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Environmental Protection Agency hearings on the chlordane issue are still rolling on, but all indicators point toward turf insect control without chlordane by sometime this fall.

"It (chlordane) probably won't go completely out of the picture," in the opinion of one EPA official, but will definitely be out for use on turf. The reason is potential human exposure. Chlordane will probably remain in use as a subterranean termite control because of its long persistence in the soil and, most likely, farmers will be allowed limited use provided applicators protect themselves with proper clothing.

In the past, when other chlorinated hydrocarbon insecticides were banned, substitutes came to light. For example, when aldrin, dieldrin and heptachlor were banned, chlordane came into use. Now chlordane is going and a substitute must be used.

Existing organophosphate insecticides, such as diazinon, chlorpyrifos (Dursban), and trichlorfon (Dylox or Proxol) can provide the answer if applied properly. Since organophosphates are not persistent, they need to be moved from the surface into the soil immediately to be effective.

"Thatch is a major factor limiting the effectiveness of insecticides in controlling soil inhabiting insect pests of turf," according to Dr. Harry Niemczyk, professor of turfgrass entomology at the Ohio Agricultural Research and Development Center.

Currently available organophosphate insecticides do not move freely through thatch, so it becomes an urgent necessity to move them. If rainfall doesn't do it, then irrigation is called for.

Experiments in Ohio have shown that one-half inch of thatch in turf can significantly reduce the effectiveness of the organophosphate insecticides.

Liquid diazinon, giving 90 percent or better control at 5.5 to 6 pounds AR/A (active ingredient per acre), was reduced to 52 to 60 per-
Princep® works around ornamentals.

Princep® herbicide stays where you put it. And since it has practically no foliar action, there's little danger to the plants you spray around.

Princep cleans up your right-of-way and won't hurt your ornamental plantings. It's as simple as that.

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approval or recommendation of Adelphi by the U.S.D.A.)

Photography at McGOVERN SOD FARMS, Melville, N.Y.
One-half inch of thatch can reduce effectiveness of insecticides.
Water is quantitatively the most important nutrient required for plant growth and survival. Actively growing grass tissue consists of about 90 percent water by weight.

Plants not only contain large quantities of water, they also usually require hundreds of times this amount during growth. This enormous amount of water contained and used by plants is more than just an inert filler, probably every plant growth activity is directly or indirectly affected by water. All of this water is absorbed from the soil through the plant's root system.

Since water is very essential for plant growth, and since all of the water used by plants comes from the soil, any factor affecting the absorption of water will, therefore, probably affect plant growth.

A number of biological, chemical and physical factors directly and indirectly affect either soil water retention and movement, or plant root growth and absorption. The primary soil physical factors affecting plant water absorption are soil water content and soil aeration.

Water content is important because it indicates how much water is potentially available for plant use.

Soil aeration (the exchange of oxygen and carbon dioxide between the soil and above-ground atmosphere) is important in maintaining a constant supply of the oxygen required for good root growth and absorption. Both aeration and water retention depend primarily on soil structure which is determined by the kind and arrangement of particles in the soil.

Most golf greens have two important features which distinguish them from other golf course turf sites:
1. They are subject to severe
Continued on page 28
THE INNOVATOR

"They copied all they could copy, but they couldn't follow my mind, and I left 'em sweating and stealing... a year and a half behind!"

As expressed by: Rudyard Kipling in "The Mary Gloster"

SAFE-T-LAWN, INC.
MIAMI, FLORIDA

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SOIL AMENDMENTS

Continued from page 26

foot and mower traffic, and
2. they are drained.

The effects of the traffic are obvious (soil compaction, poor root growth and absorption); however, the effects of the shallow drainage (excess soil water content, poor soil aeration) are less obvious but are generalized in Figure 1. A perched water table forms at the drainage level in such a green following irrigation and drainage. Under these circumstances, any good, medium-textured natural soil will likely be saturated throughout (Fig. 1-B) and grass growth will probably be poor.

Both problems are minimized in practice by amending the soil with coarse-textured materials (e.g. bark, calcined clay, gravel, perlite, sand, scoria, vermiculite, etc.) to increase the soil’s resistance to compaction and to increase the amount of large aeration pores which drain despite the water table. Unfortunately, “too little” amendment reduces both soil aeration and soil water retention without increasing the soil’s resistance to compaction and “too much” reduces water retention excessively.

The “optimum amount” of soil amendment should maximize soil compaction resistance and at the same time provide soil aeration and soil water retention which closely match those required for good turfgrass growth and water absorption.

This article briefly discusses the changes in soil physical properties when natural soils are amended with coarse-textured materials.

Soil Amendment — soil physical changes

Figure 4 “pictures” what happens as a coarse-textured amendment is mixed with soil in increasing proportions. Since soil mixtures are usually prepared from bulk quantities (e.g. bu. ft. 3, lit. m 3, yd 3 etc.), component and mixture quantities are herein expressed as

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