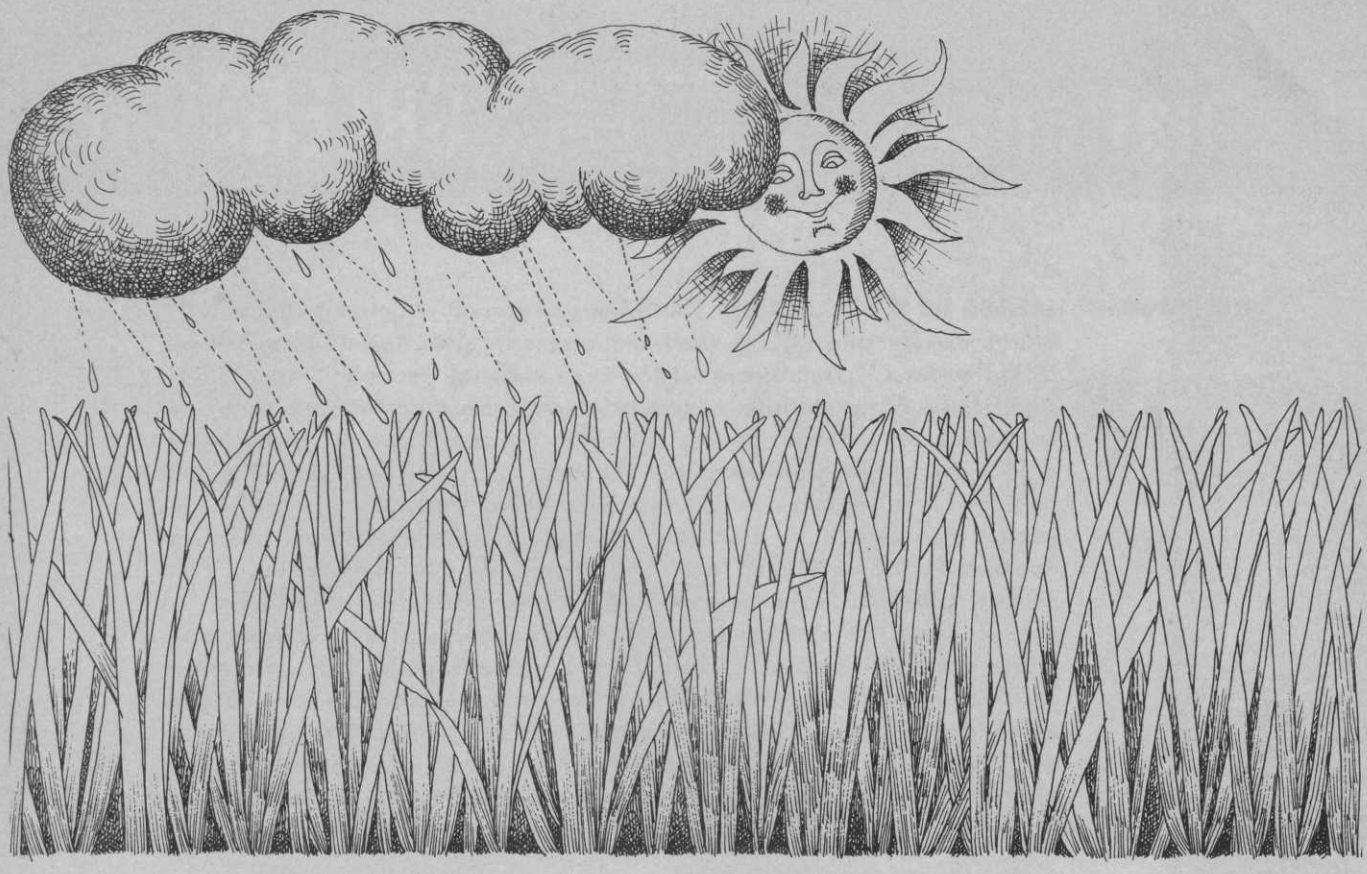


Shell's Akton® Insecticide controls chinch bugs in turf for up to 8 full weeks. Rain or shine.

At 1¼ lbs. per acre, Akton® keeps turf green for up to 10 full weeks. That can mean a full 2 months between applications.

Akton kills both resistant and non-resistant chinch bugs and it also kills sod webworms. Rain won't hinder its performance. And it has no known phytotoxicity among ornamentals or other plants.

