241-208

ACCEPTED

MAY 17 1974

UNDER THE FEDERAL INSECTICIDE FUNGICIDE AND RODENTICIDE ACT FOR ECONOMIC POISON REGISTERED UNDER NO. 241-208 SUBJECT TO ATTACHED COMMENTS.

05/17/1974

CYANAMID

EPA-PR 1/14

IMPORTANT

Before Using

STOP

Read Directions

in This Leaflet

Undiluted spray droplets of CYTHION Insecticide, The Premium Grade Malathion or MALATHION ULV Concentrate Insecticide will permanently damage automobile paint unless these specific instructions for ground and aerial application are followed.

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CONTENTS OF THIS LEAFLET APPLY TO BOTH:

CYTHION ® INSECTICIDE "THE PREMIUM GRADE MALATHION "®	MALATHION ULV* CONCENTRATE INSECTICIDE
EPA Reg. No. 241-208-AA	EPA Reg. No. 241-110-AA

*Trademark

Active Ingredient:
Malathion**..... 95.0%
Inert Ingredients..... 5.0%
**O,O-dimethyl phosphorodithioate of diethyl mercaptosuccinate
(One gallon contains 9.7 pounds of malathion)

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

(TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you)

Before using, read the directions contained in this leaflet for the proper methods and procedures which must be followed to achieve effective insect control and avoid permanent damage to automobile and other paint finishes.

(18 pt. type) **CAUTION!**

(12 pt. type) KEEP OUT OF REACH OF CHILDREN

HARMFUL BY SWALLOWING,
INHALATION OR SKIN CONTACT

Avoid Breathing Spray Mist
Avoid Contact With Skin
Wash Thoroughly After Handling
Change Contaminated Clothing
Do Not Contaminate Food Or Feed Products

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Highly toxic to fish.
Do not contaminate any body of water,
by direct application, cleaning of equipment
or disposal of wastes and containers.

In case of an emergency endangering
life or property involving this product,
call collect, day or night,
Area Code 201-835-3100.

American Cyanamid Company
Agricultural Division
P. O. Box 400
Princeton, New Jersey 08540

DISCLAIMER

American Cyanamid Company does not assume any responsibility for any damages which result from failure to properly design, maintain or operate any ULV equipment or from failure to determine or to obtain proper droplet size.

American Cyanamid Company warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use.

Any damages arising from a breach of this warranty shall be limited to direct damages, and shall not include consequential commercial damages such as loss of profits or values, etc.

American Cyanamid Company makes no other express or implied warranty, including any other express or implied warranty of FITNESS or of MERCHANTABILITY.

BUYER assumes the risk of any use contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable by American Cyanamid Company.

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(Illustration)

AGRICULTURAL USES

Directions For Use

For Ultra Low Volume Applications

Do not use this product
for any uses other than those
specified in this leaflet.

MALATHION is used undiluted in specially designed aircraft or ground equipment capable of applying ultra low volumes for control of the insects indicated. Aerial applications are most effective when made at a boom height of 5 feet and a swath width of 50 feet. Do not make application when winds exceed 5 mph.

Mist blowers and boom sprayers utilizing a controlled air flow to facilitate particle size and spray deposition may be used at a vehicle speed of 4 to 10 mph.

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Mist blowers with a pump capable of producing up to 40 psi and blower speeds of 2600 rpm are satisfactory. Use flat fan nozzles, 8001 to 8002, placed 30° into air blast or rotary atomizers into the air blast that produce an efficient spray particle with a mass medium diameter of 40 to 100 microns. Swath widths should not exceed 30 feet, and applications should not be made when winds exceed 5 mph.

Boom sprayers with a filtered rotary air compressor, either PTO or gas engine driven or an air pump capable of producing at least 12 psi are satisfactory. Use air pressure on chemical tanks and an accurate metering valve to assure a calibrated flow of the pesticide. Air should be regulated with relief valve and gauge for proper air and liquid mixture. Pneumatic-type spray nozzles, as suggested by equipment manufacturer, should be used for spray particles with mass medium diameter of 30 to 100 microns. Applications should not be made when winds exceed 5 mph.

Repeat applications should be made as necessary unless otherwise specified.

IMPORTANT - Undiluted spray droplets of MALATHION will permanently damage automobile paint. Cars and trucks should not be sprayed. If accidental exposure does occur, the vehicle should be washed immediately.

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

Consult your state experiment station or state extension service for proper timing of sprays.

