

1973

Fall 1973

Louis E. Barbrow


Paul R. Harder

Joseph Troll

C. T. Dickerson Jr.

Robert N. Carrow

Follow this and additional works at: https://scholarworks.umass.edu/turf_bulletin

 Part of the [Other Plant Sciences Commons](#), [Plant Biology Commons](#), [Plant Breeding and Genetics Commons](#), [Plant Pathology Commons](#), and the [Weed Science Commons](#)

Barbrow, Louis E.; Harder, Paul R.; Troll, Joseph; Dickerson, C. T. Jr.; and Carrow, Robert N., "Fall 1973" (1973). *Turf Bulletin*. 33.
Retrieved from https://scholarworks.umass.edu/turf_bulletin/33

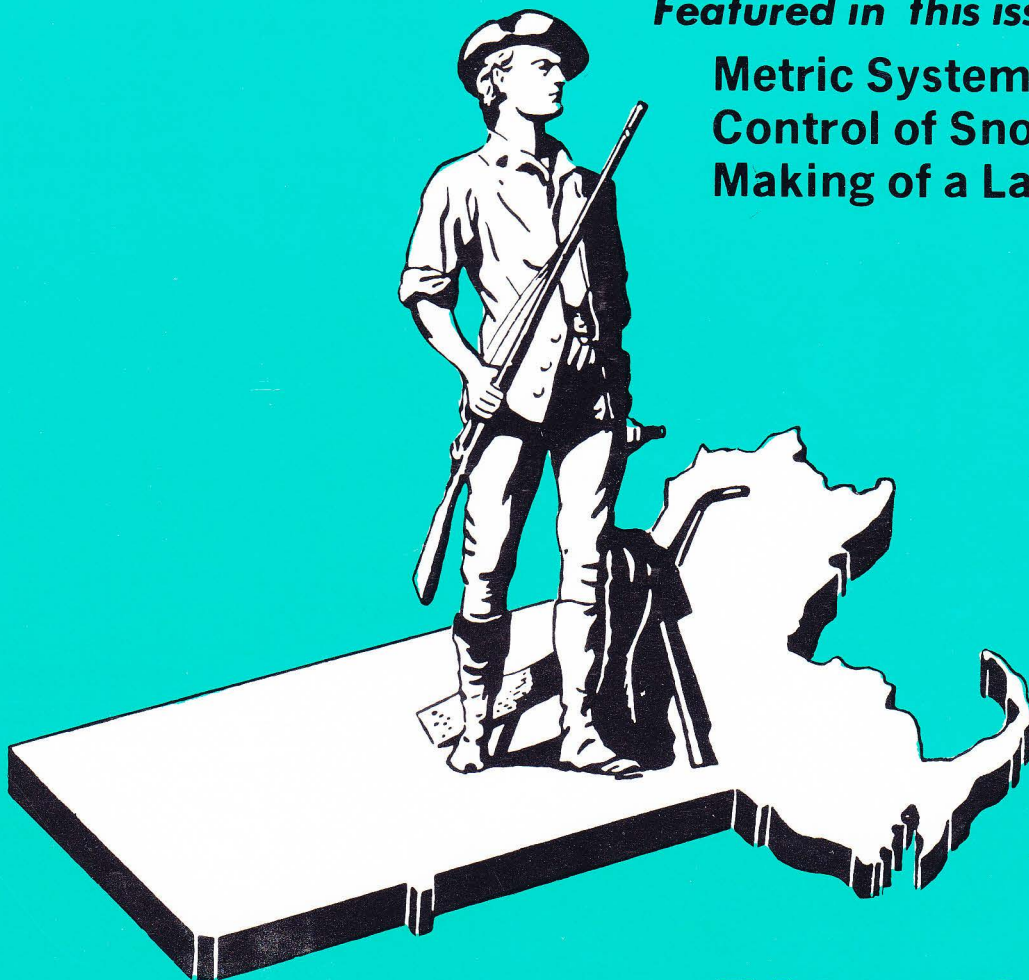
This Article is brought to you for free and open access by the Turf Program at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Turf Bulletin by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

