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Pesticide Safety for Farmworkers

PESTICIDE SAFETY FOR FARMWORKERS

A Syllabus

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FOREWORD

This syllabus is intended as an aid to presenting information about pesticide safety for farmworkers and the recognition and management of pesticide poisonings.

This material is more effective when used in conjuction with one or more of the slide/cassette subsets of the series on pesticide safety for farmworkers prepared by the University of Florida and available through Ms. Carol Parker, Farmworker Pesticide Program, Office of Pesticide Programs, Environmental Protection Agency.

The author has found the subsets entitled "First Aid and Prevention" and "Daily Living with Pesticides" to be most useful in presentations to farmworker groups, growers, health providers and administrators.

A variety of references were used in constructing this syllabus including various Environmental Protection Agency publications, Recognition and Management of Pesticide Poisonings", authored by Donald P. Morgan, M.D., Ph.D., and The Occupational Health of Migrant and Seasonal Farmworkers in the United States, authored by Ms. Valerie Wilk.

The author is particularly indebted to Mr. Lysle Waters and to Dr. Morgan who assisted in making presentations to farmworker and health provider groups from which much of the material contained in this syllabus was taken.

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PESTICIDE SAFETY FOR FARMWORKERS

Introduction

Pesticide safety for farmworkers has been a major public concern for the past twenty-five years. The understanding of exposure to pesticides and the potential for subsequent adverse health effects requires a knowledge of the pesticides in question, the exposure sequence and early recognition of poisoning symptomatology.

Agricultural chemicals that are listed as pesticides include insecticides, herbicides, plant regulators, defoliants and dessicants.

By definition except for plant regulators, defoliants and dessicants a pesticide is any substance that will prevent, destroy, repel or mitigate any unwanted plant or animal species.

There are three categories of certification of use that are important to know in reference to farmworker safety including a certified applicator, a private applicator and a commercial applicator.

The term "certified applicator" means an applicator who is certified to use or supervise the use of any restricted use pesticide.

A "private applicator" is a certified applicator who uses or supervises the use of any restricted use pesticide for production of any agricultural commodity on property owned or rented by him or his employer.

A "commercial applicator" is a certified applicator who uses or supervises the use of any restricted use pesticide for any purpose on any property.

Unless otherwise prescribed by its labeling, a pesticide shall be considered to be applied under the direct supervision of a certified applicator or applied by a competent person acting under the instructions and supervision of a certified applicator who is available if and when needed.

Pesticides are classified into general and restricted use categories. General use pesticides are those that have shown no potential for adverse health or environmental effects. A restricted use pesticide is one that may not be used without additional regulatory restrictions based on its potential for causing adverse health or environmental effects.

Exposure of Farmworkers to Pesticides

Eight hundred million of the one billion pounds of pesticides are applied annually to twenty percent of the total crop acreage most of which require field labor on a seasonal basis.

More than fifty percent of the farmworker population are hired for harvesting operations. Harvesting operations frequently require intimate contact with pesticide treated foliage.

Twenty-seven percent of all farmworkers are involved in the cultivation of crops with more than one third of these working in cotton.

The following is a list of ways in which farmworkers may become exposed to pesticides.

Direct Spraying

Drift from sprays or dusts

Plant and foliage pesticide residues

Not washing before eating

Not washing before smoking

Not washing before toileting

Eating contaminated fruits or vegetables while picking them

Drinking water from hollowed out cucumbers, peppers, etc., that have not been washed thoroughly

Using water contaminated by pesticide residues

Using leaves or twigs from pesticide treated plants as a substitute for toilet paper

Farmworker experience has shown, that under certain conditions, field workers became ill after having worked in fields or orchards treated with pesticides. The majority of these illnesses are due to skin disorders with about twenty five percent relating to systemic illness and about twelve percent due to eye disorders.

Entry into any pesticide treated area may present a hazard. This hazard exists wherever labor intensive field and orchard crops are treated with pesticides. While organophosphate insecticides have played an important role in reentry related poisonings, it is recognized also that other pesticidal products can cause adverse health effects associated with re-entry.

The severity and extent of the re-entry hazard includes the following factors:

The amount of pesticide remaining on the plant surfaces

The toxicity of the pesticide degradation products

The intensity and duration of the exposure

The amount of pesticide an individual absorbs

The response of the individual to the toxicity of the pesticide

Pesticide residue levels in treated fields are influenced by the following:

Climate

Rate and frequency of application

Pesticide formulation

Time interval since the last application

Worker exposure is influence by the type of activity being performed such as pruning, thinning, roguing, picking, etc. The frequency with which these activities are performed and the type of protective clothing or safety devices worn by the worker influence the degree of exposure.

Earlier observers believed that the most significant mode for transfer of pesticide residues to field workers was by volatilization followed by inhalation or skin absorption of the vapors. Now it is recognized that exposure to workers in field situations is by skin contact with the residues that are adsorbed on particulate matter. There is no doubt that some inhalation exposure occurs, but it is believed to be minimal. Encapsulated and wettable powder forms of pesticide formulation can increase the persistence of pesticide activity and thus increase the potential for exposure.

Pesticide Poisoning Prevention Strategies

The potential for public exposure to pesticides as reflected by production and use statistics is enormous as shown below.

Pesticide Production

30 major and 100 other producers of active ingredients

1,400 registered active ingredients

15 new ingredients are added each year

50,000 formulated pesticide products are registered with EPA

3,300 formulators and 29,000 distributors in the U.S.

Pesticide Usage

Agriculture	60 percent
Industry and Government	25
Home and Garden	15

Farmworker protection from exposure to pesticides focuses on exposures to sprays, dusts and dislodgeable plant and soil residues. Principal strategies include communication, development of re-entry intervals and personal protection.

Communication must include adequate notification of potential exposure to a hazardous substance and may be either written or oral and must include information about areas where hazardous materials are in use.

The recently adopted "Right to Know" legislation by the Occupational Safety and Health Administration has placed an added emphasis on communication.

The responsibility of farmers and growers under this regulation requires that they post a notice in the workplace notifying employees of their right to request information about pesticides, that they respond to requests for information about pesticides by letting the farmworkers read the label or inform them about the information on the label and provide training to farmworkers who will be exposed to pesticides.

A number of states have enacted right to know legislation. Unfortunately, in some areas there has been a move afoot to exempt farmers and growers from the right to know requirements.

Either general or specific re-entry intervals should be designated for pesticides to protect workers against exposure to

dislodgeable foliage residues.

Personal protection usually includes the use of protective clothing, adequate personal hygiene, monitoring and medical surveillance.

PREVENTION STRATEGIES
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I. PREVENT EXPOSURE
****

COMMUNITATION/INFORMATION

ESTABLISHING REENTRY TIMES

PERSONAL PROTECTIVE EQUIPMENT

PERSONAL HYGIENE

II. EARLY RECOGNITION OF POISONING
****

RECOGNITION OF SYMPTOMATOLOGY

REMOVAL FROM EXPOSURE AREA

III. DIAGNOSIS AND MANAGEMENT
****

List of Pesticides Having Reentry Intervals

			Federal Standards in Days (crops)	California Standards in Days	Texas Standards in Days
1.	Azinphos-methyl	(Guthion)	1	1 - 30	2
2.	Carbofuran	(Furadan)	14 (sweet and seed corn)	-	-
3.	Carbophenothion	(Trithion)	2	2 - 14	2
4.	Carbosulfan	(Advantage)	-	7	-
5.	Chlorpyrifos		1 4 (citrus, grapes, peaches)	2	-
6.	Demeton	(Systox)	2	2 - 7	2
7.	Dialifor	(Torak)	-	75	-
8.	Diazinon		-	5	-
9.	Dicrotophos	(Bidrin)	2	2	2
10.	Dimethoate	(Cygon)	-	4	-
11.	Dioxathion	(Delnav)	-	1 - 30	-
12.	Disulfoton		-	2	2
13.	Endosulfan	(Thiodan)	-	2	2
14.	Endrin		2	2	2
15.	EPN		1	2 - 14	-
16.	Ethion		1	2 - 30	2
17.	Fosetyl	(Aliette)	7 (hops)	-	-
18.	Imidan		-	2 - 5	-
19.	Malathion		-	1	-
20.	Methidathion	(Supracide)	-	2 - 30	2
21.	Methiocarb	(Mesurol)	-	7	-
22.	Methomyl	(Lannate, Nudrin)	-	1 - 2	-
23.	Mevinphos	(Phosdrin)	2 - 4[a]	2 - 4	2
24.	Monocrotophos	(Azodrin)	2	2	2
25.	Naled	(Dibrom)	-	1	-
26.	Oxamyl	(Vydate)	-	1 - 2	-
27.	Oxydemeton-methyl	(Metasystox-R)	2	2	2
28.	Parathion-ethyl	(parathion)	2	2 - 60	7
29.	Parathion-methyl	(methyl-parathion)	2	2 - 21 (21 for encapsulated)	2
30.	Phorate	(Thimet)	-	2	-
31.	Phosalone	(Zolone)	1	7	2
32.	Phosphamidon	(Dimecron)	-	2 - 14	-
33.	Propargite	(Omite)	7 (grapes)	7	-
34.	Sulfur		-	1	-
35.	TEPP		-	2 - 4	-
XXX	All pesticides in Toxicity Category I		-	1	1

