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green world

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Let Science Guide Us

We live in a world of great dependency on the sciences of biology, chemistry, and physics. Yet students in school often evade science courses for an easier academic life and our society often refuses the intellectual enlightenment of science. Many give more attention to obsessive mysterious cult worship and astrology than to science. A recent study at the University of Pennsylvania indicated: (1) increased viewing of television's dramatic programs creates a negative feeling about scientists, (2) greater TV viewing increases willingness to put restrictions on science, and (3) scientists are "killed" on prime time TV more than any other group.

While science remains a respected profession, we might assume some of the opinions reflected above are true. The person who is a professional scientist or gets involved in science is forced to respect a different mental discipline than most. The very nature of a scientist's work requires frequent challenge of new or so-called facts. A scientist who is loose or flip with accurately reporting the truth is unlikely to be a good scientist. Also, those who do applied work in the biological sciences must strive to maintain integrity in their work. Finally, good scientists are usually humble.

Without reflecting further on the nature of a scientist, how do we attain better science in our complex society? Our world needs the highest quality science. How can this goal be reached? An understanding of science and its uses is a first, useful step.

Steps to Good Science

Some of the modern day problems with science start with mistakenly calling things science or scientific proof where neither can exist. The magnitude or misdirection of this failure is serious, but the cure is better science. Are we striving intensely enough for the best science in our working world? When an answer is needed, the solution should be pursued with the best effort. There is no place for superficial research. Reducing scientific mistakes would enhance many difficult situations in our lives, our government, our turf, our landscape, and our agriculture. In this era, better science in our research, decisions, teaching, and technical utterances will give better health, save money, and enrich our lives. With poor science, problems will be solved slowly or remain unsolved and we may be led into more blind alleys.

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Do You Remember?

Perhaps you do not remember the story of these pictures or you may be new to New Jersey turf, but the tale relates to this state's wet seasons. New Jersey's great acreage of wetlands has expanded in the 1987 season. Parks, golf courses, and some other types of turf areas are often built in very wet areas for various reasons. Some of the resulting drainage problems are unique and difficult.

Figures 1 and 2 The first picture is from **Green World** of 1976 and was taken at the Picatinny Arsenal' Club. The top is essentially the basement sump pump setup. The installation below was operated by suction from water running through a pipeline.

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OPINIONS AND COMMENTS

Timeliness

When working with turf, as with most other biological things, timeliness is a key factor. Learning this lesson from experience is one reason "we should get better with age." Last year, I urged timely fertilization for quick recovery of summer devastated Kentucky bluegrass turf. Some fertilizer in the September - early October period, along with the cooler temperatures, rain, and possibly less severe mowing, will heal quickly all but large voids. In this issue, I will comment on the timeliness of seeding new turf and overseeding of old turf.

Time of Seeding a New Turf

Seeding in late August until September 1 is the time for establishing cool season grasses in our climate. This gives the maximum chance of favorable weather for establishment and maturity before the devastation of summer strikes. Seeding later or in other seasons can succeed, but it is a poor second choice. With Kentucky bluegrass and its slow starting, I have known sod growers to cancel intended seeding rather than face the increased chance of an inadequate growth from late seeding. Extra care, protection, and costs are required for untimely seeding. Spring seeding has a high percentage of failure. At this season, the turf-type ryegrasses give one of the best chances for useful results.

Timeliness of Overseeding Turf

The results of overseeding are often a disappointment. Yet it is important to heal the larger voids in turf as soon as possible. Late September is the best possible overseeding season in the New Jersey-type climate. Seeding at other seasons is less efficient or poor, yet any success it gives in closing voids promptly is useful. A slicing machine or other tool that gives seed contact with soil is important. In spite of low efficiency of overseeding, it is often the only recourse for introducing a desirable new grass. When turf is thin, timely fertilization will often eliminate the need for overseeding.

❒ REE

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Pocono Turf Supply
QQ's "The Trailer Place"
Rapp Sod Farm
Reed's Sod Farm
Reid Sod Farm
Rockland Chemical Co.
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The past always looks better than it was.

OPINIONS AND COMMENTS

The Role of Turf-type Ryegrasses in Lawns

Most everyone in turf has observed the turf-type ryegrasses for a few to more than a dozen years. Many are using this grass regularly or exclusively, while others do not use it. These ryegrasses are a valuable component in the Kentucky bluegrass type of sunny lawn. When ryegrasses are used in a seed mixture, any appreciable excess above twenty pounds per acre has a very destructive effect on seedlings of Kentucky bluegrass and fine fescue. This plus its habit of surviving as scattered plants in shade makes it objectionable for this turf purpose. I am not sure how or when turf-type ryegrasses only should be used for lawn turf. They can be the "work horse" of many 3/4 to 1 1/2 inch lawns. If a Kentucky bluegrass component is not present, overseeding of the turf ryegrasses may be needed at one to three year intervals to help maintain a uniform cover. The number of lawns with all ryegrass will increase.

