Green World

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James Smith, Sr. (right) receives the first New Jersey Turfgrass award from Leo Cleary, chairman of the Hall of Fame Committee. (Story Page 2)

Cities' 'Waste May Be Soils' Treasure

This caption headlines a brief easily read article in the December 1974 issue of Crops and Soils (pp. 9-11).

A review is given here of the article by Dr. W. E. Larson, a USDA research soil scientist to give an overview of the use of sewage sludge on land. This commodity, that has been receiving so much attention of late as an environmental liability, has assets equivalent to 2.5 percent of the nitrogen sold as fertilizer in the U. S. in 1973, 6 percent of the phosphorus, and 0.5 percent of the potassium.

The author suggests that if properly handled, recycling this resource could alleviate a pollution problem and a shortage of fertilizer nutrients.

Heavy Metals a Concern

Characteristics of sludge are given in a general way, with the caution that sludges vary; dependent primarily upon what goes into the sewage treatment plant, and how it is processed. Variability is particularly likely if industrial wastes are involved.

(Page 3, please)

Resistant Grubs Controlled in Tests

Louis M. Vasvary, Associate Extension Specialist in Entomology, Cook College

The Japanese beetle was first discovered in the United States in 1916 near Riverton, N.J. About a dozen beetles were found in the initial infestation; however, from this small beginning it spread rapidly and has become established in over 100,000 square miles and in many isolated areas beyond the region of natural distribution.

Adult beetles have over 275 host plants and are responsible for considerable economic damage. The immature stage or grub feeds on the roots of plants, especially grasses. When grubs are numerous they can cause severe injury to turf.

In the recent past cyclodiene insecticides such as chlordane, dieldrin, aldrin, and heptachlor were utilized as grub-proofing materials. One application remained effective for 3 to 5 years and grub problems became relatively nonexistent.

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Researchers Report Progress in Fight Against Nematodes

John K. Springer, Associate Extension Specialist, Plant Pathology, and Tseh-An Chen, Professor, Nematology, Cook College

A number of plant-parasitic nematodes are found feeding on the roots of grasses in New Jersey. Those most frequently encountered causing injury are the Dagger, Ring, Lance, Lesion, Pin, Spiral, Stubby Root, and Stunt nematodes. In general, Lance, Ring, Dagger, Stunt, and Spiral nematodes are most prevalent in the lighter soils of our Coastal Plains, while Lesion, Dagger, Lance, Spiral, and Ring nematodes are more prevalent in the heavier soil of northern counties.

The root systems of turf exhibit injury symptoms before the aboveground portions of the plant show any evidence of injury. The type of symptom expressed on the roots varies with the specific nematode involved. Most plant-parasitic nematodes which attack turf in New Jersey produce discolored lesions at the root tips or along the side of the roots.

When feeding injury is extensive, considerable dead roots and sloughing of the root cortex is observed. With a few kinds of nematodes, no distinct, necrotic lesions are observed, but a general stunting of the roots and a lack of feeder roots is evident. Whichever type of root injury occurs, the end result is a very shallow, sparse root system.

Turf Loses Vigor

The aboveground symptoms of nematode feeding injury are similar to those symptoms of any factor which restricts root development; i.e., poor cultural practices, severe soil compaction. Initial symptoms are development of lighter green color of the grass in variously shaped patches. The patches can range in size from a few inches to a few feet, and shaped from somewhat circular to elongated streaks. Later, the grass blades turn shades of yellow and eventually die from the tips of the leaf to its base.

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Comments and Opinions (Why not share yours? We welcome your letters.)

