

241-208

12-13-1972

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CYANAMID

IMPORTANT
Before Using
STOP
Read Directions
in This Leaflet

Undiluted spray droplets of Malathion Insecticide will permanently damage automobile paint unless these specific instructions for ground and aerial application are followed.

Notice--Malathion Insecticide must not be used undiluted as a nonthermal aerosol applied in low volume by ground equipment for control of adult mosquitoes unless written authorization and specific instructions for this use are obtained from American Cyanamid Company.

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CONTENTS OF THIS LEAFLET APPLY TO BOTH:



EPA Reg. No. 241-208-AA

MALATHION ULV*
CONCENTRATE
Insecticide

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.

CAUTION!

**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

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.

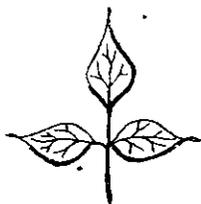
American Cyanamid Company warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use.

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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AGRICULTURAL USES

Directions For Use

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 below. 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.

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.

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IMPORTANT—Undiluted spray droplets of MALATHION will permanently damage automobile paint. Cars should not be sprayed. If accidental exposure does occur, the car should be washed immediately. Consult your state experiment station or state extension service for proper timing of sprays.

This product is highly toxic to bees exposed to direct treatment. Protection information may be obtained from your Cooperative Agricultural Extension Service.

Crop	Pests Controlled	Fluid Ounces Per Acre	Interval Between Last Application and Harvest
Alfalfa	Alfalfa caterpillar Western yellow striped armyworm	8-12	Use lower rate when larvae are small. May be applied on day of harvest or grazing. Use higher rate when larvae are large or when alfalfa is thick. 5 days.
	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	8-16	Use lower rate when larvae are small. May be applied on day of harvest or grazing. Use higher rate when larvae are large or when alfalfa is thick. 5 days.
	Grasshoppers	8	May be applied on day of harvest or grazing.
		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	Interval Between Last Application and Harvest
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 of harvest or forage use. Corn: 5 days. Grasses: May be applied on day of harvest or grazing.
Clover, Pasture and Range Grass, Grass, Grass Hay, Non-agricultural Land (wastelands, roadsides, soil bank lands)	Grasshoppers	3	May be applied on day of harvest or grazing. 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	3-12	
		16	
	Grasshoppers	3	
	Lygus Bugs	3-12	
		16	Very heavy migrating populations

(Continued)

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(Continued)

Crop	Pests Controlled	Fluid Ounces per Acre	Interval Between Last Application and Harvest
Grain Crops (barley, corn, oats, rye, rice, grain sorghum and wheat)	Grasshoppers	8	7 days. Corn: 5 days of harvest or forage use.
Grain Sorghum	Sorghum Midge	8-12	Apply during the bloom stage. 7 days of harvest or forage use.
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 of harvest or forage use.
Sugar Beets	Grasshoppers Sugar Beet Root Maggot Adults	8	7 days if tops are to be used as 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, soil bank lands): 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 use; 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	Directions
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 the 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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ADULT MOSQUITO CONTROL

DIRECTIONS FOR USE

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

IMPORTANT

Instructions when CYTHION The Premium Grade Malathion or Malathion ULV Concentrate is to be used in ultra low volume spraying over cities, towns and other areas where automobiles, trailers and pleasure boats are present.

Apply with aircraft equipped for ultra low volume application. Generally, spraying should *not* be attempted when the wind is at or above 10 mph or temperatures are above 82°F.

Spray droplets of this product undiluted will permanently damage automobile paint unless all of the following conditions are met:

1. Aircraft is operated at 150 mph or more.
2. There are no leaks in the ultra low 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 this product does not exceed 3.2 fluid ounces per acre (40 acres per gallon).
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.

Ultra Low Volume Application

NONTHERMAL AEROSOLS Applied by GROUND EQUIPMENT

This use is restricted to professional mosquito control personnel who have the experience, knowledge and equipment necessary to follow the highly technical and specific instructions which follow. If these requirements cannot be met, do not use those products for nonthermal aerosol ULV application.

IMPORTANT NOTICE

MALATHION must not be used undiluted as a nonthermal aerosol applied ultra low volume by ground equipment for control of adult mosquitoes unless written authorization and specific instructions for this use are obtained from American Cyanamid Company.