Akton is competitively priced with other currently used insecticides. And, because it kills chinch bugs for up to 8 weeks, you can save by scheduling your maintenance on an every-other-month basis.

For up to eight weeks of effective chinch bug control, Shell's Akton does the job. Rain or shine.

For information, write: Shell Chemical Company, Peachtree Center Station, P. O. Box 56144, Atlanta, Georgia 30343.

Shell does a better job.

SHELL

the national GREENSCAPE

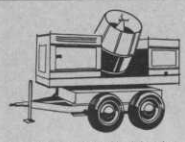
NO IMMINENT HAZARD TO PUBLIC HEALTH! That's the decision on remaining uses of DDT, aldrin, dieldrin and 2,4,5-T. The announcement came Mar. 18 from William D. Ruckelshaus, administrator of the Environmental Protection Agency. The significance of the decision, prompted through court action initiated by the Environmental Defense Fund, is two-fold: The products will not be immediately suspended from interstate shipment and use; and, secondly, that benefit-risk values can now be considered before determining whether registered uses should be cancelled. Notices of cancellation had been announced for all remaining uses of the products, but manufacturers filed protests within 30 days, as permitted by law. This action necessitated the conduct of an "administrative review," either by a scientific advisory committee or public hearings, or both. Such a review is under way on the four products. The review opens the way for a more reasonable decision, because as a part of the EDF vs. Ruckelshaus decision the court recognized that the "cancellation decision does not turn on a scientific assessment of hazard alone. The statue leaves room to balance the benefits of a pesticide against its risks."

FERTILIZER PRICING should remain extremely competitive through 1971. The reason is that it still will take several years for demand to catch up with production capabilities, according to a Chase Manhattan Bank chemicals technical director. There still is over-capacity in manufacturing facilities, says Richard E. Anderson, but he forecasts a limited improvement in profit and pricing in 1971. The over-capacity developed, he said, primarily because companies outside the chemical industry got in the business hoping for higher returns. Now that investments in chemicals are less attractive, he concluded, there should be a showdown in capacity buildup.

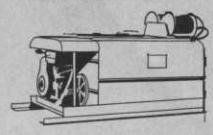
ENTOMOLOGICAL SOCIETY OF AMERICA has announced the establishment of the American Registry of Certified Entomologists. The Registry, the result of a 10-year study, will identify specialists with the training and technical ability to advise the public on matters pertaining to man and his environment, according to Robert H. Nelson, Society president. Initially, 15 classifications are available. They include: Agricultural entomology, physiology, toxicology, medical and veterinary entomology, regulatory entomology, pest management, pesticide research, and urban entomology.

WHITE-FRINGED BEETLE QUARANTINE has been extended to all or parts of 30 previously unregulated counties and two cities in seven states, reports USDA. These areas are: Counties—Clay, Lawrence and Union in Arkansas; Hamilton in Florida; Appling, Carroll, Chatham, Columbia, Douglas, Haralson, Jenkins, Madison, Mitchell, Rockdale and Whitfield in Georgia; Caddo, Grant, Iberville and West Feliciana parishes in Louisiana; Rowan and Pitt in North Carolina; Decatur, Giles, Hamilton, Lewis, Maury, Rhea, Roane, Rutherford

This Rotomist® sprayer has the greatest "rate-of-work" capacity ever developed for shade tree work. It is a design that provides a *controlled air pattern*, all the way to the top of the tallest trees. This means adequate coverage, as well as more efficient use of your chemicals. It means versatility, because the Rotomist pivots 110° vertically, rotates through 360° horizontally. Which means you can put your spray material—either dilute or concentrate—anywhere you want it. Up in trees. Over an embankment. Down, to windrow leaves. And, of course, John Bean makes many Rotomist models to match your requirements. They all mean business.

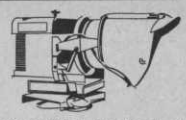


ROTOMIST available in a wide range of capacities.



