



U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Pesticide Programs
Registration Division (7505C)
401 "M" St., S.W.
Washington, D.C. 20460

EPA Reg. Number:

42519-19

Date of Issuance:

SEP - 9 1998

NOTICE OF PESTICIDE:

 x Registration
 Reregistration

(under FIFRA, as amended)

Term of Issuance:

Conditional

Name of Pesticide Product:

Dorsan 4E-45

Name and Address of Registrant (include ZIP Code):

Luxembourg-Pamol, Inc.
5100 Poplar Avenue, Suite 2700
Memphis, TN 38137

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Registration Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby registered/reregistered under the Federal Insecticide, Fungicide and Rodenticide Act.

Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

This product is conditionally registered in accordance with FIFRA sec. 3(c)(7)(A) provided that you:

1. Submit and/or cite all data or other material required for registration/reregistration of your product under FIFRA sec. 3(c)(5) or FIFRA sec. 4 when the Agency requires all registrants of similar products to submit such data.
2. Make the labeling changes listed below before you release the product for shipment:
 - a. Add the phrase "EPA Registration No. 42519-19".

Signature of Approving Official:

Tina E. Levine

Tina E. Levine, PhD, Chief
Insecticide-Rodenticide Branch
Registration Division (7505C)

Date:

SEP - 9 1998

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4. Submit two (2) copies of your final printed labeling before you release the product for shipment. Refer to the A-79 enclosure for a further description of final printed labeling.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA sec. 6(e). Your release for shipment of the product constitutes acceptance of these conditions.

A stamped copy of the label is enclosed for your records. If there are questions concerning this registration, contact Dani Daniel of my staff at 703 305-5409.

Enclosure:

(Base label):

Dorsan 4E-45

To be applied only by or under the direct supervision of commercial applicators responsible for insect control programs. Sale to or use by persons owning or occupying a dwelling is strictly prohibited.

Active Ingredient:

chlorpyrifos: O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate.....	44.9%
Other Ingredients	55.1%
Total	100.0%

Contains 4 pounds of chlorpyrifos per gallon.
Contains xylene range aromatic solvents.

**ACCEPTED
with COMMENTS
In EPA Letter Dated:
SEP - 9 1990**

Precautionary Statements

Hazards to Humans and Domestic Animals
Keep Out of Reach of Children
WARNING AVISO

*Under the Federal Insecticide,
Fungicide, and Rodenticide Act,
as amended, for the pesticide
registered under EPA Reg. No.
42579-19*

Precaucion al usuario: Si usted no lee inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

May Be Fatal If Swallowed • Absorption Through Skin May Be Fatal • Causes Substantial But Temporary Eye Injury • Causes Skin Irritation • This Product May Cause Skin Sensitization Reactions In Certain Individuals

Do not get in eyes, on skin, or on clothing. Avoid breathing vapors and spray mist. Handle concentrate in a ventilated area. When handling concentrate wear eye protection and protective clothing such as long-sleeved shirt, long-legged pants, rubber gloves and footwear, i.e. neoprene or nitrile butadiene rubber, resistant to aromatic solvents. Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash before reuse. Keep away from food, feedstuffs, and water supplies.

First Aid

If swallowed: Call a physician or Poison Control Center immediately. Do not induce vomiting. Contains an aromatic petroleum solvent. Do not give anything by mouth to an unconscious person.

If on skin: Immediately wash with plenty of soap and water. Get medical attention.

If in eyes: Flush with plenty of water for 15 minutes. Get medical attention.

If inhaled: Remove to fresh air if symptoms of cholinesterase inhibition appear and get medical attention immediately.

Note to physician: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. If exposed, plasma and red blood cell cholinesterase tests may indicate significance of exposure (baseline data are useful). Atropine, only by injection, is the preferable antidote. Oximes, such as 2-PAM/protopam, may be therapeutic if used early; however, use only in conjunction with atropine. In case of severe acute poisoning, use antidote immediately after establishing an open airway and respiration.

