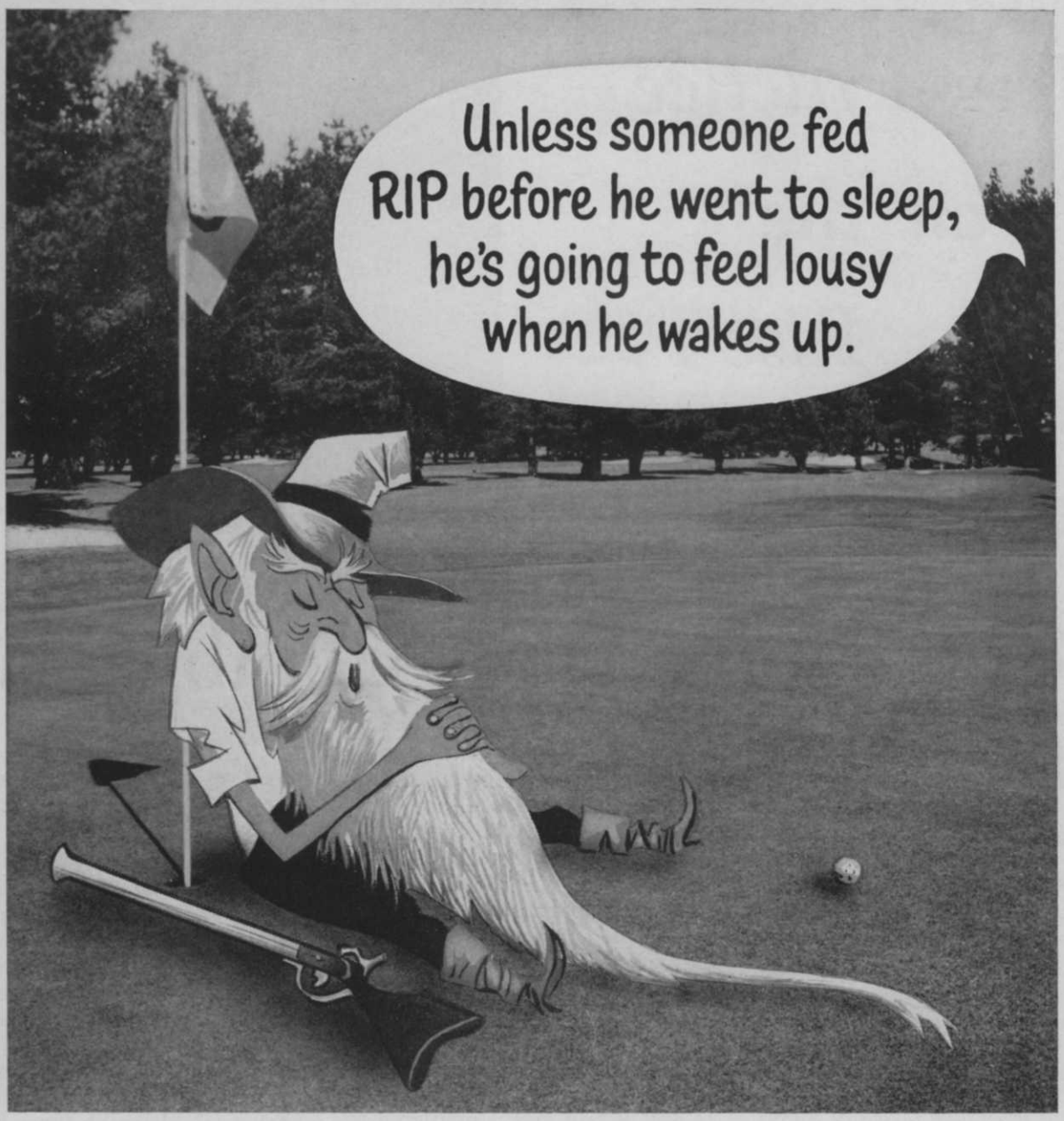


Like Rip Van Winkle, your turf enjoys a long nap. Turfgrass goes dormant after a fall surge of growth, needs a deep healthy root system to survive the winter, and to get a vigorous start in the spring.

