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Date out of EAB: 31 JAN 1984

To: J. Ellenberger
Product Manager
Registration Division (TS-767)

From: Samuel M. Creeger, Chief
Environmental Chemistry Review Section 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769c)

SMC

COPY

Attached, please find the EAB review of:

Reg./File No.: 464 - 448 and 464 - 552

Chemical: Chlorpyrifos

Type Product: Insecticide

Product Name: LORSBAN 4E and LORSBAN 50W

Company Name: Dow

Submission Purpose: add use on filberts and pecans

ZBB Code: 3(c)(7)

Action Code: 335

Date In: 12/5/83

EAB No.: 4103 & 4104

Date Completed: 31 JAN 1984

TAIS (Level II) Days

Deferrals To:

63

0.5

 Ecological Effects Branch

 Residue Chemistry Branch

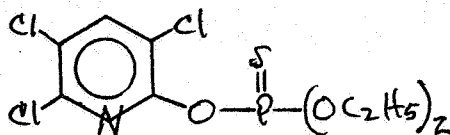
 Toxicology Branch

1.0 INTRODUCTION

Chemical Name and Type of Pesticide: chlorpyrifos, O,O-diethyl O-(3,5,6-trichloro-2-pyridyl)phosphorothioate, insecticide.

Trade Name: LORSBAN 50W Wettable Powder Insecticide
LORSBAN 4E Insecticide

Chemical Structure:



Dow Chemical is requesting an amendment to their LORSBAN 50W and 4E labels to add filberts and pecan nuts. LORSBAN 4E is currently registered on a wide variety of crops and tree fruits.

2.0 DIRECTIONS FOR USE

See attached label.

3.0 DISCUSSION OF DATA

No new data submitted. Studies pertinent to the environmental fate data requirements for these requested new uses (filberts and pecans) have been previously reviewed and found acceptable.

4.0 RECOMMENDATION

The EF data in our files supports the proposed use on filberts and pecans.

Herbert L. Manning
Herbert L. Manning, Ph.D.
Review Section #1
EAB/HED

SPECIMEN LABEL
REDUCED TO 72%



Lorsban^{*}

50W

wettable powder insecticide

For Control of Major Pests on Apples

ACTIVE INGREDIENT:

Chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate]

50%

INERT INGREDIENTS:

50%

EPA Registration No. 464-552

EPA Est. No. 5905-AR-1

STORAGE AND DISPOSAL

Prohibitions: Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.

Pesticide Disposal: Pesticide or suspension that cannot be used should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

Container Disposal: Dispose of in an incinerator or landfill approved for pesticide containers or bury in a safe place.

General: Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, extends to the use of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

U.S. Patent No. 3,244,586

13101-024-1

882

THE DOW CHEMICAL COMPANY

Midland, MI 48640 U.S.A.

*Trademark of THE DOW CHEMICAL COMPANY

KEEP OUT OF REACH OF CHILDREN

WARNING

MAY BE FATAL IF SWALLOWED • CAUSES EYE IRRITATION

Read Complete Precautions on Side Panel

In case of an emergency endangering life or property involving this product, call collect
517-636-4400

AGRICULTURAL CHEMICAL
Do Not Ship or Store with Food, Feeds, Drugs or Clothing

1.36 kg / 3 lb

86-1777 PRINTED IN U.S.A. IN JANUARY, 1983.
THIS IS THE INITIAL PRINTING.

Calcium chloride, calcium nitrate or any other micronutrients should be sprayed separately.

PRECAUCION AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta haya sido explicada ampliamente.
TRANSLATION: (TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.)

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

General Information

LORSBAN 50W insecticide is a wettable powder formulation designed for use as a cover spray to control various pests. ~~injurious to apples~~ The pests controlled are listed in the accompanying table. LORSBAN 50W is compatible with insecticides, miticides, and fungicides commonly recommended in orchard spray schedules except for alkaline materials such as Bordeaux mixture and lime.

Mixing Instructions

LORSBAN 50W mixes readily with water to form a suspension. Mix the required amount of LORSBAN 50W with a small quantity of water and add this premix while filling the spray tank. Alternatively, fill the tank with the required amount of water and then add the premix. Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture. LORSBAN 50W contains a wetting agent. Do not use additional wetting agents, spreaders or stickers.

Use and Dosage Recommendations

Use LORSBAN 50W at the dosages indicated by application as a foliar spray to control the pests listed in the following table. Make the application as a dilute or concentrate spray using conventional, power operated ground spray equipment that will ensure thorough and complete coverage of the foliage and fruit. Treat when pests appear or in accordance with local conditions. Consult your State Agricultural Experiment Station or Extension Service specialist for specific use information in your area.