a Proposed but not implemented yet

LIST OF INTERIM REENTRY INTERVALS

ESTABLISHED IN REGISTRATIONS STANDARDS

NAME OF PESTICIDE	DATE OF ISSUE	DATA REQUIRED	INTERIM INTERVAL	TOXIC EFFECT
1. ALDICARB	3/84	yes	24-hr	ChE (TOX I)
2. ALIETTE	6/83	no	[a]	Teratogen
3. ALUMINUM PHOSPHIDE	10/81	yes	[b]	Acute Inhal.
4. ANILAZINE	12/83	yes	24-hr	skin irrit.
5. ASPON	9/80	yes	48-hr	ChE (TOX I)
6. CAPTAFOL	8/84	yes	24-hr	Oncogen
7. CARBOFURAN	7/84	yes	24-hr [c]	Skin Irrit, ChE
8. CARBOPHENOTHION	5/84	yes	48-hr	ChE
9. CHLOROBENZILATE	12/83	yes	24-hr	Oncogen
10. CHLOROPICRIN	9/82	no	[d]	Acute
11. CHLOROTHALONIL	9/84	yes	24-hr[e]	Skin Irrit.
12. CHLORPYRIFOS	9/84	yes	24-hr[e]	ChE
13. DAMINOZIDE	6/84	yes	24-hr	Oncogen
14. DEMETON	2/85	yes	48-hr	ChE
15. DIALIFOR	7/81	yes	75-days on grapes	Teratogen
16. DICROTOPHOS	6/82	no	48-hrs[f]	ChE
17. DIMETHOATE	4/83	yes	4 days, citrus, grapes	Onco., Muta., & Terat.
18. DIOXATHION	3/83	yes	24-hr	Acute Oral & Der. Tox. I

[a] In a separate action and after receipt of additional toxicology data, a 7-day reentry interval was imposed for use on hops based on a teratogenic effect.
[b] Aeration of the structure/container required to the OSHA TWA. (The active prinicipal, phosphine, is a gas.)
[c] Also has a current 14-day RI on seed corn.
[d] OSHA Standard (TWA) applies - only present as a gas after application.
[e] Protective clothing required for early reentry.
[f] On ornamental and crop usage

LIST OF INTERIM REENTRY INTERVALS (CONT.)

NAME OF PESTICIDE	DATE OF ISSUE	DATA REQUIRED	INTERIM INTERVAL	TOXIC EFFECT
19. DISULFOTON	12/84	yes	24 hr	Acute Tox.
20. ETHION	12/82	yes	24 hr	Che
21. FENSULFOTHION	12/83	yes	[g]	Tox. I Oral & Dermal
22. FONOFOS	3/84	yes	24 hr	Tox. I
23. FORMETANATE HYDROCHLORIDE	9/83	yes	24 hr	Tox. I-Acute Ora and Eye Effects
24. LINURON	6/84	yes	24 hr	Potential Oncogen
25. METHIDATHION	1/83	yes	24 hr	Tox. 1- Oral Tox. 2- Dermal
26. METHAMIDOPHOS	9/82	yes	24 hr	ChE
27. METHOMYL	1/82	yes	48 hr	ChE
28. MONOCROTOPHOS	9/85	yes	48 hr	Acute Tox.
29. NALED	6/83	yes	24 hr	Tox. I innal. & eye irr., Tox. I
30. PHORATE	8/84	yes	24 hr	High Acute Tox.
31. PHOSALONE	8/81	no	24 hr	ChE
32. SULFUR	12/82	yes	24 hr	Low Tox.
33. SULFURYL FLUORIDE	6/85	yes	[d]	Acute Inhal.
34. THIRAM	6/84	yes	24 hr	
35. TPTH	9/84	yes	24 hr	Teratogen; pot. Oncogen; Tox. I
36. TRICHLORFON	6/84	no	24 hr	Tox. II oral; Tox. III dermal

[g] 7 day RE interval when applied to soil and 24 hours for hand labor operations and foliar contact. The 7 day RE interval is waived when applied to soil if workers are wearing impermeable footwear and impermeable gloves when hand contact with soil will occur. If soil is dry, the 7 day interval is waived and the 24 hour interval will apply.

General Approaches to Pesticide Exposure Prevention

Farmers and growers should make sure that no pesticide is applied in a manner such than any worker or other persons are exposed directly or through drift except those who knowingly are involved in the application of the pesticide and who are wearing appropriate protective clothing.

Workers should not be allowed to enter any areas treated with a pesticide categorized as restricted use for 48 hours following application unless a specific re-entry interval has been established.

Workers should not be allowed to enter an area treated with any general use pesticide for until 24 hours have elapsed unless specifically provided for under label instructions.

Children should not be allowed to play in pesticide treated fields while their families are at work in those fields.

Farmers, growers or other responsible persons should notify workers when they have reasonable access to areas being treated with pesticides or previously treated areas that have a re-entry interval. Notification should be either oral or by posting a notice in a prominent location.

Farmers and growers should provide proper training to all farmworkers who are assigned to tasks in areas where pesticides have been applied.

Farmers and growers should make arrangements for access to emergency medical care in a nearby location for workers whose tasks involve exposure to pesticides or their residues.

Personal protective equipment should be provided and worn as required by the pesticide label. Protective goggles and/or face shields should be made available by the employer where required by pesticide label instructions.

When protective clothing or suits are worn, they should be cleaned each day following their use.

A source of clean water, soap and disposable towels should be provided at the work site for any persons exposed to pesticides or their residues.

All farmworkers should be encouraged to practice routine washing with clean water and soap before eating, drinking, toileting or using tobacco and showering immediately after work.

Workers who come into substantial contact with a pesticide or its residue should wash immediately with clean water and soap. If protective clothing becomes saturated with a pesticide, workers should remove the clothing or other protective devices,

wash thoroughly with clean water and soap and put on clean clothing.

Pesticide contaminated clothing should be washed separately from other laundry in water containing a strong household laundry detergent.

Code 66

RESTRICTED USE PESTICIDE

For retail sale to and use only by certified applicators or persons under their direct supervision, and only for those uses covered by the certified applicator's certification.

Net Weight Lbs.

Phos Kil® Spray

Insecticide
Contains 15% Parathion

EPA Reg. No. 279-336 E.P.A. Est. No. 279-FL-1

Active Ingredient:	
*Parathion	15.0%
Inert Ingredients:	85.0%
	100.0%

*O, O-Diethyl O-p-nitrophenyl thiophosphate

DANGER—POISON—PRECAUTIONS

POISONOUS IF SWALLOWED

This product can kill you if swallowed even in small amounts: spray mist or dust may be fatal if swallowed.

POISONOUS BY SKIN CONTACT

Poisonous if touched by hands or spilled or splashed on skin, in eyes or on clothing (liquid goes through clothes.)

POISONOUS IF BREATHED

Breathing vapors, spray mist or dust may be fatal.

POISONOUS TO FISH AND WILDLIFE

POISON SIGNS (Symptoms)

PARATHION is a very dangerous poison. It rapidly enters the body on contact with all skin surfaces and eyes. Clothing wet with this material must be removed immediately. Exposed persons must receive prompt medical treatment or they may die.

Some of the signs and symptoms of poisoning are: Headache, nausea, vomiting, cramps, weakness, blurred vision, pin-point pupils, tightness in chest, labored breathing, nervousness, sweating, watering of eyes, drooling or frothing of mouth and nose, muscle spasms and coma.

STOP! READ THE LABEL

CAN KILL YOU

DANGER

Keep out of reach of children

POISON

See side panels for antidote and precautions

USE ONLY WHEN WEARING THE FOLLOWING PROTECTIVE EQUIPMENT AND CLOTHING

(1) Wear water-proof pants, coat, hat, rubber boots or rubber overshoes. (2) Wear safety goggles. (3) Wear a mask or a pesticide respirator jointly approved by the Mining Enforcement and Safety Administration (formerly the U.S. Bureau of Mines) and by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part II. (4) Wear heavy duty, natural rubber gloves.

FMC

FMC Corporation
Agricultural Chemical Group
2000 Market Street
Philadelphia PA 19103

PA 6/78

WORK SAFETY RULES

Keep all unprotected persons and children away from treated area or where there is danger of drift.

Do not rub eyes or mouth with hands. If you feel sick in any way, STOP work and get help right away. Call a doctor (physician), clinic or hospital—immediately. Explain that the victim has been exposed to parathion and describe his condition. After first aid is given (see First Aid Treatment Section) and if a doctor cannot come, take victim to clinic or hospital.

IMPORTANT! Before removing gloves, wash them with soap and water. Always wash hands, face and arms with soap and water before smoking, eating or drinking.

AFTER WORK, take off all work clothes and shoes. Shower, using soap and water. Wear only clean clothes when leaving job. Do not wear contaminated clothing. Wash protective clothing and protective equipment with soap and water after each use. Respirator should be cleaned and filter replaced according to instructions included with respirator.

FIRST AID TREATMENT

Call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to parathion and describe his condition.

If breathing has stopped, start artificial respiration immediately and maintain until doctor sees victim.

If swallowed: Call a physician, or Poison Control Center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger, or, if available, by administering syrup of Ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. See doctor immediately.

NOTE TO PHYSICIAN

Antidote — administer atropine sulfate in large doses, TWO to FOUR mg. intravenously or intramuscularly as soon as cyanosis is overcome. Repeat at 5 to 10 minute intervals until signs of atropinization appear. 2-PAM chloride is also antidotal and may be administered in conjunction with atropine. DO NOT GIVE MORPHINE OR TRANQUILIZERS. Parathion is a strong cholinesterase inhibitor affecting the central and peripheral nervous systems and producing cardiac and respiratory depression. At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. Continued absorption of the poison may occur and fatal relapses have been reported after initial improvement; VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.