TURF BULLETIN

MASSACHUSETTS TURF
AND LAWN GRASS COUNCIL
I N C O R P O R A T E D

Featured in this issue:

Metric System
Control of Snow Mold
Making of a Label



FALL 1973

BETTER TURF THROUGH RESEARCH AND EDUCATION

EDITORS
 William H. Spence
 William F. Clark
 Rm. 10, Stockbridge Hall
 UMass., Amherst, Mass.

SECRETARY-TREASURER & ADVISOR
 Dr. Joseph Troll
 RFD No. 2 Hadley, Mass.

Vol. 9, No. 6

Fall 1973

**Massachusetts Turf & Lawn Grass Council
 Officers and Directors**

President — Tony Caranci, Jr.

Vice President — Paul Serra

Treasurer — Robert Gomes

Secretary — Francis Downey

Directors

Charles Mruk	John Moodie
Garfield Leard	Ken Minasian
Joel McKoan	Richard Lussier
Julian Kieliszak	Dale Sandin
Lou Doyal	Dr. Joseph Troll
Richard Langevin	George Moore

The Massachusetts Turf and Lawn Grass Council Incorporated is chartered under the laws of the Commonwealth of Massachusetts as a non-profit corporation. The turf council seeks to foster "Better turf through research and education."

More detailed information on the subjects discussed here can be found in bulletins and circulars or may be had through correspondence with the editor.

Permission to reproduce material appearing in the Turf Bulletin must be obtained from the respective publications where the article is reprinted from. If an article is not a reprint, permission is granted to reproduce it, providing full acknowledgement is made of the author.

Table of Contents

	Page
The Metric System—Future	3
The Metric System and Small Business	5
Louis E. Barbrow	
Performance of Five Fungicides for Control of Snow Mold	11
Paul R. Harder & Joseph Troll	
The Making of a Label	13
Dr. C. T. Dickerson, Jr.	
Calculations for Turfgrass Culture 1: Fertilizers	17
Dr. Robert N. Carrow	

The Metric System—Future

From a speech given at the Midwest Regional Turf Foundation Conference March 5-7, 1973 at Purdue University.

Walter Wilkie, March Irrigation & Supply Co.
Muskegon, Mich.

The Great Metric Controversy began here in America. At that time one of the greatest proponents for conversion to it was John Quincy Adams, where I am reminded of what he once said: "Weights and measures may be ranked among the necessities of life to every individual of human society. They enter into the economical arrangements and daily concerns of every family. They are necessary to every occupation of human industry; to the distribution and security of every species of property; to every transaction of trade and commerce; to the labors of mankind; to the studies of the philosopher; to the navigation of the mariner, and the marches of the soldier; to all the exchanges of peace, and all the operations of war." Why, then, the controversy? Simply because there are two systems of measurement in the world, and whenever two systems of any kind occur there is always some kind of debate as to which one should succeed.

The metric debate has been a strange one. Measurements may not seem like an emotional issue, yet few of the participants have managed to keep their tempers, and on both sides the arguments have been loud and inflammatory, and well laced with personal attacks. Advocates have claimed that the United States could convert to the metric system in a few weeks, and that the cost of the change would be recovered in a few months. The cost would be tens of billions of dollars, opponents have replied, and it could never be recovered. Thousands of businesses would fail, and millions would be unemployed. Almost everyone would welcome it, its advocates say. On the contrary, opponents retort. It could never be enforced and the jails would bulge with violators.

