

what they are

2078

SUNSPRAY is

the trade mark of Sun Oil Company's product line of horticultural spray oils made especially for use with other agricultural pesticides. They are highly refined paraffinic hydrocarbons and are supplied to formulators either as base oils or completely miscible products. The SUNSPRAY line represents the latest generation of horticultural quality oils that Sun has been researching, manufacturing and field-testing for more than 50 years.

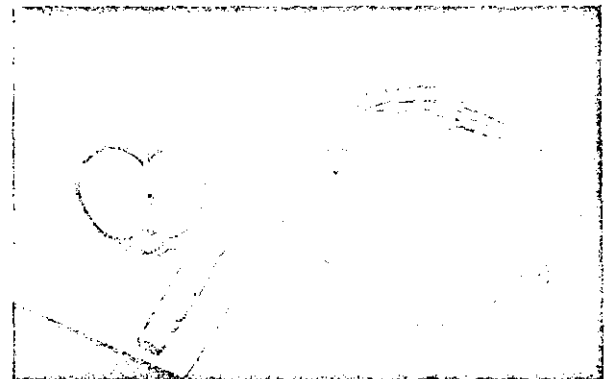
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Available Sunspray Products			
Product	SUS Vis. @ 100 °F	EPA Reg. No.	Wt. % Oil
1. Sunspray 11N	120 max.	862-4	100
2. Sunspray 7N	74 max.	862-6	100
3. Sunspray 6N	63 max.	862-10	100
4. Sunspray 11E	120 max.	862-9	98.8
5. Sunspray 7E	74 max.	862-8	98.8
6. Sunspray 6E	63 max.	862-11	98.8

The "N" Series of base oils are for formulators who prefer to produce their own miscible oil.

The "E" series are offered as a customer service to formulator-distributors of agricultural pesticides who prefer to purchase a ready made miscible oil.

When you apply Sunspray as a part of your spray program you can get beneficial results like this



Cortland apples

—healthy, high-yield crops generally unmarred by insect damage.

Photo credits:

- Prof. Dean Asquith, Entomologist, Pennsylvania State University
- Dr. P. J. Chapman, Entomologist Emeritus, Cornell University
- Dr. R. R. Kriner, Entomologist, Rutgers University
- Dr. A. S. Deal, Entomologist, University of California
- Mr. Harvey Sutton, Waverly Growers Cooperative, Florida
- Florida Extension Service, University of Florida

but they do

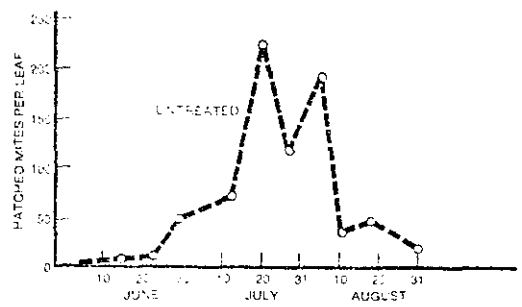
where they are used

in's interest in agricultural chemicals originated in the Twenties when American fruit production was threatened by the European Red Mite (*anonychus ulmi*) and San Jose scale (*spidiotus perniciosus*). The spray oil that resulted from this challenge proved to be one of the most effective countermeasures ever developed for these fruit pests.

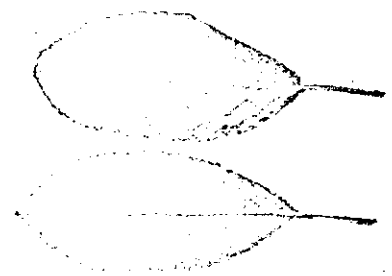
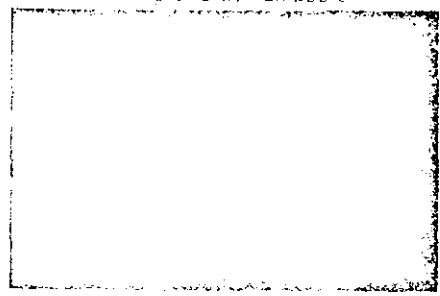
The oil component in agricultural sprays interferes fatally with insect metabolism. And, in contrast to certain synthetic organic pesticides, oil continues to be effective year after year. Certain insects evidently have a way of developing any protection against oil attack. The result is pesticidal power that conforms completely with the rigorous standards of current ecological and environmental programs.