Environmental Hazards

This pesticide is toxic to birds and wildlife, and extremely toxic to fish and aquatic organisms. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. Cover or incorporate

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spills. Do not contaminate water when disposing of equipment washwaters. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Physical or Chemical Hazards

Do not use or store near heat or open flame. Do not cut or weld container.

Refer to label booklet for additional precautionary information and Directions for Use.

Notice: Read the entire label. Use only according to label directions. Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" inside label booklet.

In case of emergency endangering health or the environment involving this product, call collect 1-800-424-9300. Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

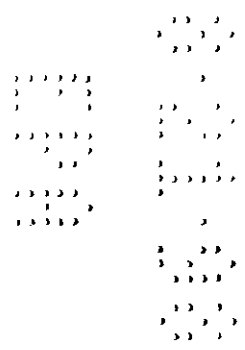
EPA Reg. No. 42519-xx RO

EPA Est. xxxxx-xx-xx

Luxembourg-Pamol, Inc. • Memphis, TN 38137 U.S.A.

Specialty Insecticide

Net Contents: 20 kg (45 lb)
5 gal.



(Datapack cover):

Dorsan 4E-45

To be applied only by or under the direct supervision of commercial applicators responsible for insect control programs. Sale to or use by persons owning or occupying a dwelling is strictly prohibited.

Active Ingredient:

chlorpyrifos: O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate.....	44.9%
Inert Ingredients.....	55.1%
Total	100.0%

Contains 4 pounds of chlorpyrifos per gallon.

Contains xylene range aromatic solvents.

Keep Out of Reach of Children

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AVISO

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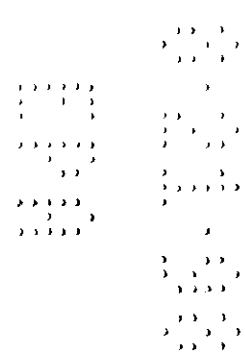
EPA Reg. No. 42519-XX

EPA Est. xxxxx-xx-xx

Luxembourg-Pamol, Inc. • Memphis, TN 38137 U.S.A.

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Net Contents: 20 kg (45 lb)
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Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

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Note to physician: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. If exposed, plasma and red blood cell cholinesterase tests may indicate significance of exposure (baseline data are useful). Atropine, only by injection, is the preferable antidote. Oximes, such as 2-PAM/protopam, may be therapeutic if used early; however, use only in conjunction with atropine. In case of severe acute poisoning, use antidote immediately after establishing an open airway and respiration.

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spills. Do not contaminate water when disposing of equipment washwaters. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Physical or Chemical Hazards

Do not use or store near heat or open flame. Do not cut or weld container.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

Chemigation: Do not apply this product through any type of irrigation system. Do not formulate this product into other end-use products.

Not for use on plants grown for sale or other commercial use, or for commercial seed production, or for research purposes. For use on plants intended for aesthetic purposes or climatic modification and being grown in interior plantscapes, ornamental gardens or parks, or on golf courses or lawns and grounds.

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.

Storage: Store in original container in secured dry storage area. Prevent cross-contamination with other pesticides and fertilizers. Do not store above 100°F for extended periods of time. Storage below 20°F may result in formation of crystals. If product crystallizes, store at 50 to 70°F and agitate to redissolve crystals. If container is damaged or spill occurs, use product immediately or dispose of product and damaged container as indicated below.

Pesticide Disposal: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Metal Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill, or by other procedures approved by state or local authorities.

Plastic Container Disposal: Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Reusable Portable Container Disposal: Do not rinse or put any other material into container. When returning reusable portable container, seal all openings and return to Luxembourg-Pamol, Inc.

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General Information

Dorsan 4E-45 insecticide is an emulsifiable concentrate designed for use as a spray to control various pests injurious to trees, turf, and ornamental plants. The pests controlled are listed in the accompanying tables. Dorsan 4E-45 is compatible with insecticides, miticides, and fungicides commonly recommended except for alkaline materials such as Bordeaux mixture and lime. A small amount of spray mixture should be prepared to check for compatibility before a large volume of spray is mixed.