Some very distinguished men have asserted that the metric system would save two to three years of time in the education of a child. Equally distinguished men have branded this as utter nonsense, for if there were any savings it would be less than a week. According to its critics, the metric system violates the laws of nature and the needs of man. They cite that it drove American engineers mad during World War I and II, and made cripples of customs inspectors—the reason, I'm sure that a forgotten pamphleteer once wrote:

"Modern science, disguise it as we may, is not merely out at sea upon the waves of doubt, but is essentially an atheistic school, that has no God, which has long since closed its doors against the written word. Our representatives have no more right to force the metric system upon us than they have to make our babies beg for bread in foreign idioms. . . . Even the permissive use of the metric

system is a blot upon our statute books. If men want to use an evil system, they will do it anyway."

As if God and Christianity were not enough, then, some anti-metricists claim paganism and superstition as allies. They wrote involved dissertations on ancient symbols as guides to cosmic truths, and professed to find in the mystic numerical ratios of these symbols the foundations of the English system of measurement.

The metric system has had many famous men as advocates, but in general these can be defined as scientists and educators. The opposition, however, has not been quite so sharply defined. Some industrial groups have favored it. Others, chiefly the metal working industries, textile companies, shoe companies, and machine tool fabricators have opposed it. In tests of strength, the opposition has always won.

For a number of years the issue of whether or not to convert has seemed almost dead in the United States, and the organizations set up to promote metric legislation have virtually disbanded. But, this is cold comfort for advocates of English measurement. The metric system has become the sole official system in nation after nation, sweeping around the world, becoming the first international language of measurement. Of all rival systems, only the English and American have withstood it, and even they have lost ground. There's not the slightest chance today that our system should or could become a world system, for if the world is ever to have a single system of measurement it will, in my opinion, be the metric system.

Why, then, all the fuss? The controversy began with man's natural endowment, the manner in which nature shaped his body. He had ten fingers. He counted on his fingers and he measured with them too. But, there was no relationship at first between counting and measuring. Nor did man in those days compute. He counted. He did not add or subtract, multiply or divide.

The units of linear measure—foot, nail, cubit, span—were not chosen because they were related to each other in simple ratios. Nor did man begin counting on his fingers because he had ten. The ratios were discovered later, and by then decimal counting was well established. The early refinements of measurements were very simple, more in the nature of mechanical operations than of number-work. As craftsmen gained skill, they required more precise units of measure. To obtain a smaller unit of measure than a foot, for example, it was better to sub-divide the foot than resort to another kind of unit.

Suppose you wish to sub-divide a pie, or lump of clay, or a strip of paper, into an equal number of parts, using no measuring instruments. You can easily di-

(Continued on Page 4)

(Continued from Page 3)

vide the whole into halves, and the halves into quarters, and you can verify your accuracy by comparing the pieces. With somewhat less ease, but with fair accuracy, you can sub-divide into thirds. But, if you should attempt to sub-divide into fifths or tenths, your margin of error would be considerably larger.

From these beginnings came the structure of present-day English measure: the 12-inch foot, the 3-foot yard, the 6-foot fathom, and so on. From the craftsman's sub-divisions came the divisions of the inch into halves, quarters, eighths and sixteenths; and similar sub-divisions of the gallon, quart, mile, ton and pound.

Further, as the need arose for extremely small units, decimal division was sometimes adopted in place of halving. In the United States, for example, machinists worked in fractions of an inch down to a sixty-fourth. Beyond that point, however, fractions became unwieldy, and so they now divide the inch decimally into thousandths.

The metric system is so logical and reasonable that most people in England or America, who consider it for the first time, are baffled. Why on earth didn't we adopt it long ago? Why do we adhere to our jumbled system of unrelated units which almost no one can remember, and which require time-consuming and cumbersome calculations?

Perhaps, then, this is the reason the following article appeared on the editorial page of the October 27, 1972, issue of the Detroit Free Press:

"We are about to be subverted. Our familiar world of measurement deals in such units as inches, feet, yards, and miles, gallons, bushels and Fahrenheit degrees. But the outer world, even including the eccentric British, is either on the metric system, which deals in multiples of 10, or is committed to going there."