A fall feeding with Nitroform restores turf damaged during the summer and takes advantage of the peak growing cycle of cool-season grasses, allowing them to spread out and develop roots while most weeds are dormant. Fall feeding with Nitroform strengthens any turf for overwintering and builds residual nitrogen in the soil for use in the spring.

Nitroform®, Hercules Powder Company's ureaform turf food, contains a whopping 38% nitrogen which is released slowly as the grass needs it. In addition, Nitroform is easy to handle and store, is odorless and nonburning, and is available in two forms: granular Blue Chip® for conventional spreading, and Powder Blue*—the first sprayable ureaform.

But let the Hercules representative explain why Nitroform means "pleasant dreams" in grass talk!

STH66-10

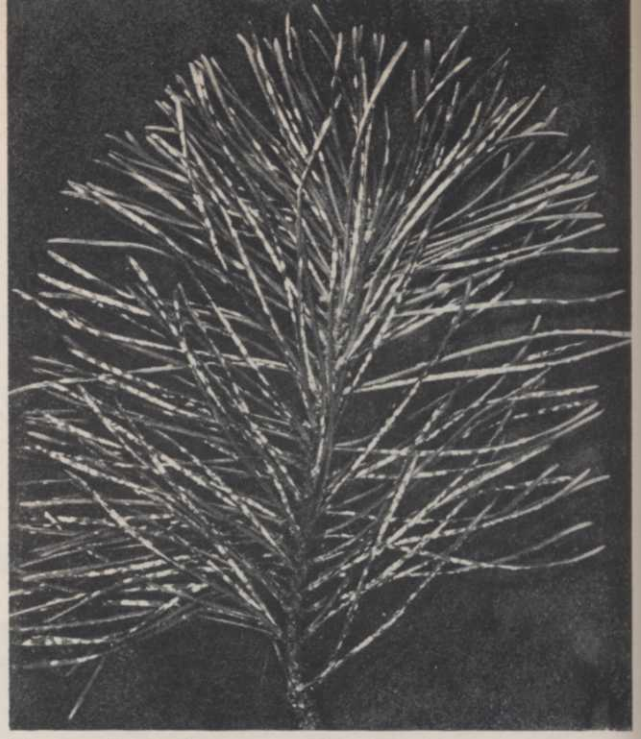
HERCULES
INCORPORATED

*HERCULES TRADEMARK

New Practice on the Rise . . .

By
D. H. MOORE

Research & Development Department
Niagra Chemical Div., FMC Corp.



Pine needle scale can be all-but-eliminated with application of ethion-oil combined spray. (See table 1. for field test results).

Oil-Insecticide Combination

MANY nurserymen and professional landscapers are taking a long and interested look at a relatively untouched mode of pest control—a combination of oil and insecticide.

Though oils have been used by themselves as insect sprays in this country for more than 75 years, they have had rather limited acceptance since World War II. Now, increasing resistance of pests to some organic compounds and the marriage of small quantities of chemical insecticide with oil have spurred increasing interest in oils once again.

Why Insecticide With Oil

When properly applied, oil sprays generally provide good control of mites and most scale insects. But thorough coverage is an absolute must when using oil alone. The oil must make direct contact with the pest upon application since its action is via suffocation and there is no residual toxic effect. It is strictly a "one shot" material, and if you don't hit the pest upon application, for all practical purposes you have missed him.

The possibilities regarding types of insecticide-oil combinations are almost limitless and there has been experimentation with several variations. Ethion, malathion, parathion, DDT, Trithion and many other insecticides have been used successfully in combination with different grades and viscosities of oil. At present, however, only an ethion-Superior oil combination is being used commercially to any extent and is available as a preformulated product that does not require mixing of components by the user.

Ethion-oil formulations are registered both for dormant and summer sprays. For dormant applications they can be used on some 20 different ornamental trees and shrubs (including such common varieties as maple, elm, oak, birch and dogwood) to curb 12 species of scale. For summer sprays a special formulation containing less oil and more ethion has registration for control of both mites and scale on 11 ornamental varieties (including such plants as camellias, boxwood, gardenias, and azaleas).

This combination has been found considerably more effective than straight oils. Inclusion of ethion in the formulation provides additional assurance of control. Even if eggs are missed by the oil during application, the insecticide, with its long residual activity, will halt resulting larvae as they crawl around. Control of aphids, leafhoppers and mealybugs is another plus for ethion-oil, although there is currently no registration regarding these pests on ornamentals. Straight oil has never been a reliable weapon against them.