Time will tell us more on the appropriateness of this monoculture.

❒ REE

—ABSTRACT—

New Seedings and Lime Procedures

by D.W. Koch and G.O. Estes
Agronomy Journal **78** :567-571, 1986

The purpose of the study was to compare the response of plants to lime with and without soil incorporation. A study was conducted on a fine, sandy loam in New Hampshire with an initial pH of 5.6. Mixtures of timothy Phleum pratense L., orchardgrass Dactylis glomerata L., alfalfa Medicago sativa L., and birdsfoot trefoil Lotus corniculatus L. were seeded with unincorporated surface lime and conventional incorporation by disking. Rates of dolomitic lime application were 4.5 and 9.0 Mg ha^{-1}, and were made in August, 1976. P and K were applied to all plots in April, 1977. The incorporated plots were disked again before seeding in May, 1977. With no tillage, paraquat was used the day before seeding. Surface liming without tillage gave less vigorous seedlings and slower establishment. There was no difference in seedling density with liming or seeding method. Yields of plant material in the seeding year were greater with incorporation of lime than with no incorporation. With a 4.5 Mg ha^{-1} lime rate, yields over six years were not different for liming method. The rate of 9.0 Mg ha^{-1} of incorporated lime gave a six year yield advantage. During this time interval, the high rate gave increased pH to a depth of only 10 cm (4 inches). Alfalfa-orchardgrass was more responsive to lime than birdsfoot trefoil-timothy.

[Editorial Comment — *The incorporation (disking) of lime after application showed significant benefit only on plots with the higher rates. This supports the contention that larger applications of lime can increase the rate of downward movement. The study shows that lime on the surface is less than ideal and a shortcoming of variable nature. Lime in a test of this type in a more severe summer climate would likely have reduced droughtiness. The test results emphasize the importance of applying enough lime to correct the need, and also it supports waiting enough time for responses to occur for determining the total benefit. The studies of Sprague, et al., (1938-41), and Engel (1951) showed the slowness of lime penetration. The former study also reported the more active form of lime (hydrated) gave no significant increase in penetration rate.*

❒ REE

Turf Seed Treatment

Seed treatment with an appropriate fungicide can protect turf seed during germination and first stages of seedling growth. This can be especially valuable in warm, wet weather or with bentgrass germination. Dr. Bruce Clarke has done some research on this and will have a comprehensive article on turf seed treatment in a future issue. ❐ REE

Just be glad you are not getting all the government you are paying for.

--- Will Rodgers

A great man is one who can have great power and not abuse it.

--- Henry L. Doherty

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Another major step to good science is dedication to learning the truth. Yet the fallibility of people is such that we placidly accept things that do not seem right, lack evidence, or contain biases. Complete objectivity is not always easy to achieve. During my research years, I tried to question myself and review the evidence of new or disturbing findings. It took time but I tried to sort out and evaluate all sincere criticisms of my research. The quest for scientific knowledge needs the challenge of the new coupled with avoidance of mistakes and untruths.

Do we discipline ourselves into good scientific procedure? Do we use statistics? When number ratings are given to comparative biological research responses, do significant differences occur? The big question becomes: "How real are these differing results?" Sometimes, variability is so great that differences are meaningless. Statistics are valuable and are commonly used as a test of confidence on data of scientific study. They are unnecessary occasionally for some research tests when differences are consistently large. While statistics are essential tools, they do not give absolute proof. Unfortunately, useful statistics are omitted in many studies where they could give us confidence levels for research data. Some reasons for this omission are: (1) a lack of appreciation, (2) insufficient time allowed for statistical techniques, and (3) failure, for whatever reason, to reveal evidence showing the meaningfulness of differences. Look for statistical tests of confidence on research data as part of the process of accepting conclusions as real.

Another failure of research is drawing conclusions based on chance association rather than on hard, scientific logic. Some years ago, an avian study with confined feeding that included high rates of DDT resulted in thin egg shells and a poor hatch of eggs. This has led to many and continuing interpretations about birds being endangered by thin egg shells caused by DDT. These statements appear to have generated from one study that was reported. The test was based on artificially high dosages of DDT given to mother birds that ate little else. With low food intake, low calcium follows and thin egg shells would be expected. Those responsible for this "thin egg shell" project had an obligation to clarify this issue before or after publication as a warning against overtheorizing on this point. Yet we have heard this "thin egg shell" story as gospel repeatedly and we shall hear it many

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more times.

In addition, another loose scientific step is the quick, emotional banning of the valuable hydrocarbon insecticides of some years ago. An ironic aspect of this situation was the finding of vast quantities of hydrocarbons in the earth's water and soil that were not cross-checked with treated and untreated soil or the actual tonnage of manufactured chlorinated hydrocarbons. This omission seems all the more inconceivable with consideration of such findings as the work of Frazier, et al., of the Department of Soil Science, University of Wisconsin, as was reported in the September, 1970 issue of **Pesticide Monitoring**, Vol. 4. Thirty-two of thirty-four samples of soil taken in 1909-1911 and sealed tightly in glass jars (25 years before the manufacture of chlorinated hydrocarbon insecticides) gave the hydrocarbon reaction. Does nature make its own hydrocarbons or is the chemical identification test faulty? How long can or should this country indulge in making decisions on the use or banning of chemicals without the facts when vital information is obviously missing?