You could say, "so what?" but the infiltrators are already within our gates. The millimeter is creeping upon the inch. Photographic film comes in metric measurements. The pharmaceutical industry has abandoned old-fashioned drams and grains in favor of

milligrams and grams. Swimming pools are now being built to international metric-distance specifications. Automobile mechanics are being forced to add metric tools to their toolboxes, for imported cars have metric parts. Whether it comes in years or decades, we are on our way to a momentous change.

I am sure I won't like it, but then, I had a predominantly literary education. I like to savor Robert Frost's lines about having "promises to keep and miles to go before I sleep," and would hate to have my poetry foot-noted to include kilometer readings.

Seriously, though, the opponents of the metric system will have to recognize that they are fighting a rear-guard action. Once upon a time the island and the peninsula peoples of the world (the British, with their dominions and colonies, the U.S. as an offshoot of Britain, the Greeks, the Boers, and the Japanese) disdained counting everything in units of 10. The metric system was the child of the continental masses. Where Englishmen stuck to gallons, stones, ounces and pounds, Talleyrand put the full authority of the French Revolution behind a logical system that related everything to everything else by decimal ratios. The system took hold from the English Channel to the China Sea.

The triumph of the metric system has been coincidental with the disappearance of the British Empire. With Britain and Canada signifying their intention of going over to metric standards, Britain's old African colonies have taken the same course. So has India. The nations of the European Common Market have been ironing out their remaining national differences in engineering standards.

Our big multinational corporations, which assemble computers, automobiles and complicated factory machinery from components made in several countries, have all been going metric. This means that smaller companies, which hope to sell to big companies, must go metric too. In Britain, U.S. subsidiaries account for 14 percent of the total economy. Thus, as Britain goes metric, U.S. multinational companies in the United Kingdom must conform or die.

SHEPARD SOD CO., INC.

EAST WINDSOR HILL, CONN.

200 SULLIVAN AVENUE

OVER 350 ACRES OF QUALITY TURFGRASS GROWN UNDER CONTROLLED CONDITIONS FOR SUN OR SHADE, GOOD OR POOR SOIL, GOLF COURSES, HOME LAWNS, ATHLETIC FIELDS, HIGHWAY BEAUTIFICATION AND BUSINESS OR INDUSTRIAL USE.

- MERION BLUEGRASS
- MERION MIXTURES
- PENN CROSS BENT
- SHADE MIXTURES
- ATHLETIC MIX
- 0217 FYLKING BLUEGRASS
- PASTURE & FIELD SOD

WE ALSO GROW SOD UNDER CONTRACT ACCORDING TO YOUR SPECIFICATIONS!

Reprinted from *Fertilizer Solutions*, March-April 1973

The Metric System And Small Business

By Louis E. Barbrow
Coordinator of Metric Activities
National Bureau of Standards

From time to time, an NFSA Dealer Aid is published to suggest that owner-managers look to the future—to the horizon. Trends or techniques may be appearing that will demand your attention at a future date.

This is such an article. It discusses the matter of the United States changing to the metric system of measurement. At the present time, this country is the only major nation not operating on it or committed to it.

The basic material used in developing this article is contained in *A Metric America—A Decision Whose Time Has Come*, which is a Report to the Congress on the findings of a three-year study on the impact that the increasing worldwide use of the metric system has had on the United States.

A plan for national changeover to the metric system over a 10-year period has been recommended. This article discusses what led up to that recommendation and urges owner-managers to be alert to developments as the Nation considers this proposal through its Congress.

Some owner-managers of liquid fertilizer businesses have been thinking about the metric system and how it relates to their operation. Others haven't paid much attention to it. It is a subject that you should be considering. Briefly, what is involved is the question of America's increase in the use of the metric system of weights and measures—that is, a change from the customary language of inches and pounds to the metric language of meters and kilograms.

Why change? For many reasons, all of which stem from the fact that the United States is now the only major country in the world not committed to the metric system.