FOR EMERGENCY ASSISTANCE CALL
716—735-3765
POST TREATED AREA

Consult your State Agricultural Extension Service or Experiment Station regarding posting treated areas.

ENVIRONMENTAL HAZARDS

This product is toxic to fish and wildlife. Birds and other wildlife in treated areas may be killed. Keep out of any body of water. Do not apply when weather conditions favor drift from treated areas. Do not apply where runoff is likely to occur.
Do not contaminate water by cleaning of equipment or disposal of wastes.
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.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
DO NOT USE IN UNDILUTED FORM.

Use a knife to slit open the package containing this material. Hold the cut end of the bag closed while introducing the bag into the spray tank opening or slurry bucket to minimize the amount of powder floating in the air. Do not shake bag until it is deep within the tank opening. It is recommended that the concentrated wettable powder be emptied into water in a slurry bucket and then emptied into the tank. This procedure is preferred to dumping the dry material into the tank or onto a screen and then washing it into the tank.
Avoid use of this material in combination with strongly alkaline materials such as Bordeaux, Lime Sulfur or Hydrated Lime. OBSERVE DAYS INTERVAL BETWEEN LAST APPLICATION AND HARVEST INDICATED BY NUMBER IN () FOLLOWING CROP.
Apples (14): Mites — Use 1 pound per 100 gallons of water. Apply in 2 or 3 applications at 7 to 10 day intervals. Make first application when mites first become troublesome. Aphids — Use 1 pound per 100 gallons of water when aphids first appear, and make a second application if necessary. Mealybugs — Use 1 to 1½ pounds per 100 gallons of water in 1 or 2 applications when necessary. Plum Curculio — Use 1 to 1½ pounds per 100 gallons of water in the calyx and first cover spray for the control of early season injury. Where Curculio feeding later in the season causes fruit damage, one or more additional applications may be desirable starting when the first damage appears. Bud Moth — Use 1 pound per 100 gallons of water in an application ahead of bloom where bud moth is a serious problem and satisfactory control is not resulting from the use of a regular program. Red-banded Leafroller — Use 2 lbs. per 100 gallons applied in the calyx and 10 days later for control of first brood larvae. For later broods, use 2 pounds per 100 gallons in 2 or 3 cover sprays when the larvae are present.
CAUTION: For greater safety the use of as low dosages as possible is advised. Slow drying weather increases the danger of injury. Russeting has been reported on Jonathans. Applications of this product may cause injury to fruit and foliage of McIntosh and related varieties.
Pears (14): Mites — Use 1 pound per 100 gallons of water. Apply in 2 or 3 applications at 7 to 10 day intervals. Make first application when mites first become troublesome. Mealybugs — Use 1 to 1½ pounds per 100 gallons of water in 1 or 2 applications when necessary. Pear Psylla — Use 1 pound per 100 gallons of water early in the season and later if needed when Pysilla becomes troublesome. More than one application may be needed.
Peaches (Except California) (14), Plums (14), Prunes (14): Plum Curculio — Use 1½ to 2 pounds per 100 gallons of water in 2 or more applications at 8 to 10 day intervals. Begin when adults are present and continue throughout the period when overwintering Curculio are active. Additional applications will be necessary for later broods. Do not apply more than 5 pounds actual Parathion per acre per year on peaches.
Peaches (Except California) (14): Oriental Fruit Moth — Use 1½ to 2 pounds per 100 gallons of water. Time the applications with egg hatch of the broods. Mites — Use 1 pound per 100 gallons of water in 2 or 3 applications at 7 to 10 day intervals. Make applications when mites become troublesome. Cottony Cushion Scale — Use 2 pounds per 100 gallons of water in two applications 10 days apart beginning when the crawlers first appear. Do not apply more than 5 pounds actual Parathion per acre per year on peaches.
Citrus (14): Including Grapefruit, Lemons, Limes, Oranges, Tangelos, Tangerines: Florida Red and Purple Scale, Mealybugs, Aphids, Cottony Cushion Scale — Use 2 pounds per 100 gallons of water. Begin when insects first appear and repeat as needed. Do not make more than 3 applications per season. Do not apply within 30 days of harvest if exceed 1300 gallons of water per acre at listed rate.
Tobacco: Aphids — Use 1 pound per 100 gallons of water as needed. Make no applications within 5 days of priming or 15 days of cutting. Avoid getting wet with plant juices when cutting. Gloves should be worn while transplanting plants or harvesting leaves if an application has been made within 30 days.
Tomatoes (10): Aphids — Use 2 pounds per acre in sufficient water to cover. Begin when aphids first appear and repeat as needed.
Cabbage (10), Broccoli (7), Brussels Sprouts (7), Cauliflower (7): Aphids, Diamond-back Moth Larvae, Imported Cabbageworm, Cabbage Loopers, Armyworms — Use 2 to 3 pounds per acre in sufficient water to cover. Begin when insects first appear, and repeat as needed.
Carrots (15): Leaf Miner, Leafhoppers, Vegetable Weevils — Use 2 to 3 pounds per acre in sufficient water to cover. Aphids, Stink Bugs — Use 3-1/3 pounds per acre. Do not use treated carrot tops for food or feed.
Table Beets (15) (21 days if tops are to be used for food or feed): Flea Beetle, Leaf Miners, Aphids, and Webworms — Use 3 pounds per acre in sufficient water to cover. Blister Beetle — Use 3-1/3 pounds per acre.
Turnips (10): Aphids, Cabbage Webworms, Cutworms, Vegetable Weevils, False Chinch Bugs and Harlequin Bugs — Use 3 pounds per acre in sufficient water to cover. Cabbage Loopers — Use 3-1/3 pounds per acre. If greens are used for food, do not apply within 21 days of harvest.
Potatoes (5): Aphids — Use 2 pounds per acre in sufficient water to cover. Begin when aphids first appear and repeat as needed.

STORAGE AND DISPOSAL

Rinse equipment and dispose of wastes by burying at least 18" deep in non-crop lands away from water supplies. Do not reuse or burn container; bury with wastes.
NOT FOR USE OR STORAGE IN OR AROUND THE HOME.
DO NOT CONTAMINATE FEED OR FOODSTUFFS

Dealers Should Sell In Original Packages Only.
Terms of Sale or Use On purchase of this product buyer and user agree to the following conditions:
Warranty FMC makes no warranty, expressed or implied, concerning the use of this product other than indicated on the label. Except as so warranted, the product is sold as is. Buyer and user assume all risk of use and/or handling and/or storage of this material when such use and/or handling and/or storage is contrary to label instructions.
Directions and Recommendations Follow directions carefully. Timing and method of application, weather and crop conditions, mixture with other chemicals not specifically recommended, and other influencing factors in the use of this product are beyond the control of the seller and are assumed by buyer at his own risk.
Use of Product FMC's recommendations for the use of this product are based upon tests believed to be reliable. The use of this product being beyond the control of the manufacturer, no guarantee, expressed or implied, is made as to the effects of such or the results to be obtained if not used in accordance with directions or established safe practice.
Damages Buyer's and user's exclusive remedy for damages for breach of warranty or negligence shall be limited to direct damages not exceeding the purchase price paid and shall not include incidental or consequential damages.

THE PESTICIDE LABEL

All registered pesticides must contain certain information on the product label. This information can be extremely helpful to physicians or other health providers in ascertaining pesticide exposures associated with an illness alleged to be associated.

The label indicates whether the product is a restricted or general use product, its proprietary name, active ingredient, manufacturer and EPA registration number.

The manufacturer's name and the EPA registration number are important bits of information for the health provider. If one has no other information than the registration number, a quick phone call to a poison information center will provide you with the product name, its manufacturer, symptomatology and treatment information.

The same information can be obtained by calling the EPA, National Telecommunications center "hotline" 1-800 858 PEST.

All labels carry a precautionary statement that are indicative of a pesticide products toxic potential. These precautionary statements carry the signal words "CAUTION", "WARNING", or "DANGER POISON".

A skull and crossbones shown in red along with the signal words "DANGER POISON" are indicative of a pesticide that is of high toxicity and must be used only by a certified applicator. These products are restricted use pesticides.

Products containing the signal word "WARNING" are of medium high toxicity and should be used with great care.

Products containing the signal word "CAUTION" are of lower toxicity but must be treated with respect.

These precautionary statements alone provide information on the severity of toxicity of the product. If a subject is exposed to a pesticide that has the skull and crossbones and the words "DANGER POISON" on the label, you immediately know that you are dealing with a highly toxic substance.

All labels bear a statement of practical treatment containing information of what to do if the product is swallowed, gotten into the eyes or spilled on the skin.

Human health and environmental hazards are listed along with directions for use and recommended uses.

Additional information on storage, disposal, equipment cleaning, container storage and handling and disposal are included.

Health Effects of Pesticide Exposure

The health effects of pesticide exposure of farmworkers is very poorly documented. California is a state that uses about twenty-five percent of the pesticides employed in agriculture in the U.S. Fortunately, under California law, occupational illnesses are required to be reported. Therefore, there are some statistics available with respect to farmworker pesticide related illnesses.