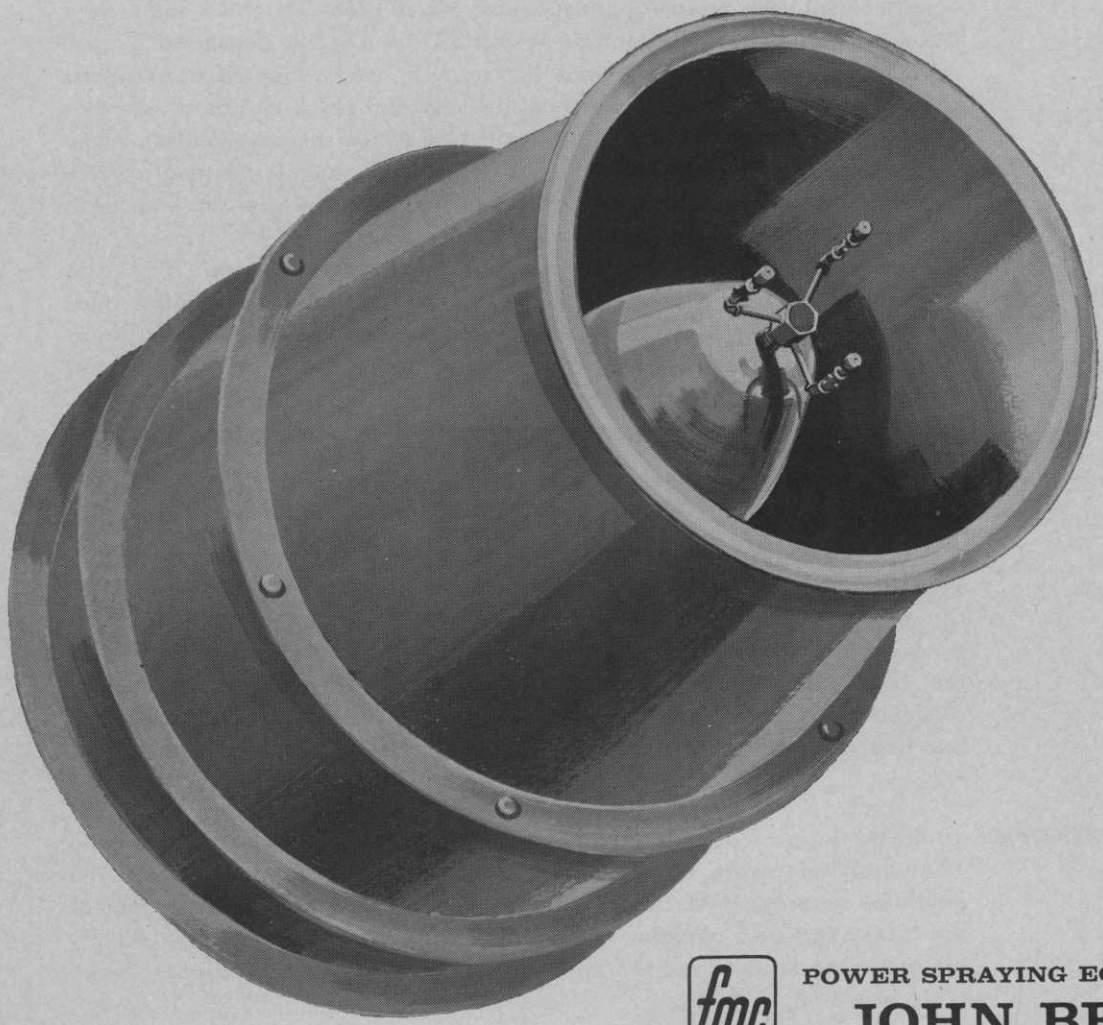
ROYALIER SKIDMOUNTED delivers 20 gpm at 400 psi

MODEL 1010 TURFKEEPER has flotation tires for golf course use.



ROTOCAST broadcast air sprayer effectively handles all weed-killing programs.

Spray control is straight-through air



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POWER SPRAYING EQUIPMENT

JOHN BEAN

DIVISION

Lansing, Mich. – Orlando, Fla. – San Jose, Calif.

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and Wayne in Tennessee; Cities—Arlington and Falls Church in Virginia. White-fringed beetle quarantine restrictions are now in effect in all or parts of Alabama, Arkansas, Florida, Georgia, Louisiana. Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

USDA IS COMPUTERIZING its plant pest interception records. The first computerized version of its annual List of Intercepted Plant Pests (ARS 82-6-4) is now available. This 56th annual report lists pests of known or potential importance to agriculture that are not known to occur or are not widely distributed in this country. It covers July 1, 1968, to June 30, 1969. Some 11,658 significant interceptions at U. S. ports of entry of insects, mites, mollusks, diseases and nematodes are tabulated by country of origin.