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 truck speeds:

Truck Speed Miles per Hour	Flow Rate of MALATHION Fluid Ounces per Minute
5	1 to 1.5 fluid ounces
10	2 to 3 fluid ounces

Flow rate must be constantly monitored by the operator to maintain uniform control of discharge rate. (Continued)

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IMPORTANT—Undiluted spray droplets of **MALATHION** will permanently damage automobile paint unless these specific instructions are followed:

DROPLET SIZE

1. Spray droplets must not be less than 5 microns in size as the smaller droplets do not impinge readily on adult mosquitoes.
2. Spray droplets must not exceed the range of 23 to 27 microns in size as larger droplets, when transported by natural air currents, impinge more readily on objects in their pathway and will permanently damage automobile paint.
3. More than one-half of the total spray mass must consist of droplets in the 5 to 15 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 20 microns in range.
5. The mass median diameter (MMD) of the droplets should not exceed 14 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 size below the MMD and 50% is above the MMD.
6. The average diameter of the droplets should not exceed 12 microns.

OPERATING EQUIPMENT

1. The Ultra Low Volume cold aerosol nozzle for dispersal of **MALATHION** to control adult mosquitoes must have the minimum capability of producing the droplet spectrum described under *Droplet Size*
2. Tank Pressure—not less than 3 to 3.5 p.s.i.
—not greater than 6 p.s.i.
3. No insecticide pump is necessary with the ULV system.
4. Flow Rate—must be regulated by accurate flow meter
—not greater than 3 fluid ounces per minute.
5. Nozzle Direction—rear of the truck
—upward at an angle of 45° or more.
6. Vehicle speed—not greater than 10 miles per hour
—shut off spray equipment when vehicle is stopped.

Directions for determining the droplet size of Malathion Ultra Low Volume nonthermal aerosols

Droplet size should be determined as frequently as necessary to insure that proper droplet size is maintained for each operation. Because of the newness of this technique, no guidelines exist as to how frequently droplet size should be rechecked. Until such guidelines can be developed by experience, we suggest droplet size determinations be made every time the unit is installed on a vehicle, following any accident and in any event after every 50 hours of operation in the case of commercially manufactured units and more frequently in the case of other units. Equipment manufacturer instructions setting forth cleaning and maintenance of the unit must also be consulted and followed to obtain proper droplet size. Permanent records of each droplet size determination must be kept and made available to American Cyanamid Company upon request.

I. Preparation of Slides

MALATHION droplet sizes are determined by depositing a sample of the aerosol on a 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 solution of one part of silicone to nine parts of acetone, allowed to dry and stored in a tight slide box. Slides are lightly polished with a soft tissue before using to remove any foreign particles.

II. Impingement of **MALATHION** Droplets on Slides

A sample of the **MALATHION** aerosol is deposited on a slide by waving the slide through the aerosol cloud at a distance of 25 feet from the point of discharge. Slides are waved perpendicular to the movement of the aerosol and then stored in a tight slide box for transfer to a location where measurements can be made.

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. 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 0.4. Therefore, in Table 1 each division of the eyepiece actually equals 1.4 microns (3.5 microns times the 0.4 spread factor).