DOSAGE AND USE RECOMMENDATIONS for LORSBAN 50W wettable powder insecticide

Crop	Insects Controlled	Dosage		LORSBAN 50W per acre	Restrictions	
		Dilute Sprays				Concentrate Sprays
		LORSBAN 50W per 100 gallons water	Spray mixture per acre			LORSBAN 50W per acre
Apples	Apple aphid Apple maggot Codling moth European apple sawfly Eyepotted bud moth Fruitree leafroller Green fruitworm Lesser appleworm Obliquebanded leafroller Oriental fruit moth Plum curculio Redbanded leafroller Rosy apple aphid San Jose scale Spotted tentiform leafminer Tarnished plant bug Tufted apple budmoth Variegated leafroller White apple leafhopper Wooly apple aphid	8 to 16 oz	300 gallons	3 lb	Do not apply more than 8 complete applications per season at the maximum recommended dosage rate. Do not apply last treatment within 28 days before harvest or apply last two treatments closer than 21 days apart. Do not allow livestock to graze in treated orchards	

KEEP OUT OF REACH OF CHILDREN

WARNING

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals
MAY BE FATAL IF SWALLOWED
CAUSES EYE IRRITATION

Do Not Take Internally • Do Not Breathe Dust
 Do Not Get in Eyes, on Skin, or on Clothing
 Wash Thoroughly After Handling and Before Eating or Smoking • Remove and Wash Contaminated Clothing Before Reuse • In Case of Contact, Immediately Flush Eyes With Plenty of Water and Get Prompt Medical Attention if Irritation Develops or Persists • Wash Contaminated Skin With Soap and Plenty of Water.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on crops. Avoid use when bees are actively foraging. Protective information may be obtained from your Cooperative Agricultural Extension Service.

LORSBAN 50W insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if their waters are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

Use and Dosage Recommendations

Use LORSBAN 50W at the dosages indicated by application as a foliar spray to control pests listed in the following table. Mix the required dosage in sufficient water to ensure thorough and complete coverage of the foliage and crop and apply as a concentrate or dilute spray (25 to 400 gallons per acre) using conventional, power-operated ground spray equipment. Treat when pests appear or in accordance with local conditions. Consult your State Agricultural Experiment Station or Extension Service specialist for specific use information in your area.

DOSAGE AND USE RECOMMENDATIONS
for LORSBAN 50W Wettable Powder Insecticide

Crop	Insects Controlled	Dosage		Restrictions
		LORSBAN 50W per acre	LORSBAN 50W per 100 gallons	
Apples	Apple aphid Apple maggot Codling moth European apple sawfly Eyespotted bud moth Fruittree leafroller Green fruitworm Lesser appleworm Obliquebanded leafroller Orange tortrix Oriental fruit moth Pandemis leafroller Plum curculio Redbanded leafroller Rosy apple aphid San Jose scale Tarnished plant bug Tufted apple budmoth Variegated leafroller Woolly apple aphid	3 lb		Make no more than 3 applications per season. Do not apply last treatment within 28 days before harvest or apply last two treatments closer than 21 days apart. Do not allow livestock to graze in treated orchards. In California do not do work involving contact with trees within 2 days after treatment.
Almonds	Naval orangeworm Peach twig borer San Jose scale	4 lb		Make no more than 3 applications per season on almonds and filberts and no more than 2 applications per season on walnuts. Do not apply within 14 days of harvest. Do not allow livestock to graze in treated orchards.
Filberts	Eyespotted bud moth Filbert aphid Filbert leafroller Filbertworm Obliquebanded leafroller Omniverous leaf-tier Winter moth	3 to 4 lb		
Walnuts	Codling moth Walnut scale	4 lb		
Pecans	Black pecan aphid Hickory shuckworm Pecan leaf scorch mite Pecan nut casebearer Pecan weevil Phylloxera spp.		2 lb	Make no more than 5 applications per season. Do not apply within 28 days of harvest. Do not allow livestock to graze in treated orchards.

SPECIMEN LABEL
REDUCED TO 55%



Lorsban^{*} 4E insecticide

*For Control of Various Insects
Infesting Certain Field, Fruit, Nut and Vegetable Crops*

ACTIVE INGREDIENTS

Chlorpyrifos [O,O diethyl O (3,5,6 trichloro 2 pyridyl) phosphorothioate]	40.7%
Aromatic petroleum derivative solvent	22.8%
INERT INGREDIENTS	36.5%
Contains 4 pounds of chlorpyrifos per gallon	
EPA Reg. No. 464-448	EPA Est. 464 MI 1

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.
TRANSLATION TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.

KEEP OUT OF REACH OF CHILDREN

WARNING

**MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN
MAY BE INJURIOUS TO EYES AND SKIN
SEE BACK PANEL FOR ADDITIONAL PRECAUTIONS**

In case of an emergency endangering life or property involving this product, call collect
517-636-4400

AGRICULTURAL CHEMICAL
Do Not Ship or Store with Food, Feeds, Drugs or Clothing

18.93 L / 5 gal

86-1417 PRINTED IN U.S.A. IN MAY, 1983.
REPLACES SPECIMEN LABEL 86-1417 PRINTED IN APRIL, 1983.
DISCARD PREVIOUS SPECIMEN LABELS.
REVISIONS INCLUDE: (1) CONTROL OF BEET ARMYWORMS AND CUTWORMS IN SUGAR BEETS.

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KEEP OUT OF REACH OF CHILDREN

WARNING

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN
Not Take Internally • Do Not Get in Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

Allowed, do not induce vomiting. Contains aromatic petroleum solvent. Call a physician immediately.

Skin: In case of contact, remove contaminated clothing and immediately wash with soap and water. Wash contaminated clothing before reuse.

Eyes: Flush eyes with plenty of water for 15 minutes. Call a physician immediately. **TO PHYSICIAN:** Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical Hazards

COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

Environmental Hazards

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 or weeding if bees are visiting the treatment area.