MEN AND WOMEN WITH OCCUPATIONAL DISEASE
ATTRIBUTED TO PESTICIDES AND OTHER AGRICULTURAL CHEMICALS
California, 1973

	Men	Women
Skin conditions	365	63
Eye conditions	390	27
Systemic poisoning	234	15
Chemical burn	106	2
Respiratory condition	76	16
Other	142	15

OCCUPATIONAL DISEASE
ATTRIBUTED TO AGRICULTURAL CHEMICALS
California, 1971-1973

	Number	Percent
Organophoshorus pesticides	810	18
Herbicides	643	15
Fertilizers	529	12
Halogenated hydrocarbon pesticides	293	7
Sulfur	183	4
Fungicides	174	4
Phenolic compounds	137	3
Carbamates	125	3
Other specified chemicals	242	5
Unspecified	1,267	29

Occupational Disease in California Attributed Pesticides and Other Chemicals, 1972-1974, State of California, Department of Health, Occupational Health Section and Center for Health Statistics

MEN AND WOMEN WITH OCCUPATIONAL DISEASE
ATTRIBUTED TO PESTICIDES AND OTHER AGRICULTURAL CHEMICALS
California, 1973

	Men	Women
Systemic poisoning	234	15
Respiratory condition	76	16
Skin condition	365	63
Chemical burn	106	2
Eye condition	390	27
Other	142	15
	1,313	138

OCCUPATIONAL DISEASE

ATTRIBUTED TO AGRICULTURAL CHEMICALS

California, 1971-1973

	Number	Percent
Organophosphorus pesticides	810	18
Herbicides	643	15
Fertilizers	529	12
Halogenated hydrocarbon pesticides	293	7
Sulfur	183	4
Fungicides	174	4
Phenolic compounds	137	3
Carbamates	125	3
Other specified chemicals	242	5
Unspecified	1,267	29
	4,403	100

PESTICIDE POISONING-SIGNS AND SYMPTOMS

Organophosphorus Pesticides

The organophosphorus pesticides attach themselves to an enzyme in the blood known as "cholinesterase" that is normally present and is necessary for proper nerve function. Since the action of cholinesterase is blocked by the organophosphorus pesticides, they are known as 'cholinesterase inhibitors'.

When the enyzme activity of cholinesterase is inhibited it can not perform its normal function of hydrolyzing acetyl choline which is produced at nerve synapses during the transmission of nerve impulses. Acetyl choline then builds up and a variety of symptoms ensue.

The most common early signs and symptoms of organophosphorus poisoning are dizziness, weaksness, incoordination, muscle twitching, nausea, abdominal cramps, diarrhea and sweating.

Blurred or dark vision, confusion, tightness in the chest, wheezing, productive cough and pulmonary edema may occur. Incontinence, unconsciousness and convulsions indicate very severe poisoning. Slow heartbeat, and tearing are common. Toxic psychosis, with manic or bizarre behavior, has lead to misdiagnosis of acute alcoholism. Respiratory depressin may be fatal.

Continuing daily absorption of organophosphorus pesticides at an intermediate dosage may cause an influenza like illness characterized by weakness, anorexia and malaise.

The very few individuals who have suffered peripheral neuropathy following organophosphate exposure exhibited diverse clinical courses. Onset of symptoms was generally slow, sometimes after an asymptomatic interval of several days following exposure. Principal symptoms have been numbness, tingling, pain and weakness of the arms and legs. Some recovered fully in a few weeks; a few others experienced muscle atrophy, leaving a degree of paresis and sensory loss.

Differentiation of Organophosphate Poisoning

The following guidelines are helpful in differentiating organophosphate pesticide poisoning from other forms of illness.

IT PROBABLY IS AN ORGANOPHOSPATE PESTICIDE POISONING IF.....

There is a definite history of exposure 6 hours or less before onset AND

there is clinical evidence of diffuse parasympathetc stimulation AND

there is marked depression of plasma and/or RBC cholinesterase. There are usually no symptoms or signs until the cholinesterase activity level has been depressed below the normal range or pre-exposure value.

IT PROBABLY IS NOT AN ORGANOPHOSPHATE PESTICIDE POISONING IF....

The exposure was more than 12 hours before onset

It is a febrile illness

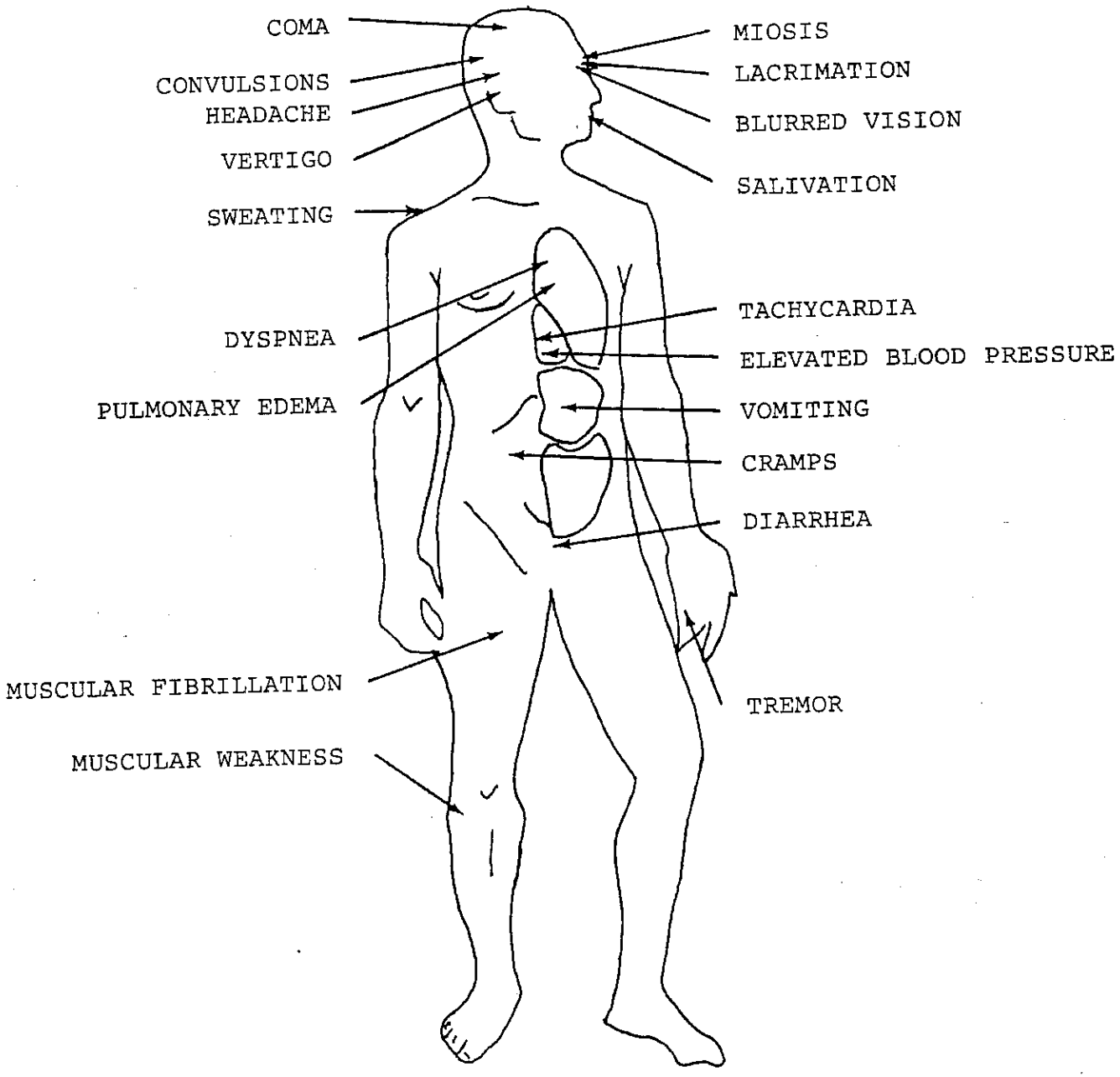
There are meningeal signs

Neither plasma nor RBC cholinesterase activity level is depressed more than 30 percent below the normal or pre-exposure level.

Illness persists longer than 24-48 hours

If there are strong clinical indications of organophosphorus pesticide poisoning, TREAT PATIENT IMMEDIATELY. Do not wait for laboratory confirmation.

MANIFESTATIONS OF
PHOSPHATE ESTER POISONING



University of California Agricultural Extension Service

IT PROBABLY IS PHOSPHATE ESTER POISONING IF...

1. *there is a definite history of exposure 6 hours or less before onset AND*
2. *there is clinical evidence of diffuse parasympathetic stimulation AND*
3. *there is marked depression of plasma and RBC cholinesterase. There are usually no symptoms or signs till cholinesterase level reaches about 25% of normal or pre-exposure value.*

IT PROBABLY IS NOT PHOSPHATE ESTER POISONING IF...

1. *the exposure was more than 12 hours before onset.*
2. *it is a febrile illness.*
3. *there are meningeal signs.*
4. *neither plasma nor RBC cholinesterase level is below 30%.*
5. *illness persists longer than 24-48 hours.*

REMEMBER *... the onset is abrupt, the course is short, and the clinical manifestations follow a definite pattern.*

University of California Agricultural Extension Service

Laboratory Confirmation of Organophosphorus Poisoning

Depression of plasma pseudocholinesterase and/or red cell acetyl-cholinesterase enzyme activities are the most commonly used and generally available biochemical indices of excessive organophosphate absorption. The enzyme depression is usually apparent immediately after, or within 12-24 hours of, signifcant absorption of an organophosphorus pesticide.