AN ADDITIVE FOUND TO ENHANCE THE EFFICIENCY OF HERBICIDES may lead to effective weed control with fewer applications at lower herbicide rates, believes a USDA scientist. Phenylcarbamate herbicides are readily degraded by soil micro-organisms, said Dr. Donald D. Kaufman, and repeated applications often are needed to control weeds effectively. But research has shown that certain methylcarbamate chemicals (some of which are insecticides), when applied along with certain herbicides, temporarily inhibit the degradative action of the soil micro-organisms. Dr. Kaufman said he and Dr. Charles S. Helling found that p-chlorophenyl methylcarbamate (PCMC) strongly inhibited the biodegradation of propham and chlorpropham. They also learned that to obtain the least herbicide degradation, the inhibitor must remain close to the herbicide. If the technique is to be effective, Dr. Kaufman said, care must be taken to match the mobilities of the inhibitor and of the herbicide.

A SPECIAL ORNAMENTAL HORTICULTURE TECHNOLOGY CURRICULUM with guidelines for suggested two-year courses has been published by the Department of Health, Education and Welfare. The curriculum was developed to aid in planning and developing two-year post high school programs, or in evaluating existing ones. Areas covered are landscape, nursery, floriculture, turfgrass and arboriculture; and includes suggested course outlines, lists of text books, and related subjects. One chapter of the book is devoted exclusively to facilities and equipment and cost with each broken down for the five horticulture curriculums.

GRASSHOPPERS could be more of a problem on western and midwestern rangelands in 1971 than they were last year, warns USDA. A fall survey indicated the potential severity; a spring check will give a more accurate estimate of the infestation and pinpoint areas likely to require control efforts. Ranchers are being encouraged to treat infested areas before grasshoppers leave their breeding grounds.

A Princep foundation gets most weeds before they become weeds.

It's a more attractive way to keep bare ground bare. Using Princep® herbicide to kill weeds before they come up. That way you don't have a lot of ugly dead weeds hanging around as you do with contact weed killers.

Not that Princep eliminates the use of contacts entirely. You may need them to get the few weeds Princep misses. But starting with Princep as the foundation for your herbicide program you can solve the bulk of your weed problems. More economically and safely than anything else.

In fact, just about the only thing in any danger from Princep are weeds. It's safe to use. There's minimal leaching and no contact action, so it's safe to nearby crops and ornamentals.

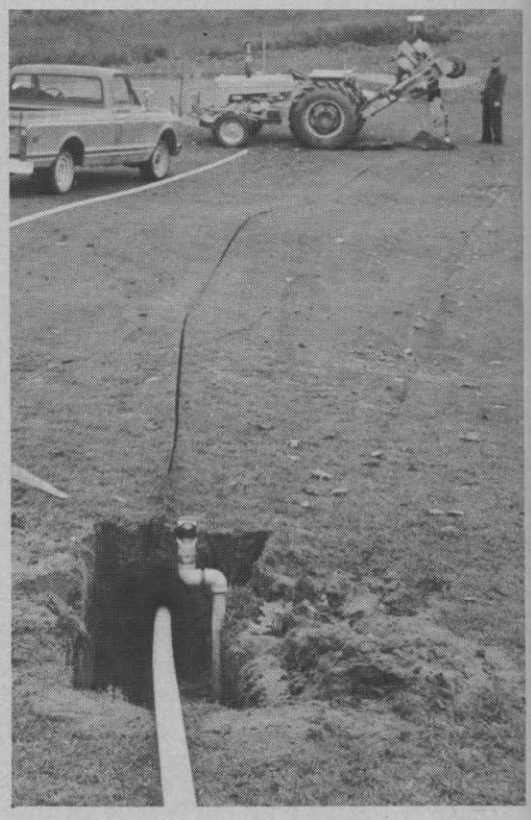
So if your object is bare ground weed control, use the safe heribicide. And the best foundation herbicide. Princep.

For information about Princep, brand of simazine, and other Geigy herbicides, AAtrex®, Pramitol®, and Atratol®, write to Geigy Agricultural Chemicals, Division of CIBA-GEIGY Corporation, Ardsley, New York 10502.

