



CHAPTER 10

Planning the Pesticide Application

Chapter 10

National Pesticide Applicator Certification Core Manual

Planning the Pesticide Application

This module will help you:

- ❖ Understand pesticide and adjuvant selection
- ❖ Understand tank mixing and loading, and pesticide application procedures
- ❖ Understand container and equipment rinsing considerations

Pesticide Selection

Before selecting and applying a pesticide:

- ❖ Know the pest
- ❖ Know federal, state and local pesticide regulations
- ❖ Know how to properly use application equipment
- ❖ **Read the Label!**
- ❖ Know what PPE is required.



Product Selection



- ❖ Crop or site of application **MUST** be on the label
- ❖ Rights-of-way, industrial area, turf, ornamental planting bed, alfalfa, corn, food-handling establishment, etc.

Artichoke (0 day phi)		
Insects Controlled	Rate of Application	Method of Application
Artichoke Plume Moth Leafminers	4 to 12 ounces (0.1 to 0.3 pound active) per acre.	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. Apply as needed. Buds may be harvested on the day of application.
Do not apply more than 5 applications (1.5 pounds active ingredient) per acre per season.		
Asparagus (1 day phi)		
Insects Controlled	Rate of Application	Method of Application
Asparagus Beetle Cutworms	2 to 4 ounces (0.05 to 0.1 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre. Apply as needed.

NON-CROP (INDUSTRIAL) SITES

APPLICATION INFORMATION

HYVAR® X-L is recommended for use for general weed control on non-crop industrial sites such as railroad, highway and pipeline rights-of-way, petroleum tank farms, lumber yards, storage areas and industrial plant sites.

ORNAMENTAL PLANTS

To control the following on ornamentals, mix the indicated dosage with 100 gallons of water. Apply spray when the insects are first observed and repeat as necessary.

OYSTER SHELL SCALE – 1 pint. **APHIDS, SPIDER MITES, JAPANESE BEETLE ADULTS, LEAFHOPPERS, THRIPS, AND SCURFY SCALE** – 1 1/2 pints. **BIRCH LEAFMINER, BOXWOOD LEAFMINER, AZALEA SCALE, PINE LEAF SCALE, AND MAGNOLIA SCALE** – 2 pints. Do not use on Boston, Maidenhair, or Pteris ferns. Do not use on petunias. May cause injury to Crassula.

MOSQUITO CONTROL

ADULT MOSQUITO CONTROL – To control adult mosquitoes outdoors, in backyards, in areas of ornamental shrubbery, and on lawns, use a 2% to 5% area or fog spray. For a 2% spray, dilute 1 part Malathion-5 Emulsifiable Concentrate with 28 parts of water, fuel oil, or diesel oil. For a 5% spray, dilute 1 to 11. Apply water based spray uniformly, into and around the ornamental vegetation. Apply oil based fog to uniformly penetrate into and around the ornamental vegetation. Repeat applications as needed. Do not apply to areas where food or feed crops are growing. Do not apply oil mixture for fogging directly to ornamental plants.

MOSQUITO LARVAE CONTROL – For control of mosquito larvae in standing water (intermittently flooded areas, stagnant water, temporary rain pools), apply 13 fluid ounces of Malathion-5 Emulsifiable Concentrate per acre, mixed in sufficient water or oil to obtain even coverage when applied by air or ground equipment. Broadcast use only over intermittently flooded areas. Application may not be made around bodies of water where fish or shellfish are grown and/or harvested commercially. NOTE: Contamination of shallow, fish bearing waters may kill fish.

GRAIN PROTECTANT

CLEAN-UP SPRAY (Before Storing Barley, Corn, Oats, Rye and Wheat) – Since many of the insects which commonly infest grain in storage continue to live and breed in residues and debris, the bins, storage areas, elevators, and handling equipment such as trucks and conveyors should be thoroughly cleaned before storing the new crop. Remove and burn all sweepings and debris. The ground outside should be kept free of debris since this material also breeds insects.

Product Selection



- ❖ Consider personal and environmental safety precautions and prohibitions
- ❖ Does label recommend the use of an **adjuvant** (buffer, surfactant, colorants)?