Turf Fertilizer Diversion Scant Help to World Food

It has been proposed that fertilization of turfgrass and ornamentals in this country should end for the sake of aiding food supply in starvation countries. Let us look at the potential of fertilizer used on turf for increasing food supply in foreign countries:

- Local production of fertilizer is more economical than shipping it long distances.
- The most troubled starvation areas appear to be the dry lands of Africa and India. Of course, it does not take much agricultural know-how to realize that more fertilizer in these areas will be useless without increased water supply.
- Of the total United States fertilizer use, 3½ percent is estimated to have been used for nonfarm purposes; i. e., parks, playgrounds, highway rights-of-way, erosion control plantings at construction sites, lawns, gardens, golf courses, airport runway de-icing, etc. This quantity is scarcely adequate to make a worthwhile contribution to world fertilizer needs.
- Significant portions of fertilizer used on turf and ornamentals are slow release and low analysis, which are not efficient for food crop production.
- There is no disagreement with the fact that fertilizer will have an important role in ending starvation. Also, in the name of human decency, everyone should help increase the food supply for starving people. Yet, fertilizer is not the basic solution to their problems. Much more profound and complicated problems must be solved before a 25, 50, or 100 percent increase in food is of lasting benefit.

What If Fertilizer Is Taken Away From Turf Usage?

First, use of some turf areas requires minimal quality standards. Where these cannot be maintained, the turf would be very unsatisfactory or nonuseable.

Second, there would be less total use of turf areas without fertilizer. More time would be required for establishment of new fields or recovery of heavily used turf.

Third, turf cover cannot be developed on many poor soils without fertilizer. This would increase the old and unhappy practice of hauling and spreading topsoil to obtain minimal turf cover.

Fourth, turf cover on some established turf areas would deteriorate until the grass cover is lost.

Turfgrass and the Environment

Also, before serious restrictions are made on turf fertilization, we should recognize that turfgrasses are a plus for environment because:

- They reduce dust, mud, and loss of topsoil which makes them an urban soil conservation asset.
- They cut down on injuries in contact sports as compared with artificial surfaces or bare ground.
- Culturing lawn grasses as with any grass, is a soil-improving process. It conserves nutrients in the soil by reducing leaching losses. Thus, use of fertilizer on turf is a plus to the environment rather than something harmful. Our old lawns that have grown a good stand of grass are a great resource in case we are forced to grow our own food in home gardens.
- Bulky and low analysis environmental waste products are dissipated as a significant portion of turfgrass fertilizers.

What's wrong with a society where man uses the environment to grow some quality turf for exercise, sports, or therapy? Is not this a most desirable facility and activity for making life more bearable in our crowded society?

Other people of this country and those of most other countries have many less constructive ways of dissipating their quota of material resources and energy. Some of these other sources of energy and wasteful consumption of materials might be a bigger contribution to fertilizer production than a ban on fertilization of nonfood crop areas.

In summary, prohibiting the use of fertilizers for turf and ornamentals cannot be expected to give a major and prompt assist to the world food shortage.

Nevertheless, I doubt if turf lovers would object to giving up significant quantities of fertilizer for food production if other less constructive use of resources have been turned to the aid of starving countries that have no immediate feasible means of developing their own fertilizer supply. Or, in case our local fertilizer needs cannot be met or a country has a national catastrophe that destroys its fertilizer-producing facilities, I am sure turf growers would be willing to divert a major portion of their fertilizer to such emergency use.

In the meantime, judicious use of fertilizer on turf is a desirable and constructive practice.

R.E. Engel

James Smith, Sr. First Hall of Fame Winner

James Smith, Sr. of Rahway is the first to receive the New Jersey Turfgrass Hall of Fame Award, having been awarded a plaque at the New Jersey Turfgrass Expo on Dec. 4 at Cherry Hill.

Mr. Smith, who has long been associated with turfgrowers, was born and reared in Scotland. As a young man, his position with a wooden cask company brought him to America, which has been his home for many years.

His Scottish background and love of golf aroused his curiosity on turfgrass-growing problems. He sensed the need for a quality topdressing material for putting greens.

This led him to the Agronomic Science Department of Rutgers University where he spent many hours in the laboratory with Dr. H. B. Sprague, in the study of soil and topdressing preparation.

The ensuing topdressing product, Fertl'Soil, is now sold by the company Mr. Smith founded, not only in New Jersey but as far away as Maryland, Eastern Pennsylvania, Albany, N.Y., Western Connecticut and Long Island.