Use of oil-insecticide combinations as dormant sprays might be considered as a means for combating resistance. Petroleum oils appear to be resistant proof, at least there is no indication of pests developing immunity to them. Then, too, by controlling pests in their overwintering form, the population is more exposed and therefore more readily reached by the pesticide.

The closer to hatching, the more susceptible insect eggs are

Table 1. Field Tests on Effectiveness of Ethion-Oil

Control of Pine Needle Scale

Treatment	Date Applied	Average No. Growing Scale/Leaf 6/5	6/12	6/21
Ethion-oil 2 qt./100 gal.	5/22	0.4	0.6	0.0
Ethion-oil 3 qt./100 gal.	5/22	0.0	0.0	0.05
Untreated check		15.0	24.1	45.6

Control of Taxus Mealybug on Taxus with Ethion .67 Superior 60 Oil

Material	No. of Mealybugs/Tip 7 Days* 7/5	13 Days 7/11	39 Days 8/6
Ethion .67 Superior 60 oil (ME C241), 3 qt./100 gal.	0.8	0.0	0.0
Untreated check	12.9	6.2	155.0

*Number of days after first treatment.

rays for Ornamentals

to oil. Because of this, many nurserymen have found it effective to apply oil-insecticide sprays in the delayed dormant stage—after some foliage has appeared. A good rule of thumb is to treat when about one-half inch of leaf tissue is exposed.

200 Species Tested

Care must be taken to avoid phytotoxicity (damage to the plant) when using oil-insecticide combinations. This is particularly true of summer sprays which should utilize lighter viscosity oils. It might be noted here that ethion and light grades of superior oil have been tested on over 200 ornamental species without injury, even on orchids.

Cold weather is a factor to consider regarding delayed dormant sprays. Treatment should not be made when temperatures are expected to drop to freezing or below.

Still another consideration is compatibility of oils with other materials which may be applied around the same time. Oil and sulfur are incompatible, for example, and may lead to damage of new growth.

A major deterrent to the use of oils has always been their tendency to injure plants. Development of a class of highly refined, basically paraffinic oils having a narrow distillation range has relieved this problem somewhat. The term Superior oil was coined by New York State Experiment Station workers to describe them.

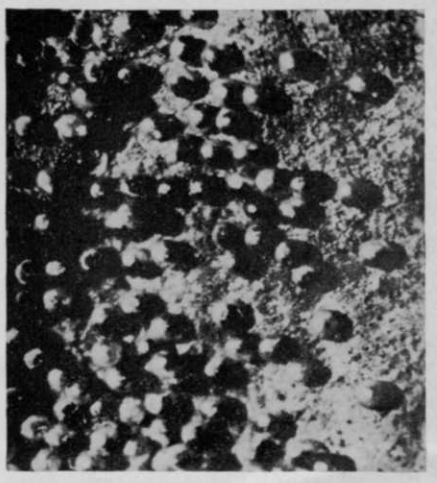
Another factor making oil sprays somewhat safer to use today is the trend toward lighter (less viscous) oils, particularly where summer use is concerned.

Among the lighter oils frequently used are 60-second and 70-second Superior oils, so named to indicate the number of seconds it takes for a sample of oil to flow through a special test device. The lower the number, the lighter the oil.

Today's oil formulations are "fast breaking." That is, they contain just enough of the proper emulsifier to keep the oil in proper suspension in the spray tank, provided there is adequate agitation. This permits rapid disassociation of the oil and water upon application to a plant surface. In short, the emulsion will "break" upon striking the plant, leaving oil on the surface and permitting water to run off. This is in contrast to older so-called "tight" emulsions which did not break rapidly but allowed both oil and water to run off the plant.

This "speed of breaking" has become very important in recent years because application techniques have changed so much. With today's speed sprayers, fast-breaking oils are very necessary. They do not have as great a tendency to leave the tree with the water carrier and "runoff" of oil is therefore minimized. When hand guns and stationary spray tanks are employed, however, fast-breaking oils—through overlap spraying—will result in excessive oil deposits on trees and may lead to phytotoxicity. Hence slower breaking oils are still best where these older or simpler types of equipment are used.