This situation has been studied in detail. Because the U. S. Congress had the responsibility to fix the national standards of weights and measures, it ordered a nationwide survey. A three-year study was made of all major segments of American society to determine how the country as a whole felt about the matter. The results of the survey show a clear consensus that:

1. Increased use of the metric system is in the best interests in the United States.
2. The Nation should change to the metric system through a coordinated national program.
3. The transition period should be 10 years, at the end of which the Nation would be predominantly metric.

So the time has come for all Americans to start considering what this means in terms of their own lives.

Obviously, it is especially important for owner-managers of small businesses to examine the situation.

How Our System Grew

Most people don't think of a system of weights and measures as being a language. But it is. The words and symbols for length, mass, time, temperature, and so forth allow individuals to communicate with one another in terms of quantity. This knowledge is so vital that it is often learned by people who learn nothing else, not even to read and write.

The customary system of measurement used today in the United States dates back to colonial days. In those times, measuring standards differed from country to country—in some places from town to town and even from trade to trade. There was great confusion and a jumble of poorly defined units.

The measuring standards we inherited from the British stemmed from a hodge-podge of Anglo-Saxon, Roman, and Norman weights and measures, based largely on folk-ways. For instance, early records indicate that an inch was originally defined as "three barleycorns, round and dry" when laid together, and a yard was roughly the length of a man's arm. But the English had started trying to set up certain uniform standards as far back as the 12th century. The yard of Henry II actually differs from the one we use today by only about one part in a thousand.

In his first message in 1790, President Washington told Congress that it was time for America to set its own standards of weights and measures. Secretary of State Thomas Jefferson submitted two plans, but in spite of prodding by the President neither was adopted.

About this time, the French statesman Tallyrand persuaded his government to adopt a new system of weights and measures. The result was the decimal-based "metric" system. It was based on a concept developed in 1670 by a vicar named Gabriel Mouton, in which the meter was defined as a specific fraction of the earth's circumference. The scheme was radically different from any of the commonly used measurement methods of that day. This metric system was wholly rational, quite simple, and internally consistent. It is the system that most of the world—including Great Britain and the Commonwealth Countries—has come to recognize and adopt.

While France, and then other nations, adopted the metric system, the debate about standards continued in the United States. It has been going on for almost 200

(Continued on Page 6)

(Continued from Page 5)

years. In 1816, President Madison reminded Congress that the lack of uniformity in weights and measures was a piece of unfinished business. Following this, in 1821, John Quincy Adams submitted a comprehensive report on the desirability of the metric system. But again no action was taken. Then, in 1866, Congress passed an act making lawful the use of metric in the United States. But still no move was made toward a national changeover. Nevertheless, ever since 1893, our customary fundamental standards of length and mass have been defined as fractions of metric units, the meter and the kilogram, respectively. (For example, an inch is officially 25.4 millimeters.)

The most important influence on the American debate has been the spread of the metric system throughout the world. By 1921, when Japan began converting to it, the metric system had been adopted by about half of the countries of the world. Practically all of the other non-metric countries have since followed suit. England announced in 1965 that it would change over. In January of 1970, Canada and Australia announced that they would, too. Now over 90 percent of the world population lives in nations that are metric or committed to the metric system.

Actually, the metric system is more extensively used in the United States than most people realize. Doctors, druggists, and scientists use it for virtually all their measurements. In 1957, the year of the launching of Sputnik, the U. S. Army adopted it for its weaponry. Then in 1970 the National Aeronautics and Space Administration became the first Federal agency to adopt the system. Metric measurements and practices have been increasingly used in certain manufacturing industries.

The Logical Metric System

Today the metric system is known as the SI system (for Systeme Internationail d' Unites). It is simpler than any other scheme of measurement that has been used. There are only seven base units for different types of measurement.

The unit of **length** is meter.

The unit of **mass** is kilogram.

The unit of **temperature** is kelvin.

The unit of **time** is second.

The unit of **electric current** is ampere.

The unit of **light intensity** is candela.

The unit of **amount of substance** is mole.