Chemicals and the Future

Will we lose additional chemicals of great importance to kneejerk emotion, a lack of good scientific study, biases, or inability to recognize the truths of science? Pseudo-scientific procedure and cult thinking can push our society into a tangle of confusion, cause us to follow a lot of third- and fourth-rate techniques and follow more procedures that are wasteful or worthless.

Along with misreading results of research, it is easy to anticipate too much from tests. Useful answers often do not develop or are sufficiently obscure that there is a tendency to grope for conclusions where little or no information exists. It is important to avoid building more answers than were proven by the research.

The impact and folly of this pitfall is seen in various ways. For example, a turf group was ill-advised to use a preemerge for annual bluegrass control on the greens of several of their golf courses. This was done in spite of research that showed a lack of evidence for success. After five or six years of treatments, the program was abandoned as ineffective. This might be dismissed as bad luck or simply poor science, but one person of the turf groups salvaged a science lesson by saying, "Now we know why scientists insist on thorough evidence before general use of the new."

In a more positive vein, a lot of money is spent on research in the USA and good results have been put to use in many fields of endeavor. It will help if those not in research would understand the needs and support the research scientist in his follow-through efforts on important work. Success in research does not come easily. It involves hard work, perseverance and ingenuity. The acclaimed scientist will usually say that a little luck in selecting the research leads is important.

Science deserves respect, needs good thought before starting, patient study of results that develop and an open mind. Equally important is support of modest or large amounts of money to accomplish the work. Chemistry will contribute greatly to better turf and society. Hopefully, scientific study will be the best and science can fulfill its important role. Anything less is bad business.

❒ REE

Do You Remember?

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Picatinny Arsenal Club installed sump pumps, as seen in Figures 1 and 2, which were used to maintain a lower water table in boggy fairways. Seabright used pumps to speed relief of wet and slight depressions that were slow in drying. Portable pumps will work, but this is often inefficient with New Jersey's frequent rains.

Free water at the surface does more than interfere with turf use. We know it interferes with maintenance, and also can kill grasses with scald or the anaerobic condition of stagnant water. Excessive wetness ruins good soil structure that is needed for the best grass.

My purpose in showing the pictures is to encourage whichever type of device is needed to avoid excess water. It is possible that basic drainage will be adequate. If it is not, a good sump starts without waiting for management, daylight, or a work day. Although there may not be a storm drain or other disposal area within reach, this need not be an insoluable problem for ponds

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that develop occasionally in wet weather periods. Spreading the pumped water on high grounds, such as a rough, will usually suffice in these cases.

I am not proposing pumps as a substitute for good basic soil drainage. But adequate removal of excess water is better than suffering the wetness or being forced to reseed. Just as it was true years ago, sump pumps or portable pumps still may be the immediate and best answer on many occasions to the problems of excess water in the wet New Jersey climate.

The Golf Course Superintendent's Life

"I have so many troubles that if anything happens to me today it will be at least three weeks before I can worry about it.."

William Smart,
Hudson Valley Foreground

Worth Repeating

The Lord's Prayer contains 56 words... Lincoln's Gettysburg Address contains 266 words... The Declaration of Independence contains 3,000 words... but a Government regulation on the sale of cabbages contains 26,911 words.
[from "This Week" in **Farm Bureau**]

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Comments on Chemicals

Are agricultural contaminants in groundwater and drinking water threatening human health? The only adverse effects of an agriculture-related chemical substance in groundwater that have been verified are from nitrate. This is derived from nitrogen fertilizers, human and animal wastes, and other organic residues. The hazard of excess nitrate in drinking water for infants is well known, but problems are rare. In rural areas where water from shallow wells may contain excess nitrate, parents are advised to supply infants with bottled water for the first year.

Pesticides, which have been highly publicized, have not been implicated in adverse health effects. If detected, pesticides generally are present at concentrations less that 1 part per billion (ppb). Concentrations up to 20 or 50 ppb or higher are found only occasionally. The dosage of a chemical ingested is critical in determining its effect; the effect increases with the dosage. Possible adverse health effects of chemicals in parts-per-billion or parts-per-trillion concentrations, measurable by modern analytical techniques, currently are of concern. The biological effects of most chemicals cannot be measured at such concentrations.

The toxic effects of chemicals are understood to be absent below a threshold of no-effect dose dependent on the potency of the chemicals; however, whether this is true for chemical carcinogens is controversial. For such chemicals, mathematical extrapolations of uncertain validity are used to estimate the risk to humans exposed to very small doses from effects of large doses of the chemicals on laboratory animals.
[from Summer 1987, "Council for Agricultural Science and Technology"]