Attention: Do not allow adults, children, or pets on treated areas until spray has dried. Keep out of fishpools and other bodies of water. Do not treat vegetable gardens. Do not allow livestock to graze in treated areas. Do not feed treated grass cuttings (hay) or seed screenings to livestock nor use hay for livestock bedding. Do not use in poultry houses.

Pest Control Indoors

Use Dorsan 4E-45 to control pests listed in the following table by applying at the recommended dosages. Use a 0.25% spray to control light infestations and a 0.5% spray to quickly reduce heavy infestations or as directed. To prepare the spray, dilute Dorsan 4E-45 with water or with a suitable base oil. Use only deodorized kerosene for oil-based sprays in food handling establishments.

Applications may be made within residential buildings, including homes, and apartment buildings. Applications may also be made within mausoleums and nonfood areas of industrial, institutional, and commercial buildings, including hospitals, stores, manufacturing plants, and warehouses. Applications may be made within food handling establishments. This includes, but is not limited to, restaurants, grocery stores, bakeries, bottling plants, canneries, and grain mills.

Apply as a coarse, low pressure spray (20 psi or less) or with a paint brush to localized areas in and around both food and non-food areas. Treat where insects are found or normally occur, including dark corners of rooms and closets; floor drains; cracks and crevices in walls; along and behind baseboards; beneath and behind sinks, stoves, refrigerators, refrigerator units, and cabinets; and around plumbing and other utility installations.

In food-handling establishments use only as a spot treatment. Spot treatment may encompass crack and crevice treatments by applying small amounts of material directly into openings leading to voids and hollow spaces in walls, equipment legs and bases, or which occur at points between different elements of construction, or between equipment and floors. Equipment capable of delivering a pinstream of spray should be used. Repeat treatment as needed, but not more often than once every 7 days in restaurants and similar food service establishments, or more often than once every 14 days in other types of food-handling establishments. In case of emergency (call back), Dorsan 4E-45 may be applied after 2 days from last treatment, but emergency use should be limited to once per month. Applications of this product in food-handling establishments other than as a spot and/or crack and crevice treatment are not permitted.

Note: Where quick "knockdown" and/or "flushing action" is desired, pyrethrins may be added to the spray mixture containing Dorsan 4E-45. For best results, use pyrethrins at 0.25% in water-based sprays and 0.05% in oil-based sprays. Consult labeling for pyrethrin products used to determine the amount needed to give the desired spray concentration. Also read and observe all use and handling precautions for these products.

Do not apply water-based sprays of this product in conduits, motor housings, junction and switch boxes, or other electrical equipment because of possible shock hazard. If there is need to treat such areas, use only oil-based sprays. Prior to application, de-energize electrical equipment. After application allow time for oil to evaporate before starting motors or placing switches in the "on" position.

Do not allow spray to contact food, feedstuffs, or water supplies. Thoroughly wash dishes and food-handling utensils with soap and water if they become contaminated by application of this product. Do not allow children or pets to contact treated surfaces until spray has dried. Remove pets and cover fish bowls (tanks) before spraying. Do not introduce the spray into the air or allow the spray to contact food or food-contacting surfaces.

Use Dorsan 4E-45 to control the pests listed below by application as a 0.25% or 0.5% spray.