Crop	Pests Controlled	Fluid Ounces Per Acre	Days to Harvest or Grazing & Comments
Alfalfa	Alfalfa caterpillar Western yellow striped armyworm	8	0 day. Apply when larvae are small.
		12	5 days. Apply when larvae are large or when foliage is dense.
	Alfalfa weevil larvae	16	5 days. Apply when day temperatures are expected to exceed 65°F. and when 50-75% of leaves show feeding damage.
	Beet armyworm	8	0 day. Apply when larvae are small.
		16	5 days. Apply when larvae are large or when foliage is dense.
	Grasshoppers	8	0 day.
	Do not apply to alfalfa in bloom. Do not apply to seed alfalfa.		
Beans (lima, green, snap Navy, red kidney, wax, dry, blackeye)	Mexican Bean Beetle Leafhoppers Green Cloverworm Japanese Beetle Lygus Bug	8	1 day.

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Crop	Pests Controlled	Fluid Ounces per Acre	Days to Harvest or Grazing & Comments
Blueberries	Blueberry Maggot	10	0 day
Cherries	Cherry Fruit Fly	12-16	1 day. Apply by aircraft only. Use higher rate when foliage is heavy or infestation is severe. Make first application as soon as flies appear.
Cereal crops (barley, corn, oats, wheat) and grasses	Cereal leaf beetle	4-8	Barley, oats, wheat: 7 days. Corn: 5 days. Grasses: 0 day.
Clover, Pasture and Range Grass, Grass, Grass Hay, Non-agricultural Land (wastelands, roadsides)	Grasshoppers	8	0 day. Do not apply to clover in bloom.
Corn	Adult Corn Rootworm	4	5 days.
Cotton	Early Season Insects Thrips Fleahoppers Leafhoppers	4-8	0 day
	Boll Weevil	8-12	Early to midseason
		16	Late season
	Grasshoppers	8	
	Lygus Bugs	8-12	
		16	Very heavy migrating populations

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Crop	Pests Controlled	Fluid Ounces per Acre	Days to Harvest or Grazing & Comments
Grain Crops (barley, corn oats, rye, rice, grain sorghum and wheat)	Grasshoppers	8	7 days, except corn. Corn: 5 days
Grain Sorghum	Sorghum Midge	8-12	7 days. Apply during the bloom stage.
Rice - Grain Form (Louisiana, Texas)	Rice Stink Bug	8	7 days. Apply by aircraft only. Apply during early milk and dough stage of growing rice.
Safflower	Grasshoppers Lygus Bugs	8	3 days of harvesting seeds.
Soybeans	Mexican Bean Beetle Grasshoppers Japanese Beetle Green Cloverworm	8	7 days
Sugar Beets	Grasshoppers Sugar Beet Root Maggot Adults	8	0 day 7 days. If tops are to be used for food or feed.
Nonagricultural Lands	Beet Leafhopper (on wild host plants)	8	0 day.
Beef Cattle-Feed Lots and Holding Pens	Adult Flies and Mosquitoes	6-8	0 day.

OTHER AGRICULTURAL USES:

Alfalfa, Clover, Pasture and Range Grass, Grass and Grass Hay, Grain Crops, Beans, Rice, Tomatoes and Nonagricultural Lands (wastelands): Adult mosquitoes and flies-Apply MALATHION at the rate of 2 to 4 fluid ounces for control of adult mosquitoes and at 6 to 8 fluid ounces per acre for control of adult flies and mosquitoes. Repeat applications as necessary. On alfalfa, clover, pasture and range grass, grass and grass hay, may be applied on day of harvest or grazing. Do not apply to alfalfa and clover in bloom. Do not use on seed alfalfa. On grain crops, make no application within 7 days of harvest or forage use; on corn, within 5 days of harvest or forage; on rice, within 7 days of harvest; on beans and tomatoes, within 1 day of harvest.

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FOREST INSECTS

Apply with aircraft equipped for ultra low volume application. Make application when air is calm and temperature is below 68°F. Do not allow spray to contact ferns, hickory and maples as injury may result. Do not spray on elms under extreme heat, drought and disease conditions.

Tree	Pests Controlled	Fluid Ounces per Acre	Comments
Douglas Fir True Fir Spruce	Spruce Budworm	13	Apply when highest percentage of larvae are in the fifth instar.
Hemlock	Hemlock Looper	8	Apply when most larvae are in third and fourth instar.
Pines	European Pine Sawfly	10	Apply when larvae are in the first or second instar or before they reach ½ inch in length.
	Saratoga Spittlebug		Apply when 95% of the population has become adult.
Larch	Larch Casebearer	8	Apply in spring as soon as larvae break hibernation and begin feeding on new foliage.

