law limits use of petroleum oils to woody plants, as indicated on your database form. Many of these oils are also used on vegetables.

National List recommendation: Allowed synthetic. Dormant sprays are compatable with organic systems because they attack the pest at a weak stage in its lifecycle. The low toxicity of the product and its mode of action support its use, even though synthetic in nature. Even as a foliage spray, the low toxicity justifies its use.

Alternatives: To my knowledge, there are no natural oils - such as vegetable or fish oils - that are currently EPA registered for use on insects. While some growers do use natural oils instead of petroleum, they are of unproven effectiveness. More research is needed and EPA registration is required before we can remove petroleum oils as an organic alternative for dormant sprays.

For summer sprays, the alternatives are soap (another allowed synthetic?) or botanicals. Trapping can be effective for some of the pests targeted by oils, but is not practical on a large scale.

Other organic solutions do not target insect eggs.

Biology: Pest resistance should not be a problem due to the smothering mode of action.

References: Sunoco's Grower's Oilmanac detailing production techniques (enclosed).

Reviewed by Vivian Purdy, Feb. 28.1995 Vivian Purdy

This report was also reviewed by Bill Wolf, who agrees with the facts and opinions set forth. Bill Wolf

NOSB Materials Database

3.

Identification

Common Name **Oils, Petroleum Based** **Chemical Name**

Other Names Dormant Oil, Suffocating Oil, Summer Oil, Volck Dormant Oil, Omni Supreme Spray

Code #: CAS 64741-89-5 **Code #: Other**

N. L. Category Synthetic Allowed

Chemistry

Composition Highly refined paraffin type petroleum oil base **Family** Petroleum Hydrocarbon

Properties Clear, odorless, oily liquid.

How Made Crude oil is extracted from ground and refined by fractional distillation. Composition of petroleum varies from one locality to the next. The most refined types are the most suited to agricultural use, and summer use requires a more refined oil than dormant use. Usually formulated with an emulsifier to help the oil stay in solution in water.

Use/Action

Type of Use Crops

Use(s) -Insecticide: aphids, cankerworms, leafhoppers, leaf rollers, leaftiers, mealybugs, mites, mosquitoes, scales, psylids, tent caterpillars, webworms.

Action Acaride and insecticide with ovicidal activity. Works by smothering the pest so that it can't respire.

Combinations Water plus Emulsifier and Soap

Status

OFPA 2118(c)1(B)i

N. L. Restriction Allowed on woody plants for dormant and summer pest control. May not contain any prohibited substances. Prohibited for use as weed control.

EPA, FDA, etc 59639-20-AA

Registration

Directions

Safety Guidelines Do not apply if possible drift could occur, may damage crops.

State Differences

Historical status Allowed by a wide majority of certification groups.

International status OCIA: Restricted; CODEX and EU ok for paraffin oil; IFOAM ok for light mineral oil.

NOSB Materials Database

OFPA Criteria

2119(m)1:chem. inter.
-No risk of polynuclear aromatic compounds entering food chain
-Incompatibility: strong OXIDIZERS or SULFUR containing materials.
-Unknown decomposition products may form in a fire situation. Incomplete combustion may lead to formation of carbon monoxide or asphyxiants.

2119(m)2: toxicity
-Oral LD-50: Acute >15g/kg (Rat)
-Inhalation: LC-50 >5.32mg/L (Rat-4 hours)

2119(m)3:manufacture Petroleum drilling and refining has a wide range of environmental impacts.

2119(m)4:humans
-Not poisonous to humans
-Dermal Entry
-May be irritant to eyes and nasal passages
-Moderate skin irritant

2119(m)5: biology CAUTION: against spraying certain thin barked species: maples, beeches, birches and certain evergreens: conifers with waxy powdery leaves

2119(m)6:alternatives -Lime Sulfur, vegetable or animal-derived oils, soap, pheromones (each of these is very situation-specific).

2119(m)7:compatible

References

1. Olkowsk, W, S. Daar, H. Olkowski. 1991. Common Sense Pest Control. Conneticut. Tauton Press. pg 112-114.

2. Chemical Free Yard and Garden 1991.Emmus, PA. Rodale Press. pgs.211-213.,

United Horticulture Supply: 303-356-4400
Valent, U.S.A. Corporation:1333 N. California Blvd. 415-256-2700

Petroleum Oils REFERENCES

AU: McWhorter,-C.G.; Ouzts,-C.; Hanks,-J.E.
TI: Spread of water and oil droplets on johnsongrass (sorghum halepense) leaves.
SO: Weed-sci. Champaign, Ill. : Weed Science Society of America. July/Sept 1993. v. 41 (3) p. 460-467.
CN: DNAL 79.8-W41