It can be seen from the foregoing that oil sprays are quite different today from what they once were. Now, improvement in the oils themselves and their use in combination with small amounts of insecticide, make them safer and more effective than they ever were. It would appear that as a result, a rise in the use of oil-insecticide sprays can be expected in the years ahead.



European red mite eggs on the bark of ornamentals will hatch into trouble if not checked. Ethion-oil has proved effective.

How To Control

Cottony maple scale is obvious from white egg sacs, each containing 500 to 3000 eggs. Flat, brown bodies of the female insects can be seen at end of the sacs.

Cottony Maple Scale

By

DR. R. LEE CAMPBELL

Associate Professor
Ohio Agricultural Research and Development Center
Wooster, Ohio

THE COTTONY MAPLE scale, *Pulvinaria innumerabilis* (Rathvon), has been rather abundant this year, particularly in the vicinity of Cleveland. This insect occurs throughout the United States and southern Canada, wherever its host plants grow. Although primarily a pest of soft maples, especially silver maple, the cottony maple scale has also been reported to attack a wide variety of plants including: linden, alder, dogwood, euonymus, hawthorne, ivy, lilac, rose, spirea, apple, pear, willow, poplar, grape, hackberry, sycamore, honeylocust, beech, elm, plum, peach, gooseberry, currant, Virginia creeper, sumac, boxelder, white ash, black locust, oak, red mulberry, and snowball.

This scale periodically appears in great numbers, rather suddenly, and then, two or three years later, apparently disappears again, only to recur in another outbreak a few years later. The reason for this fluctuation is that there are several species of insects which feed on the cottony maple scale and these can, in a couple of years, nearly eliminate an infestation. Then, having little left to feed on, these natural enemies of the scale decline in numbers themselves. This allows the scale insect to become abundant again. Some of the insects which can contribute to a decline in cottony maple scale numbers are: several lady beetles, notably the two-spotted lady beetle *(Adalia bipunctata);* a moth *(Laetilia coccidivora);* and a chalcid wasp *(Coccophagus lecanii).*

Egg Sacs Are Conspicuous

The cottony maple scale is usually noticed when the females begin to produce their conspicuous white egg sacs. At this time they may be 4 x 7 mm. This is generally the period from late May to early August, depending upon latitude and annual variations in weather. These egg sacs are composed of a waxy material which the female secretes through pores near the posterior end of her body. Within these sacs each female deposits 500 to 3000 eggs. When these hatch, the young scales move to tender twigs or to the undersides of the leaves where they suck sap and grow. Before the leaves fall in autumn the male scales mature and transform into a tiny winged stage. These mate with the still immature females and then die. The females move from the leaves to small twigs and branches where they survive the winter. These overwintering females are about 1/16 by ⅛", oval in shape, slightly convex, and dark brown.

The next spring when sap begins to rise in the trees the females resume feeding and complete their development. After the eggs are laid the female dies.

As the scales grow, they produce copious amounts of honeydew which can be obnoxious as it drips from the trees onto sidewalks, cars, or passersby. Also the honeydew which sticks on leaves serves as a nutrient media for a sooty mold fungus and the

Closeup shows waxy egg sacs of the female.

black mass of this can reduce the esthetic value of a tree.

The more serious damage which the scale can cause when present in large numbers results from their sucking sap from leaves and twigs. This reduces growth and weakens the tree, and can cause dieback of branches or even the death of trees if an infestation is not controlled. Weakened trees are susceptible to attack by bark beetles and borers. For this reason some people may want to spray their more valuable trees. Suitable materials are a Superior-type oil applied when the trees are dormant, or either malathion or carbaryl (Sevin) applied as the crawlers begin to move out of the egg sacs.

The dormant oil treatment, designed to kill the overwintering females, is least harmful to the natural enemies of the scale, but care must be taken to ensure that it is applied only when the trees are truly dormant, as oil is known to cause injury to some maples, particularly the hard varieties. A highly refined Superior oil should be used at the rate of 2 to 3% oil in water. Thorough coverage is important.