Cholinesterase activities are lowered by dosages of organophosphorus pesticides considerably less than that required to produce symptoms, hence measurement of cholinesterase activity becomes a useful biological monitoring tool for indications of exposure to organophosphorus pesticides.

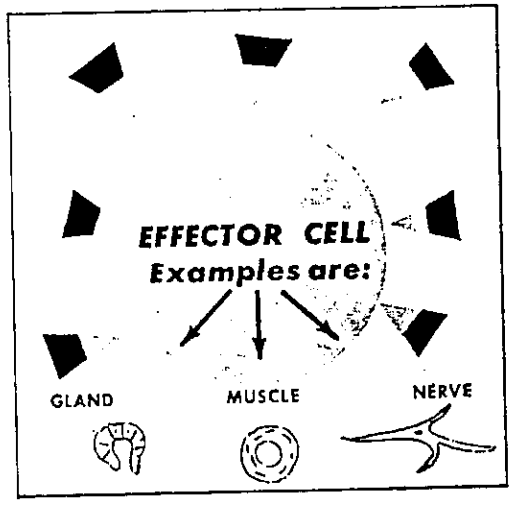
Depression of plasma pseudocholinesterase usually persists several days to a few weeks. The red cell acetyl-cholinesterase enzyme activity usually remains depressed longer, sometimes as much as three months.

When using cholinesterase depression as an indicator of exposure, comparison with a pre-exposure blood sample should be made whenever possible.

An enzyme depression of 25 percent or more below the normal range is indicative of excessive absorption of a cholinesterase inhibiting substance. If the enzyme depression is 30 percent or more the subject should be removed from the workplace.

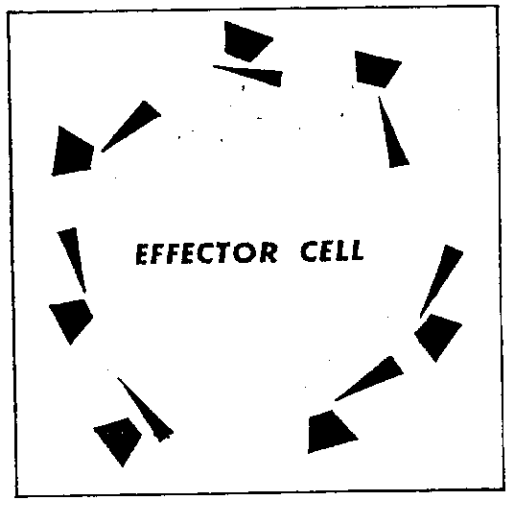
PHYSIOLOGICAL ACTION OF ACETYLCHOLINE

ACETYLCHOLINE, LIBERATED BY NERVE IMPULSE, ACTS DIRECTLY UPON EFFECTOR CELLS TO PRODUCE THEIR CHARACTERISTIC RESPONSES



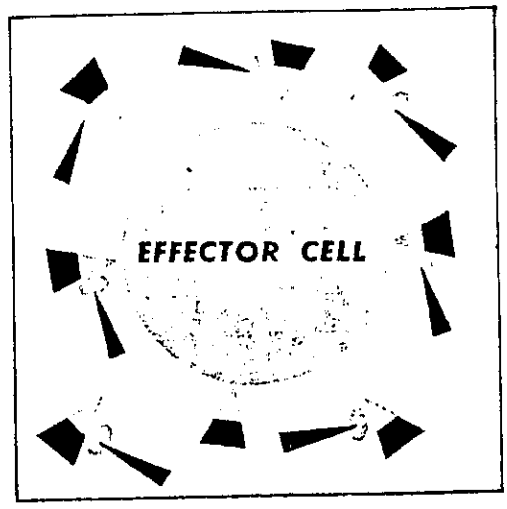
PHYSIOLOGICAL ROLE OF CHOLINESTERASE

CHOLINESTERASE TERMINATES THE RESPONSE BY HYDROLYZING ACETYLCHOLINE TO CHOLINE AND THE ACETATE ION



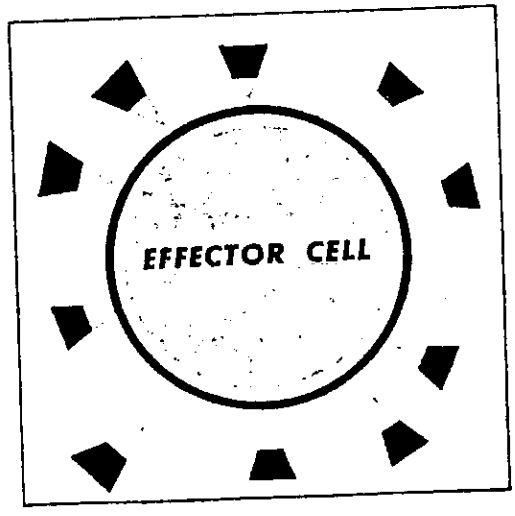
MECHANISM OF TOXIC ACTION OF PHOSPHATE ESTER INSECTICIDES

PHOSPHATE ESTER COMPOUNDS ATTACH A PHOSPHORYL GROUP TO CHOLINESTERASE AND THEREBY RENDER THE ENZYME UNABLE TO PERFORM ITS FUNCTION



MECHANISM OF PROTECTIVE ACTION OF ATROPINE

ATROPINE BLOCKS THE ACTION OF ACETYLCHOLINE BY INTERFERING WITH THE ABILITY OF THE CELL TO RESPOND TO THIS CONTINUING STIMULUS



Treatment for Organophosphate Pesticide Poisoning

Persons attending organophosphorus pesticide poisoned individuals should first establish a clear airway by aspiration of secretions if necessary. Pulmonary ventilation should be achieved by mechanical assistance to improve tissue oxygenation. Administer atropine intravenously, or intramuscularly, if intravenous injection is not possible. Atropine protects the muscarinic endo-organs from excessive concentrations of acetyl-choline, but does not reactivate the cholinesterase enzyme.

Complete treatment and management information is available in the third addition of RECOGNITION AND MANAGEMENT OF PESTICIDE POISONING. This manual is authored by Dr. Donald Morgan and is available through the U.S. Printing Service. There are a limited number of Spanish translations of the manual available free of charge from the Exposure Assessment Branch, Office of Pesticide Programs, EPA.

Management of Organophosphate Poisoning

The following steps should be taken in the management of organophosphate pesticide poisoned subjects.

1. Establish airway, gas exchange and circulation

2. Antidotes:

   Atropine sulfate: 2-4 mg q 10-20 minutes I.V. to mydriasis, dry mouth, pulse 140, and clear lung bases. Maintain atropinization until pesticide is excreted. (Child's dose 0.05 mg/Kg)

   Pralidoxime chloride: for muscle weakness, respiratory depression. One gram slowly I.V. May repeat q 4-6 hours. (Child's dose 25-50 mg/Kg)

3. Decontaminate

   Bathe and shampoo for skin contamination.
   If swallowed, empty stomach by emisis or lavage.
   Give charcoal and cathartic

4. Observe patient until atropinization has worn off to insure against relapse.

Poisoning by Carbamate Pesticides

The mode of action of these compounds is very similar to that of the organophosphorus compounds in that they inhibit the enzyme cholinesterase. They differ in action in that their effect on cholinesterase is brief because the carbamates are broken down in the body rather rapidly. These carbamates are

referred to as "rapidly reversing inhibitors" of cholinesterase. The reversal is so rapid that, unless special precautions are taken, measurement of blood cholinesterase is likely to be inaccurate and always in the direction of appearing to be normal.

The symptoms of carbamate poisoning are essentially the same as those for organophosphorus pesticide poisoning.

Poisoning by Chlorinated Hydrocarbon Pesticides

The chlorinated hydrocarbon pesticides act on the central nervous system, but the exact mode of action is not known. Large doses cause diarrhea and vomiting. Repeated large doses can cause liver and kidney damage in animals, but these signs have never been demonstrated in man. Nervousness and convulsions may occur.

The most frequent symptoms and signs of chlorinated hydrocarbon pesticide poisoning are apprehension, excitability, dizziness, headache, disorientation, weakness, paresthesia, muscle twitching, tremor, tonic and clonic convulsions (often epileptiform), and unconsciousness are the major manifestations

Laboratory Confirmation of Chlorinated Hydrocarbon Poisoning

Chlorinated hydrocarbon pesticides and/or their metabolites can usually be identified in blood or urine by examination of samples taken within 72 hours of poisoning. Most of these tests can be performed by state health departments and university laboratories supported by EPA.

Poisoning by Herbicides

Herbicides have not been involved in pesticide related poisonings to any large extent. However, there are some that are worthy of mention.

Poisoning by Paraquat

Contact with the concentrated paraquat may cause irritation and fissuring of the skin of the hands and cracking, discoloration and sometimes loss of the fingernails. Splashed in the eye, paraquate concentrate causes conjunctivitis and, if not promptly removed, may result in protracted opacification of the cornea.

Although nearly all systemic intoxications by paraquat have followed ingestion of the chemical, occasional poisonings have resulted from excessive dermal contact. Absorption of toxic amounts is more likely to occur if the skin is abraded. Persons who have experienced extraordinary dermal contact with paraquat (especially the concentrate) should be examined and tested for hazardous concentrations of the agent in the blood and urine.