Before using CYTHION or MALATHION for the preparation of malathion insecticides, manufacturers should consult American Cyanamid Company for manufacturing and safe handling instructions.

The sale of this product does not include a license under any patent owned by the American Cyanamid Company.

Made and Printed in U.S.A.

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Ultra Low Volume Aerial Application where automobiles, trailers, trucks and pleasure boats are present.

DIRECTIONS FOR USE

ADULT MOSQUITO CONTROL OVER CITIES, TOWNS, AND OTHER AREAS WHERE AUTOMOBILES, TRAILERS, TRUCKS AND PLEASURE BOATS ARE PRESENT: Apply 2.6 to 3.0 fluid ounces of CYTHION Insecticide, The Premium Grade Malathion or MALATHION 8LV Concentrate Insecticide per acre. Aerial spraying should not be attempted when the wind is at or above 10 mph or temperatures are above 82°F.

IMPORTANT — Undiluted spray droplets of CYTHION or MALATHION will permanently damage vehicle paint finishes unless the aircraft used for the ultra low volume application meets all of the specifications listed below:

1. Aircraft is operated at 150 mph or more.

2. There are no leaks in the ultra volume spray system.

3. Nozzles are placed on the boom at a 45° angle down and into the wind.

4. Diaphragm check valves are used on all nozzles to insure positive cut-off of the spray.

5. Dosage of CYTHION or MALATHION does not exceed 3 fluid ounces per acre.

6. The spray system produces droplets of this product in the 50 to 60 mass median diameter (MMD) micron range, with no more than 10% of the droplets exceeding 100 microns, as determined by readings made from microscope slides coated with Dri-Film.

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Ultra Low Volume Application

NONTHERMAL AEROSOLS Applied by GROUND EQUIPMENT

IMPORTANT NOTICE

TO BE APPLIED ONLY BY TRAINED PERSONNEL OF MOSQUITO ABATEMENT DISTRICTS OR PEST CONTROL OPERATORS.

DIRECTIONS FOR USE

Adult Mosquito Control — For control of adult mosquitoes over a 300-foot swath with nonthermal aerosols of MALATHION using the ultra low volume method, use the following flow rates at the indicated vehicle speeds:

Vehicle Speed Miles per Hour	Flow Rate of MALATHION Fluid Ounces per Minute	Maximum Flow Rate per Hour
5	1.0 to 2.1 fluid ounces	1 gallon
10	2.0 to 4.3 fluid ounces	2 gallons

Adult Stable Fly Control — For control of adult stable flies over a 300-foot swath with nonthermal aerosols of MALATHION using the ultra low volume method, use the following flow rates at the indicated vehicle speeds:

Vehicle Speed Miles per Hour	Flow Rate of MALATHION Fluid Ounces per Minute	Maximum Flow Rate per Hour
5	2.1 fluid ounces	1 gallon
10	4.3 fluid ounces	2 gallons

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DROPLET SIZE

1. The mass median diameter (MMD) of the droplets should not exceed 17 microns. The MMD is the drop diameter which divides the spray volume into two equal parts; i.e. 50% of the volume is in the drop sizes below the MMD and 50% is above the MMD.

2. Spray droplets should not exceed 32 microns in size. Three percent of the spray droplets (6 droplets out of 200) can exceed 32 microns providing the MMD does not exceed 17 microns and no droplets exceed a maximum of 48 microns. Larger droplets, when transported by natural air currents, impinge more readily on objects in their pathway and will permanently damage automobile-type paints.

3. More than one-half of the total spray mass must consist of droplets in the 6 to 18 micron range to achieve adequate dispersal of insecticide over a 300-foot swath.

4. A minimum of two-thirds, preferably four-fifths of the total spray mass must consist of droplets not exceeding 24 microns in range.