The materials, malathion and carbaryl, can be used to destroy the young crawlers as they move to the leaves and twigs. Carbaryl may be used at the rate of 2 lbs. of 50% wettable powder per 100 gals. of water. This material has the advantage of a somewhat longer residual action than malathion, but is more toxic to honeybees and slightly more hazardous to apply. Also it may cause some injury to the trees if used in wet or humid weather. Malathion can be used at the rate of 4 lbs. of 25% wettable powder per 100 gals. of water. This treatment usually needs to be repeated 10 days later due to the short residual period which is characteristic of malathion.

These materials will be ineffective if used at other times of the year since after the crawlers settle down and begin developing they are very difficult to kill. Only while they are moving, generally early July in central Ohio, can they be controlled with malathion or carbaryl.

mow it tall . . .

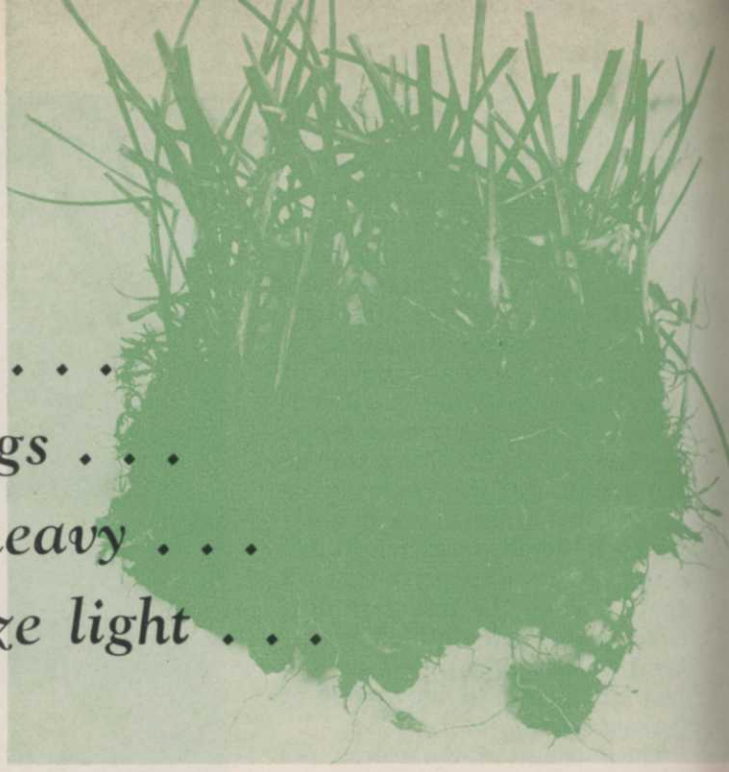
mow it short . . .

collect clippings . . .

leave clippings . . .

fertilize heavy . . .

fertilize light . . .



Remarkable Kentucky Bluegrass

By

DR. ROBERT W. SCHERY

Director, The Lawn Institute

Marysville, Ohio

KENTUCKY bluegrass, *Poa pratensis,* including its many select varieties such as Park and Merion, is one of man's most coveted and widely used plants. Generally in combination with one or more of the fine fescues, such as Chewings, Illahee or Pennlawn, Kentucky bluegrass is responsible for most of the lawns and play turf in the northern two-thirds of the United States.

Thatch removal was part of the bluegrass test; here performed with an attachment to the John Deere garden tractor.

In spite of this importance, and in spite of no little resarch at experiment stations within the bluegrass belt, the relative consequence of various management factors is still elusive. Although we know that Kentucky bluegrass requires at least reasonable fertility to look well, it is puzzling that sometimes the untended pasture survives better than the pampered lawn. And what happens to all these materials we deposit on bluegrass turf? Where does all the nitrogen go, particularly on lawns where the clippings are left? The phosphorus and the potassium, too? How does clipping collection and thatch removal relate to fertility and grass response, over a protracted period?

For the short term such questions have been at least partially answered for circumscribed conditions and particular soils, to the satisfaction of many experimenters. But, there is often nagging wonder how really important certain practices are to lawn survival through the years.

Kentucky bluegrass is a truly remarkable plant, in its tenacity. It can suffer seemingly complete disaster, only to revive and spread the next favorable growing season to the extent that its former decimation is unrecognizable. In drought years on the eastern plains, bluegrass appears to have disappeared; but it's back in as great abundance as ever when rains revive it. Some fields in Kentucky are said to have been continuously in bluegrass for more than a century. Certainly the grass thriving in them must clearly be well adapted to its environment. On the other hand, "disease" sets back the bluegrass on many a lawn, and the weeds invade. Why?