TO PREPARE THE SPRAY: Mix AMINE 4 only with water. Add about half the water to the mixing tank, then add the AMINE 4 with agitation, and finally the rest of the water with continuing agitation. Note: Adding oil, wetting agent, or other surfactant to the spray may increase effectiveness on weeds, but also may reduce selectivity to crops resulting in crop damage.



Examples: Application Considerations

- ❖ Application timing
 - ❖ Plant, insect, disease growth stages
 - ❖ Soil conditions

Make applications prior to egg hatch or when larvae are small and actively feeding (late spring through mid-summer).

For residual control of weeds, apply in later summer, fall or early spring to ensure adequate moisture for soil activation.



Examples: Application Considerations

❖ Weather conditions

❖ Rain or irrigation

❖ Wind direction and speed

❖ Cloudy, cool or sunny, warm

❖ Drift warnings, setbacks or no-spray buffers

WIND

Drift potential increases at wind speeds of less than 3 mph (due to variable direction and inversion potential) or more than 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. **AVOID APPLICATIONS DURING GUSTY OR WINDLESS CONDITIONS.**

Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they effect spray drift.

BEFORE USING, READ PRECAUTIONARY STATEMENTS

Loader and applicator requirements to minimize the potential for runoff to surface water:

- maintain a 500 ft. vegetative buffer between treated area and surface water on neighboring land,
- maintain a 500 ft. buffer between a standpipe drain outlet and surface water on neighboring land,



Examples: Equipment Considerations

- ❖ Application equipment
 - ❖ Chemigation
 - ❖ Aerial, ground, spot spray
- ❖ Application volume
 - ❖ Apply in minimum of 20 gallons per acre
 - ❖ Apply in a minimum of 100 gals. per acre

Application restrictions:

- Do not use in chemigation systems
- Do not apply by aerial application

Don't drift onto sensitive sites. Apply in a minimum of 20 gallons per acre.

Equipment Considerations

- ❖ Tank size and pump adequate for job
 - ❖ Is agitation required?
- ❖ Type of tank (poly, galvanized steel)
- ❖ Nozzle type
 - ❖ Formulation, drift reduction, coverage
- ❖ Nozzle height/spacing (pattern), alignment
- ❖ Pressure



Post-Application Restrictions

- ❖ Posting

- ❖ Restricted entry interval (REI)

 - ❖ If nothing is stated: may reenter as soon as spray is dry; dusts have settled

 - ❖ **Agricultural Worker Protection Standard: absolutely no entry for a minimum of 4 hours; then remainder of REI**





Examples: Post-Application Restrictions

❖ Drinking, fishing, swimming

NOTE: Do not apply this product directly to water within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours

❖ Ornamental transplants or cropping replant

USE PRECAUTIONS AND RESTRICTIONS:

Do not use on trees that have been established for less than 6 months.

Do not allow granules to stick to foliage or to accumulate at the soil line around the base of the tree.

Do not plant rotational crops, on which CASORON is not registered, in treated soil within one year after application.

❖ Grazing and milking restrictions

❖ Pre-harvest or pre-slaughter interval

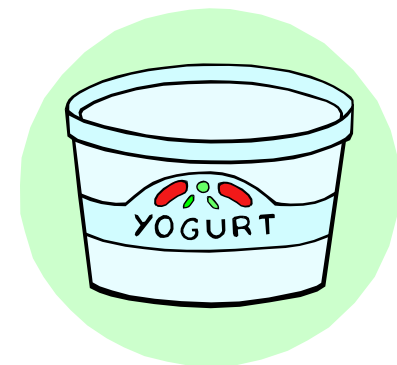
Avoid Pesticide Incompatibility

- ❖ **Incompatibility** – mixing of two products that do not physically or chemically suit each other
 - ❖ **Timing incompatibility**
 - ❖ Mixing a preemergent and post emergent pesticide
 - ❖ **Placement incompatibility**
 - ❖ Mixing a soil incorporated pesticide with a foliar applied pesticide



Pesticide Incompatibility

- ❖ **Physical incompatibility** - Some products don't mix or don't stay mixed
 - ❖ Putty, paste, separation, cottage cheese-like
 - ❖ Inadequate agitation in tank
 - ❖ Improper mixing order - **always mix in powders before ECs**
 - ❖ EC and fertilizer incompatibility
 - ❖ Hard water (pH) – some products require buffers to alter pH of water