All other units are derived from these seven. For example, a newton, the unit of **force**, involves meters, kilograms, and seconds. A pascal, the unit of **pressure**, is one newton per square meter. And so on. Although the metric system was designed to fill all the needs of scientists and engineers, laymen need only know and use a few simple parts of it.

SI is based on the decimal system and follows a consistent name scheme. This makes for easier and more accurate calculation. Multiples and submultiples are always related to powers of 10.

Deka means ten times, hecto means a hundred times,

kilo means a thousand times, mega means a million times, and so on.

Deci means a tenth of, centi means a hundredth of, milli means a thousandth of, micro means a millionth of, and so on.

It is plain to see that SI is easier to learn than the customary system. Schools could well use the time now spent in teaching customary—with all the fractions and complicated calculations—for other new subjects. (Four of the SI base units are already used in our customary system—second, ampere, candela, and mole). Also, because metric is easier to use, it saves time and errors. Computations are much simpler. There is only one unit for each quantity and the relationship between the unit is simple.

Naturally, if they use a common measurement language, scientists, engineers, businessmen, educators, and government officials throughout the world can communicate more freely and with less misunderstanding.

Advantages for America

The American economy today depends as never before on trading raw materials, manufactured products, and technological ideas with countries abroad, all of whom use or are changing to metric. Though small in relation to the total economy, our exports are crucial to maintaining a favorable trade balance in an increasingly metric world. The United States puts itself at a disadvantage competitively by using a measurement system that is different from that of the world market.

U. S. companies that want to make metric products, usually for sale abroad, have found it advantageous to

NITROFORM®

organic nitrogen

the professional turfkeeper...

Nitroform® fertilizer is for tightfisted professional turf men and sod growers. It helps keep costs down because it is long-lasting, slow-release organic nitrogen . . . concentrated to 38%. Nonburning and odorless, Nitroform also resists leaching and builds a residual. It comes in two forms:

For granular applications use

BLUE CHIP® organic nitrogen

The Coursekeeper

For spray application use

POWDER BLUE™ organic nitrogen

The Greenskeeper



5TH73-9

Turf & Horticultural Products
Synthetics Department
HERCULES INCORPORATED
Wilmington, Delaware 19899

build where they employ native workers who know the metric system. Such export of jobs is a problem that a national changeover to the metric system would help to halt.

America's military allies are either already using the metric system or committed to becoming metric. Therefore, military coordination and logistics would be simplified by conversion to metric. Use of SI would make all U. S. and foreign military equipment more compatible.

Moreover, if the United States is part of a common system, there should be one less hangup in relations with other nations.

And the fewer obstacles the better when it comes to setting international standards of all sorts, especially those concerned with industrial products. Going metric should help this country win acceptance for its ideas.

That last point was particularly emphasized in the recommendations resulting from the national metric study. "Standards" refer not only to units of weight and measurement but also to product performance, quality control, applications, and so on. Engineering standards serve a technical society as both a dictionary and a recipe book. They specify characteristics of things or ways to do things—almost anything that can be measured or described.

Standards cover an enormous range. For example, the diameter of wire, the purity of aspirin, the meat content of frankfurters, the symbols on highway signs, the fire resistance of clothing, the wattage of light bulbs, the weight of a nickel, and the way to test for sulphur in fuel oil—to name but a few.

The Department of Defense and the General Services Administration have issued for Government use about 40,000 procurement standards. Hundreds of private, voluntary groups have issued about 20,000 (one-fifth of which are recognized as national standards).

Where U. S. standards differ from international standards, trade can be hindered. To date, relatively few international standards, 1,500 or so, have been adopted, but the number is expected to increase tenfold within the next 10 years. It is in the best interests of the United States to get in on the ground floor in the setting up of new international standards because such standards form the basis for international trade. Already, multinational corporations are tending to integrate the world economy and are helping to bring about worldwide uniformity of engineering standards. In a metric world it is evident that these uniform international engineering standards will predominantly use metric weights and measures.