Five Year Search For The Answers

Wondering about the longer term influence of several lawn management practices, a section of the Lawn Institute grounds was set aside for several-year observation. The original seeding was to natural Kentucky bluegrass, and invasion by volunteer bluegrass as well as other adventives is likely. For the last five years certain treatments have been continued consistently. Part has been mowed at 3 inches, part at 1½ inches. Part of each of these sections had the clippings collected, part not. Some sections received frequent

and generous fertilization, some relatively little. And, more recently, thatch was mechanically removed in strips across several of these interacting treatments.

Perhaps we shouldn't have been surprised to note that versatile Kentucky bluegrass adapted itself fairly well to almost any combination of treatments, and when once again (after five years) all the area was treated alike not a whole lot of difference could be noted in the sod attributable to former care.

Before resuming uniform care for this section of the grounds, the frequency of shoots and depth of thatch were measured, relative to the various treatments. This was accomplished by taking 20 plugs in spring from each test area under scrutiny, hand separating and counting the culms in the laboratory, and measuring the depth of thatch on the plug (as nearly as the exact limit of thatch can be estimated, often appreciably different on opposite sides of a plug). No claim is made for statistical significance to the differences noted; obviously, considerable chance is involved in just how dense a population of culms would occur in any given plug, depending where the plug was taken.

Some of the conclusions of Table I are the expected. For example, lower clipping should increase proliferation, giving a greater number of (but correspondingly dwarfed) tillers. On the other hand, it was somewhat surprising that the rate of fertilization seemed to make no long-term difference, either in extent of thatch or number of tillers.

Influence of clipping removal was not clear-cut. In most cases, leaving the clippings on the turf seemed to increase the thatch somewhat, but it had no influence on the density of the sod. However, under tall mowing, there was a slight indication that letting the clippings lie increased the number of shoots slightly.

Perhaps most strange was that thatch removal (the year previously) seemed not to decrease the thickness of the thatch, but actually to increase it slightly. The frequency of culms was increased somewhat, too, by thatch removal. Perhaps the area sampled here just happened to provide better growing conditions, which would tend to make more thatch more quickly, as well as provide somewhat denser turf.

Table I sums up these observations.

Summary

Kentucky bluegrass turf, after five years' comparative maintenance, showed:

Fertilization—Rate made little difference in amount of thatch or density of sod.

Mowing Height—Shorter mowing produced somewhat denser but weaker sod.

Clippings—When left, increased thatch slightly, but generally had no influence on sod density except possibly beneficial under high mowing).

Thatch—Removal seemed to have no permanent influence, though process possibly stimulates slightly greater culm production.

Table 1. Kentucky bluegrass turf, managed as indicated over 5-year span, with thatch thickness and culm density resulting under the various combinations of treatment.

	Average, from 20 Plugs Randomly Sampled			
	Thatch		Density	
	Average Thickness, in inches		Average number of culms per plug	
Treatment	Av. No.	Range	Av. No.	Range
A. Mowed tall, clippings collected, heavy fertilization.	.46	1/8"-3/4"	16	10-30
B. Mowed tall, clippings left, heavy fertilization.	.53	1/8"-1"	21	9-36
C. Mowed tall, clippings left, heavy fertilization, de-thatched 1 year ago.	.71	1/4"-1"	30	7-59
D. Mowed short, clippings left, heavy fertilization.	.58	1/4"-1"	27	9-45
E. Mowed short, clippings left, light fertilization.	.48	1/8"-1"	25	9-63
F. Mowed short, clippings collected, light fertilization.	.32	0-3/4"	25	8-61
G. Mowed short, clippings collected, heavy fertilization.	.31	less than 1/8"-3/4"	26	12-38

Northwest Spraymen's Association Defines Goals

"It is our main purpose to provide for our members a regional voice in any matters of concern to the professional applicator of pesticides, wherever that voice may be needed. In education, legislation, self-protection, self-inspection, public relations, and any other areas, the Pacific Northwest Spraymen's Association aims to be there providing leadership and help in any way that will best serve the public and our profession." These are the words of Bill Owen, president of the recently organized PNSA, as he describes the goals and functions of the association.