Inhalation of dilute spray mist may irritate the upper respiratory passages causing a scratchy throat and nosebleed. Effects induced by dilute paraquat sprays ordinarily resolve promptly following withdrawal from exposure.

If ingested, paraquat produces inflammation of the mouth and gastro-intestinal tract, sometimes progressing to ulceration in 1-4 days. Once absorbed, it damages the parenchymal cells of the liver and tubule cells of the kidney. In most instances, the victim survives these injuries.

Paraquat is actively concentrated in the pneumocytes of lung tissue. Several days after ingestion these cells die, after which there is rapid proliferation of connective tissue cells which fill the alveolar spaces. Although some victims have survived, death from asphyxiation usually occurs once this degree of lung damage has occurred. In survivors, recovery of normal lung function requirs weeks or months.

Treatment of Paraquat Poisoning

Guidelines for the treatment of severe paraquat exposures are as follows:

1. Contaminated skin must be flushed with copious amounts of water. Material splashed in the eyes must be removed by prolonged irrigation with clean-water. Eye contamination should thereafter be treated by an ophthalmologist. Mild skin reactions usually respond to simple avoidance of further contact, but the irritation may take several weeks to resolve. Severe injuries, with cracking, seconday infection, or nail injury, should be treated by a dermatologist.

2. If paraquat has been ingested, evacuate the stomach, then load the intestinal tract with an effective absorbent to minimize absorption of the paraquat. THESE MEASURES MUST BE UNDERTAKEN IMMEDIATELY, EVEN THOUGH THE PATIENT IS FREE OF SIGNS OF SYSTEMIC TOXICITY, AND EVEN WHEN, BY ALL ACCOUNTS, THE INGESTED DOSE WAS PROBABLY SMALL AND WAS TAKEN AS LONG AS SEVERAL DAYS PRIOR TO TREATMENT.

   Intubate the stomach and aspirate its contents, the lavage with at least two liters of a slurry of absorbent in normal saline. Then slowly instill several hundred additional milliliters of absorbent slurry.

   The ideal absorbent is bentonite. If not immediately available use activated charcoal.

   Initiate catharsis. Give sodium sulfate and repeat in two hours and repeat if no bowel movement has occurred. Continue administering bentonite and sodium sulfate

until the gut has been thoroughly flushed. This may require several days.

3. Blood and urine samples should be taken for confirmation of the diagnosis.

4. Intravenous infusions of glucose and electrolyte should be administered to minimize toxicant concentrations in the tissues.

5. Although some cases of paraquat poisoning have been sucessfully managed by forced diuresis regimens alone, it is more effective to use extracorporeal hemodialysis and/or hemoperfusion over specially coated charcoal. This procedure for toxicant removal is best performed in tertiary care center where paraquat levels can be monitored periodically.

6. Do not administer supplemental oxygen in paraquat poisoning.

RESTRICTED USE CHEMICALS

Active Ingredient	Product Name	Restriction Criteria
acrolein	Aqualin	Human inhalation hazard. Avian and aquatic residue eff.
acrylonitrile		
aldicarb	Temik	See below
allyl alcohol		Acute dermal toxicity
aluminum phosphide	Phostoxin	Human inhalation hazard
ANTU - All concentrations above 29%		
Avitrol		
azinphosmethyl	Guthion	Human inhalation hazard
Bomyl		
carbofuran	Furadan	Acute toxicity (oral, dermal, inhalation)
carbon disulfide No permits will be issued for concentrations greater than 90%.		
carbophenothion All concentrations above 5%.	Trithion	
chlordane	Chlordane	No uses permitted at this time.
chlorfenvinphos	Birlane	Acute dermal toxicity
chlorophacione All concentrations above 0.05%	Rozol	Human hazard. Potential for food contamination. Possible inhalation hazard.
chloropicrin		Acute inhalation toxicity. Hazard to non-target organisms.
cyanides		Calcium-inorganic cyanides and liquid hydrogen cyanide.
cycloheximide All concentrations above 1.3%.	Acti-dione	Acute dermal toxicity.
demeton	Systox	Acute oral toxicity. Acute dermal toxicity.

Restricted Use Chemicals (Cont'd.)

Active Ingredient	Product Name	Restriction Criteria
dibromochloropropane	DBCP	
dichlorvos	DDVP, Vapona	All concentrations above 1%. Resin strips such as flea collars, bird perches and other impregnated resin products are not restricted.
dicrotophos	Bidrin	Acute dermal toxicity. Residue effects on avian species.
dinoseb	DNBP or DNOSBP	Acute dermal toxicity
dioxathion	Delnav	
diphacinone	Ramik	All concentrations above 3%.
disulfoton	Di-Syston	Acute dermal toxicity. Acute inhalation toxicity.
DNOC		
DNOCHP		
endosulfan	Thiodan	
EPN		Acute dermal toxicity. Acute inhalation toxicity. Residue effects on avian species.
ethion		All concentrations above 3% and granular formulations above 6%.
ethyl parathion	parathion	Human inhalation hazard. Acute dermal toxicity. Residue effects on mammalian, aviation and aquatic species.
famphur	Warbex	
fenamiphos	Nemacur	Acute dermal toxicity.
fensulfothion	Dasanit	Acute dermal toxicity. Acute inhalation toxicity.
fenthion	Baytex	All concentrations above 0.5%.
fonofos	Dyfonate	Acute dermal toxicity.
formetanate hydrochloride	Carzol SP	
Fumarin		All concentrations above 3%.
methamidophos	Monitor	Acute dermal toxicity.
methidathion	Supracide	Residue effects on avian species.

Restricted Use Chemicals (Cont'd.)

Active Ingredient	Product Name	Restriction Criteria
methomyl	Lannate, Nudrin	Residue efects on mammalian species. Other effects - accident history.
methyl bromide		Other hazards - accident history
methyl parathion	Parathion	Residue effects on mammalian and avian species. Hazard to bees. Acute dermal toxicity. Other hazards - accident history.
mevinphos	Phosdrin	Acute dermal toxicity. Residue effects on mammalian and avian species.
monocrotophos	Azodrin	Residue effects on mammalian and avian species.
mexacarbate	Zectran	
nicotine alkaloid	Nico-Fume	Acute inhalation toxicity. Effects on aquatic organisms.
Nicotine salts		All concentrations above 40% nicotine expressed as alkaloid.
oxamyl	Vydate	
paraquat	Paraquat	All concentrations above 0.2%. Human toxicological data. Other hazards - Use and accident history.
parathion - (See ethyl parathion)		
pentachlorophenol	PCP	All concentrations above 5%. Possible oncogenic and reproductive effects.
permethrin	Pounce, Ambush, Ectiban (same formulations)	Possible adverse effects on aquatic organisms.
phorate	Thimet	Acute dermal toxicity. Residue effects on mammalian and avian species.
phosphamidon	Dimecron	Acute dermal toxicity. Residue effects on mammalian and avian species.
Phosphorus (white or yellow)		
picloram All uses except cut surface treatment of unwanted trees.	Tordon	Hazard to non-target organisms (specifically non-target plants, both crop and non-crop)
pindone	Pival	All concentrations above 3%.

Restricted Use Chemicals (Cont'd.)

Active Ingredient	Product Name	Restriction Criteria
PMP	Valone	All concentrations above 6%.
schradan	OMPA	
Strychnine and its salts	Various products	Acute oral toxicity. Hazard to non-target organisms. Other hazards - use and accident history.
Sulfotepp	Various products	Human inhalation hazard.
sulfuryl fluoride	Vikane	
TEPP	TEPP	Human inhalation hazard. Human dermal hazard. Residue effects on mammalian and avian species.
terbufos	Counter	
thionazin	Zinophos	
Vacor		All concentrations above .2%.
warfarin		All concentrations above 3%.
zinc phoshide	Various product names	All products suspended. Acute inhalation toxicity. Acute oral toxicity. Hazard to non-target organisms.

Representative Cases of Pesticide Poisoning

ORGANOPHOSPHATE POISONING

18-month-old boy-girl twins were being attended by relatives, when the girl began acting strangely, walked erratically, collapsed.

At the hospital boy became ill, flaccid, unconscious, apneic.

Both children showed bradycardia, miosis, sweating, cyanosis.

Gastric lavage was carried out; antidote administered. Girl responded well, but the boy died despite cardiopulmonary resuscitation.

Fonofos (Dyfonate) was identified in the gastric contents of boy.

Dyfonate granules were found on the lawn of the relatives' home. The Dyfonate had been obtained from a farmer friend and applied to the lawn by the relative to kill ants.

Dyfonate granules (20%) contain enough active ingrediant in one-half gram (one-quarter teaspoonful) to kill an 18-month child.

Other corn rootworm insecticide granules are about equally toxic.

CARBAMATE POISONING

A 3-year-old child was found semiconscious, clinging to a fence in front yard of a farm at corn planting time.

Blue stain on lips matched blue stain of granules found in a pile nearby, that had aparently spilled from a bag.

At emergency room, child was stuporous, showed muscle twitching, pinpoint pupils, frothy sputum, and moderate cyanosis.

Blood cholinesterase activities were near the lower end of normal, but within normal range.

Pulmonary gas exchange was established, with some benefit.

Excellent response to atropine sulfate, 2 mg I.V. Full dosage was repeated once after 20 minutes. Child recovered fully.

Granules identified as carbofuran, a corn rootworm insecticide.