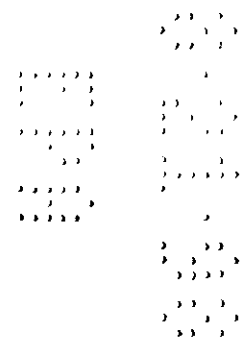
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Pest†	Amount of Dorsan 4E-45 to Make								Specific Directions	
	1 Gallon of Water-Based Spray				1 Gallon of Oil-Based Spray					
	0.25% Spray		0.5% Spray		0.25% Spray		0.5% Spray			
	fl oz	ml	fl oz	ml	fl oz	ml	fl oz	ml		
	2/3	20	1 1/3	40	1/2	15	1	30		
Ants ¹ Cockroaches ² (American) (Brownbanded) (German) (Oriental) (Smokey brown) Confused flour beetles Crickets Earwigs Firebrats									Indian meal moths Mediterranean flour moths Millipedes Red flour beetles Rice weevils Saw-toothed grain beetles Silverfish Spiders	Use the low rate (0.25%) to control light infestations and the high rate (0.5%) to quickly reduce heavy infestations or for extended residual control. <ol style="list-style-type: none"> For ants, apply to ant trails and around doors and windows and wherever else the pest may find entrance. A period of 4 to 7 days is normally required for maximum effect on cockroaches.
			1 1/3	40			1	30		
Brown dog ticks ¹ Carpet beetles ² Clover mites									<ol style="list-style-type: none"> For the control of brown dog ticks, thoroughly apply the spray as a spot treatment to infested areas, such as pet beds and resting quarters; nearby cracks and crevices; along baseboards, windows and door frames, and localized areas of floor and floor coverings where these pests may be present. Old bedding should be removed and replaced with clean, fresh bedding after treatment. Do not treat pets with this product. For the control of carpet beetles, thoroughly apply the spray as a spot treatment along baseboards and edges of carpeting, under carpeting, rugs and furniture, in closets and on shelving, and wherever else these insects are seen or suspected. 	

†Superscripts refer to Specific Directions.

Turf and Other Outdoor Uses

Use Dorsan 4E-45 to control the pests listed in the following table by applying at the recommended dosages and in accordance with the directions given below. Dilute Dorsan 4E-45 in water and apply as a coarse, low-pressure spray using suitable application equipment. Thoroughly water immediately after treatment to wash the insecticide into the turf, except as noted. For best results, the lawn should be moist at time of treatment. Spray when pests first appear; re-treat when needed.



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Pest†	Amount of Dorsan 4E-45 In Water to Make		Specific Directions
	1 gal	100 gal	
Ticks ¹ (American dog) (Cattle fever) (Gulf coast) (Lone star)	1/4 fl oz	1 1/2 pt	1. For control of ticks infesting corrals, stockyards, holding pens and other outdoor livestock areas. Treat soil in corrals and pens, especially in corners, under and around fences, grassy areas, protected areas under feeders and shelters and other areas likely to serve as harborage sites for ticks that have removed themselves from their host. Spray surfaces to be treated until wet, but do not create excessive runoff. Note: This application is intended as a premise spray only. Do not use as a direct spray on livestock. Take care to avoid creating mist or drift which may come into contact with feed, water or livestock. Livestock should not be allowed in treated areas until spray deposits have dried.

†Superscripts refer to Specific Directions.

Pest†	Amount of Dorsan 4E-45 per		Specific Directions
	1000 Sq Ft	Acre	
Ants (including foraging fire ants) Armyworms (Beet) (Fall) (Yellowstriped) Centipedes Chiggers ¹ Chinch bugs Clover mites Cutworms Crickets Earwigs Fiery skipper Fire ants (mounds) ² Fleas Gnats Grasshoppers Greenbugs June beetles Leafhoppers Lucerne moths Millipedes Mites (Clover) (Formula grass) (Winter grain) Mosquitoes ³ Sod webworms ⁴ (lawn moths) Sowbugs Springtails Ticks ¹	3/4 fl oz	1 qt	<p>1. Use Dorsan 4E-45 for area control of ticks and chiggers infesting non-cropland areas such as roadsides, footpaths and trails, picnic and camping sites, parks and other recreational areas where these pests are present and create a nuisance or a possible public health problem. Do not allow public use of treated areas during application or until spray has dried. Apply Dorsan 4E-45 in water at the rate of 1/2 pint/acre (equivalent to 1/2 fl oz/2,700 sq ft) using a hydraulic sprayer, mist applicator, knapsack sprayer, or other suitable hand- or power-operated spray equipment. Treat low underbrush, grassy areas, weeds, and ground surface and debris using enough spray volume to obtain thorough coverage, usually 40 - 100 gal/acre.</p> <p>2. For individual fire ant mounds, apply Dorsan 4E-45 as a drench, diluted at the rate of 1 fl oz (30 ml) per 4 gal of water. Gently sprinkle a total of 1 gal of the diluted emulsion over the surface of each mound using a gentle spray (such as a sprinkler can). Thoroughly wet mound and surrounding areas to a 4 ft diameter (12 sq ft). For best results, apply in cool weather, 65-80°F, or in early morning or late evening hours. Treat new mounds as they appear. Pressurized sprays may disturb the ants and cause migration, reducing product effectiveness.</p> <p>3. Mosquitoes coming to rest on areas treated for control of turf pests will be killed for varying periods of time after treatment, depending on exposure of treated areas to weathering conditions.</p> <p>4. For sod webworms, delay watering and mowing the treated area for 12 - 24 hours after treatment.</p>