Successful Banker, Humanitarian

Mr. Smith has relinquished the company to his son, James Smith, Jr., who is assisted by his sons Chip and Dave. Both James, Jr. and Chip are graduates of the College of Agriculture of Rutgers University.

While Mr. Smith, Sr. still maintains a keen interest in the topdressing company, he is now the very successful president of the Rahway Savings Bank at the grand age of 86. He has been a prime factor in making the Rahway Hospital one of the best in the area.

His interest in the golf course superintendent and those who labor in turf has been deep and inspiring from his first interest in turfgrass. Young turfgrowers of today are the third generation who have received his encouragement.

The Turfgrass Hall of Fame is honored to make this award to Mr. Smith, who has done so much in the three turfgrass areas of technical development, applied practice, and the inspiration of men.

Mr. Smith, your association with turfgrass has been one of the fine things that has happened to New Jersey turf.

'Nervy' Plants

The mystery of how certain carnivorous plants "know" when to close their traps to capture insects alighting on them has at last been solved by Plant Physiologist Stephen E. Williams of the Divison of Biological Sciences, Cornell University.

Mr. Williams discovered that the tips of the hair-like leaf tentacles of the sundew [*Drosera*] have highly sensitive cells which can convert a physical stimulus into electrical impulses much like nerve signals. When a tip is touched, a signal travels down to the base of the tentacle, "ordering" it to bend over and trap the prey.

This process closely resembles the way human nerve cells relay signals throughout the body in the form of electrical pulses.

In the sundew, however, the signal travels perhaps 10,000 times slower than in animal systems. As Mr. Williams notes, "It is remarkable that these plants are totally unrelated to animals and yet they have developed very similar sense organs completely independently."

Study of this mechanism, he says, can shed much light on the evolution of sense organs.

Like the Venus fly trap [*Dionea muscipula*], which Darwin called "a most sagacious animal," the sundew is a bog plant, and captures and digests insects to secure the nitrogen lacking in its soil. These are fascinating house plants, easy to maintain if given 75° to 80° full sun, peaty acid soil with no fertilizer, and very high humidity, as in a terrarium.

from The Avant Gardener

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$1 Million a Year to Test

It generally takes five to seven years of testing for a chemical company to generate sufficient data for product registration. Expenses involved in product testing are rising rapidly, now amounting to more than $1 million a year. This means a company must invest several million dollars before a new product reaches the market.

Imagine the startled golfer who knocked a ball in after a 30-yard chip only to see his ball suddenly ejected onto the green, followed by a large frog. Or the golfer who won his match by one stroke when his putt rested on the lip of the cup only to drop in as a large grasshopper landed squarely on the ball.

"The trouble with the world is not that people know too little, but they know so many things that ain't so." — Mark Twain.

"Consider the postage stamp; its usefulness consists of its ability to stick to one thing until it gets there." — Josh Billings.

Hard work is an accumulation of easy things you did not do when you should have.

(WASTE from Page 1)

One concern of soil scientists is the possibility of adverse effects of heavy metals as long-term pollutants of soils. Particularly where industries dispose of quantities of heavy metals, the toxic properties of these elements may affect plants. Vegetable crops differ appreciably in uptake and response to certain heavy metals.

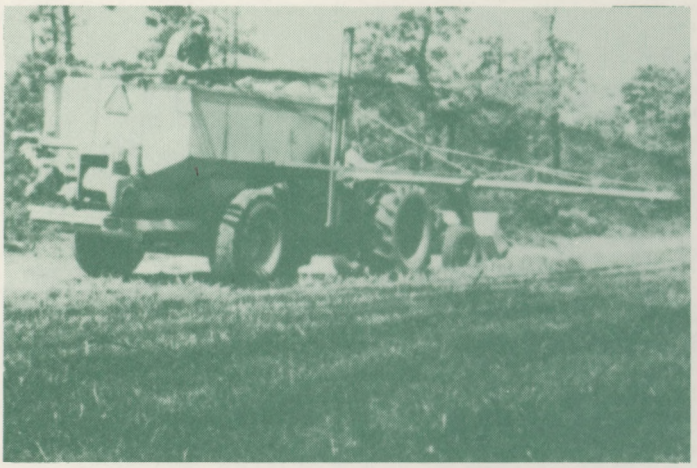
Some plants accumulate cadmium which poses a potential danger to consuming animals and man.