LORSBAN 4E insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if their waters are contaminated with this product. Keep out of streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas that contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ AND FOLLOW COMPLETE DIRECTIONS FOR USE AND OTHER IMPORTANT INFORMATION GIVEN IN BOOKLET ATTACHED TO PRODUCT CONTAINER

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Store in a well-ventilated area. Keep container closed.

Disposal: Pesticide, spray mixture or rinse water that cannot be used according to directions must be disposed of according to approved Federal, state or local procedures.

Triple Rinse: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or for disposal in a sanitary landfill or by other approved State and local procedures.

Seller warrants that the product conforms to its chemical description and is reasonably fit for the uses stated on the label when used in accordance with directions under normal conditions of use. This warranty, or any other warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, extends to the use of this product contrary to label in or under abnormal conditions or under conditions not reasonably foreseeable to seller, and assumes the risk of any such use.

U.S. Patent No. 3,244,586

45378-1183

RQ INSECTICIDE
LIQUID N.O.S.
(Chlorpyrifos) NA 1993
F.P. 73-100°F



DOW CHEMICAL COMPANY

AND SUBSIDIARIES

MICHIGAN 48640 USA HÖRGEN SWITZERLAND HONG KONG
GABLES FLORIDA 33134 USA SARNIA ONTARIO CANADA

® Trademark of THE DOW CHEMICAL COMPANY

18010-001-2

THE DOW CHEMICAL COMPANY
Midland, MI 48640 U.S.A.

45378-X483

Page 1

Environmental Hazards

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.

LORSBAN 4E insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if their waters are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

General Information

LORSBAN 4E insecticide forms an emulsion when diluted with water and is suitable for use in all conventional hand- and power-operated ground spray equipment. Aerial spray equipment also may be used where specified.

Mixing Instructions

To prepare the spray, add a portion of the required amount of water to the spray tank and with agitation add the LORSBAN 4E. Complete filling the tank with the balance of water needed. Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture.

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Lorsban[®]
4E insecticide

For Control of Various Insects Infesting Certain Field, Fruit, Nut, and Vegetable Crops

Complete Directions for Use, Use Precautions and Restrictions, Hazards and Other Important Information for the Proper Use, Handling, Storage and Disposal of this Product.

EPA Reg. No. 464-448 EPA Est. 464-MI-1

45378-X483

*Trademark of THE DOW CHEMICAL COMPANY

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LORSBAN 4E insecticide may also be used in tank mixtures with certain herbicides and/or with non-pressure fertilizer solutions as recommended under specific crop use directions. Prepare tank mixtures in the same manner as recommended above for use of LORSBAN 4E alone. When tank mixtures of LORSBAN 4E and herbicides are involved, add wettable powders first, flowables second, and emulsifiable concentrates last. Where a fertilizer solution is involved, it is strongly recommended that a fertilizer pesticide compatibility agent such as Unite¹ or Complex² be used. Maintain constant agitation during both mixing and application to ensure uniformity of the spray mixture.

NOTE: Test compatibility of the intended tank mixture before adding LORSBAN 4E to the spray or mix tank. Add proportionate amounts of each ingredient to a pint or quart jar, cap, shake, and let set 15 minutes. Formation of precipitates that do not readily redispense indicates an incompatible mixture that should not be used.

¹ Trademark of The Hopkins Agricultural Chemical Company.

² Trademark of Kaio Laboratories, Inc.

Use and Dosage Recommendations

ALFALFA: Use LORSBAN 4E to control the following pests at the dosages indicated by application as a broadcast, foliar spray:

- Corn rootworm adults (spotted cucumber beetle), grasshoppers ½ to 1 pint per acre;
- Alfalfa blotch leafminer, alfalfa looper, alfalfa weevil larvae and adults, aphids, armyworms, cutworms, Egyptian alfalfa weevil larvae and adults, plant bugs, leafhoppers, spittlebugs 1 to 2 pints per acre.

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READ ENTIRE LABEL BEFORE USING THIS PRODUCT

LEUCACION AL USUARIO: Si usted no lee lés, no use este producto hasta que etiqueta le haya sido explicada plamente.

ANSLATION: (TO THE USER: If you can read English, do not use this product if the label has been fully explained to L.)

ACTIVE INGREDIENTS:

Chlorpyrifos (0,0-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate) 40.7%
 Aromatic petroleum derivative solvent 22.8%

INERT INGREDIENTS 36.5%
 Contains 4 pounds of chlorpyrifos per gallon.

In case of an emergency endangering life or property involving this product, call collect 517-636-4400

AGRICULTURAL CHEMICAL
 Do Not Ship or Store with Food, Feeds, Drugs or Clothing

Do not use on turf or for structural pest control. Do not formulate this product into other end use products.

Use the required dosage with enough water to insure thorough coverage of crop foliage and apply using aerial (fixed-wing or helicopter) or power-operated ground spray equipment. For aerial application use at least 2 gallons of water per acre. Treat when field counts or crop injury indicates that damaging pest populations are developing or present; however, do not apply more than once per crop cutting.

LORSBAN 4E insecticide should not be tank-mixed with pesticides, surfactants, or fertilizer formulations unless prior use has shown the combination to be non-injurious under your current conditions of use. Some phytotoxic symptoms may be observed on young, tender rapidly growing alfalfa when treated with LORSBAN 4E. Alfalfa will outgrow the symptoms and no yield loss should be expected.