Sunspray Emulsifier	For Formulator Use Only			For Rebranding Purposes		
	6N No	7N No	11N No	6E Yes	7E Yes	11E Yes
EPA Reg. #862	-10	-6	-4	-11	-8	-9
State Specs: Florida	FC412-66	FC435-66	None	FC412-66	FC435-66	None
New York	60 Sup.	70 Sup.	100 Sup.	60 Sup.	70 Sup.	100 Sup.
Texas	Light 410-425	Medium 430-450	Heavy 455-470	Light 410-425	Medium 430-450	Heavy 455-470
California Narrow Range Unclassified	CNR 415	CNR 440	Unclassified	CNR 415	CNR 440	Unclassified

Graph showing degree of control of European red mites: European red mite populations in untreated trees and in those receiving a 1% 60-second superior oil spray at the tight cluster bud stage, 1964, under Western New York State conditions



Over-wintering European red mite eggs on leaf of Stayman apple



Use Area	6N	7N	11N	6E	7E	11E
Citrus	X	X	X**	X	X	X**
Deciduous	X	X	X	X	X	X
Agronomical	X	X	X	X	X	X
Ornamental	X	X	X***	X	X	X***
Forestry		X				
Insecticide	X	X	X	X	X	X
Fungicide Additive	X	X	X	X	X	X
Herbicide Additive	—	X	X	X	X	X
Ground Rigs	X	X	X	X	X	X
Aerial	X	X	X	X	X	X
Concentrate	X	X	X	X	X	X

How they are used

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SUNSPRAY products

6N, 7N and 11N are not finished horticultural spray oils. They are, however, the principal or active ingredients. As such, they mix readily with many commercially available oil-soluble emulsifiers (non-ionic preferred).

Both quick-breaking emulsions, generally preferred for agricultural sprays; or stable emulsions, usually favored for ornamentals, can be formulated. It's just a matter of choosing the proper emulsifier concentration.

Sunspray 6N, 7N, and 11N provide full coverage for crop protection in all kinds of weather, leaving either a short residual or an extended residual, as desired.

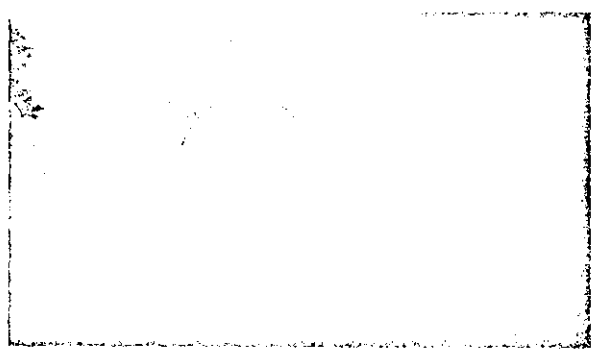
Pesticides that have been successfully combined with SUNSPRAY products include:

Insecticides:

EPN, Malathion, Cygon, Guthion, Imidan
Trithion, Ethion, Galecton and Phosalone

Fungicides:

Bordeaux, Fixed coppers, Cyprex, Difolatan, Benomyl,
TD-1771 (Cercobin-M),
Ferbam, Maneb, Polyram, Thiram and Zineb



Specific use suggestions

- 1 Sunspray Nos. 6N and 7N have narrow distillation ranges. These sprays evaporate uniformly and quickly from the surface of trees and plants, giving maximum plant safety consistent with efficient pest control.
- 2 Sunspray 7N is preferred for maximum pesticidal activity with a minimum of plant damage. Sunspray 6N is preferred if plants are approaching or breaking a stress condition. It gives adequate pesticidal control with maximum plant safety. Sunspray 11N is a quality product with a slightly broader distillation range which allows an oil application deeper in the dormant period, thereby extending the spray season to insure adequate time for an oil application.
- 3 Sunspray Nos. 6N and 7N have low viscosities which make these products four-season oils in the deciduous and citrus production area. Sunspray 11N offers a slightly higher viscosity for use in the early spring or deep dormancy to assure ample resistance to weathering.