OPERATING EQUIPMENT

Each Nonthermal Aerosol Generator used for dispersal of CYTHION Insecticide, The Premium Grade Malathion or MALATHION ULV Concentrate Insecticide to control adult mosquitoes must have minimum capability of producing the droplet spectrum described under DROPLET SIZE. The initial determination of droplet size is made after the unit is installed in a vehicle and prior to its use in mosquito control operations. The unit should be rechecked as frequently as necessary to insure that proper droplet size is maintained for each operation. Determination of droplet size every two months is usually sufficient if the unit has been maintained in good operating condition. Equipment manufacturer's instructions setting forth cleaning and maintenance of the unit must be followed. The unit must be inspected before each operation to correct any leaks or obstructions in the spray system; to detect whether the nozzle, hoses, or other parts are worn and need replacement; to insure that the flow meter is properly calibrated; and to determine that the pressure recommended by the manufacturer is being maintained.

Flow Rate — must be regulated by accurate flow meter.
— not greater than 1 gallon per hour at 5 mph or 2 gallons per hour at 10 mph.

Nozzle Direction — rear of the vehicle.
— upward at an angle of 45° or more.

Vehicle Speed — not greater than 10 miles per hour.
— shut off spray equipment when vehicle is stopped.

IMPORTANT — Spray droplets of undiluted MALATHION will permanently damage automobile paint unless all the conditions described and recommended in this leaflet are met.

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Directions for Determining the droplet size of MALATHION Ultra Low Volume nonthermal aerosols

Permanent records of each droplet size determination must be kept and made available to American Cyanamid upon request.

I. Preparation of Slides

MALATHION droplet sizes are determined by depositing a sample of the aerosol on a coated glass slide and measuring the droplets under a high-power microscope. Ordinary 3" x 1" glass slides must be coated with silicone (General Electric SC-87 Dri-Film) prior to sampling to prevent excessive spreading or coalescence of the droplets. The slides are dipped into a 10 percent solution of Dri-Film in toluene, drained and dried at about 200°F. for 30 minutes, after which they are dipped in acetone, allowed to dry and stored in a tight slide box. Coating solution must be freshly prepared. Do not store coating solutions because it will deteriorate. Slides are lightly polished with a soft tissue before using to remove any foreign particles.

II. Deposition of MALATHION Droplets on Slides

Droplets should be collected under ideal operating conditions to insure representative sampling of droplets in the aerosol. A sample of the MALATHION aerosol is deposited on a slide by waving the slide as rapidly as possible perpendicular through the aerosol cloud at a distance of 25 feet from the point of discharge. The slide velocity may be increased by attaching it to a 3 or 4 foot stick by means of a spring paper clip. At least two slides should be exposed to insure an adequate sample. Store slides in a tight slide box for transfer to a location where measurements can be made. Avoid excessive heat during transit and store in a cool place until measurements can be made.

Although label specifications require the aerosol nozzle to be angled upward at 45° or more during operation, it is more convenient to position the nozzle parallel to the ground for droplet sampling. If this is not possible it will be necessary to be positioned at a sufficient height to obtain a representative sample of the aerosol.

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III. Determination of MALATHION Droplet Sizes

A microscope with mechanical stage and an eyepiece micrometer are used to determine the size of the individual aerosol droplets. Prior to taking measurements, the divisions of the eyepiece micrometer must be calibrated into microns by means of a stage micrometer. In the example represented in Table 1, droplets were measured at 400x magnification. At that magnification each division of the eyepiece was calibrated to equal 3.5 microns.

At least 200 droplets should be measured. Usually this is easily accomplished on one slide. An accurate method is to measure all droplets that pass through the micrometer scale as the slide is moved from one edge to the other by using the mechanical stage. Measurements should not be taken along the margins of the slide. It is more convenient to measure in terms of the divisions of the eyepiece micrometer and then convert these divisions into microns.

The measurements converted into microns must then be corrected for the amount of spread that occurred on the slides. The MALATHION spread factor for silicone coated slides is 0.5. Therefore, in Table 1 each division of the eyepiece actually equals 1.75 microns (3.5 microns times the 0.5 spread factor).

The measurements are tabulated and processed as in Table 1. The Maximum Diameter is calculated by converting the diameter of the largest droplet measured into microns. In Table 1, the largest droplet measured had a diameter of 19 eyepiece divisions. Therefore, the Maximum Diameter is 33.3 microns (19 x 1.75 = 33.3).

To determine the Mass Median Diameter (MMD), the accumulative percentages from the last column in Table 1 are plotted against the eyepiece divisions (D) on arithmetic probability paper as in Figure 1. Directly across from the 50 percent point on the line is the median droplet size in eyepiece divisions which must be converted to microns. In Figure 1, 9.2 eyepiece divisions times the conversion factor of 1.75 equals a Mass Median Diameter of 16.1 microns.