Princep by Geigy

Jack Soderstrom Tells How to Install

IRRIGATION BY SABER SLICE



WHEN IT COMES to installing sprinkler systems in existing golf courses, Jack Soderstrom has a better idea. Soderstrom, of Sparta, Mich., has been an underground contractor for the past 20 years, but, since 1965, he has specialized in irrigating golf courses. His better idea consists of plowing in the plastic pipe which carries the water.

To do this, Soderstrom uses a machine called a Saber Plow, a tractor-type machine equipped with a vibratory blade in the rear that can bury cable, wire, tubing and pipe down to depths of 3½ feet. Manufactured by Parsons Division of Koehring, Newton, Ia., the Saber Plow provides a major benefit of requiring no restoration.

Thus on existing golf courses, Soderstrom estimates the course savings in restoration at close to 80% because no restoration of turf is required. Naturally this gives him a keen competitive edge over other methods of installation.

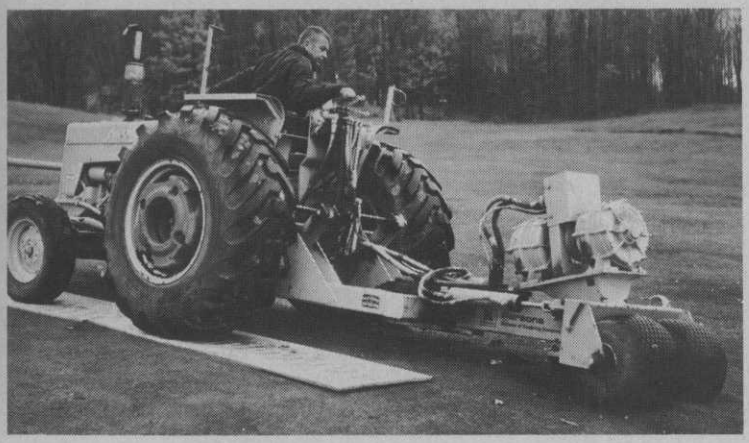
An example of this is a system he recently installed for the Newberry Country Club on its nine-hole course in Newberry, Mich.

Built in 1928, the course had an old, inadequate system that provided water only for the tees and greens — fairways were watered at the whim of Mother Nature. Soderstrom's bid was only slightly higher than the competitive bid based on trenching in the pipe. The considerable restoration of grass required would then have had to be completed by the Club's grounds crew.

To put in the new system, designed by Soderstrom and Spartan distributors of Spartan, Mich., Soderstrom used 4, 3, 2½, 2 and 1½ inch pvc pipe (polyvinylchloride) of 160 P.S.I., and 6- and 8-inch cement-asbestos pipe. Celanese Corp. manufactured the pvc pipe while Flintite Corp. produced the asbestos variety. All the pipe 3 inches in diameter and smaller, the majority of the system, was plowed in with the DP-30 Saber Plow. For the remaining large diameter pipe, Soderstrom used a Parsons 150 trencher and backfilled with a Case dozer. In all, a total of 16,000 feet of pipe was installed.

Although the Newberry course will be a manual system, automatic systems also make up a good share of Soderstrom's work. These consist of individually controlled sprinkler heads, automatically and individually activated with clocks, which spray water for a period of time preset according to soil conditions. On nine-hole automatic courses, an additional 60,000 to 64,000 feet of control tubing and wires are plowed in. To better handle these controls, Soderstrom added a special handling rack to the front of the DP-30.

All elements of installing an irrigation system with a Saber Plow are shown in this series of pictures. Beginning at the left is the tractor-pulled plow slicing around a green. Plastic pipe is attached to the bottom of the plow by chain and is pulled into place as the tractor moves forward. Holes are needed only for initial entry and for connecting sprinklers. The slice knits quickly. Flotation-type tires help close the slit. When it is necessary to drive on the green, sheets of plywood are used to prevent tire indentations. Installation of joints where sections of pipe meet at a 90-degree angle is a simple operation requiring a matter of minutes to complete. A special carrying attachment handles miles of control cable needed to complete the automatic system.



Because of these controls, the cost of an automatic system is about twice that of a manual system. Average costs, according to Soderstrom, including installation and complete parts, are about $25,000 for a nine-hole manual course, $45,000 to $50,000 for a nine-hole automatic or an 18-hole manual, and $80,000 to $90,000 for an 18-hole automatic.