To sum up the advantages, a metric America would seem desirable in terms of the Nation's stake in world trade, its national security, its relations with its neighbors, and its participation in the development of international standards.

The U. S. Metric Study

In 1968, Congress authorized the Department of Commerce ". . . to conduct a program of investigation, research, and survey to determine the impact of increasing

worldwide use of the metric system on the United States; to appraise the desirability and practicability of increasing the use of metric weights and measures in the United States; to study the feasibility of retaining and promoting international use of dimensional and other engineering standards based on the customary measurement units of the United States; and to evaluate the costs and benefits of alternative courses of action which may be feasible for the United States."

In the course of the U. S. Metric study, opinions were gathered from many different cross sections of American life. On a national scale, whole industries were asked for their collective views. At the grass-roots level, individual citizens expressed their personal thoughts in correspondence and in public hearings. And in between, ideas were collected from large and small firms, labor unions, professional and technical societies, and other groups with special interests. Participants included representatives of both manufacturing and nonmanufacturing industries.

In the manufacturing segment of the economy, questionnaires were sent to about 4,000 companies—a sample from the approximately 300,000 manufacturing companies in the United States. These companies ranged from tiny operations employing only a handful of people to giants with payrolls of tens of thousands. Asked whether increasing the use of metric would be good for the Nation as a whole, a large majority voted yes. More than 90 percent of those who responded preferred a coordinated national program based on either voluntary participation or mandatory legislation. Large manufacturing firms tended to be more in favor than small ones. However, some small manufacturers were among

(Continued on Page 8)

**Try our Fungicides
Herbicides
Insecticides
Liquid & Soluble Fertilizers
Wetting Agents
Specialty Items**

SINCE 1939

ALFCO ROKEBY CO., INC.
FERTILIZERS & CHEMICAL SPECIALTIES FOR HORTICULTURE & TURF

phone 373-1394

P.O. Box 267

MARIETTA, OHIO 45750

Area Representatives:

Kenneth B. Turner, Jr., Frank Downey

John Murphy

(Continued from Page 7)

the most outspoken advocates of a metric changeover through a national program. Approximately 82 percent of the companies thought the transition period should be 10 years or less.

Of the nonmanufacturing businesses, again a substantial majority felt that increasing metric usage would be in the Nation's best interest. Eighty-six percent favored a national conversion program. And, speaking for themselves, the nonmanufacturing firms thought about five years or less would be sufficient for the changeover.

During the three-year study, conferences were held by the National Bureau of Standards to afford all sectors of the Nation an opportunity to express their views. The consensus was that a changeover to metric is inevitable, that the costs and inconveniences of conversion will never be less than they are now, and that the need will be ever more increasing.

Before the study many courses of action were deemed to be conceivable, including an abrupt and mandatory conversion to metric on the one hand and a program to promote more use of customary on the other hand. From the study it develops that the feasible courses of action are narrowed to two main alternatives:

1. To allow the increase of use of the metric system in the United States to continue to accelerate without overall design or

2. To adopt the measurement system that has achieved worldwide acceptance and to work out a plan for changing to it.

The main purpose of a planned program is to minimize breakdowns in cooperation and coordination during a changeover. In a planned program, metric parts can be available when needed, metric products will be in demand when they are made, and employees can be appropriately trained on a "when and as needed" basis.

Unfortunately, the study could not produce a balance sheet of costs and benefits incident to changing to metric. It is plain that benefits and costs are not directly comparable because they would occur at different times. Virtually all costs would be incurred during the transition. The benefits, some of which are intangible, would not appear until afterward. In addition, metrication costs are almost impossible to evaluate because they cannot be isolated from the usual and normal costs of innovation and redesign. It is at the time of redesign that metric can be most economically introduced.