HERBICIDE INGESTION (Paraquat)

A farm wife, 32 years old sipped a mouthful concentrated herbicide from an unlabeled jug. She spat the material out immediately, then washed her mouth out with water.

She reported to the local hospital emergency room because of of uncertanty about toxicity of the herbicide.

Immediate treatment:
Ingestion of large amount of activated charcoal slurry.
Transfer to U of Iowa Hospitals.

Subsequent treatment:
Continuous gastric installation of bentonite slurry for 4 days, via nasogastric tube.
Hemoperfusion over specially coated activated charcoal.
Forced diuresis.
Saline catharsis.

Paraquat concentrations (ug/ml)

Hours Post-Ingestion	Serum	Urine
6	0.100	0.6
24	0.100	–
32	0.003	–
38	0.003	–

Urine negative for protein.
Liver function tests normal.
Hemoperfusion well tolerated.
Slight hemoglobinemia
No drop in platelets
Chest x-rays normal to 3-weeks post-ingestion.
Pulmonary function tests normal to 3-weeks post ingestion.

Information Resources

There are several resources available for information on the recognition and management of pesticide poisonings.

If information on the characteristics and toxicity of a pesticidal product is desired and either the generic or proprietary name or only the EPA registration number, the most convenient source is the local poison information center. Most poison information center are electronically linked to other centers and can provide information on the characteristics, toxicity, emergency measures to be taken and antidotes for most chemical products.

Another source of clinical and/or other information on pesticides is available through the National Telecommunications Network developed by the Environmental Protection Agency. This network maintains a toll free "hot line" that is available 24 hours a day in which they are able to handle almost all requests for information. This center is located at the Texas Tech University Health Sciences Center in Lubbock, TX.

The address and phone number follows:

National Pesticides Telecommunications Network
Texas Tech University Health Sciences Center
School of Medicine
Department of Preventive Medicine
Lubbock, TX 79430

The toll free number is 800/858-PEST

The best reference for clinical information of the recognition and management of pesticide poisonsings is the publication by EPA listed below:

RECOGNITION AND MANAGEMENT OF PESTICIDE POISONINGS, 3d Ed.
Donald P. Morgan, M.D., Ph.D.

This manual is available from:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

Cost: $5

PESTICIDE MANUFACTURERS AND FORMULATORS EMERGENCY PESTICIDE MEDICAL TELEPHONE NUMBERS

Other information sources in reference to specific manufacturers' products can be obtained from the Pesticide Manufacturers and Formulators Emergency Pesticide Medical Telephone Numbers. The following is their listing.

Abbott Laboratories	312/927-6100
Agway Incorporated	315/477-6177
American Cyanamid	201/831-2000
Ansul Company	715/735-7411
BASF Wyandotte	201/263-0200
Chemagro	816/242-2000
Chevron Chemical	415/233-3737
Ciba-Geigy Corp.	919/292-7100
Dow Chemical	517/636-2400
Diamond Shamrock	201/267-1000
Elanco Products Company	317/261-2568
	317/261-2305
E.I. duPont	302/774-2421
FMC Chemical Division	716/735-3765
Gulf Oil Corporation	713/754-2811
ICI, Americas, Inc.	302/575-3000
Merck and Company	201/381-5000
Monsanto Chemical Company	314/694-2194
Mallinckrodt, Inc.	314/895-2000
Nor. Am. Agr. Products	815/459-5391
	815/459-4749
Olin Corporation	203/789-5436
PPG Industries, Inc.	412/434-3131
	412/681-6669
Pennwait Corporation	215/242-1700
Proctor and Gamble	513/562-1100
Rhone Poulenc Inc.	201/846-7700
Rohm and Haas	215/592-3000
O.M. Scott and Sons	513/644-0011
Shell Chemical Company	713/473-9461
Stauffer Chemical Company	203/226-6602
Triangle Chemical Company	912/743-1548
Thompson Hayward Chemicals	913/321-3131
Union Carbide Corporation	212/551-4785
	914-946/0646 (night)
UniRoyal Chemicals	203/723-3776
	203/723-3670 (night)
Upjohn Company	616/323-6615
U.S. Borax and Chemical Co.	714/774-2670
Velsicol Chemical Co.	319/353-3526 (day)
	312/467-5700
	319/338-9088
Vineland Chemical Co.	609/344-4081 Ext. 249

INFORMATION RESOURCES

EPA NATIONAL PESTICIDES TELECOMMUNICATIONS NETWORK

1-800 858-PEST

POISON CONTROL CENTERS

STATE PESTICIDE COORDINATORS

AGRICULTURAL EXTENSION AGENTS

Educational Resources for Farmworker Pesticide Safety

The U.S. Environmental Protection Agency in conjunction with the Institute of Food and Agricultural Sciences, University of Florida, issued two training packets in November 1983, one dealing with farmworkers and the other with non-certified mixers, loaders and applicators. These packets include a leaders' guide, slides divided into three parts with audiocassettes (both Spanish and English versions have audible or inaudible beep/pulse) with laminated cards for use by trainees.

the FARMWORKER'S PESTICIDE SAFETY PROGRAM is divided into three parts:

I. Introduction and Lable (Approx. 10 min.)
II. First Aid and Prevention (Approx. 13 min.)
III. Daily Living with Pesticides (8 min.)

PESTICIDE SAFETY FOR MIXERS, LOADERS AND APPLICATORS has three parts:

I. Formulations, Label, Clothing (12 min.)
II. Safety Measures (9 min.)
III. Disposal and Transportation (9 min.)

These materials are distributed by:

University of Florida
IFAS-Bldg. 664
Gainesville, FL 32611

Cost: $42 for each training program
$52 for each set of instructional materials
(Laminated cards for fifteen participants)

The EPA may be able to provide some sets to migrant clinics, farmworker organizations and community health centers free of charge. For further information contact:

Ms. Carol Parker
Farmworker Safety Program TS-757c
Environmental Protection Agency
401 M. Street, S.W.
Washington, DC 20460 Phone: 703/557-7747

PESTICIDES: A GUIDE FOR FARMWORKERS (National Version)

This is a fifteen minute slide show. The audiocassette has a Spanish version on one side and an English version on the other. The transcript shows when to advance slides. The set includes both Spanish and English titled slides.

This set discusses the uses of pesticides, how poisoning of farmworkers occurs, symptoms of pesticide poisoning, worker's compensation, federal pesticide laws and workers' rights.

Target audience: Farmworkers, community organizations serving farmworkers, persons interested in farmworker issues.

Distributed by: California Institute for Rural Studies
P.O. Box 530
Davis, CA 95617 Phone: 916/756-6555

Cost: $85 plus $3 postage; $20 for one month rental $60 refundable deposit required. Recipient must pay postage both ways.

PESTICIDAS, UNA HISTORIA DE PELIGRO (Pesticides: A Story of Danger)

This is the first in a series of five videotapes focusing on issues related to farmworkers and pesticides, using farmworkers as actors. It depicts farmworkers with symptoms of pesticide exposure approaching the crewleader, going to a health clinic, and learning about the dangers of being exposed to pesticides. It outlines symptoms of exposure, describes procedures for cleaning after contact with chemnicals, and reviews risks to children and pregnant women. The over riding theme is that victims of exposure should seek medical attention for treatment, and that they should document their exposure (19 min.).

These tapes are produced by Jaime E. Garza, Health Educator, Hidalgo County Health Care Corporation, Pharr, TX, in conjunction with an advisory committee composed of representatives from HCHCC, the Texas Department of Health, Texas Rural Leagal Aid and Su Clinica Familiar, Harlingen, Texas.

Distributed by: Mr. Jaime E. Garza
Hidalgo County Health Care Corporation
P.O. Drawer Q
Pharr, TX 78577 Phone: 512/383-4985

Cost: Cost of reproducing the tape, plus postage

PEBBLES IN THE POND

A videotape produced by TEACH (Teaching Environmental Awareness to Children). In addition, curriculum units are available for migrant farmworker children from pre-kindergarten to grade six for teaching correct practices to avoid pesticide exposure.

For more information contact:

Project TEACH
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17108 Phone: 717/783-7093

PESTICIDE POISONINGS AND INJURIES: WHERE, WHEN AND HOW

This is a 26 minute self-instructional slide show with a booklet and pre and post tests and answers, text of the cassette and a suggested reading list.

The set contains a history of the development of pesticides, classification of types of pesticides, adverse health and other effects of pesticides, epidemiology of pesticide poisonings, range of toxicity of pesticides and chemical classes largely responsible for poisonings. Routes of pesticide absorption into the body, outline of occupations involved with the manufacture, distribution and use of pesticides and specific risks of each occupation are addressed. Techniques for preventing poisonings are included. A self-test requires analysis of four pesticide poisoning cases.

Target audience: Physicians, nurses, medical and nursing students, other health professionals and scientists.

Distributed by: National Audio Visual Center
General Services Administration
Order Section/MM
Washington, DC 20409

Phone: 800/638-1300 (toll free)
301/763-1891

Cost: $44 (not for rent)

TOXICOLOGY OF CHOLINESTERASE INHIBITING INSECTICIDES.

This is a 21 minute slide show including bookliet with pre- and post-tests and answers, text of cassette and suggested reading list.