Of short-term concern is nitrate pollution of bodies of water and ground water. Heavy applications on sandy soils close to water sources are to be avoided, but specific rates and distances are yet to be developed. Most pathogenic microorganisms are killed in the treatment plant during anaerobic digestion, and further destruction occurs in the soil. The fate of viruses in the sludge and after application to the land has been little studied, according to this article.

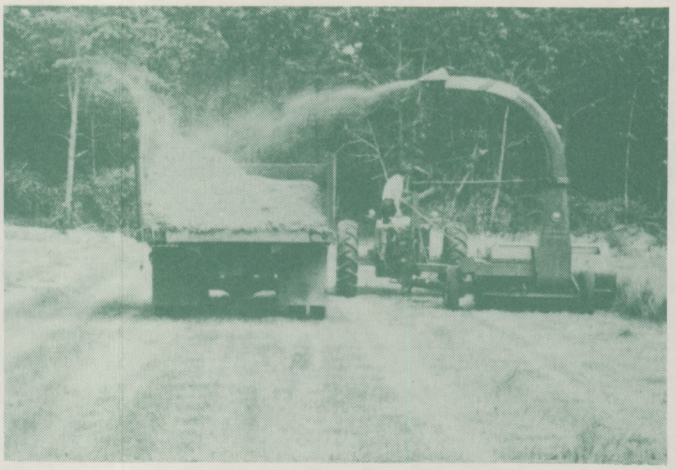
Public Relations Factor

Properly digested sludge does not have strong offensive odors as does primary sludge. Precautions should be taken, however to avoid adverse public relations.

The author advises observing precautions of keeping parties involved informed that considerations are made concerning hauling, disposal site, safeguards against water and air pollution off-site. Municipalities sometimes give sludge away free or haul it to disposal sites.



Boom truck applies sludge to grass.



Harvesting grass from sludge-treated land, Ocean County.

Sludge may leave the treatment plant as a liquid (often 5 percent solids) to be sprinkler-applied to land or as a cake that can be spread like manure. Grasses generally respond well to this source of nutrient, and are quite tolerant of heavy metals.

Rates of application of sludge that supply adequate amounts of nitrogen will supply an excess of phosphorus, but insufficient potassium. Repeated applications through the season would be required to grow grass, and an accumulation of dark organic matter on the soil surface would become noticeable.

Dr. Larson sagely concludes that we should learn more of this resource to use it more effectively.

In New Jersey we are applying sludge to grass plots growing on three typical sandy soils in the pine barrens. After two years of multiple applications of liquid secondary-treated sewage sludge, yields of grasses increased with rates applied up to 20 tons per acre dry matter per year. Wildlife preferentially graze heavily treated plots, up to 40 tons, and initially-sparse stands of Kentucky bluegrass flourish on what was unproductive sand.

Review and comments by R. W. Duell, Associate Research Specialist, Soils and Crops, Cook College

(NEMATODES from Page 1)

The most common symptom of nematode injury observed by individuals working in turf is the lack of plant vigor and a gradual thinning of the stand. By this time, extensive root injury has already occurred.

The more astute turf specialist will observe that affected turf lacks drought-hardiness and the turf becomes more susceptible to the other stress factors before any yellowing of the blades occurs. He will also note that disease control programs are frequently somewhat less effective in these areas, particularly with Dollar Spot.

Mild Winters Favor Nematodes

In most instances, the degree of nematode injury is related to the amount of nematode feeding on the roots. Consequently, factors which increase or decrease the nematode population levels affect the amount of injury incurred. One of the most prominent factors in New Jersey is the relative mildness of the past winters.

When several mild winters occur in a row, nematode injury is observed in almost all turf throughout the state. However, when several consecutive severe winters occur, nematode injury appears to be more restricted in its distribution.