Pest Control on Outside Surfaces and Around Buildings

Apply Dorsan 4E-45 as a residual spray to outside surfaces of buildings including porches, window frames, eaves, patios, garages, refuse dumps, and other areas where pests congregate or have been seen. Repeat treatment as needed to maintain effectiveness.

Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon	10 gallons	50 gallons	
	For Band Treatment¹			
	1/12 fl oz	3/4 fl oz	4 fl oz	
	For Outside Use			
Ants	1 1/3 fl oz	13 1/3 fl oz	2 qt	<p>1. To help prevent infestation of buildings, treat a band of soil 6 - 10 ft wide around and adjacent buildings, also the building foundation to a height of 2 - 3 ft, where pests are active and may find entrance. Use 4 fl oz of Dorsan 4E-45 per 50 gal of water and apply as a coarse spray at the rate of about 10 gal spray mixture per 1,000 sq ft to thoroughly and uniformly wet the band area.</p> <p>2. For scorpions, treat or remove accumulations of lumber, firewood, and other materials which serve as insect harborage sites.</p>
Bees				
Carpenter ants				
Clover mites				
Cockroaches††				
Crickets				
Earwigs				
Fleas				
Flies				
Hornets				
Millipedes				
Mosquitoes				
Scorpions ²				
Silverfish				
Sowbugs				
Spiders				
Ticks				
Wasps				
Yellowjackets				

†Superscripts refer to Specific Directions.

††Controls American and smokey brown cockroaches.

Ornamentals

Use Dorsan 4E-45 to treat flowers, shrubs, evergreens, vines, shade and flowering trees found to be infested with pests listed in the following table. Dilute Dorsan 4E-45 with water according to directions given in the table and apply using suitable hand- or power-operated spray equipment in a manner to provide complete and uniform coverage. For best results, apply a coarse spray to thoroughly wet both upper and lower leaf surfaces and infested limb and trunk areas. Attempt to penetrate dense foliage, but avoid overspraying to the point of excessive runoff. Treat when pests appear and repeat at 7 to 10 day intervals, if needed.

Consult your state Agricultural Experiment Station or Extension Service Specialist for application timing and other specific use information.

Note: Environmental factors have significant effects on phytotoxic expression. Dorsan 4E-45 has been tested on numerous ornamental plants without causing serious phytotoxicity. However, do not use on azaleas, camellias, poinsettias, rose bushes, or variegated ivy because of possible injury to these plants.