On Newberry's new manual course, to water fairways the grounds keeper waters the desired area by means of a key that he fits into a quick coupling valve. The Toro sprinkler head is at the top of the key. When the area is sufficiently watered, the key is removed and taken to the next coupling valve. System capacity is 500 gallons per minute and, since one sprinkler requires 50 gallons per minute, 10 sprinklers can be activated at once.

On greens and tees there are permanent in-ground sprinklers, three or four to a green, two or three on a tee, depending on the size of the green or tee, which all pop up when the water is turned on via a nearby valve. Greens sprinklers each shower 15 gallons of water per minute.

On the fairways, the distance between sprinklers was 90 feet (as specified by the course architect) and Soderstrom plowed in 180 feet of pipe at a time, enough to include three sprinkler heads. The Saber Plow pulled the fairway pipe in with a 24-inch blade.

An 18-inch blade was used on the greens. After the line was plowed around the green, the pipe was simply pushed in by hand — a faster process since the time required was a matter of two-three minutes.

Soderstrom described the DP-30 Saber Plow as, "Nothin' but good. To my knowledge, we are the only contractor in this area using a plow in this type of application. Because the golf courses save on restoration, we are considerably cheaper. On this course, conditions are excellent. The soil is pure sand and we have been able to do all the plowing in second gear."

Soderstrom, who covers the entire state of Michigan, spent about three weeks on the Newberry job and normally handles three or four golf course jobs per year, about half being automatic systems. He spends about eight months of the year on jobs and the remaining four months overhauling equipment, and handling sales contact and planning work for the next year.

With improved grass and ground conditions next year at Newberry, golfers will have one less excuse for not breaking par during their own watering stop at the 19th hole.

HOW TO EVALUATE A FERTILIZER BID

By RON SMITH, horticulturist
Bowling Green State University
Bowling Green, Ohio

ONE OF THE MAJOR problems encountered by individuals in the turf industry, has been how to properly and fairly evaluate the comparative costs of various types of fertilizers. This is further complicated in that various manufacturers produce such a variety of different analyses and types.

First, let's be realistic and admit that it would be virtually impossible to compare and evaluate all types. Also, in most cases, the superintendent is not interested in a wide range of types. His mind is pretty well made up in advance as to just what he wants. He should have basic parameters established on what would constitute an acceptable fertilizer. Specifications should be listed that are restrictive enough to give him what he wants, and yet broad enough to provide several manufacturers the opportunity to submit competitive bids.

An example this could include some of the following:

1. A homogeneous granular or pellet.
2. NPK ratio within 15% of 3-1-2.
3. Not less than 30% of organic nitrogen and activity index.
4. List of desirable trace elements.
5. Range of screen or sieve sizes.

Of course many more could be added to this list, or changed to fit the individual's needs.

Once this has been completed, we are ready to begin our evaluation of comparable products.

In the example listed above, we used a 3-1-2 ratio of NPK as our desired analysis. Therefore, the fertilizer contains six total units of NPK. Of this, nitrogen constitutes ½ of the total units, so it should amount to about ½ of the bid price. The cost per pound of actual nitrogen can then be computed, based on the percent of N in the formulation and ½ of the bid price.

In general, we can assume that nitrogen costs three times as much as potash and phosphate costs twice as much as potash. This then, gives us the following formulas for computing the relative cost of our three major ingredients:

$$\text{cost/lb. of actual N} = \frac{\text{½-Ton bid price}}{(2{,}000)\ (\%\ \text{of N})}$$

$$\text{cost/lb. of actual } K_2O = \frac{\text{cost/lb. of N}}{3}$$

$$\text{cost/lb. of actual } P_2O_5 = (2)\ (\text{cost/lb. of } K_2O)$$

Now that we have these basic costs, we can expand them into a more realistic cost of the total fertilizer, based upon the percent of content of each of them.

A = % of N in formulation
B = % of P in formulation
C = % of K in formulation
N = Cost/lb. of actual N
P = Cost/lb. of actual P_2O_5
K = Cost/lb. of actual K_2O

Using the above figures, we can now reach a relative cost value for 100 pounds of fertilizer with the following formula:

$$(A)\ (N) + (B)\ (P) + (C)\ (K) = \text{Formulation value/100 lbs.}$$

The cost can now be calculated, based on the above figure, to put one pound of actual N plus all other ingredients on 1,000 sq. ft. of turf area.