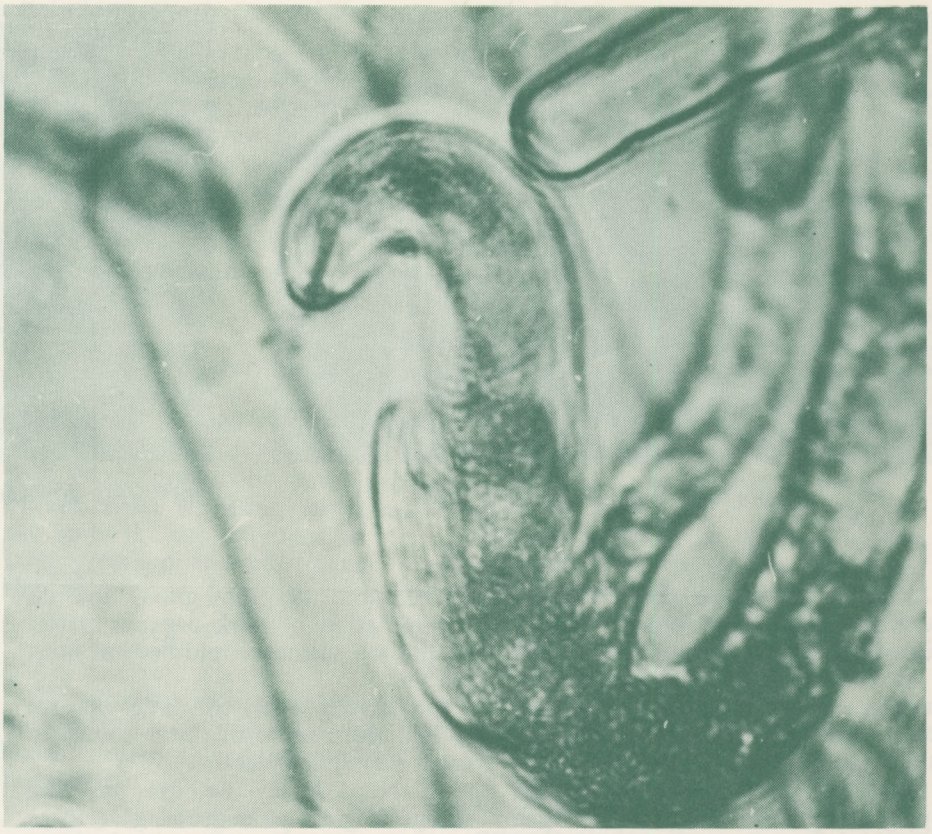
Nematode injury should be suspected whenever turf does not respond to good cultural practices and where the obvious cause is not evident. Although precise diagnosis of nematode feeding injury cannot be determined in the field, a soil sample can be processed to confirm whether nematodes are involved in the affected area.

Turf managers frequently ask how the nematodes were introduced in the first place. From a survey of uncultivated woodland areas in New Jersey, conducted in 1961-63, we know that most of the serious plant parasitic nematodes attacking turf occur naturally in our soils. Consequently, the initial source of the problem was present when a course was constructed.

Another source of infestation is with introduced soil. We examined six loads of topsoil for nematode levels this fall and found that five of the six had nematode population levels higher than the level needed to cause economic damage to turf.

Chemical Control Winning

At present, the only control possible is through the use of chemical treatments to the soil. Both homeowners and commercial turf managers have successfully used DBCP and Sarolex for control for a number of years. DBCP has the disadvantage of being somewhat phytotoxic to bentgrasses and, in some instances, to bluegrasses. Sarolex has produced some temporary yellowing and stunting to bentgrasses.



Grass takes a beating when nematodes like this one feed on root hairs. Most nematodes are just about too tiny for the naked eye to see.

Dasanit, a new contact-systemic type nematicide, can be used by commercial turf producers, but because of its high mammalian toxicity, it cannot be used by homeowners. We have not observed any phytotoxicity to bentgrass or any other grasses tested.

Turf response to treatment has been rapid and quite dramatic. Turf managers have observed an increase in clippings within a couple of weeks and an increase in the depth of rooting within four or five weeks of application. Dasanit has the added advantage of not being as temperature-dependent as is DBCP and it can be applied earlier and later in the growing season.