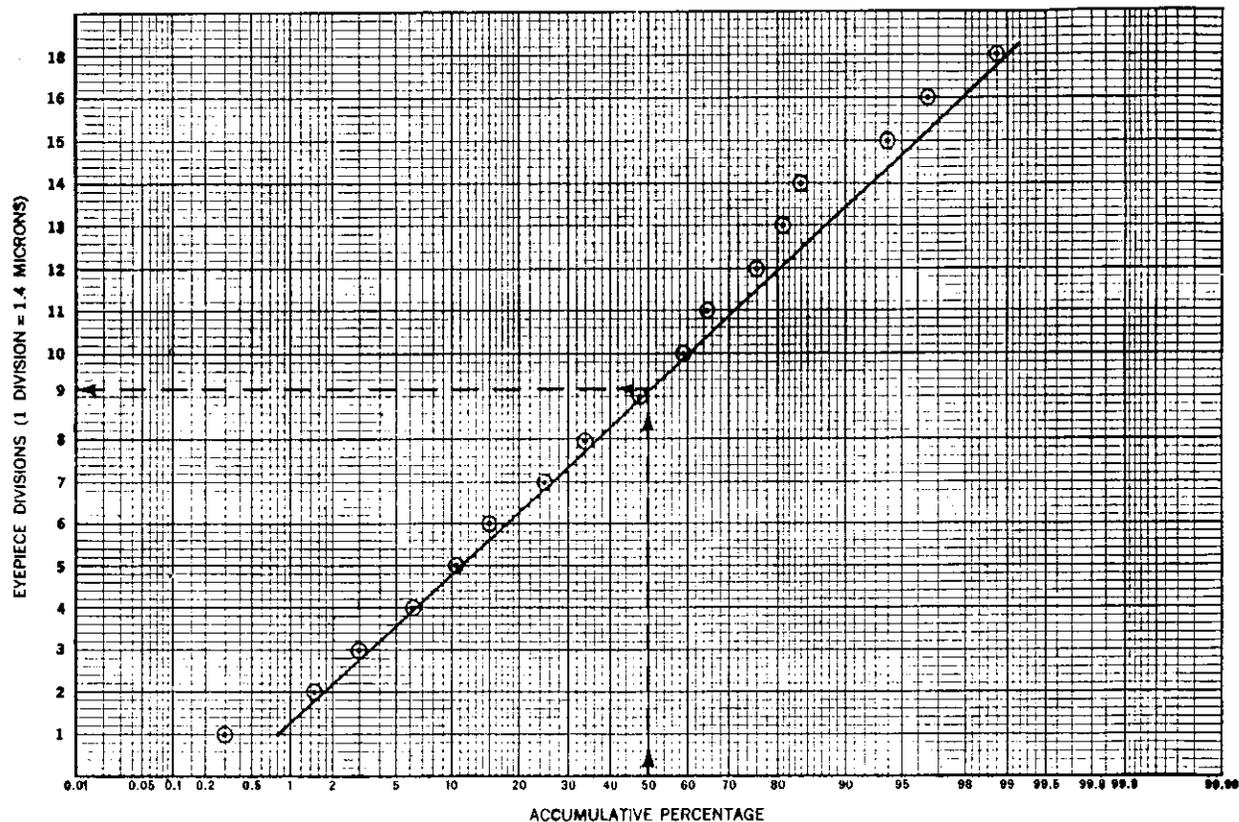
The measurements are tabulated and processed as in Table 1. The Average Droplet Diameter is determined by dividing the total of DXN by the total of N and multiplying by the number of microns per eyepiece division. In this example, 1636 divided by 199 equals 8.2. Then, 8.2 times the conversion factor of 1.4 microns per division gives an Average Droplet Diameter of 11.48 microns.

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 26.6 microns ($19 \times 1.4 = 26.6$).

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 1.4 equals a Mass Median Diameter of 12.88 microns.

Figure 1.

Percentage of the total volume of aerosol samples below each stated droplet size (from Table 1). The Mass Median Diameter is determined from the 50 percent point on the line. The Mass Median Diameter (MMD) = 9.2 divisions times 1.4 = 12.88 microns.



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Table 1.
Representative Count of CYTHION Aerosol Droplets Impinging on Microscope Slides.

Eyepiece Divisions (D*)	Number of Droplets (N)	% of Total DXN		Accumulative Percentages
		DXN	Σ (DXN)	
1	5	5	0.31	0.31
2	10	20	1.22	1.53
3	9	27	1.65	3.18
4	12	48	2.93	6.11
5	15	75	4.58	10.69
6	12	72	4.40	15.09
7	25	175	10.70	25.79
8	14	112	6.85	32.64
9	28	252	15.40	48.04
10	19	190	11.61	59.65
11	14	154	9.41	65.06
12	10	120	7.33	76.39
13	6	78	4.77	81.16
14	4	56	3.42	84.58
15	11	165	10.09	94.67
16	2	32	1.96	96.63
18	2	36	2.20	98.83
19	1	19	1.16	99.99
Total	199	1636		

*Measurements were taken at 400x magnification. Each eyepiece division equals 1.4 microns (3.5 microns times the 0.4 spread factor).

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CRANAMID

MALATHION ULV*
CONCENTRATE
Insecticide

CYTHION
THE PREMIUM GRADE
MALATHION
INSECTICIDE

ACCEPTED
DEC 13 1972
UNDER THE FEDERAL INSECTICIDE
FUNGICIDE AND RODENTICIDE ACT
FOR ECONOMIC PEST CONTROL
ED UNDER NO. 241-208 SUBJECT
TO ATTACHED COMMENTS.

241-208