This product is highly toxic to bees exposed to direct treatment on alfalfa. Do not apply if nearby colonies are clustered outside of hives and bees are foraging. Protective information may be obtained from your Agricultural Extension Service.

Restrictions: Do not cut or graze treated alfalfa within 14 days after application of 1 pint of LORSBAN 4E per acre nor within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per year.

TRUCK FRUITS: Use LORSBAN 4E insecticide at the rates indicated to control the following pests. Use the lower rates for light infestations and increase the dosage for heavier infestations.

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HAZARDS
KEEP OUT OF REACH OF CHILDREN
WARNING

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN
Do Not Take Internally • Do Not Get In Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment
If Swallowed: Do not induce vomiting. Contains aromatic petroleum solvent. Call a physician immediately.

If On Skin: In case of contact, remove contaminated clothing and immediately flush skin with soap and water. Wash contaminated clothing before reuse.

If In Eyes: Flush eyes with plenty of water for 15 minutes. Call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical Hazards
COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame • Do Not Cut or Weld Container

CROP	PEST	Dosage LORSBAN 4E for Spray Coverage		Gallons of Spray Per Acre For Dilute Applications ¹	Remarks
		Dilute (Pints/100 gal. water)	Concentrate (Pints/Acre)		
Grapefruit Lemons Oranges and Other Citrus Fruits	Aphids, Katydids Lepidopterous larvae Cutworms Fruit tree leafroller Orange tortrix Western tussock moth	Outside Coverage Spray (OC) 1/4 to 1	2 to 7	200 to 700	Use directions apply in all states including California.
	Citrus thrips ¹ , Mealy bugs ¹ Scale insects ² Black scale Brown soft scale California red scale Snow scale, Chaff scale	1/4 to 1	200 to 700	Use directions apply in all states except California (See footnotes 1 & 2).	

¹In California apply as Thorough Distribution Coverage (TDC) using 1/2 to 1 pint of LORSBAN 4E in 100 gallons of water and 6 to 12 pints LORSBAN 4E per acre in dilute or concentrate sprays. For dilute sprays, apply 600 to 1200 gallons of spray per acre.

²In California apply as Thorough Coverage (TC) using same dosages as in ¹. For dilute sprays apply 1200 to 2400 gallons of spray per acre but do not apply more than 12 pints of LORSBAN 4E per acre.

³Gallonage per acre based on average size of mature trees. Adjust to tree size per acre.

For dilute applications, use the specified dosage in 100 gallons of water for the spray type indicated for pest to be controlled. For concentrate sprays, use the same amount of LORSBAN 4E per acre that would be needed for application as a diluted spray, using appropriate application / coverage procedures. Treat when insects become a problem or in accordance with the local spray schedule recommended by your State Extension Service Specialist. Do not apply during bloom period or when temperature exceeds 95°F. Do not tank mix LORSBAN 4E and PULCTRAN® 50W miticide in low volume applications.

Restrictions: Do not apply more than 2 applications per fruit year or more than 15 pints of LORSBAN 4E insecticide per acre per fruit year. Do not make second application within 30 days of the first application. Do not treat within 21 days before harvest for applications up to 7 pints of LORSBAN 4E per acre nor within 35 days for application of rates above 7 pints per acre. Do not pick fruit or do other work involving contact with trees within 2 days after treatment. Do not allow livestock to graze in treated areas.

FIELD CORN, POPCORN, SWEET CORN: For use to control cutworms, armyworms, chinch bugs, grasshoppers, wireworms, flea beetle larvae and adults, aphids, billbugs, grubs, western bean cutworm, corn borers, symphylans and lesser cornstalk borer.

Preplant Incorporation Treatment: Use LORSBAN 4E at the following rates by application in sufficient water to the soil surface and incorporate into the soil:

Cutworms, symphylans . . . 2 to 4 pints per acre;
Wireworms, billbugs, flea beetle larvae,
grubs 4 pints per acre.

Use recommended rate in not less than 10 gallons of water per acre and apply as a broadcast spray to the soil surface using suitable power-operated ground spray equipment. On the same day of treatment, incorporate the insecticide into the top 2 to 4 inches of soil using a disc, field cultivator or equivalent equipment.

LORSBAN 4E insecticide may also be applied in tank mixtures with non-pressure fertilizer solutions and/or with Bladex¹, Eradicane², Sutan³, Lasso⁴, Dual⁵, and Atrazine herbicides. See the Mixing Instructions section of this label for further information. Read and carefully follow all applicable directions, restrictions, and precautions on labeling for the other products used in combination with LORSBAN 4E.

¹ Trademark of Shell Chemical Company

^{2,3} Trademark of Stauffer Chemical Company

⁴ Trademark of Monsanto Company

⁵ Trademark of Ciba-Geigy Corporation

Cultivation Time Treatment: Use LORSBAN 4E at the rate of 2 pints per acre to control corn rootworm larvae. Apply LORSBAN 4E as a water emulsion on both sides of the row at the base of the plants just ahead of the cultivator shovels. Cover the insecticide with soil around the brace roots. The best time to apply a basal treatment of a soil insecticide with cultivation is near the beginning of egg hatch. A cultivation application of LORSBAN 4E may be made in addition to an at planting application of LORSBAN 15G granular insecticide.