AU: Buckardt,-H.L.
TI: Effectiveness of furfural petroleum combinations in eradicating certain noxious weeds.
SO: J-Am-Soc-Agron. Madison, Wis. : American Society of Agronomy. June 1936. v. 28 (6) p. 437-442.
CN: DNAL 4-AM34P

AU: Knapp,-J.L.
TI: Effect of different petroleum oils on defoliation, fruit quality, and pest control of Florida citrus.
SO: Proc-Annu-Meet-Fla-State-Hortic-Soc. [S.l.] : The Society. June 1991. v. 103 p. 1-4.
CN: DNAL SB319.2.F6F56

AU: Johnson,-W.C.-III; Mullinix,-B.G.-Jr.; Brown,-S.M.
TI: Phytotoxicity of chlorimuron and tank mixtures on peanut (Arachis hypogaea).
SO: Weed-Technol-J-Weed-Sci-Soc-Am. Champaign, Ill. : The Society. Apr/June 1992. v. 6 (2) p. 404-408.
CN: DNAL SB610.W39

AU: Lawson,-D.S.; Weires,-R.W.
TI: Management of European red mite (Acari: Tetranychidae) and several aphid species on apple with petroleum oils and an insecticidal soap.
SO: J-Econ-Entomol. Lanham, Md. : Entomological Society of America. Oct 1991. v. 84 (5) p. 1550-1557.
CN: DNAL 421-J822
PY: 1991
AB: Three petroleum oils and one insecticidal soap were evaluated in laboratory tests at different rates for ovicidal efficacy against overwintering Panonychus ulmi (Koch) eggs. Sunspray 6E and Volck Supreme oils caused the greatest mortality of all materials tested. Sunspray 6E+ caused less mortality than did the Sunspray 6E and Volck Supreme but greater mortality than Safer Insecticidal Soap Concentrate, which caused only slightly greater mortality than the distilled water check. Field applications of the same materials by airblast sprayer and high-pressure handgun caused less mortality of overwintering eggs than in the laboratory study. Summer applications of these materials were tested for their ability to suppress mite and aphid populations throughout the growing season. Applications of all materials provided significant control of populations of P. ulmi, rosy apple aphid, Dysaphis plantaginea (Passerini), and a green aphid complex made up of the apple aphid, Aphis pomi De Geer, and the spirea aphid, Aphis spiraecola Patch. Spray volume, coverage, and rate of material applied were related to mite and insect control and plant phytotoxicity; the greater the volume, coverage, and rates used, the greater the control and phytotoxicity obtained. Volck Supreme oil, particularly at the high rate, caused more damage to fruit and foliage than did any of the other treatments. Sunspray 6E and Sunspray 6E+ appear to be equally safe to fruit and foliage based on phytotoxicity ratings taken throughout the growing season.

AU: Swingle,-H.-S. (Homer Scott), 1902-; Snapp,-Oliver-I. (Oliver Irvin), 1895-
TI: Petroleum oils and oil emulsions as insecticides, and their use against the San Jose scale on peach trees in the south.
SO: Washington : U.S. Dept. of Agriculture, 1931. 48 p., 2 p. of plates : ill.
CN: DNAL 1-Ag84Te-no.253

AU: Riehl,-L.A.
TI: Fundamental consideration and current development in the production and use of petroleum oils.

SO: Proceedings of the International Society of Citriculture / [International Citrus Congress, November 9-12, 1981, Tokyo, Japan ; K. Matsumoto, editor]. Shimizu, Japan : International Society of Citriculture, 1982-1983. p. 601-607.
CN: DNAL SB369.I5-1981

AU: Wills,-G.D.; Hanks,-J.E.; Mack,-R.E.
TI: Evaluation of the effect of a paraffinic petroleum oil-based adjuvant and an organosilicone-modified methylated vegetable-oil-based adjuvant on the efficacy of imazethapyr herbicide as applied in conventional and ultra-low volumes.
SO: Pestic-sci. Essex : Elsevier Applied Science Publishers. 1993. v. 38 (2/3) p. 280-282.
CN: DNAL SB951.P47

AU: Cornish,-A.; Battersby,-N.S.; Watkinson,-R.J.
TI: Environmental fate of mineral, vegetable and transesterified vegetable oils.
SO: Pestic-sci. Essex : Elsevier Applied Science Publishers. 1993. v. 37 (2) p. 173-178.
CN: DNAL SB951.P47

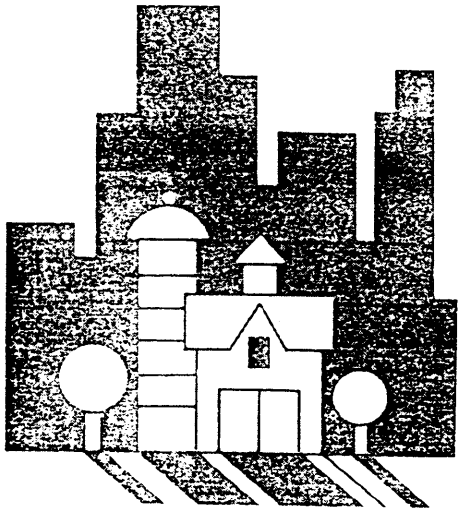
AU: Hamilton,-R.J.
TI: Structure and general properties of mineral and vegetable oils used as spray adjuvants.
SO: Pestic-sci. Essex : Elsevier Applied Science Publishers. 1993. v. 37 (2) p. 141-146.
CN: DNAL SB951.P47