The Pacific Northwest Spraymen's Association is an organization of professional pesticide applicators, and is comprised of four regional groups in Oregon and Washington. It is incorporated under Oregon law and is also legally recognized in Washington, Idaho, and British Columbia. Owen notes that three years of effort have gone into incorporation and establishment of the organization.

Among the group's plans are the annual spraymen's conference (their 1966 Spray-O-Rama was held in Portland, Sept. 23-24), sponsorship of short courses for pesticide applicators in various spots throughout the area, public relations and educational programs, and the formation of committees to investigate group insurance plans and to work with legislators and other groups towards betterment of the profession.

Want an extra month of spring next year?

Get the jump on maintenance jobs right now!

How did your work go last spring? Packed tight? Summer on top of you before you finished your maintenance and rebuilding jobs? If so, you had plenty of company.

One way to beat the calendar is to turn it upside down. Act like April comes in the fall. Just look around. There may be a dozen jobs you've scheduled for next spring that could be polished off right now.

Building or repairing service roads, walks, drives, terraces or parking areas. Cut and fill work, leveling, paving or spreading gravel.

Trap and tee repair on golf courses. Reshaping rough. Relocating bunkers and other hazards.

Removal of dead trees and other waste growth.

Plus of course all the usual fall chores. Clean-out of waterways and open drains. Leaf raking and mulching. Fall fertilizing and spraying.

Ambitious schedule? Sure. It demands a hustling tractor. One like the International® 2424 turf tractor—

plenty of moxie for off-season chores, plus compact styling for all your mowing jobs later on.

The 2424 delivers 47 hp (43.5 diesel) in a low profile design that out-

maneuvers every other tractor in its class. The tightest turning radius: 8½ feet. The shortest wheel base: 70 inches. Only 51 inches, chest height, to

the top of its hood. And the Lo-Boy® model is an even tighter package!

It's the only tractor in this class with full-time hydrostatic power steering.

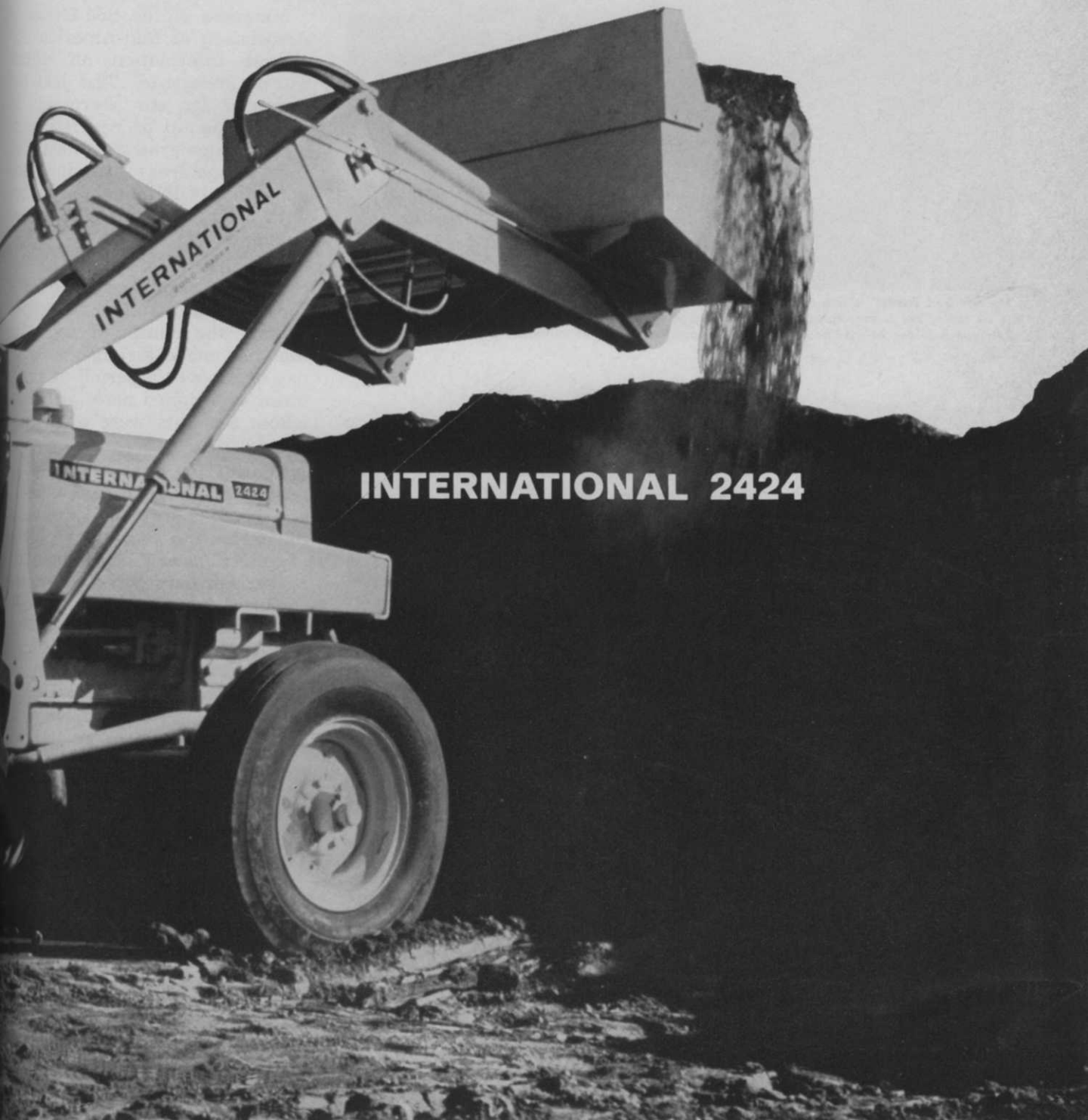
A differential lock feeds power to both rear wheels regardless of traction. No spin-out. No gouging of turf even when you start up from a dead stop on a slope. On side hills it holds the nose straight and prevents downdrifting.