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Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon 1/12 fl oz	3 gallons 1/4 fl oz	100 gallons 8 fl oz	
Adelgids: (Cooley) (Eastern spruce galls) (Pine bark)		Katydid Lace bugs Leafhoppers		<ol style="list-style-type: none"> For bagworms, treat when insects are in the crawler stage. For effective control of leafrollers, spray should be applied before leaves are tightly rolled. For effective control of maple leafcutters on maple trees, apply spray to larvae as cases are being formed. Do not treat sugar maple trees intended for maple syrup production. For effective control of spider mites when large numbers of eggs are present, apply a second spray 3 - 5 days in the south or 7 - 10 days in the north after initial treatment to control newly-hatched nymphs.
Ants (including foraging fire ants)		Leafrollers ² Maple leafcutters ³		
Aphids (Apple) (Chrysanthemum) (Cottonwood) (Elm leaf) (Peach) (Rose) (Spirea) (Woolly)		Mites ⁴ (Clover) (Red spider) (Southern red) Oleander caterpillars Orange tortrix Periodical cicada Plant bugs Poplar tentmaker		
Amyworms (Fall) (Yellowstriped)		Psyllids Puss caterpillars Rose chafers		
Bagworms ¹		Sawflies, exposed		
Boxelder bugs		(Pine)		
Cankerworms		(Pin oak)		
Catalpa sphinx		(Redheaded)		
Chiggers		Sowbugs		
Citrus mealy bugs		Spittlebugs		
Cockroaches (American) (Brownbanded) (German) (Oriental) (Smokey brown)		Spring elm caterpillars Springtails Spruce budworms Tent caterpillars (Eastern) (Forest) (Western)		
Elm spanworms		Thornbug		
Fall webworms		Walnut caterpillars		
Grasshoppers		Western spruce budworms		
Green fruitworms		Whiteflies		
Hornworms		Yellownecked caterpillars		
Jackpine budworms				
Juniper webworms				

†Superscripts refer to Specific Directions.

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Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon 1/12 fl oz	3 gallons ¼ fl oz	100 gallons 8 fl oz	
Armyworms (Holly bud) (Beet) (Nantucket pine tip) Beetles (Pandora) (Fuller rose) (Pitch pine tip) (Native elm bark) ¹ (Subtropical pine tip) Cutworms (Tussock) Leafhoppers Oakworms Mahogany webworms (California) Mealybugs (Orangestriped) Mimosa webworms (Redhumped) Moths Redhumped caterpillars (Browntail) Thrips (exposed) (Cypress tip) Weevils (Douglas fir tussock) (Blackvine) ³ (European pine shoot) (Yellow poplar) (Gypsy) ² (Pine reproduction)				1. To reduce twig and branch feeding by bark beetles, applications should be made in the spring or early summer. 2. To kill migrating and invading gypsy moth larvae, treat trunks and foliage. 3. Blackvine weevils are night feeders. Late afternoon spraying will give control in some areas.
Beetles (Cottonwood leaf) ¹ (Elm leaf) (Flea) (Willow leaf)	1/6 - 1/3 fl oz	1/2 - 1 fl oz	1 pt - 1 qt	1. For cottonwood leaf beetles, use Dorsan 4E-45 in water to control larvae and adults infesting cottonwoods. Make the treatment when field counts indicate damaging beetle populations are developing or present.
Borers ¹ : Clearwing moths (Ash) (Dogwood) (Lesser peachtree) (Lilac) (Oak) (Rhododendron) Metallic wood (Bronze birch) (Flatheaded appletree) (Twolined chestnut) Longhorned beetles (Locust) (Red oak) Leafminers Needleminers (Jeffrey pine) (Lodgepole pine) (Spruce)	1/3 fl oz	1 fl oz	1 qt	1. For borers, apply Dorsan 4E-45 to the trunks and lower limbs of trees and shrubs when the adults begin to emerge. Consult your state Agricultural Experiment Station or Extension Service Specialist for proper time to treat. Apply uniformly as a coarse low-pressure spray.
Scale crawlers (Cottonycushion) (Cottony maple) (Euonymus) (Fletcher) (Florida wax) (Golden oak) (Hemispherical) (Lecanium) (Magnolia) (Oak kermes) (Oystershell) (Pine needle) (San Jose) (Tea) (White birch)				
Borers (Cottonwood) (Peachtree) ¹	1 fl oz	3 fl oz	3 qt	1. For peachtree borers, apply Dorsan 4E-45 in water to flowering trees and shrubs of the genus <i>Prunus</i> as a trunk spray before newly-hatched larvae enter the trees. Apply as a coarse, low-pressure spray. Thoroughly wet all bark areas from ground level to scaffold limbs.