GROWER'S OILMANAC™

PUBLISHED BY SUN COMPANY, INC. FIRST ISSUE

Grower's Oilmanac is written and published by Sun Company, Inc. (R&M), the manufacturers of superior horticultural spray oils marketed under the Sunspray name. The purpose of our bulletin is to educate the public and our customers about the advantages, and some precautions, when using a superior horticultural spray oil as a pesticide. The bulletin will be published semi-annually and will include a key subject in each issue along with a questions and answer section.

In our first issue, Sun Company, Inc. would like to provide the reader with some background on horticultural oils and a better understanding of their origin.



Sun and the Evolution of Sunspray

Sun Company, Inc. has been involved in developing and manufacturing superior horticultural spray oils dating back over 50 years. These oils are not new to the arsenal of pesticides. They have been used as insecticides and fungicides on bananas, citrus, apples and, to a lesser extent, woody ornamentals for many years. Technology has advanced greatly in recent years and a better understanding has developed as to what it takes to make an effective horticultural spray oil. Concurrently, added regulations and environmental concerns along with increased obsolescence of synthetic organic pesticides due to pest mutation have caused people to question their use. The scientific community, as well as the general public, is interested in more natural, less toxic substances. Fortunately, horticultural spray oils fall into this category.

The Production of Sunspray

Petroleum products come from refining crude oil and are typically comprised of three hydrocarbon types: paraffins, naphthenes and aromatics. Paraffins are the most stable hydrocarbon structure in applications requiring oxidation, heat and light stability. Accordingly, paraffins are the predominant hydrocarbon structure found in superior horticultural spray oils because they are less likely to react and cause phytotoxicity problems when sprayed on plants and trees. To obtain this paraffinic predominance, it is important to select the proper crude oil. Second, it is critical to properly develop this paraffinic predominance through selective refining techniques which will be referred to as processing. Finally, the selection of key analytical tests is important in guaranteeing that key performance properties are met. We will discuss these three areas in further detail.

1. Crude Selection

Crude oil is a naturally occurring substance which was formed by decaying organic matter millions of years ago. Proper crude selection is an important first step in the process of manufacturing an effective horticultural spray oil. Proper selection of paraffinic crude permits us to product spray oil products which are more efficacious, safer to the plant and tree, and more cost effective.

When a barrel of crude oil comes into a refinery, it is distilled into numerous fractions based on the boiling points. The boiling point of a specific fraction determines what finished product the fraction will be used to formulate. The bottom of the crude barrel, typically 30%-40% for a paraffinic lube crude, is referred to as reduced crude and this is the stream from which the lube oil or base oil fractions are produced. The various lube products obtained from crude oil fractions are illustrated in Figure 1.

2. Proper Processing

Further processing the lube fraction to consistently produce a superior horticultural spray oil to a particular set of specifications is not easy. Sufficient amounts of unstable, potentially harmful aromatic compounds must be removed because, if not removed in adequate quantities, the product will be phytotoxic to plants and trees. Reduction of aromatics is accomplished by their removal or by converting them into more stable naphthenes and paraffins. The method of removal is an extraction process utilizing a solvent which is selective of aromatics. The method of conversion is a hydrogenation process utilizing a catalyst, along with high temperature and pressure.

Equally as important as aromatics reduction is proper distillation of the lube oil fraction to produce the desired midpoint and distillation range for the spray oil. This controls the length of time the spray oil remains on the plant or tree. If the spray remains on the plant too long, it could harm the plant. However, if it does not remain on the plant long enough, it will not be effective against pests.

3. Selection of Key Analytical Test Methods

The analytical test methods are specified by ASTM (American Standards and Testing Methods) and are used to assure the satisfactory performance of the spray oil and to properly control the processing. The two most important analytical tests are ASTM D1160, a vacuum distillation which checks the distillation midpoint (temperature at 50% distilled) and the distillation range (temperature at 90% distilled minus the temperature at 10% distilled) and ASTM D483, unsulfonated residue which reports the amount of stable unreactive compounds in the oil. Details on these ASTM tests will be published in our next issue.

For answers to other pertinent questions related to superior horticultural spray oils and their uses, write to:

Sun Company, Inc.
P.O. Box 1135
Marcus Hook, PA 19061
Attn: Ms. Nancy E.H. Wright

Figure 1: Lube Products from Crude Oil Fractions