INSECTICIDES AND MITICIDES IN THE LANDSCAPE

When landscape plants are introduced into new environs, concerns arise over susceptibility and resistance to foreign and familiar pests.

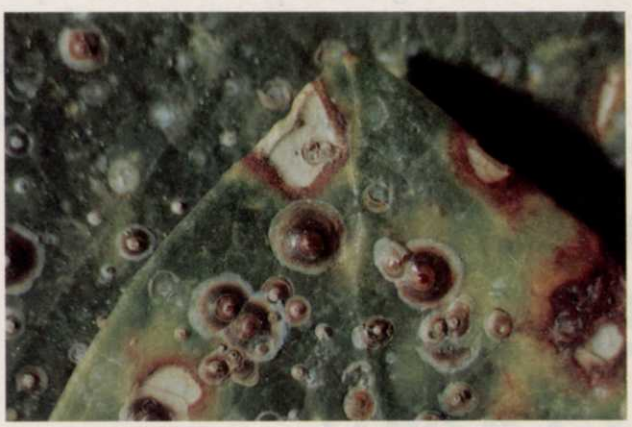
by James R. Baker, Ph.D, and Stephen J. Toth, Jr.

Pest management in the landscape environment is unique due to the public's contact with plants and the large number of exotic plant species and varieties.

Some of these species have little natural resistance to insects and mites. In its native land, an exotic ornamental plant may have pests that are of little consequence because of naturally occurring parasites and predators. However, if the plant is introduced into a new environment containing pests but not parasites and predators, the pests may cause considerable injury.

In addition, insecticides or miticides applied for one pest may eliminate parasites or predators of that particular pest or another pest. For example, spraying for aphids may eliminate parasites of mites and, as a result, mites may suddenly become a major problem.

Woolly apple aphids can have a devastating effect on pyracantha.



Bifasciculate scale on English ivy can give a landscape manager headaches.

Pests go for the green

Because well-maintained landscapes are usually verdant in spite of summer droughts, many ornamental plants in the landscape are susceptible to field crop pests, such as European corn borer, corn earworm and beet armyworm. This is in addition to the pests which are usually confined to ornamental plants, such as bagworms, whiteflies (on bedding plants), Japanese weevils and many others.

The genetic resistance to pesticides by insect and mite populations has greatly aggravated problems with pest management on ornamental plants.

In cases where an insecticide or miticide fails to control a pest it once controlled, a possible solution is to switch to a chemical with a different mode of action. An insecticide or miticide in a different chemical group can have a different type of toxic effect on the pest.

Cross-resistant pests

Pests are sometimes "cross resistant" to more than one class of chemical (for example, DDT and pyrethroids), but in most cases there is some benefit to switching to a different class of chemical when dealing with resistant pests.

Insecticides and miticides labelled for landscape use are listed according to their chemical classes in Table 1.

As a result of constant exposure to pesticides during the busy spraying season, the landscape manager has a greater risk of some deleterious effect caused by pesticides than does a homeowner who may only apply pesticides a few times a year for only a few hours at a time.

In addition to exposure during application of a pesticide, the landscape manager also encounters pesticide residues on the foliage of plants just treated or treated the week before.

The obvious ways of reducing the risks associated with pesticide use are to use less toxic pesticides and decrease the amount of exposure by using proper protective clothing or by observing optimal re-entry times after

TABLE 1.

Some insecticides and miticides labeled for use on landscape ornamentals.

Bacterial
- Bacillus thuringiensis (Bactospeine, Biotrol, Dipel Thuricide, Vectobac)
- Bacillus popilliae (Doom, Japademic, Milky Spore)

Carbamates
- Baygon
- Dycarb, Ficam, Turcam
- Lannate*
- Mesurol
- Oxamyl 10 G
- Sevin
- Vydate L*

Chlorinated hydrocarbons
- lindane
- Marlate
- Pentac
- Thiodan

Pyrethroids
- Mavrik
- Talstar
- Tempo 2

Organophosphate
- diazinon (D.z.n, Knox-Out)
- dimethoate (Cygon)
- Di-Syston
- Dursban
- Dylox, Proxol
- ethion
- Imidan
- Malathion (Cythion)
- Metasystox-R2
- Mocap
- Oftanol
- Orthene
- Pestroy, Sumithion
- Triumph

