



BioWorks[®]
DIVISION OF BIOFIRST GROUP

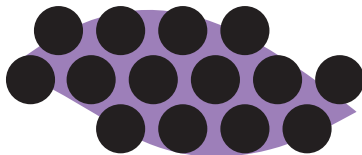


ABOVE AND BEYOND IS WHERE WE BEGIN

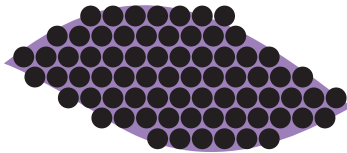


BEST PRACTICES: SUFFOIL-X[®]

SuffOil-X is an insecticide, miticide, and fungicide that suffocates pests in all life stages with a unique concentration of pre-emulsified and highly refined oil. SuffOil-X's formulation delivers lower petroleum oil content and a droplet size that's 93% smaller than other agricultural spray oils. This allows a high level of protection using a thinner coating – resulting in faster dry times, less blockage of stomata and plant respiration, and less magnification of sunlight. Plus, the emulsifiers help SuffOil-X dilute faster and more thoroughly in water than traditional spray oils. All of which dramatically reduce the chances of plant burn.



**COMPETITOR
HORTICULTURAL
OILS**



SUFFOIL-X

SUFFOIL-X DROPLETS ARE 14X SMALLER THAN CONVENTIONAL SPRAY OIL DROPLETS, IMPROVING SPRAY PROPERTIES, PROVIDING MORE UNIFORM COVERAGE, QUICKER DRY-DOWN, LESS PHYTOTOXICITY, AND IMPROVED EFFICACY.



FEATURES AND BENEFITS

- + Suffocates pests in all life stages
- + Equivalent efficacy to products with higher oil concentrations
- + Pre-emulsified to achieve optimal and uniform coverage
- + Minimizes chance of plant burn
- + Excellent for use with beneficial insects
- + Compatible with other insecticides, fungicides, and pesticides labeled for use with oils
- + Odorless and non-toxic residue
- + Easily diluted; will not separate in spray tank
- + Stable emulsion lasts longer, ensuring consistent application from beginning to end



BEST PRACTICES: SUFFOIL-X

PESTS CONTROLLED

- + Mites
- + Aphids
- + Mealybugs
- + Scales
- + Whiteflies
- + Thrips
- + Powdery Mildew
- + Rust
- + Leaf miners
- + Thrips
- + Leaf rollers
- + Adult Fungus Gnats
- + Soft bodies insects

SPRAYING GUIDELINES

BioWorks strongly advises testing SuffOil-X on a small number of plants to check for adverse plant effects before applying to a larger number of plants.

- + Product can separate in container if it sits too long so shake well to recombine
- + Use when RH is below 90%
- + Spray before temperatures reach 90-95 °F (33-35 °C)
- + Apply when temperatures are above 40 °F and there is no chance of freezing
- + Apply when oil will dry and evaporate in 1-2 hours
- + Avoid applications on overcast, humid days or after rain when evaporation time will be longer
- + Do not apply at night
- + Use caution when applying to open blooms, especially on varieties known to be sensitive. It is recommended that a small group of plants be tested for effects on open blooms before making applications to the whole crop.
- + Apply to glisten, too much water can delay dry time
- + Pests are killed by direct contact so thorough coverage is necessary
- + Do not use in auto-fogging equipment
- + SuffOil-X has a high pH in solution, don't adjust
- + Ensure plants are not drought stressed and have adequate soil moisture
- + Don't tank mix or rotate with sulfur
- + Do not combine with NPK foliar fertilizer applications
- + Start with 1%, and move up to 2% if needed
- + Spray as needed, 7-10 days is recommended

MODES OF ACTION

- + Insecticide
 - + Suffocation
 - + Ovicide, larvicide, adulticide (soft bodied insects)
 - + Residual film prevents scale from attaching to tissue
- + Fungicide
 - + Suffocation of mycelium
 - + Prevents attachment of mycelium to plant
- + Oviposition Disruption
 - + Masks the UV emission from leaves that mobile insects recognize before feeding and egg deposition (repellent)



BEST PRACTICES: SUFFOIL-X

SUFFOIL-X PHYTOTOXICITY STUDIES ON ORNAMENTALS

Phytotoxicity observed after spray application of SuffOil-X on ornamentals, including various bedding, foliage and ornamental plants.