Pesticide Incompatibility

❖ Chemical incompatibility

❖ Some products when mixed are altered through chemical reactions

❖ Degradation occurs

❖ Hard or chlorinated water,
addition of fertilizer

❖ Increased toxicity can result in
loss of selectivity

Pesticide Incompatibility

❖ Read the label

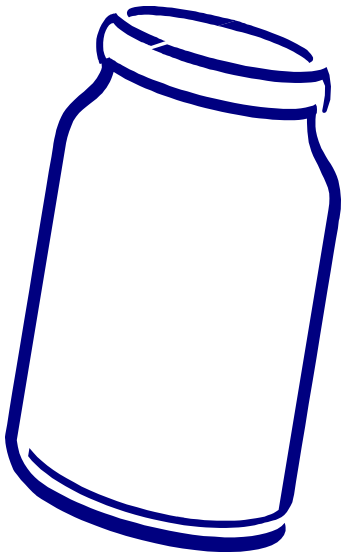
- ❖ Specific recommendations for tank mixes known to be compatible
- ❖ Specific prohibitions for tank mixes known to be incompatible
- ❖ No statement, applicator responsibility to jar test for compatibility





Jar Test for Compatibility

Mix proportionate amounts of all products



1. Fill jar $\frac{1}{2}$ full with water or carrier
2. Add products one at a time in proper order
3. Shake jar and see what happens
4. Allow jar to stand for 10-15 minutes.
5. Products are not compatible if have a precipitate, heat is given off, or products separate into layers

Mixing Order for Tank Mix

1. 1/5 to 1/2 of the water or carrier (fertilizer)
2. Compatibility agent (if needed)
3. Suspension products
 - Dry – WP, DF, WDG
 - Liquid – F, L, ME
4. Solution products (S, SP)
5. Adjuvants (if needed)
6. Emulsion products (EC) the oil-based products always go in last



Tank Mixes

- ❖ Thoroughly mix each product before adding the next
Preslurry – a little water and product mixed to form paste before adding to tank mix
- ❖ Make certain you have a uniform spray mixture at all times
 - ❖ Agitation may be required



Safe Mixing and Loading

- ❖ Appropriate mixing and loading area
 - ❖ Outdoors
 - ❖ Well-ventilated
 - ❖ Away from people and animals



Safe Mixing and Loading

- ❖ Protect water sources
 - ❖ Location of mix and load site---protect water sources
 - ❖ Containment pad
 - ❖ Use an **air gap, check valves or anti-siphon devices** (especially with chemigation)



Safe Mixing and Loading

Personal Protective Equipment



Wear additional PPE when you mix and load: gloves, apron, face/eye protection and possibly a respirator

Safe Mixing and Loading

- ❖ Clearly mark measuring devices
- ❖ Store measuring devices in pesticide storage area
- ❖ Carefully open containers
- ❖ Close container while not actually measuring and transferring



Safe Mixing and Loading

- ❖ Use an accurate scale or measuring device
- ❖ Reduce exposure
 - ❖ Stay upwind of vapors and dusts
 - ❖ Be extra careful to ensure you do not splash or spill concentrated product
 - ❖ Pour below eye level
- ❖ Never leave the sprayer or filled/partially filled containers unattended



Cleaning and Disposal of Pesticide Containers

❖ Rinsable Containers

❖ Triple-Rinse immediately

1. Completely empty pesticide concentrate
2. Fill container about 20% full with water, replace lid, shake container
3. Drain and rinse water into spray tank
4. Repeat rinse 2 more times



Cleaning and Disposal of Pesticide Containers

❖ Rinsable Containers

❖ Pressure-rinse immediately

1. Consider goggles
2. Allow pesticide concentrate to drain
3. Puncture the bottom-side of the container with special rinse nozzle and rinse into spray tank for 30 seconds, or until clear





Cleaning and Disposal of Pesticide Containers

❖ Non-Rinsable Containers

1. Empty as best possible
2. Return if appropriate
3. Dispose of in normal refuse if not recyclable or returnable; also render unusable

Container Recycling or Disposal

- ❖ Recycle plastic containers;
 - ❖ Triple/pressure-rinsed and clean
 - ❖ Stains are acceptable
- ❖ If recycling is not available, take to local landfill or incineration facility



Agricultural Container
Recycling Council: ACRC

Recycled Pesticide Containers

where do they end up?