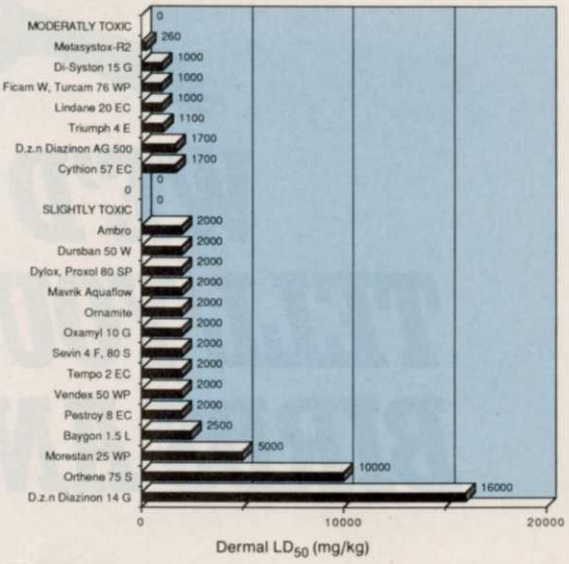
Miscellaneous
- Amdro
- Avid
- Insecticidal soap
- metaldehyde
- Morestan
- Ornamite
- Vendex

*Do not use on home landscapes.

Source: James R. Baker, Ph.D. and Stephen J. Toth, Jr.

FIGURE 1.

Dermal toxicity of insecticides and miticides labeled for use on landscape ornamentals.[1]



1 Dermal toxicity is determined by the lethal dose required to kill 50 percent of the test animals (LD_{50}). The lower the LD_{50} (i.e., the shorter the bar), the more toxic a chemical is when applied to the skin. LD_{50}s for Ficam W, Turcam 76 WP, Lindane 20 EC, Proxol 80 SP and Vendex 50 WP are based upon tests on rats; LD_{50}s for all other products are based upon tests on rabbits. Sources for the dermal LD_{50} data were the companies' product material data safety sheets. In each case, the lowest LD_{50} reported for the formulated products was used. Moderately toxic pesticides are those with dermal LD_{50}s ranging from greater than 200 mg/kg to 2,000 mg/kg. Slightly toxic pesticides are those with dermal LD_{50}s ranging from greater than 2,000 mg/kg to 20,000 mg/kg.

treatment.

Factoring toxicity

When choosing a pesticide to control insects and mites in landscapes, the chemical's toxicity should be considered along with the chemical, cost, residual activity, environmental impact and effectiveness in controlling the pest.

An insecticide or miticide in a different chemical group can have a different type of toxic effect on the pest.

Pesticides have three major routes of entry into the body: through the mouth (oral), through the eyes or skin (dermal), or through the lungs (inhalation).

Information on the relative toxicity of a pesticide product is provided on the product's label which must contain one of the following signal words: "Danger" (highly toxic orally, dermally or by inhalation), "Warning" (moderately toxic) or "Caution" (slightly toxic).

A comparison of the dermal toxicity of insecticides and miticides commonly used in landscape management is provided in Figure 1.

Insecticidal soap and products containing the bacteria *Bacillus thuringiensis* (e.g., Bactospeine, Biotrol, Dipel, Thuricide) are not included in Figure 1 because they are generally considered to be non-toxic to humans.

Reducing exposure

To prevent oral exposure, do not eat, drink, smoke or chew tobacco when handling or applying chemicals and wash your hands immediately after use.

Dermal exposure can be reduced by wearing adequate protective clothing and equipment during mixing and application. The product label usually contains specific protective clothing requirements. However, the minimum protective clothing that should be worn when using any insecticide or miticide are a long-sleeved shirt, long pants, and rubber or neoprene gloves.

Rubber gloves can reduce dermal exposure to pesticides by more than 95 percent. Exposure by inhalation can be prevented by wearing a respirator when applying chemicals and by avoiding treated areas immediately after an insecticide or miticide is applied unless wearing proper protective equipment. **LM**

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