This final figure is the one used for comparison of values, and should never be treated as an absolute. It is a relative figure, as are the figures it will be compared against.

Let's use a hypothetical case and see if the formula works!

The following three bids are received:

1. 15-5-10 @ $100.00 per ton.
2. 18-6-12 @ $120.00 per ton.
3. 13-4-9 @ $105.00 per ton.

First bid: $100.00/ton for 15-5-10.

$$\text{Cost/lb. N} = \frac{50.00}{(2{,}000)\ (.15)} = .17¢/\text{lb.}$$

$$\text{Cost/lb. } K_2O = \frac{.17}{3} = .06¢/\text{lb.}$$

$$\text{Cost/lb. } P_2O_5 = (2)\ (.06) + .12¢/\text{lb.}$$

THEREFORE:

$$(A)\ (N) + (B)\ (P) + (C)\ (K) = \text{Formulation value/100 lbs.}$$

$$(.17)\ (15\%) + (.12)\ (5\%) + (.06)\ (10\%) = \$3.75/100\ \text{lbs. or } 3.8¢/\text{lb.}$$

Fertilizer that contains 15% nitrogen will require 6⅔ lbs. of fertilizer per 1,000 sq. ft. to apply 1 lb. actual N/1,000 sq. ft.

Thus, actual cost becomes 3.8¢ times 6/66 lbs. or 25.3¢ per 1,000 sq. ft. of turf area.

Second bid: $120.00/ton for 18-6-12.

$$\text{Cost/lb. N} = \frac{60.00}{(2{,}000)\ (.18)} = .17¢/\text{lb.}$$

$$\text{Cost/lb. } K_2O = \frac{.17}{3} = .06¢/\text{lb.}$$

$$\text{Cost/lb. } P_2O_5 = (2)\ (.06) = .12¢/\text{lb.}$$

(Continued on page 20)

Scotts presents 4 new ways to feed your sod field.

1. That monster bag with the sling handles. It holds nine acres of Scotts ProTurf fertilizer—which saves you heaps of buying and storing. Very handy. And besides fitting neatly onto the arms of a forklift, it's equipped with a sliding-panel trapdoor . . . but more about that later. First, here's what comes in that monster bag:

2. Scotts ProTurf Starter Fertilizer—if you're just beginning a field of tender seedlings. Available in both the nine-acre monster or standard half-acre bags, it's a lightweight homogeneous product that spreads easily and evenly. And, thanks to Scotts' research-backed balancing of phosphorus/potassium/nitrogen, it feeds your young field a rich, energetic diet. Trionized bonding insures a controlled nutrient diet especially for developing new turf seedlings.

3. Or Scotts ProTurf Sod Field Fertilizer, if your grass is at a later stage. It comes in the big sling bin or the half-acre bags, too. Like ProTurf Starter, it's surface-applied, odorless, and dust-free. Being a Polyform product, it has less bulk and weight — and its controlled release nurtures the seedlings at the time they really need it. As part of Scotts' total ProTurf program, this means you'll have an earlier crop than usual. Not to mention a better product.

4. Now. Back to the sliding trapdoor. Scotts designed it so when the monster bag's hanging there on the forklift, all the forklift operator has to do is lean forward . . . pull the sliding panel . . . and watch while the fertilizer empties out into a Superspreader. Superspreader has a fully extended wingspan of 28 feet and can handle four thousand pounds of fertilizer (about three and a half monster bags) at one clip. There's a new automatic feed shutoff: when you slow down, the feed slows down; when you stop, it stops. That means no more burnt patches or starved spots when you swing around to start a new row. And—a last beautiful touch—the same worm-gear feeder that provides accurate spreading can be cleaned out afterwards. In five minutes.

A really professional lineup, for really professional sod growers. Because Scotts understands sod. They've put a hundred years of grass-growing knowhow behind every one of these new products . . . years of lab research, greenhouse development, and plot testing. That's the best new product recommendation you can get anywhere.

