Environmental Protection - Part II

Wildlife and Endangered Species

- Federal and state governments have created laws designed to protect rare or very vulnerable animals and plants.
- Those agencies that enforce these laws have been known to impose severe fines and even imprisonment on those that break these laws.
- Before applying a pesticide, read the pesticide label for any precautions designed to protect endangered or threatened species and areas where pesticide use is restricted.

Honeybees

- Pesticides that are harmful to honeybees are more likely to injure bees if applied while the bees are foraging for nectar and pollen.
- Avoid using pesticides that are toxic to bees while crops and weeds are in bloom.
- If weeds are to be sprayed, mow the blooms off first to eliminate their attractiveness to bees.
- Do not apply pesticides near a bee hive.

Honeybees

- Ideally pesticides should be applied at a time when the bees are not foraging.
- To minimize the chance of injury to bees, make sure pesticides are applied during the late afternoon with a product that breaks down within hours.
- Evening applications generally pose the least chance of harming bees.

Honeybees

- Granular formulations are generally the safest for bees.
- Microencapsulated pesticides are generally the most harmful to bees.
- Dusts are generally more harmful to bees than sprays.
- Wettable powders are generally more hazardous than emulsifiable concentrates or water soluble mixtures.
- Ultra-low volume pesticide applications are sometimes more toxic to bees than regular sprays.

Pesticide Persistence

- Pesticides that are introduced into the environment eventually break down over time due to three primary processes.
- These are microbial degradation, chemical degradation and photodecomposition.

Pesticide Persistence

- Different pesticides break down at different rates.
- Some pesticides break down rather fast - in a few hours or days.
- Others break down at a much slower rate and tend to persist within the environment.

Pesticide Persistence

- The speed at which an individual pesticide breaks down varies depending on environmental conditions.
- These conditions include the temperature, level of sunlight and air and location.
- Most of the breakdown of pesticides occurs via the actions of microorganisms.

Pesticide Persistence

- A pesticide that persists within the environment may benefit from this persistence in the control of a pest.
- It is this same persistence that can make it difficult to manage or contain the pesticide once in the environment.

Microbial Degradation

- Microbial degradation refers to the breakdown of pesticides in the soil due to the actions of soil fungi and bacteria.
- Most pesticides break down into simpler chemicals via this route.

Chemical Degradation

- Chemical breakdown does not involve living organisms. Rather, the breakdown of the pesticide occurs via one or more chemical reactions.
- Many pesticides break down at a faster rate due to hydrolysis in high pH soils and spray mixes. This is especially true for organophosphates.
- A high pH environment could reduce the effectiveness of an applied pesticide due to an elevated rate of breakdown. Yet, it would also reduce the pesticide's persistence within the environment.

Photodegradation

- Photodecomposition refers to the breakdown of pesticides due to the action of light.
- Some of the breakdown of pesticides in the environment occurs via this route.

Pesticides and Food

The Food Chain

- Animals can ingest pesticides in a number of ways.
- Sometimes an animal eats a plant treated with a pesticide.
- At other times, the pesticide is consumed when one animal consumes another animal that has a pesticide within its body.
- For example, birds that feed on insects treated with a pesticide can accumulate the pesticide within their bodies.

Accumulative Pesticides

- Those animals located higher in the food chain tend to accumulate greater amounts of pesticides within their bodies.
- Meat eaters, including humans, may receive high doses of a pesticide by eating animals that have the pesticide within their bodies.
- Fortunately, most of the persistent pesticides have been banned from use.

Nonaccumulative Pesticides

- Nonaccumulative pesticides break down rather fast.
- Generally pesticides that break down quickly are less harmful to the environment.

Pest Resistance to Pesticides

- Over 50 insect species have developed resistance to one or more insecticides.
- Most of these resistant species have been discovered in the last 30 years.
- During the last 30 years, more than 175 herbicide resistant weeds have been reported to be resistant to one or more herbicides.
- During this same time period, 100 species of plant diseases and three species of nematodes have been identified as resistant.

Pest Resistance to Pesticides

- Many of the weeds showing resistance are tolerant of applied triazines but there have also been reports where weeds have shown resistance to 2,4-D, trifluralin, paraquat, and a few of the urea herbicides.
- Scientists generally agree that the over use of a pesticide will accelerate the development of resistance within a pest species.

Pest Resistance to Pesticides

Six Suggestions for Reducing Chemical Resistance

1. Use pesticides only on an as-needed basis.

2. Rotate the pesticides used. By alternating products, the development of resistant strains can be slowed and the useful life of the pesticide products extended.

3. Use cultural practices that reduce the numbers of a pest and reduce the need for pesticides.

Pest Resistance to Pesticides

Six Suggestions for Reducing Chemical Resistance (continued)

4. Monitor indoor and outdoor areas, so problems can be detected as they are developing. Try other methods of managing a pest before using a pesticide. If other methods of controlling a pest have not been successful then consider using a pesticide.

5. Use resistant crop varieties when feasible. Also, use beneficial insects and biological control agents when useful.

6. Educate yourself about the pests you are managing. Keep up to date on the latest research.

What Pesticide Applicators Can Do to Protect the Environment

It may be necessary to apply a pesticide to reduce the numbers of a pest. When this occurs, there are a number of procedures that one can follow to prevent damage to the environment. These are listed below.

1. Read and follow the pesticide label, federal, state and local laws on the use of the pesticide.

2. Properly calibrate pesticide application equipment.

3. Avoid spraying pesticides into bodies of water. Apply the pesticide where required and nowhere else.

4. Mix pesticides at the proper rate. Never apply more than that allowed by the label.

5. Do not spray a pesticide while watering or just before watering an area. Doing so may remove the pesticide from the application site. Some of this pesticide may enter water areas and injure fish.

What Pesticide Applicators Can Do to Protect the Environment

6. Use chemigation only with approved pesticides.

7. Do not spray on windy days as this may cause the pesticide to drift into water areas or wildlife habitats.

8. Learn how the pesticides being used may affect fish and wildlife.

9. Use alternatives to chemical pest control whenever possible.

10. Have a responsible mindset towards the environment and be committed to protecting the wildlife and bodies of water where one is working.

References

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