Bridge pilings



Marine pilings



Field drain pipe

Fence posts

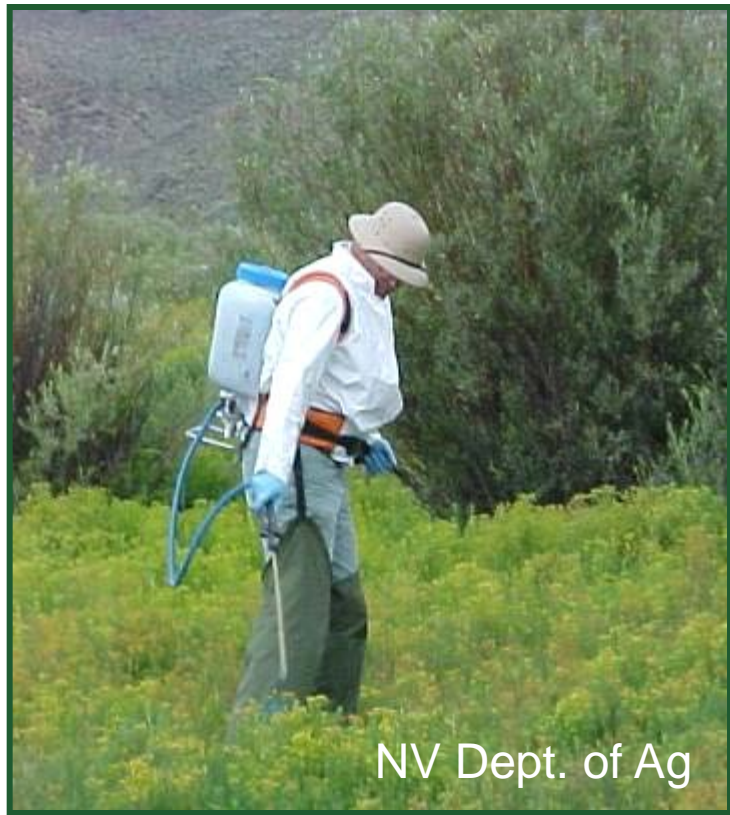


pallets



Applying Pesticides Correctly

- ❖ Personal Protective Equipment
 - ❖ Hand-carried and backpack sprayers



NV Dept. of Ag

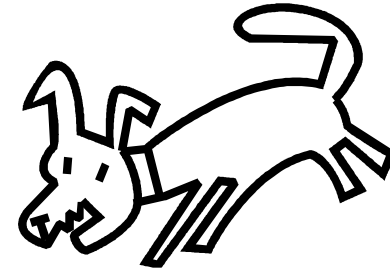
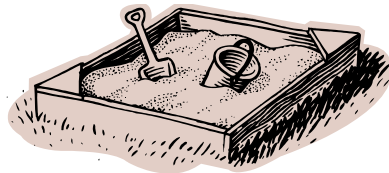


More PPE for High Exposure Applications

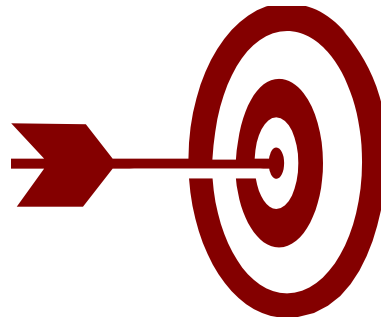
- ❖ Mist blowers or airblast sprayers
- ❖ Aerosol or foggers
- ❖ High-pressure sprays and power dusters
- ❖ Equipment that sprays above your head

Application Procedures

1. Clear all people, pets, toys and other items from application area



2. Make sure pesticide contacts target area



Application Procedures

3. Apply pesticide evenly
4. Make sure pesticide application looks appropriate
5. Check hoses, valves, nozzles, etc. for leaks during application





Application Procedures

6. Turn equipment off when you pause during the application
7. Make sure all post-application requirements are met
 - Soil incorporation
 - Label required posting
 - Reentry and restricted entry intervals
 - Grazing and pre-harvest intervals



After Mixing, Loading and Application

- ❖ **Clean application equipment when done**
- ❖ Rinse empty spray tank – apply to site
 - ❖ Carry rinsewater with you
 - ❖ Will not wash pesticide off
 - ❖ Tank is fairly clean can decontaminate next