GRAIN SORGHUM: Use LORSBAN 4E to control infestations of the Sorghum midge by application as a broadcast, foliar spray at the rate of ½ pint per acre. Mix the specified dosage in enough water to ensure thorough coverage and apply using suitable aerial or ground spray equipment. Make the first application when 30 to 50 percent of the seed heads are in bloom and midge adults are present. A second and third treatment at 3-day intervals may be needed but do not exceed 3 applications. To avoid phytotoxicity, do not treat plants that are under extreme heat and drought stress.

Restrictions: The treated crop is not to be used for forage, fodder, hay, or silage within 14 days after the last treatment. Do not treat sweet varieties of sorghum.

GRAPES: Use LORSBAN 4E insecticide for control of grape root borer by application just before the pest emerges from the soil. Mix 4½ pints of LORSBAN 4E with 100 gallons of water and apply 2 quarts of the diluted spray mixture to the soil surface on a 15-square foot area around the base of each vine. Do not allow spray to contact fruit or foliage.

Restrictions: Do not make more than one application per season or apply within 35 days before harvest. Based upon available residue data, the use of LORSBAN 4E on grapes is restricted to states East of the Rocky Mountains.

MINT: Use LORSBAN 4E by application as a broadcast, foliar spray to control cutworms at the rate of 2 to 4 pints per acre and mint root borer at the rate of 4 pints per acre. Mix the specified dosage in water to give no less than 10 gallons of spray per acre and apply using ground spray equipment. For cutworm control, treat during May and June when field counts indicate damaging insect populations are developing or present.

Postemergence Treatment: Use LORSBAN the following rate by application in sufficient water to ensure thorough coverage of treated plants:

Grasshoppers ½ to 1 pint per acre;
Armyworms, chinch bugs,
aphids 1 to 2 pints per acre;
European and southwestern
corn borer 1.5 to 2 pints per acre;
Cutworms, billbugs, lesser cornstalk
borer, flea beetle adults,
western bean cutworm . . . 2 to 3 pints per acre.

Treat when field counts indicate that pests are or may become a problem. For best billbug, chinch bug, and flea beetle adult control, apply with sufficient water to ensure a minimum spray volume of 20 to 40 gallons per acre and 40 psi using ground spray equipment. On corn less than 6 inches tall, apply the insecticide spray in a 9 to 12 inch wide band over the row. On corn greater than 6 inches tall, apply the insecticide spray using drop nozzles directed to the base of the plant. When chinch bugs continue to immigrate to corn over a prolonged period or under extreme pressure, a second application of LORSBAN 4E may be needed.

For cutworm, western bean cutworm, armyworm, aphid, European and southwestern corn borer, grasshopper, and lesser cornstalk borer control, apply as a broadcast spray using either aerial (fixed-wing or helicopter) or power-operated ground spray equipment. For aerial application, use at least 2 gallons of spray per acre. For cutworms, it is preferable to apply LORSBAN 4E when soil is moist and worms are active on or near the soil surface. If ground is dry, cloddy or crusty at time of treatment, worms may be protected from the spray and effectiveness will be reduced. If such conditions exist, shallow incorporation using a rotary hoe or other suitable

When larvae are less than ¼ inch in length, use the 2 pint rate. When larvae are ¼ inch or more in length, use the higher rate. Make only one application during the growing season. Do not apply within 90 days before harvest. For mint root borer control, apply post-harvest when field counts indicate damaging insect populations are developing or present. Follow treatment with approximately 1 acre inch of sprinkler irrigation immediately after application to incorporate the insecticide into the soil. Make only one post-harvest application per season.

NECTARINES, PEACHES: Use LORSBAN 4E insecticide for the control of peach tree borers by application as a trunk spray before newly hatched borers enter the trees. Mix 3 quarts of LORSBAN 4E with 100 gallons of water and apply as a coarse, low-pressure spray to give uniform coverage of tree trunks. Thoroughly wet all bark areas from ground level to scaffold limbs. Do not allow spray to contact fruit. Consult your State Agricultural Experiment Station or Extension Service Specialist for proper time to treat in your area.

Restrictions: Make only one application per season. Do not apply within 14 days before harvest. Do not allow meat or dairy animals to graze in treated orchards.

ONIONS (dry bulb): Use LORSBAN 4E insecticide to control onion maggot by application as an in-furrow drench at seeding. Apply LORSBAN 4E at the rate of 1.1 fluid ounce per 1000 linear feet of row at an 18-inch row spacing. Use a minimum of 40 gallons of total drench per acre. Incorporate to a depth of 1 to 2 inches.

Restrictions: For use on direct seeded onions only. Do not make more than one application per year. Based on available residue data, use of LORSBAN 4E on onions (dry bulb) is restricted to Idaho, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Washington, and Wisconsin.

equipment immediately before or soon after treatment may improve control. Consult your Agricultural Experiment Station or Extension Service specialist for additional information concerning cutworm control practices in your area. For first-generation European corn borer control, treat when 25 to 50 percent of the corn plants show pinhole feeding or leaf-feeding scars. Ground applications should be directed into the corn whorls. For second-generation European corn borer control, treat when field counts of egg masses indicate pests are or may become a problem. For southwestern corn borer control, treat when field counts of egg masses indicate pests are or may become a problem. A second application may be applied 10 to 14 days later, if needed due to reinfestation.