Beetles ¹ (Ambrosia) (Anobiidae) (Black turpentine) (Cottonwood leaf) (Elm leaf) (European elm bark) (Flea) (Fuller rose) (Japanese) (June) (Native elm bark) (Southern pine) (Willow leaf)	2 2/3 fl oz	8 fl oz	2 gal	1. For preventive treatment , apply the spray to the main trunk of trees in the early spring or when threat of attack exists from nearby infested trees. For remedial treatment , apply the spray to the main trunk of infested trees when damage occurs but before adult beetles begin to emerge.
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†Superscripts refer to Specific Directions.

Tree Pests

Use Dorsan 4E-45 to treat shade and flowering trees, and evergreens found to be infested with pests listed in the following table. Dilute Dorsan 4E-45 with water according to directions given in the table and apply using suitable hand- or power-operated spray equipment in a manner to provide complete and uniform coverage. For best results, apply a coarse spray to thoroughly wet both upper and lower leaf surfaces and to infested limb and trunk areas. Attempt to penetrate dense foliage, but avoid overspraying to the point of excessive runoff. Do not treat bearing fruit and nut trees with Dorsan 4E-45 except as indicated in the Dormant Spray section. Treat when pests appear and repeat at 7 to 10 day intervals, if needed.

Consult your state Agricultural Experiment Station or Extension Service Specialist for application timing and other specific use information.

Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon	3 gallons	100 gallons	
	1/12 fl oz	1/4 fl oz	8 fl oz	
Adelgids (Cooley) (Eastern spruce gall) (Pine bark) Aphids (Apple) (Chrysanthemum) (Cottonwood) (Elm leaf) (Peach) (Rose) (Spirea) (Woolly) Bagworms ¹ Boxelder bugs Cankerworms Catalpa sphinx Citrus mealybugs Elm spanworms Fall webworms Greenstriped mapleworms Jackpine budworms Juniper webworms Katydid	Lace bugs Leafhoppers Leafrollers ² Maple leafcutters ³ Mites ⁴ (Clover) (Red spider) (Southern red) Oak skeletonizers Poplar tentmakers Puss caterpillars Sawflies, exposed (Pine) (Pin oak) Spring elm caterpillars Spruce budworms Tent caterpillars (Eastern) (Forest) (Western) Walnut caterpillars Western spruce budworms Yellownecked caterpillars	1. For bagworms, treat when insects are in the crawler stage. 2. For effective control of leafrollers, spray should be applied before leaves are tightly rolled. 3. For maple leafcutters on maple trees, apply spray to larvae as cases are being formed. Do not treat sugar maple trees intended for maple syrup production. 4. For effective control of spider mites, when large numbers of eggs are present, apply a second spray after 3 - 5 days in the south or 7 - 10 days in the north after initial treatment to control newly-hatched nymphs.		

†Superscripts refer to Specific Directions.