Just recently Nemacur has been cleared for use by commercial turf producers. We have tested this material, together with most of the new contact-systemic type nematicides for several years and feel it performs comparable to Dasanit.

Several long-range experiments have been initiated in the Central and South Jersey golf courses and turf plots. One of the nematicide tests conducted this fall will, hopefully, summarize everything presented in this article. Two greens at a local course were not responding to good cultural practices. The soil was analyzed for nematode level in October and 625 Ring and 450 Lance nematodes to 250 milliliters of soil were found. Since the Economic Threshold Level of the combined population of these two nematodes is 50 nematodes/250 ml. of soil, it was obvious that nematodes were responsible for the problem. Nemacur 15G (3 lb/100 square feet) was applied on Nov. 27 and the soil re-examined on Dec. 18. On the latter date, the population level was 20 Ring and 10 Stunt nematodes/250 ml. of soil.

See Agent for Test

No growth response from this nematicide treatment has been recorded as yet. The value will be readily obvious, however, late next spring when stress conditions develop. The same favorable growth response would occur from treatment with any of the effective turf nematicides.

As time goes on, a number of other excellent nematicides will receive label clearance for use on turf. Those suitable for use in New Jersey will be brought to your attention for your consideration.

Before you attempt nematode control, contact your County Agent. He can arrange to have your soil tested for nematodes, and provide you with additional details necessary for the safe and successful use of control materials.

(GRUBS from Page 1)

By 1972 there had been several reports of Japanese beetle tolerance to cyclodienes and a search for alternative insecticides was initiated. In New Jersey our first indications of grub tolerance to cyclodiene insecticides was received from home gardeners who reported poor control with chlordane.

Proper Timing Vital

In 1973 three golf courses reported grub control failures, using either heptachlor or dieldrin. Trials conducted in late September provided information on insecticides to be used in 1974 when applications could be properly timed. In April of 1974, mini plots (100 square feet) were established to check the efficacy of selected insecticides on late stage grubs: diazinon AG500, Furadan 4 flowable, and Dyfonate 4 EC. Both Furadan and Dyfonate gave excellent control in our trials in 1973. However, none of the insecticides was effective in controlling late-stage grubs and emphasized the need for proper timing of application.

Treatments should be applied when the bulk of the grub population is in the second stage of development.

Complete Control

Periodic inspections of grub populations were made during the summer of 1974. An area was selected which had a uniform population. Plots were established and treated on Aug. 28. Each plot was 500 feet square, and there were three replications of treatments. The test area was irrigated following insecticide application, and Mother Nature supplied additional help in the form of a shower during the night.

Counts were made on Sept. 10. Three 1 square foot samples were taken in each treated plot, and as there were three replications, a total of 9 square feet is represented in the TOTAL COUNT column in the table.

Results of 1975 Japanese Beetle Grub Control Trials

PLOT	INSECTICIDE	FORMULATION	RATE/500 Sq. Ft.	TOTAL COUNT
1	Dyfonate	4 EC	1½ fl. oz.	16
2	Dyfonate	4 EC	1 fl. oz.	10
3	Furadan	4 lb/gal	2 fl. oz.	2
4	Diazinon	AG 500	4 fl. oz.	4
5	Dasanit	15% Granular	1½ lbs.	0
6	Dursban	2 E	2 fl. oz.	2
7	Mocap	10% Granular	0.5 lb.	4
8	Dasanit	15% Granular	0.75 lb.	20
9	Check	–	–	93

Treatment Date: Aug. 28, 1974
Data Date: Sept. 10, 1974

The results indicate that Dasanit 15 percent granular at 1½ pounds per 500 square feet provided complete control. Furadan, Dursban, Mocap, and diazinon at the 2X rate also provided excellent control. All of the insecticides performed quite satisfactorily considering the pressure of existing grub populations as indicated in the check or untreated plots.

At present both diazinon and Dursban are labeled for white grub control on turfgrass. Dasanit granules are labeled for nematode control on commercial turfgrass.

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