LORSBAN 4E insecticide may also be applied through overhead sprinkler irrigation systems as a postemergence broadcast application to control the above listed foliar insects as per the following directions for use:

Thoroughly clean the injection system and tank of any fertilizer or chemical residues, and dispose of the residues according to state and federal laws. Flush the injector with soap and water. Calibrate the injector system. Prepare a mixture of non-emulsifiable oil and LORSBAN 4E in a steel mix tank after determining the amount of insecticide that will be injected per hour at the desired rate and time of operation. Pump one-half of the non-emulsifiable oil into the steel mix tank, start mechanical or hydraulic agitation, and continue to slowly add the remainder of the LORSBAN 4E and oil. Continually agitate the LORSBAN 4E plus oil mixture. Set the sprinkler system to deliver the desired inches of water per acre (water rates less than 0.5 inch per acre are preferred). Start the water pump and sprinkler, and let the system achieve the desired pressure and speed before starting the injector. The LORSBAN 4E plus oil mixture must be injected continuously and uni-

PEANUTS: Use LORSBAN 4E for control of the following pests at the dosages indicated:

Lesser cornstalk borer . . . 2 to 4 pints per acre (as a directed spray to the base of the plants in an 8 to 10 inch wide band);

Armyworms, corn earworm, cutworms,
leafhoppers, mites, rednecked peanutworm,
thrips 1 to 2 pints per acre;
Velvetbean caterpillar, green
cloverworm ½ to 1 pint per acre;
(as a broadcast, foliar spray using ground or
aerial equipment when field counts indicate
damaging insect populations are developing or
present).

Mix the required dosage in enough water to ensure thorough coverage.

LORSBAN 4E should not be tank mixed with pesticides, surfactants, or fertilizer formulations unless prior use has shown the combination noninjurious under your current conditions of use. Phytotoxicity may occur when LORSBAN 4E is applied to Florunner peanuts experiencing high temperature and drought stress.

Restrictions: Do not make more than one application per season as a directed spray. Directed and foliar sprays should not exceed 8 pints of LORSBAN 4E per acre or 4 pounds of chlorpyrifos (active ingredient) per acre per season. Do not harvest within 21 days after treatment. Do not feed treated peanut forage or hay to meat or dairy animals.

SOYBEANS: Use LORSBAN 4E insecticide for control of the following pests at the dosages indicated:

Lesser cornstalk borer . . . 2 to 4 pints per acre (at planting or postemergence in a 6 to 10-inch wide band followed by light incorporation); 2 pints per acre (at cracking in a 6 to 10 inch wide band followed by a second spray 5 days after the initial treatment if necessary).

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into the irrigation water line as the sprin-
g moving. This procedure is necessary to
the desired rate per acre in a uniform
er. When application is finished, allow the
irrigation and injector system to be thor-
y flushed clean before stopping the system.

est results, use the recommended rate of
BAN 4E in a tank mix with 2 pints per acre of
miscible oil. Maintain vigorous tank agita-
to assure uniformity of the LORSBAN 4E plus
ture throughout the injection period.

Following use precautions will result in a safe
successful application of LORSBAN 4E plus oil
res:

USE ONLY IN STEEL MIX TANKS.

USERS OF LORSBAN 4E INSECTICIDE THROUGH OVERHEAD SPRINKLER IRRIGATION SYSTEMS SHOULD COMPLY WITH ALL THE REGULATIONS THAT APPLY TO CLASS C FLAMMABLE LIQUIDS. MINIMUM DISTANCES AND PROPER ELECTRICAL CONSTRUCTION IS ESSENTIAL TO SAFELY HANDLE LORSBAN 4E. ELECTRICAL INSTALLATIONS MUST MEET CLASS 1 GROUP DIV. 1 OR 2 REQUIREMENTS AS SPECIFIED IN THE NATIONAL ELECTRICAL CODE 70 (NEC 70). THIS TYPE OF WIRING IS GENERALLY REFERRED TO AS EXPLOSION PROOF. CONSULT WITH A LICENSED ELECTRICIAN TO CORRECTLY WIRE THE INJECTION SYSTEM AS DEFINED BY NEC 70.

The irrigation pumping plant and the chemical
injection pump should be interlocked so that if
irrigation pumping plant stops, the chemi-
cal injection pump also will stop. This pro-
cedure will prevent the possibility of filling the
irrigation pipeline with the chemical
from the supply tank.

Check and vacuum relief valves (anti-siphon
devices) are needed in the irrigation pipeline

to keep water and/or a mixture of water and
chemical from draining or siphoning back into
the irrigation well and polluting the ground
water. Both of these valves are located be-
tween the irrigation pump discharge and the
place of chemical injection into the irrigation
pipeline.

5. A check valve in the chemical injection line
is needed to stop the flow of water from the
irrigation system into the chemical supply
tank.

6. A positive displacement pump is needed to
provide uniform injection into the water line.
The injector pump must provide a greater
pressure than that of the irrigation system at
the point of injection. The pump must contain
Viton seals and be rated for use in hazardous
areas. All electrical service inside the hazard
zone must meet National Fire Protection As-
sociation 30 (NFPA 30) and NEC 70.

7. To insure uniform mixing of the insecticide
into the water line, inject the mixture into the
fertilizer injection port or just ahead of an
elbow or tee in the irrigation line so that the
turbulence created at those points will assist
in mixing.