COMMON NAME	BOTANICAL NAME	PLANT VARIETY	RATE ¹ %	PHYTOXICITY	FLOWER PHYTOXICITY
Ageratum	<i>Ageratum houstonianum</i>		1,2,4	N	N
Allamanda	<i>Allamanda cathartica</i>		1	N	
Anthurium	<i>Anthurium</i>	'Lady Jane'	1	N	
Aralia	<i>Polyscias</i>	Parsley	1	N	
Azalea	<i>Rhododendron</i>		1	N	
Azalea	<i>Rhododendron sp.</i>	'Arthur Sweet Pink', 'Autumn Carnival Red', 'G.G. Gerbing'	2	N	N
Banana	<i>Musa</i>		1	N	
Begonia	<i>Begonia x hybrida</i>		1,2,4	N	N
Begonia, Wax leaf	<i>Begonia semperflorens</i>		1,2,4	N	Y
Bird of Paradise	<i>Strelitzia</i>		1	N	
Bougainvillea	<i>Bougainvillea</i>		1	N	
Boxwood	<i>Buxus microphylla</i>	'Wintergreen'	2	N	N
Butterfly Bush	<i>Buddleia davidii</i>	'Petite Lavender', 'White'	2	N	N
Buttonwood	<i>Conocarpus erectus</i>	green	1	Y	
Buttonwood	<i>Conocarpus erectus</i>	silver	1	Y	
Calathea	<i>Calathea roseopicta</i>		1	N	
Calibrachoa (mini petunia)	<i>Calibrachoa hybrid</i>	Mixed color	1,2,4	N	Y
Cape Honeysuckle	<i>Tecomaria capensis</i>		1	N	
Chinese Fan Palm	<i>Livistona chinensis</i>		1	N	
Colocasia, Elephant's Ear	<i>Colocasia esculenta</i>	'Black Magic'	1,2,4	N	N
Cordyline	<i>Cordyline terminalis</i>	Cordyline	1	N	
Cordyline	<i>Cordyline terminalis</i>	'Global'	1	Y	
Cordyline	<i>Cordyline terminalis</i>	'Kiwi'	1	N	
Cordyline	<i>Cordyline terminalis</i>	'Red Sister'	1	N	



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Coreopsis	<i>Coreopsis verticillata</i>	'Moonbeam'	1,2,4	N	N
Crape myrtle	<i>Lagerstroemia indica</i>	'Velma Royal'	2	N	N
Croton	<i>Codiaeum variegatum</i>		1	N	
Croton	<i>Codiaeum variegatum</i>	'Petra'	1	N	
Crown of Thorns	<i>Euphorbia milii</i>	splendens	1	N	
Cuphea, Mexican Heather	<i>Cuphea hyssopifolia</i>	'Allyson'	1	N	
Cycad	<i>Zamia</i>		1	N	
Cycad, Cardboard	<i>Zamia furfuracea</i>		1	N	
Dahlia	<i>Dahlia</i>		2	N	
Dianthus	<i>Dianthus gratianopolitanus</i>	'Firewitch'	1,2,4	N	N
Dianthus, Pinks	<i>Dianthus</i>	pinks	2	N	
Dieffenbachia, Dumbcane	<i>Dieffenbachia</i>	'Bali Hai'	1	N	
Dieffenbachia, Dumbcane	<i>Dieffenbachia maculata</i>	'Camille'	1	N	
Dracaena	<i>Dracaena marginata</i>	'Colorama'	1	N	
Dracaena	<i>Dracaena reflexa</i>	'Song of India', 'Pleomele'	1	N	
Dusty Miller	<i>Jacobaea maritima</i> (Senecio)		2	N	
Evergreen Candytuft	<i>Iberis sempervirens</i>	'Purity white'	1,2,4	N	N
Ficus, Fiddle Leaf Fig	<i>Ficus lyrata</i>		1	N	
Ficus, Rubber Plant	<i>Ficus elastica</i>	'Robusta'	1	N	
Ficus, Weeping Fig	<i>Ficus benjamina</i>	'Wintergreen'	1,2	N	
Gardenia	<i>Gardenia</i>		1	N	
Gardenia	<i>Gardenia jasminoides</i>	'August Beauty'	2	N	N
Geranium	<i>Pelargonium</i>	'Deep Pink'	1,2,4	N	N
Gerbera Daisy	<i>Gerbera</i>		1	N	
Gerbera Daisy	<i>Gerbera jamesonii</i>		1,2,4	N	N
Ginger	<i>Zingiber</i>	Variegated	1	N	
Grass, Hardy Pampas	<i>Erianthus ravennae</i>		1,2,4	Y	



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Hibiscus	<i>Hibiscus</i>		1,2	N	
Hibiscus	<i>Hibiscus rosa-sinensis</i>	'Diana', 'Purple Minerva'	2	N	N
Holly	<i>Ilex crenata</i>	'Stead', 'China Girl', 'Compacta'	2	N	N
Hydrangea	<i>Hydrangea sp.</i>	'Endless Summer Blue', 'Forever and Ever Blue', 'Heaven', 'Red'	2	N	N
Impatiens	<i>Impatiens</i>		1	Y	
Impatiens	<i>Impatiens walleriana</i>	Mixed	1,2,4	N	N
Impatiens, New Guinea	<i>Impatiens x hybrida</i>		1,2,4	N	
Indian Hawthorn	<i>Raphiolepis indica</i>		1	N	
Ivy, English	<i>Hedera helix</i>		1	N	
Ivy, Grape	<i>Cissus rhombifolia</i>		1	N	
Ixora	<i>Ixora sp.</i>	'Maui', 'Nora Grant', 'Singapore', 'Petit', 'Red Taiwan Dwarf'	1	N	
Jasmine, Florida	<i>Jasminum floridum</i>		2	N	N
Jasmine, Wax	<i>Jasminum pubescens</i>		1	N	
Jatropha	<i>Jatropha</i>		1	N	
Lantana	<i>Lantana camara</i>	yellow, purple, red	1	N	
Lantana	<i>Lantana sp.</i>		2	N	N
Liriope, Lily turf	<i>Liriope muscari</i>	'Evergreen Giant'	1	N	
Loropetalum	<i>Loropetalum chinense</i>		2	N	N
Majesty Palm	<i>Ravenea rivularis</i>		1	N	
Mandevilla	<i>Mandevilla splendens</i>		1	N	
Marigold	<i>Tagetes</i>		2	N	
Marigold, African	<i>Tagetes erecta</i>		1,2,4	N	N
Mondo Grass	<i>Ophiopogon japonicus</i>		2	N	N
Oleander	<i>Nerium oleander</i>		1	N	
Oleander	<i>Nerium oleander</i>	dwarf	1	N	