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Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon 1/6 fl oz	3 gallons 1/2 fl oz	100 gallons 1 pt	
Beetles (Fuller rose) (Native elm bark) ¹ Leafhoppers Mahogany webworms Mealybugs Mimosa webworms Moths (Browntail) (Cypress tip) (Douglas fir tussock) (European pine shoot) (Gypsy) ² (Holly bud) (Nantucket pine tip)				1. To reduce twig and branch feeding by bark beetles, applications should be made in the spring or early summer. 2. To kill migrating and invading gypsy moth larvae, treat trunk and foliage. 3. Blackvine weevils are night feeders. Late afternoon spraying will give control in some areas.
Beetles (Cottonwood leaf) ¹ (Elm leaf) (Flea) (Willow leaf)	1/6 - 1/3 fl oz	1/2 - 1 fl oz	1 pt - 1 qt	1. For cottonwood leaf beetles, use Dorsan 4E-45 in water to control larvae and adults infesting cottonwoods. Make the treatment when field counts indicate damaging beetle populations are developing or present. For seedlings, use 8 - 20 gal of spray volume per acre.
Borers ¹ : Clearwing moths (Ash) (Dogwood) (Lesser peachtree) (Lilac) (Oak) (Rhododendron) Metallic wood (Bronze birch) (Flatheaded appletree) (Twolined chestnut) Longhorned beetles (Locust) (Red oak) Cranberry girdler larvae ² Leafminers Needleminers (Jeffrey pine) (Lodgepole pine) (Spruce)	1/3 fl oz	1 fl oz	1 qt	1. For borers, apply Dorsan 4E-45 to the trunks and lower limbs of trees and shrubs when the adults begin to emerge. Consult your state Agricultural Experimental Station or Extension Service Specialist for proper time to treat. Apply uniformly as a coarse low-pressure spray. 2. For cranberry girdler larvae infesting Douglas fir seedlings, apply 1 quart of Dorsan 4E-45 per acre. Direct spray at the lower crown and stems using 50 gal of water per acre. Irrigate immediately after application for soil penetration of 1 - 2 inches. Treat after egg laying during the summer.
Borers: (Cottonwood) (Peachtree) ¹	1 fl oz	3 fl oz	3 qt	1. For peachtree borers, apply Dorsan 4E-45 in water to flowering trees and shrubs of the genus <i>Prunus</i> as a trunk spray before newly-hatched larvae enter the trees. Apply as a coarse low-pressure spray. Thoroughly wet all bark areas from ground level to scaffold limbs.

†Superscripts refer to Specific Directions.

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Pest†	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon	3 gallons	100 gallons	
Beetles ¹ (Cottonwood leaf) (Elm leaf) (Flea) (Fuller rose) (Native elm bark) ² (Willow leaf)	1 1/3 fl oz	4 fl oz	1 gal	1. For preventive treatment , apply the spray to the main trunk of trees in the early spring or when threat of attack exists from nearby infested trees. For remedial treatment , apply the spray to the main trunk of infested trees or logs when damage occurs but before adult beetles begin to emerge. 2. To prevent native elm bark beetles from overwintering in uninfested trees, apply Dorsan 4E-45 water to the bottom 9 feet of the trunk. Wet the trunk thoroughly but not spray to runoff. Care should taken to apply the spray to the base of the root flare. Application can be made with either backpack mistblower or a hydraulic pressure sprayer from spring through to early fall. To reduce twig and branch feeding on uninfested trees deemed to be of value, apply a water spray the tree crown. Application should be made in the spring early summer using a sprayer that give thorough coverage to the tree crown.
Beetles ¹ (Ambrosia) (Anobiidae) (Black turpentine) (Blister) (European elm bark) (Japanese) (June) (Southern pine) (Spruce) Carpenter ants Termites	2 2/3 fl oz	8 fl oz	2 gal	1. For preventive treatment , apply the spray to the main trunk of trees in the early spring or when threat of attack exists from nearby infested trees. For remedial treatment , apply the spray to the main trunk of infested trees or logs when damage occurs or before adult beetles begin to emerge.

†Superscripts refer to Specific Directions.

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Dormant Spray

Use Dorsan 4E-45 as a dormant or delayed dormant spray at the rates indicated to control the listed insects. Spray the entire tree to runoff using suitable ground spray equipment. Use the higher dosage of Dorsan 4E-45 for severe infestations. Use oil as recommended by your state Agricultural Experiment Station or Extension Service Specialist. **Restrictions:** Make only one application during the dormant season.

Pest	Amount of Dorsan 4E-45 in Water to Make			Specific Directions
	1 gallon	3 gallons	100 gallons	
Aphids (Mealy plum) (Rosy apple) (Woolly apple) Borers (Peach twig) Cutworms (Climbing) Leafrollers (Pandemis) Pear psylla adults Plant bugs Scale (San Jose)	1/12-1/6 fl oz	1/4 -1/2 fl oz	1/2 - 1 pt	Tank mix with 1 - 2 gallons of a petroleum spray oil recommended for dormant use in 100 gallons of water.

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