FREE SOIL PROBE. An 8½" long Soil Probe is yours free, just for asking us for more information about Scotts 4 new ways to feed your sod field. Send us the coupon below, and we'll see that you find out all about the monster bag, the 28-foot Superspreader, ProTurf Starter Fertilizer, and ProTurf Sod Field Fertilizer. And we'll throw in the chrome-plated Scotts Soil Probe absolutely free. Or if you're in a big hurry, call Paul Florence—collect—at 513 / 644-2900, in Marysville.

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Scotts ProTurf®

O. M. Scott & Sons, Marysville, Ohio 43040

Send me my FREE Scotts Soil Probe. And give me all the information you have on Scotts 4 new ways to feed my sod field.

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PRINCIPLES OF TURFGRASS CULTURE by John H. Madison, Department of Environmental Horticulture, University of California, Davis. 405 pages plus index; 107 illustrations; 6 x 9; Van Nostrand Reinhold; $19.95. Publication date: March, 1971.

Principles of Turfgrass Culture is a compendium of the vast amount of literature available in the field. After noting the material, the author extracts general principles, then uses them to illustrate their bearing on various management problems and practices. Emphasis is placed on the interactions between different management practices and different environments; the principles are used to show the directions in which one can go and the compromises that are necessary to achieve certain goals.

The author provides complete coverage of the anatomy, morphology, genetics, taxonomy, and physiology of the turfgrasses—physiology and ecology are treated throughout the book as parts of almost every chapter. The author then explains climate, soils, plant nutrition, irrigation, salinity, and drainage.

An unusual feature of Principles of Turfgrass Culture is the inclusion of sections called practicum, or practical review, which make it possible to review quickly important practical applications of the scientific principles and data to field management. A second feature is the nexological approach that considers management practices as an interrelated network of the whole in which each affects the results of all the others — irrigation, mowing, disease control, fertilization, and so forth, are never considered as isolated bits in a program.

The ten chapters of Principles of Turfgrass Culture are as follows: Anatomy and Morphology of the Turfgrass Plant; Taxonomy, Cytology, and Genetics; Turfgrass Physiology; Turfgrass Climate and Microclimate; Soils; A Brief Introduction to Soil Chemistry and Plant Nutrition; Plant Nutrition and Fertilizers; Soil, Plant, and Water Factors in Irrigation; Irrigation Design; Drainage and Salinity. This important reference also contains a Glossary, Author Index, and Subject Index.

THEREFORE:

(.17) (18%) + (.12) (6%) + (.06) (.12% = $4.50/100 lbs. or 4.5¢/lb.

Fertilizer that contains 18% nitrogen will require 5½ lbs. of fertilizer per 1,000 sq. ft. to apply 1 lb. actual N/1,000 sq. ft.

Thus, actual cost becomes 4.5¢ times 5.5 lbs. or 24.75¢ per 1,000 sq. ft. of turf area.

Third bid: $105.00/ton for 13-4-9.

$$\text{Cost/lb. N} = \frac{52.50}{(2{,}000)\ (.13)} = .20¢/\text{lb.}$$

$$\text{Cost/lb. } K_2O = \frac{.20}{3} = .07¢/\text{lb.}$$

$$\text{Cost/lb. } P_2O_5 = (2)\ (.07) = .14¢/\text{lb.}$$

THEREFORE:

(.20) (13%) + (.14) (4%) + (.07) (9%) = $3.79/100 lbs. or 3.8¢/lb.

Fertilizer that contains 13% nitrogen will require 7⅔ lbs. of fertilizer per 1,000 sq. ft. to apply 1 lb. actual N/1,000 sq. ft.

Thus, actual cost becomes 3.8¢ times 7.66 lbs. or 29.1¢ per 1,000 sq. ft. of turf area.

Now—let's summarize these three bids.

1. 15-5-10 @ $100/ton = 25.3¢/1000 cost.
2. 18-6-12 @ $120/ton = 24.75¢/1000 cost.
3. 13-4-9 @ $105/ton = 29.1¢/1000 cost.

It becomes evident that the cheapest bid to start with was not necessarily the most economical as an end product. These figures are relative, and should be used for comparative purposes only. This method is much more accurate, and in many cases, will reflect a different cost than that shown by comparing the cost of N alone. This in turn gives the most important reasons for using this method of evaluation. It eliminates controversy and disagreement on the part of those bidding, and allows positive justification to superiors for final selection of a successful product.