

# *Some Effects of the Annual Application of Pesticides to Turfgrass*

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**C**ontrol recommendations for most insect and nematode pests of turfgrass include periodic applications of a variety of pesticides. Entomologists usually develop these recommendations through testing programs which normally consist of evaluation of a number of candidate materials for effectiveness against a specific pest, such as chinch bugs, sodwebworms, grubs, etc.

The effects of these short range tests are usually well known, but, when these recommendations are incorporated into a turfgrass maintenance program, it means using pesticides annually, usually over long periods of time. The overall effects of extended usage are not well known, and it has been the objective of research at Rutgers to evaluate some of these effects. This program has been underway since 1962 using certain pesticides, including carbamate, organochlorine, and organophosphate type materials.

Annual applications of pesticides to the same red fescue-Kentucky bluegrass utility turf after four years have resulted in large differences in the overall quality of that turf. Increased density and clipping yield were found to be related to chinch bug control and population suppression of a spiral and a stilet nematode. Large differences in per cent crabgrass were related to growth differences.

Chinch bug populations in chlordane treated areas were more than 2½ times greater than in control areas after four years, and over four times greater after five years, suggesting interference with some population-limiting mechanism. Red fescue succession was also observed

in the organophosphate treatments after five years. Plots treated with ethion were found to consist of almost 54 per cent red fescue compared to only 7 per cent in untreated areas.

Estimates of numbers and kinds of surface inhabiting arthropods over a 12-month period using pitfall traps have shown that large differences in types of animals exist at different seasons. Some differences in springtail and mite populations have also been found between pesticide treatments. Of greater importance, however, is the trapping of very large populations of red-legged earth mites in mid-winter, followed by large spring populations of clover mites. Both mites have been found to produce heavy damage to grass blades through feeding activity. At the same time, differences in pesticide treatments have been recorded, ethion apparently exerting a long term effect on the total arthropod populations including the two above-named mites.

Long term usage of pesticides has also been shown to affect certain plant parasitic nematodes, as well as earth worm activity. Crabgrass germination was shown to be associated with spring earthworm surface activity.

Cumulative differences in growth response due to annual treatments have been related to the activity of several important soil and surface-inhabiting animals, including certain plant parasitic nematodes, surface and soil inhabiting springtails, red-legged earth mites and clover mites. Large increases in chinch bug populations in chlordane-treated plots may be related to decreases in surface inhabiting predatory mites in these treatments.