8. The steel tank holding the insecticide mixture
should be large enough to allow the system to
complete a revolution with one filling. It
should be free of rust, fertilizer, sediment, and
foreign material, and equipped with an in-line
strainer situated between the tank and the
injector pump.

9. In order to calibrate the irrigation system and
injector to apply the LORSBAN 4E plus oil
mixture, determine the following: 1) calculate
the number of acres covered by the system, 2)
the number of minutes for the system to make
one revolution, 3) the number of inches of
water per acre delivered by the system, 4) the
number of minutes required for the injector
pump to inject one gallon of insecticide mix-

worms, European corn borer, corn
earworm, southern green
stink bug 2 pints per acre;
bean leaf beetle 1 to 2 pints per acre;
Mexican bean beetle,
armyworms 1 to 1½ pints per acre;
greenbean caterpillar, grasshoppers,
green cloverworm ... ½ to 1 pint per acre.
Use as a broadcast, foliar spray using ground or
aerial equipment when field counts indicate
damaging insect populations are developing
or present; re-treat as necessary to maintain
control).

Use the required dosage in enough water to
ensure thorough coverage. For ground applica-
tion at least 10 gallons of spray per acre. On
soybeans do not apply more than
application after pod set.

Restrictions: Do not apply more than 6 pints of
LORSBAN 4E per acre or 3 pounds of chlorpyrifos
(active ingredient) per acre per season. Do not
apply last treatment within 28 days before harvest
or apply last two treatments closer than 14 days.
Do not allow livestock to graze in treated
areas nor otherwise feed treated soybean forage
to meat or dairy animals within 14 days after
application. Do not feed straw from treated soy-
beans to meat or dairy animals within 28 days
after application.

WATERMELONS: Use LORSBAN 4E insecticide by
application as a broadcast foliar spray to control
berry bud weevil at the rate of 1 quart per
acre in a minimum of 40 gallons of spray per
acre when buds first appear and 10 to 14 days
before harvest. Do not apply after berries start to form or
if berries are present. LORSBAN 4E should
be tank mixed with pesticides, surfactants, or
other formulations unless prior use has shown
combination noninjurious under your current
conditions of use. Phytotoxicity may occur when

LORSBAN 4E is applied to strawberries experi-
encing high temperature and drought stress.

Restrictions: For pre-bloom use only. Do not make
more than two applications per season or apply
within 21 days before harvest.

SUNFLOWERS: For use to control cutworms, sun-
flower beetle larvae and adults, stem weevil,
sunflower moth, seed weevil, and grasshoppers.

Preplant Incorporation Treatment: Use LORSBAN
4E insecticide at the following rates by application
in sufficient water to the soil surface and incorpo-
rate into the soil:

Cutworms 2 to 4 pints per acre.

Use recommended rate in not less than 10 gallons
of water per acre and apply as a broadcast spray
to the soil surface using suitable power-operated
ground spray equipment. On the same day of
treatment, incorporate the insecticide into the top
2 to 4 inches of soil using a disc, field cultivator or
equivalent equipment.

Postemergence Treatment: Use LORSBAN 4E for
control of the following pests at the dosage
indicated by application in sufficient water to
ensure thorough coverage of treated plants:

Cutworms 2 to 3 pints per acre;
Sunflower beetle larvae and adults, stem
weevil, sunflower moth, and seed
weevil 1 to 1½ pints per acre;
Grasshoppers 1 pint per acre.

Apply as a broadcast spray using either aerial
(fixed-wing or helicopter) or power-operated
ground spray equipment when field counts indi-
cate that pests are or may become a problem. For
cutworm control, a second treatment may be
made 7 to 10 days later, if needed. For stem weevil
control, optimal treatment time is within 5 to 7
days after adult weevils begin to appear. For
sunflower moth control, make first application
during early 1 to 5 percent bloom stage. A second
treatment may be made 7 days later, if needed. For

ture, and 5) the total gallons of insecticide
mixture needed to cover the desired acreage.
Divide total gallons of insecticide mixture
needed to cover the irrigated area by the
number of minutes to make one circle. This
value equals the gallons per minute output
that the injector must deliver. It is suggested
that the system be calibrated at least twice
before operation, and the system should be
monitored during operation.

10. Do not apply a pesticide solution when wind-
speed or direction results in unacceptable
drift from the application area.

11. Do not allow irrigation runoff to collect or
runoff and pose a hazard to livestock, wells, or
adjoining crops.

12. Allow foliage to dry before reentering the
field.

Restrictions: Do not apply within 35 days before
harvest of grain. Do not apply more than a total of
15 pints of LORSBAN 4E per acre per season. Do
not allow livestock to graze in treated areas nor
harvest treated corn silage as feed for meat or
dairy animals within 14 days after last treatment.
Do not feed treated corn fodder to meat or dairy
animals within 35 days after last treatment.