the advantages that

Sunspray Oils

offer users

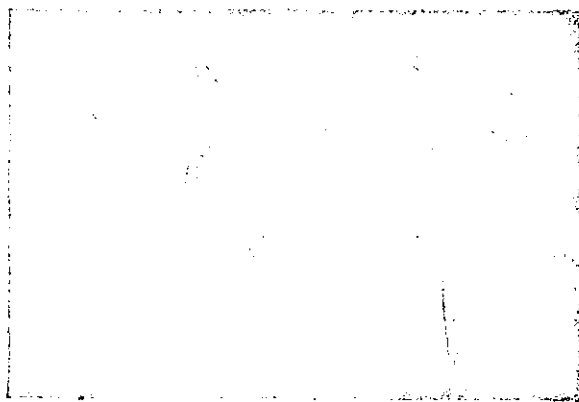
- 1 No build-up of resistance**
Sunspray Oils help retard the rapid build-up of insect and mite resistance to chemicals — no known resistance to oil has ever been exhibited by oil-susceptible pests.
- 2 Integrated control**
Sunspray Oils fit into and augment integrated control programs based on bio-chemical manipulation of the pests.
- 3 Versatility**
The "E" series of miscible oils can be combined in tank mixtures with certain other insecticides, fungicides and acaricides to provide broad-spectrum control of fruit pests (see page 4).
- 4 Exemption from tolerance requirement**
Sunspray Oils are exempted from the requirement of a tolerance when applied to growing crops in accordance with good agricultural practice, as listed in the Federal Register, Subpart D, Section 180.1001, Paragraph A and B, dated April 20, 1972.
- 5 Safe for plants**
These highly refined products offer a high degree of safety to plants.
- 6 Maximum economy**
Sunspray Oils provide extended periods of freedom from mite and scale stress.
- 7 Readily available**
There are Sunspray Distribution Centers in all major use areas in the United States.



Aphid eggs; over-wintering stage on apple twig



Rosy aphid on apple stems; *Anuraphis rosae* (Duckett)



Rosy aphid damage—healthy vs. curled leaves



Rosy aphid damage—healthy vs. malformed apples

Sunspray

and state specifications

The tables on this page show how Sunspray oils meet or exceed regional oil specifications for fruit production in the deciduous and citrus belts. These specifications were developed through research at state agricultural experiment stations throughout the United States and Canada.

Sunspray 6N/State Specifications

Property	N.Y. State 60 Second Superior Oil	State of Florida FC412-66	State of Texas Light Grade	State of Calif. Narrow Range 415	Typical Data for Sunspray
SUS Vis. @ 100°F. max. ¹	63	—	—	—	60
API Gravity @ 60°F. min. ²	35	33.0	34.5	—	35.5
Pour Point, °F. max. ³	+20	+20	+20	+20	+5
Un sulfonated Residue, min. ⁴ ASTM	94	92	92	92	96
Distillation @ 10mmHG ⁵ , 50% point °F. 10-90% Range, °F. max.	412±8	412±8	410-425	415±3	415
	65	80	80	60	60
% Carbon atoms in paraffinic structure (RI KVGC Analysis) minimum	—	—	—	60	66

The following ASTM methods are to be used: 1) D445-56 and D2161-66, 2) D287-67, 3) D97-66, 4) D482-66 and 5) D1150-61.