The 2424 has a dual range transmission with 8 forward and 2 reverse speeds (8 and 8 optional). Live, constant running PTO. Draft-sensing 3-point hitch. Live hydraulics. Wide, high-flotation tires. And more, much more.

Schedule a demonstration by your IH dealer. And while you're at it, talk money. He offers one, two and three-year financing. Deferred payments, up to three a year without penalty. Leasing. Leasing with purchase option. Or *you* suggest something. He wants to make a deal!

INTERNATIONAL HARVESTER COMPANY

The people who bring you the machines that work



INTERNATIONAL 2424

How To Reduce Sod Credit Losses

Horner Sod Farms' office manager, Bob Brewer, doubles as dispatcher. Farm communication is by radio, but instant communication is also needed between home offices and sales outlets. Teletype provides 24-hour hookup for credit approval and other matters.

* * *

Acres and acres (about 800) covered with lush, green sod. Meticulously cared for sod isn't worth the trouble to irrigate if, once delivered, the customer refuses to pay. As Horner points out, "sod has no retrievable value after the customer has received it."

By
RICHARD HORNER
Horner Sod Farms
Union Grove, Wisconsin

If there is any problem that almost every sod grower has a burning interest in, it is the problem of collections and accounts receivable.

Members of the Sod-Growers Association of Mid-America exchange information on delinquent accounts. The last list compiled by our secretary in 1965, made up of reports from eight or nine growers (mostly in the Chicago area), contained the names of 246 delinquent accounts with a total amount of $142,800 outstanding.

This list refers only to accounts the reporting growers considered delinquent. It did not contain the names of accounts that had made arrangements to pay debts over a period of time, those who signed notes, or those whose accounts were on a current basis.

Considering that probably at least one-half of these outstanding accounts are uncollectible, it illustrates the nagging problem of collections in the sod business. No grower, large or small, newcomer or oldtimer, is immune. It is a problem that is upsetting and frustrating, as well as representing a considerable drain on the profits of the typical sod farm. In short, it drives sod men crazy.

Why Collections Are a Problem

Why are collections such a problem in the sod business? There are several reasons.

One, sod is a product that has no retrievable value after the customer has received it.

Two, a large percentage of sod is sold to landscape contractors, and unfortunately a relatively large percentage of landscapers