**SWEET CORN Grown Only in Florida and Geor-
gia:** Use LORSBAN 4E to control infestations of
beet armyworm, fall armyworm and corn earworm
by application as a broadcast, foliar spray at the
rate of 1 to 2 pints per acre. Mix the specified
dosage in enough water to ensure thorough
coverage and apply using suitable aerial or
ground spray equipment. For aerial application,
use at least 2 gallons of spray per acre. Treat
when field counts indicate damaging pest popula-
tions are developing or present. Re-treat as nec-
essary to maintain control but do not apply more
than twenty-two 1-pint or eleven 2-pint treatments
per season.

seed weevil control, treat when field counts
indicate there are 10 to 12 adults per plant for oil
crops and 1 to 3 adults per plant on confectionary
crops. Additional treatments should be made at
successive 7 to 10 day intervals if field counts
indicate need to re-treat. For sunflower beetle
larvae or adult control, treat when field counts
indicate there are 10 larvae or 1 to 2 adults per
seedling. Additional treatments may be made at
successive 7 to 10 day intervals if field counts
indicate need to re-treat.

Restrictions: Do not apply more than 9 pints of
LORSBAN 4E per acre per season. Do not apply
within 42 days before harvest. Do not allow live-
stock to graze in treated areas.

SUGAR BEETS: Use LORSBAN 4E by application
as a broadcast, foliar spray to control beet army-
worms at a rate of 1½ to 2 pints per acre and
cutworms at a rate of 2 pints per acre. Treat when
field counts indicate that damaging insect popula-
tions are or may be a problem. Mix the specified
dosage with 2 to 5 gallons of water per acre and
apply using suitable aerial spray equipment or
with 10 to 30 gallons of water per acre when using
power-operated ground spray equipment. Re-
treat as necessary to maintain control.

Restrictions: Do not apply within 30 days before
harvest of beet roots and tops. Do not apply more
than a total of 8 pints of LORSBAN 4E per acre per
season. Do not allow livestock to graze in treated
areas nor harvest treated beet tops as feed for
meat or dairy animals within 30 days after last
treatment.

SWEET POTATOES: Use LORSBAN 4E to control
Conoderus wireworms, *Systema* flea beetles and
the sweet potato flea beetle by preplant applica-
tion at the rate of 4 pints per acre as a broadcast
(overall) spray to the soil surface followed by
incorporation. Mix the specified dosage with
enough water to obtain uniform coverage of the
treated area and apply as a coarse spray using

Restrictions: Do not apply
LORSBAN 4E per acre per
corn ears, allow livestock
areas, nor feed treated silage
meat or dairy animals with-
ment. Do not use in conjunc-
broadcast, foliar applicatio-
granular insecticide.

COTTON: Use LORSBAN 4
following pests in all states:
California at the dosages in

Cotton fleahopper, plant bu-
(*Lygus*, *Mirids*)

Cotton aphid, fall armyworm
grasshoppers, spider mites,
thrips, yellow-striped
armyworm

Beet armyworm, bollworms
(*Heliothis spp.*), boll weevil,
cutworms, pink bollworm, s
marsh caterpillar

NOTE: The recommended
per acre will not achieve
control of the higher label
the damage done by plant
fleahopper and allow the
survive, build up, and be
control of bollworms infest-
Use LORSBAN 4E for control
in Arizona and Califor-
indicated:

Armyworms, cotton aphid,
fleahopper, *Lygus*, salt mar
caterpillar, thrips

Bollworms (*Heliothis spp.*),
cutworms, pink bollworm

NOTE: The 2 pint rate will
cotton leafperforator and s

suitable ground spray equi-
pment, incorporate the insect
depth of 4 to 6 inches using
cultivator, or other suitable
equipment. Plant the crop in the
as possible after treatment

Restrictions: Do not make
application per season.

TREE FRUITS: Use LORSBA
delayed dormant spray at
control the following insect

Crop	Insect
Apples	Rosy apple ap San Jose scale Climbing cutw
Pears	San Jose scale Climbing cutw Pear psylla ac
Plums, Peaches	San Jose scale Mealy plum a Climbing cutw Peach twig be
Almonds, Peaches, Nectarines	San Jose scale Peach twig be Climbing cutw

Tank mix the specified dos-
age of a petroleum spray oil
for dormant use in 100 gallons of
entire tree by application
ground spray equipment. Use
of LORSBAN 4E for severe
recommended by your Sta-
tion or Extension

Restrictions: Make only
the dormant season. Do n
animals to graze in treated

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TREE NUTS: Use LORSBAN 4E at the dosages indicated by application as a foliar spray to control pests listed in the following table. Mix the required dosage in sufficient water to ensure thorough and complete coverage of the foliage and crop and apply as a concentrate or dilute spray (25 to 400 gallons per acre) using conventional, power-operated ground spray equipment. Treat when pests appear or in accordance with local conditions. Consult your State Agricultural Experiment Station or Extension Service specialist for specific use information in your area.

Crop	Insects Controlled	Dosage		Restrictions
		LORSBAN 4E per acre	LORSBAN 4E per 100 gallons	
Almonds	Navel orangeworm Peach twig borer San Jose scale	4 pints		Make no more than 3 applications per season on almonds and filberts and no more than 2 applications per season on walnuts. Do not apply within 14 days of harvest. Do not allow livestock to graze in treated orchards.
Filberts	Eyespotted bud moth Filbert aphid Filbert leafroller Filbertworm Obliquebanded leafroller Omniverous leaftier Winter moth	3 to 4 pints		
Walnuts	Codling moth Walnut scale	4 pints		
Pecans	Black pecan aphid Hickory shuckworm Pecan leaf scorch mite Pecan nut casebearer Pecan weevil Phylloxera spp.		2 pints	Make no more than 5 applications per season. Do not apply within 28 days of harvest. Do not allow livestock to graze in treated orchards.