After Mixing, Loading and Application

- ❖ Rinse empty spray tank – collect rinsate
 - ❖ Collect and hold rinsate for use in subsequent spray batch, if similar product is to be mixed later
 - ❖ Don't reuse rinsate containing cleaning agents
- ❖ Any unusable material most likely will be considered a hazardous waste

After Mixing, Loading and Application

- ❖ Decontaminate tank if necessary
 - ❖ Water-detergent solution
 - ❖ Label-prescribed decontamination instructions and materials
- ❖ Circulate in entire system for few minutes
- ❖ Flush twice with clean water



After Mixing, Loading and Application

Personal Cleanup

- ❖ Remove contaminated clothing
- ❖ Shower **immediately** after the application
- ❖ Properly wash contaminated clothing
- ❖ Dispose of heavily contaminated clothing; dispose as household hazardous waste



Disposal

- ❖ Avoid disposal problems
 - ❖ Don't buy more than you need
 - ❖ Mix only the amount you need for the application
 - ❖ Rinse containers immediately, then recycle



Summary

- ❖ Read the label
 - ❖ Plan carefully
- ❖ Read the label
 - ❖ Wear personal protective equipment
- ❖ Read the label
 - ❖ Clean and dispose of pesticides properly

CHAPTER 10


Q1. When mixing two products together in a spray tank, what can cause of incompatibility?

1. pH of water used in spray batch
2. air temperature and humidity
3. mixing wettable powders into the tank prior to adding ECs
4. conflicting chemical properties

- A. 1 and 2 only C. 3 and 4 only
B. 1 and 3 only D. 1 and 4 only



CHAPTER 10

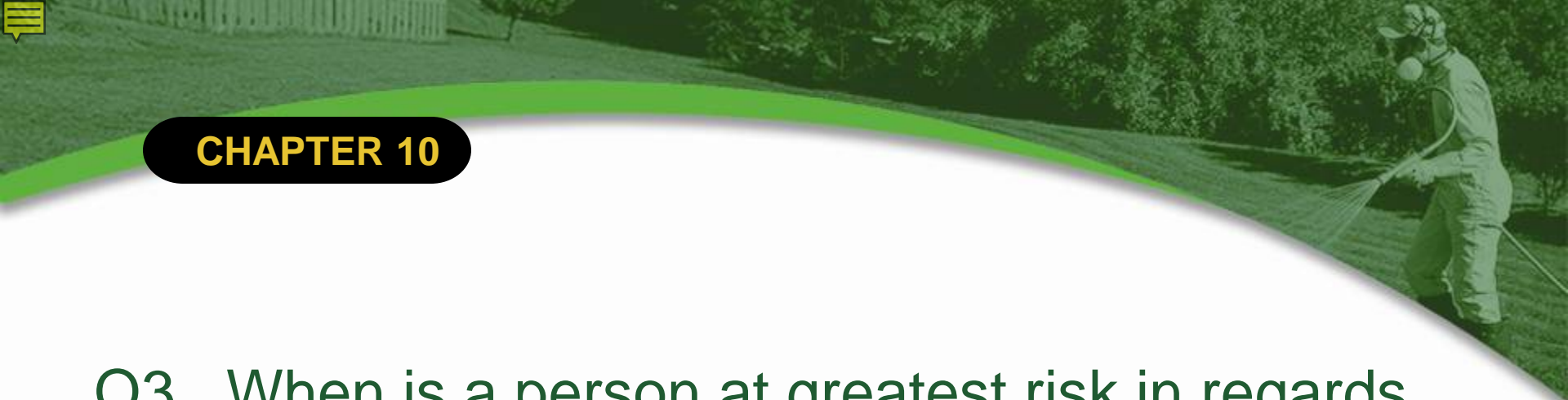


Q2. How can you dispose of a plastic pesticide container that was not rinsed when it was emptied?

- A. Take to a local landfill or incinerator
- B. Take to a plastic pesticide recycling program collection
- C. Take to a local plastic recycling program collection
- D. Pay a hazardous waste transporter to package and transport it, and someone else to accept it at a hazardous waste facility



CHAPTER 10



Q3. When is a person at greatest risk in regards to handling pesticides?

- A. when applying fine dusts
- B. when applying small, driftable droplets
- C. when reentering a treated area
- D. when mixing and loading product concentrates