Sunspray 7N State Specifications

Property ⁽¹⁾	N.Y. State 70 Sec. Superior Oil*	State of Florida FC435-66	State of Texas Medium	State of Calif. Narrow Range 440	Typical Data for Sunspray
SUS Vis. @ 100°F. max.	75	—	—	—	72.0
API Gravity @ 60°F. min.	33.8	31	—	34.5	34.8
Pour Point, °F. max.	+20°F.	+20°F.	+20	+20°F.	+5
Un sulfonated Res., % min., ASTM	92	92	92	92	96.0
Distillation @ 10mmHg, 50% point °F. 10-90% Range, °F. max.	435±8	435±8	440±10	435-445	441
	80	80	80	75	73

*Applicable for all deciduous fruit areas. ⁽¹⁾ The ASTM methods listed above

Sunspray 11N/New York and Texas

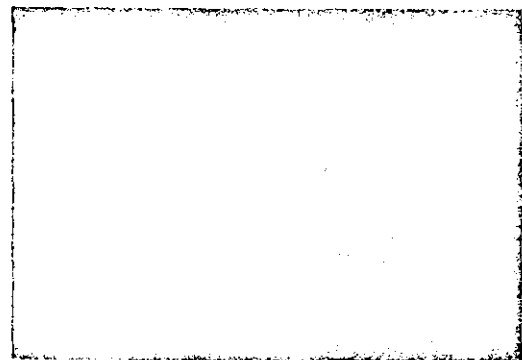
Property ⁽¹⁾	N.Y. State 100 Second Superior Oil	State of Texas Heavy Grade	Typical Data Sunspray 11N
SUS Vis. @ 100°F.	90-120	—	105
API Gravity @ 60°F. min.	31.0	—	33.3
Pour Point, °F. max.	+30	+20	-5
Un sulfonated Residue, min.	90	92	92
Distillation Range @ 10mmHg 50% 10-90% Range, °F.	•	455-470	408
	•	80 max.	123**

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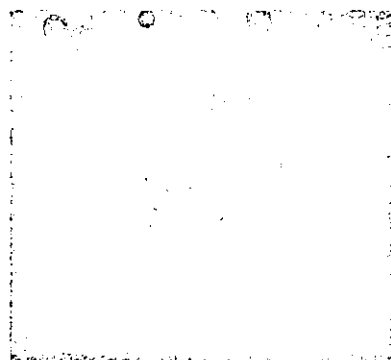
product availability

Refineries	6N			6E ¹			7N			7E ¹			11N ²			11E ¹		
	drums	TT	TC	drums	TT	TC	drums	TT	TC	drums	TT	TC	drums	TT	TC	drums	TT	TC
Marcus Hook, Pa.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tulsa, Okla.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Terminals																		
Tampa, Fla.	-	X	-	-	X	-	-	X	-	-	X	-	-	X	-	-	X	-
River Rouge, Mich.	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Toronto, Canada							X	X	X	X	X	X	X	X	X	X	X	X
Cleveland, Ohio													X	X	X			
Dayton, Ohio													X	X	X	X	X	X
Pittsburgh, Pa.													X	X	X	-	-	-
Newark, N.J.													X	X	X	X	X	X
Providence, R.I.													X	X	X	X	X	X
Chicago, Ill.													X	X	X	X	X	X
Beaumont, Texas				-	-	-	-	X	X	-	X	X	X	X	X	X	X	X

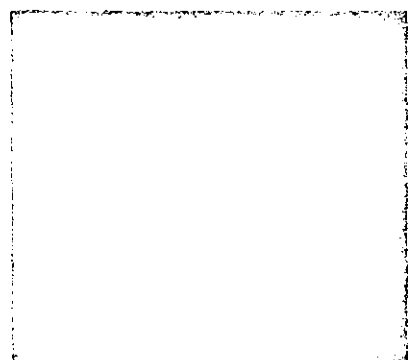
¹Florida: Sunsprays 6E, 7E and 11E can be formulated in Florida for TT tank truck (special citrus formulation) shipments
²Sunspray 11N is available at all bulk terminals



San Jose scale on apple;
Aspidiotus perniciosus (Comstock)



Florida red scale on citrus leaf
Chrysomaphalus bonidum (Linné)



California red scale on citrus leaf
Aonidiella auranti (Linné)



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In Canada: Sun Oil Company Limited

You get more than oil from Sunoco