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COMMON NAME	BOTANICAL NAME	PLANT VARIETY	RATE ¹ %	PHYTOXICITY	FLOWER PHYTOXICITY
Orchid	<i>Phalaenopsis</i>		2	N	N
Orchid Cactus	<i>Disocactus macranthus</i>		1	N	
Pansy	<i>Viola x wittrockiana</i>		1,2,4	N	N
Pentas	<i>Pentas</i>		1	N	
Philodendron	<i>Philodendron selloum</i>		1	N	
Pittosporum, Japanese	<i>Pittosporum tobira</i>	'Compacta', green, variegated, 'Wheeler's Dwarf'	1	N	
Podocarpus	<i>Podocarpus</i>		1	N	
Poinsettia	<i>Euphorbia pulcherrima</i>		2	N	
Pothos	<i>Epipremnum aureum</i>	'Jade', 'Marble Queen'	1	N	
Privet, Japanese	<i>Ligustrum recurvifolia</i>		1	N	
Privet, Chinese	<i>Ligustrum sinensis</i>		1	N	
Pygmy Date Palm	<i>Phoenix roebelenii</i>		1	N	
Queen Palm	<i>Syagrus romanzoffiana</i>		1	N	
Rose, Knock Out	<i>Rosa sp.</i>	'Red Double', 'Pink Double'	2	N	N
Royal Palm	<i>Roystonea</i>		1	N	
Salvia	<i>Salvia nemorosa</i>	'May Night'	1,2,4	N	
Salvia	<i>Salvia</i>	red	1,2,4	N	N
Scaevola, Fan flower	<i>Scaevola</i>		1	N	
Schefflera, Dwarf Umbrella Tree	<i>Schefflera arboricola</i>	'Covette', 'Golden Capella', variegated	1	N	
Seagrape	<i>Coccoloba uvifera</i>		1	N	
Sedum	<i>Sedum spectabile</i>	'Neon'	1,2,4	Y	
Snapdragon	<i>Antirrhinum</i>		1	N	
Spathiphyllum, Peace Lily	<i>Spathiphyllum</i>	'Lynise', 'Viscount'	1	N	



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St. John's Wort	<i>Hypericum calycinum</i>		1,2,4	N	N
Surinam Cherry	<i>Eugenia uniflora</i>		1	N	
Swedish Ivy	<i>Plectranthus verticillatus</i>		1	N	
Tomato	<i>Solanum lycopersicum</i>	'Cherokee Purple'	1,2,4	N	
Torenia, Wishbone Flower	<i>Torenia fournieri</i>		1,2,4	N	N
Verbena	<i>Verbena</i>		1	N	
Viburnum	<i>Viburnum sp.</i>		1	N	
Viburnum	<i>Viburnum dentatum</i>	'Burgundy Morton'	2	N	N
Viburnum, Sandankwa	<i>Viburnum suspensum</i>		1	N	
Vinca	<i>Vinca</i>		1	N	
Vinca	<i>Catharanthus roseus</i>	Mixed color	1,2,4	N	N
Vinca	<i>Catharanthus roseus</i>	'Cora'	1,2,4	N	Y
Wax Myrtle	<i>Myrica</i>		1	N	
Weigela	<i>Weigela florida</i>	'Wine and Roses'	2	N	N
Zinnia	<i>Zinnia angustifolia</i>		1,2,4	N	N

¹ Rate is % v/v (volume to volume) with water

NOTE: Use caution when making SuffOil-X applications to open blooms, especially on varieties known to be sensitive. It is recommended that a small group of plants be tested for effects on open blooms before making applications to the whole crop.

Refer to product labels for complete application details. Additional technical information is available on our website (bioworksinc.com) or from your BioWorks technical sales representative. Always read and follow label directions.

GOING ABOVE AND BEYOND

At BioWorks, we not only help eradicate harmful diseases and pests that threaten your crops, but we design and support integrated plant health management programs. And because we know how quickly some diseases can work, we respond to any questions you might have in just 48 hours. So you can get back to the business of successful growing.



SuffOil-X® is a registered trademark of BioWorks, Inc.



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