The following characteristics of cholinesterase inhibiting organophosphates and carbamate insecticides are discussed: typical uses; physical and chemical properties; relative rtoxicities of various compounds; mechanism of toxic action in humans; "muscarinic", "nicotinic" and "central nervous" symptoms and signs of poisoning; problems faced when diagnosing poisonings; three laboratory methods of poisoning confirmatina and inadequacies associated with each method; treatment and prevention of these poisonings.

Target audience: Physicians, nurses, medical and nursing students, other health professionals and scientists

Distributed by: National Audio Visual Center
General Services Administration
Order Section/MM
Washington, DC 20409

Phone: 800/638-1300 (toll free)

301/763-1891

Cost: $39 (not for rent)

PESTICIDE SAFETY EDUCATIONAL MATERIALS

Pesticides Farm Safety Staff, TS-766c
Office of Pesticide Programs
Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Phone: (703) 557-7747

PESTICIDE EDUCATION MATERIALS

THIS SLIDE/TAPE OR VIDEO TAPE SERIES IS MADE AVAILABLE FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY

THESE PESTICIDE SAFETY EDUCATION MATERIALS ARE IN TWO SERIES

FARM WORKER PESTICIDE SAFETY PROGRAM

Part	I	Introduction and Pesticide Label
Part	II	First Aid and Prevention
Part	III	Daily Living with Pesticides

PESTICIDE SAFETY FOR NON-CERTIFIED MIXERS, LOADERS, AND APPLICATORS

Part	I	Formulations, Label and Protective Clothing
Part	II	Safety Measures for Mixing/Loading or Application
Part	III	Pesticide Disposal and Transportation

Occupational Safety and Health Regulations Affecting Farmworkers

There are several public laws that govern the working envrironment of migrant and seasonal farmworkers.

OCCUPATIONAL SAFETY AND HEALTH ACT

OSHA constains only five specific standards that apply to agricultural operations.

1. Sanitation in temporary labor camps: This standard encompasses site, shelter, water supply, toilet facilities, sewage disposal facilities, laundry, handwashing and bathing facilities, lighting refuse disposal, construction and operation of kitchens, dining hall and feeding facilities, insect and rodent control and the reporting of communicable diseases.

2. The storage and handling of anhydrous ammonia

3. Slow moving vehicle emblem

4. Roll over protective measures for farm machinery

5. Safety devices for agricultural equipment

MIGRANT AND SEASONAL AGRICULTURAL WORKER PROTECTION ACT

This legislation went into effect in April 1983 and contains the following provisions.

1. Crewleaders must be licensed by the U.S. Department of Labor.

2. At the time of hiring, migrant farmworkers must be given a written statement in the language they use and best understand, which outlines the working and housing conditions, transportation arrangements, insurance coverage, and whether a strike or labor dispute exists at the work place.

3. Upon being paid, the migrant farmworkers must be given a written statement detailing wages earned, hours worked, amount withheld and why, and total pay.

4. The crewleader must obey all housing laws that control health and safety.

5. The job information must be posted at the workplace where everyone can see it.

6. Seasonal farmworkers must be given all of the above only if they request it.

FARMWORKER FIELD SANITATION

On March 1, 1984, OSHA published a proposed field sanitation standard for agricultual workers in the Federal Register. This standard requires that agricultural employers of eleven or more workers provide:

1. Potable drinking water, cool and in sufficient amounts, dispensed in single use drinking cups or by fountains.

2. One toilet and one hand washing facility for each 20 workers, or fraction thereof, within one-quarter mile of the employee's work area in the field.

HAZARDOUS CHEMICALS AND RISK RIGHT TO KNOW

Hazardous chemicals and risk right to know regulations proposed by the Occupational Safety and Health Administration went into effect in 1985. In addition to the requirements for pesticide use and safety under the Federal Insecticide, Fungicide and Rodenticide Act as Amended, the right to know requirements have some specific implications for farmworker safety.

With respect to farmers and growers who are employers of farm laborers, there are specific provisions under the right to know regulations.

1. A farmer or grower is required to post a notice in the workplace notifying employees of their right to request information about pesticides.

2. A farmer or grower is required to respond to requests for information on pesticides by letting employees read the label required to be on pesticide containers by the Environmental Protection Agency.

3. A farmer or grower is required to provide appropriate training to farmworkers who will be exposed routinely to pesticides.

Farmworkers have certain rights under the right to know regulations which include the following:

1. On request, the farmworker should be provided access to the pesticide container label, or--

2. The required information from the label should be provided to the farmworker.

RIGHT TO KNOW LAW

WHAT PESTICIDES ARE INCLUDED:

ANY SUBSTANCE OR MIXTURE OF SUBSTANCES REGISTERED WITH THE FEDERAL ENVIRONMENTAL PROTECTION AGENCY AS PESTICIDES

RIGHT TO KNOW LEGISLATION

RESPONSIBILITY OF EMPLOYERS

POST A NOTICE in the workplace notifing employes of their right to request information about toxic substances, infectious agents and pesticides.

RESPOND TO REQUESTS FROM EMPLOYES for information on toxic substances, infectious agents and pesticides

MAINTAIN INFORMATION for thirty years on toxic substances in the work place.

NOTIFY THE PARENT OF A MINOR EMPLOYE of the employe's rights under the right to know legislation.

RIGHT TO KNOW LEGISLATION

WHAT RIGHT DOES THE FARM WORKER HAVE TO INFORMATION?

FOR PESTICIDES all employers must provide the following to an employe making a written request.

- Access to the pesticide's container label, or
- The required information on the container label

PESTICIDE SAFETY EDUCATION MATERIALS

Publications

The following publications are useful as instructional aids in presenting pesticide safety educational programs.

FARMERS' RESPONSIBILITIES UNDER THE FEDERAL PESTICIDE LAW.

This is a one page fold out briefly outlining the do's and don'ts of pesticide safety, Federal Standards for reentering the field after a pesticide has been applied, poisoning symptoms and safety tips.

Available free of charge from the Farmworker Safety Program, Office of Pesticide Programs, Environmental Protection Agency.

PESTICIDE SAFETY TIPS. SOBRE PLAGUICIDAS.

A nine by three inch card outlining 15 tips for pesticide safety on the farm and around the home, comes in English or Spanish.

Available free of charge from the Farmworker Safety Program, Office of Pesticide Programs, Environmental Protection Agency.

FARMWORKERS PESTICIDE SAFETY, SEGURIDAD DE LOS TRALIAJOADORES AGRICOLAS DURANTE EL USO DE PESTICIDAS.

A 21 page largely pictorial booklet for farmworkers on pesticide safety in and around the home, comes in English or Spanish.

Available free of charge from the Farmworker Safety Program, Office of Pesticide Programs, Environmental Protection Agency.

RECOGNITION AND MANAGEMENT OF PESTICIDE POISONINGS.

A 120 page manual for hospital emergency room staffs, migrant health clinic personnel and other medical treatment providers for diagnosing and treating pesticide exposure incidents. Limited copies are available from the Farmworker Safety Program, Office of Pesticide Programs, Environmental Protection Agency.

Available in both English and Spanish versions, this publication may also be purchased from the Superintendent of Documents U.S. Government Printing Office, Washington, DC.

PESTICIDE SDAFETY FOR FARMWORKERS

A 27 page pictorial booklet available in both English and Spanish versions developed as a supplemental guide to the Farmworkers Pesticide Safety Training slide-tape program. The maual provides basic safety information for farmworkers including

pesticide label information, protective clothing, recognizing the symptoms of pesticide poisoning, and first aid information.

Available free of charge from Pesticide Farm Safety Program, Office of Pesticide Programs, Environmental Protection Agency.

WORK SMART..WORK SAFELY WITH FARM CHEMICALS

A 32 page pictorial booklet on basic pesticide safety including exposure prevention, using pesticides safety, protective clothing and personal hygiene.

This booklet is free of charge from the:

National Agricultural Chemicals Association
1155 Fifteenth St. N.W.
Washington, DC 20005

THE OCCUPATIONAL HEALTH OF MIGRANT AND SEASONAL FARMWORKERS IN THE UNITED STATES

This is a 125 page publication that is a very comprehensive presentation of all aspects of migrant and seasonal farmworker's health and environment. It is a very useful resource for administrators, educators and health providers who work with migrant and seasonal farmworkers and their families.

This publication can be ordered from:

Farmworker Justice Fund, Inc.
Washington, DC

Slide Tape Presentations

The following slide tape materials are available through the Farmworker Safety Program, Office of Pesticide Programs, Environmental Protection Agency for use in pesticide safety training programs.

FARMWORKER PESTICIDE TRAINING PROGRAM.

A comprehensive slide/tape program for the general farmworker on pesticide safety in the field and around the home. The program covers important basic safety information, signs of poisoning, what to do in case of accidental exposure, the label, residues, reentry and other critical information.

PESTICIDE SAFETY FOR NON-CERTIFIED MIXERS, LOADERS AND APPLICATORS

A comprehensive slide/tape program for non-certified mixers, loaders and applicators. The program covers important safety information, formulations, how to find, buy information on the label, protective clothing, safety measures for mixing, loading, and application, pesticide disposal and transportation, first aid and preventing accidents.

Each program runs approximately 45 minutes and includes three sets of slides, tapes in English and Spanish with both audible and inaudible beeps, a leader's guide and a set of laminated materials for classroom use. These materials can be purchased from:

University of Florida
IFAS-Building 664
Gainsville, FL 32611

The cost is $42 each. A limited number of copies are available from the EPA Pesticides Farm Safety Staff without charge to organizations working with farmworkers.

These training materials are also available on video tape.