PHYTOTOXICITY OF PESTICIDES TO PLANTS

Plant Damage due to application of pesticides to plants is known as **phytotoxicity**. Pesticide phytotoxicity appears in several ways on ornamental plants, but probably 5 types of damage most commonly occur.

1). **Burn**--This type of damage may appear on the tip, the margin, as spots on the leaf or the entire leaf surface may appear burned. The growing tip or bud may also be killed.

2). **Necrosis** (or death of the plant tissue)--Similar to burn and affecting plants in the same manner.

3). **Chlorosis** (a yellowing or bleaching effect)--May appear as spots, tip yellowing, or as a general chlorosis of the entire leaf.

4). **Leaf distortion**--May appear as curling, crinkling, or cupping of the leaf.

5). **Stunting** or other abnormal growth.

Phytotoxicity very commonly produces a combination of two or more of the five symptoms. The new growth is most likely to show damage when sprays are applied. When soil drenches are used, root tissue may be injured causing stunting or slow plant decline. Soil drenches can damage the foliage, in which case the older leaves usually show damage rather than the new growth.

**The following are general rules or guidelines to help reduce phytotoxicity**

1) Don't apply a pesticide to plants that are stressed. Plants should be growing at their optimum. Avoid spraying under extremely hot, sunny conditions. Spray in the mornings when possible, preferably between 6 and 10 a.m. When air or plant tissue temperature is approximately 90°F or higher, damage will likely occur. On bright sunny days, leaf tissue temperatures may be 5 to 15° higher than the surrounding air, thus increasing the possibility of injury. Also, slow growing plants due to cool weather or other conditions (i.e. overcast, low light conditions) are more likely to be damaged. Avoid temperature extremes, either high or low.

2) Don't apply pesticides under conditions which will not promote drying. Plants sprayed when cool, humid conditions exist for extended periods will remain wet for long periods of time and increase the probability of injury. This is one of the reasons plants sprayed under greenhouse conditions are more likely to be damaged. However, never spray plants when they are in need of water. Wilted or dry plants are extremely sensitive to spray injury.
3) Wettable powders are usually safer to plants than are emulsifiable concentrates because wettable powders do not contain emulsifiers and solvents. The disadvantage of wettable powders is the objectionable visible residue on the foliage. Continuous agitation in the spray tank is necessary to prevent spray materials from settling out, especially wettable powders.

4) Spray tank mixtures may result in plant injury that does not occur from use of either one of the materials alone. Pesticides should not be tank mixed unless directions for this use are on the container labels. If pesticides are to be tank mixed, consult a compatibility chart. Wettable powders should be mixed only with other wettable powder formulations, emulsifiable concentrates with emulsifiable concentrates, and mixes should be of compounds within the same class (organic phosphates together, carbamates together, etc.). Never tank mix soluble fertilizer with pesticides.

5) Almost all aerosol formulations of pesticides will cause phytotoxicity if applied at less than the recommended distance between the aerosol nozzle and plant. The distance usually recommended is 18-20". In some experiments, it was found that almost all of 23 aerosols tested were phytotoxic when applied at 8", but only two of these caused severe injury at 12-16" from the plant. Most aerosols will damage plants when applied at temperatures above 85°F and when the foliage is wet. Be sure to read the container label carefully before aerosols are used.

6) One of the most important precautions to avoid plant damage is to make 3 or 4 preliminary spray applications at 3 to 7 day intervals to a few plants of the species grown under your growing conditions. Preliminary applications should be made at the same time of day, and by the same method as when all plants are treated. All the conditions should be as nearly the same as possible in the preliminary tests as when all plants are sprayed (sunlight conditions, temperature, etc. should be recorded in the spray log book for future comparisons). Plant damage with some pesticides has occurred within 18 hours, with others as long as 72 hours, but damage should be evident within a week after spraying.

7) Study the label and any brochures (labelling) that are available concerning the particular pesticide to be used for dosage rates, application instructions, and phytotoxicity information. Do not overdose. Clean out sprayer, hose and nozzles after each use. Avoid using any sprayer in which weed killers have been used.

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**Pesticide Use** - Due to constantly changing laws and regulations, no liability for the suggested use of chemicals in this Newsletter is assumed by the ONW Newsletter. Pesticides should be applied according to label directions on the pesticide container.

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