Experience in Britain shows that conversion turns out to be much easier and less costly than anticipated. The British are following a policy of "letting the costs lie where they fall." Metrication is being coordinated by a small group known as the Metrication Board at a very modest cost to the taxpayer. The general rule is that everybody in the society, including governmental agencies, must share in the temporary costs just as they will share in the continuing benefits. The same philosophy was followed by Japan in its conversion to metric.

The U. S. metric study report points out that such a general policy "does not exclude special assistance for small business. Nor does it exclude some help during the transition period in the form of accelerated depreciation for machinery and investment tax credits. Even under the present tax laws, metric conversion costs would be tax deductible."

Comparing the Commonest Measurement Units
Approximate conversions from customary to metric and vice versa.

	When you know:	You can find:	If you multiply by:	
LENGTH	inches	millimeters	25	
	centimeters	feet	30	
	yards	meters	0.9	
	miles	kilometers	1.6	
	millimeters	inches	0.04	
	centimeters	inches	0.4	
	meters	yards	1.1	
	kilometers	miles	0.6	
	AREA	square inches	square centimeters	6.5
		square feet	square meters	0.09
square yards		square meters	0.8	
square miles		square kilometers	2.6	
acres		square hectometers (hectares)	0.4	
square centimeters		square inches	0.16	
square meters		square yards	1.2	
square kilometers		square miles	0.4	
square hectometers		acres	2.5	
(hectares)				
MASS	ounces	grams	28	
	pounds	kilograms	0.45	
	short tons	megagrams (metric tons)	0.9	
	grams	ounces	0.035	
	kilograms	pounds	2.2	
	megagrams (metric tons)	short tons	1.1	
LIQUID VOLUME	ounces	milliliters	30	
	pints	liters	0.47	
	quarts	liters	0.95	
	gallons	liters	3.8	
	milliliters	ounces	0.034	
	liters	pints	2.1	
	liters	quarts	1.06	
	liters	gallons	0.26	
TEMPERATURE	degrees Fahrenheit	degrees Celsius	5/9 (after subtracting 32)	
	degrees Celsius	degrees Fahrenheit	9/5 (then add 32)	

Congressional Concern

As the owner-manager of a small business, you probably are wondering what happens to small business in a national metric changeover. And rightly so. Already Congress has been looking into the matter.

The Select Committee on Small Business of the House of Representatives assigned to its Subcommittee on Minority Small Business Enterprise the task of conducting hearings. The objective was "... to identify not only those small business problems which may arise from a national transition, but also the difficulties which small business may face as a result of an increased use of metric weights and measures by their large business competitors . . . (and) review methods by which the Federal agencies and departments may provide the assistance necessary to preserve the competitive position of small business in our economy."

Based on those hearings and the nationwide metric study, the Subcommittee submitted a report on March 14, 1972, on "Small Business Problems in Metric Conver-

sion." The problem of education is considered the most basic one. The primary task that faces the small businessman—whether he be manufacturer, merchant, or distributor—is to learn to "think metric" and understand the system sufficiently to plan for transition on an orderly and sound basis. The report points out that because small businesses appear to use the metric system to be a lesser degree, they will encounter more difficulty in changing to metric measures than larger businesses, which tend to set the pace.

The report expresses the Subcommittee's concern that all appropriate governmental agencies should cooperate in aiding and assisting the small business sector and that timely steps should be initiated to assure that small business will continue to be a viable part of American enterprise and a competitive factor in both the domestic and foreign markets.

Along with other recommendations regarding the activities of large business and Government in relation to small business during metrication, the Subcommittee, recommended "that the appropriate legislative committees of the Congress consider legislation which would amend the Small Business Act to provide financial assistance to small business concerns in converting to the metric system" and "that the Select Committee on Small Business of the House of Representatives continue to study the impact of metrication upon small business, in the light of actual ongoing experience."

Getting Started

Many owner-managers of small businesses may be like the general public which, according to the U. S. metric study, knows little about the metric system. In fact, only 40 percent of the individuals sampled could name a single metric unit. And only half of those were familiar with relationships among customary and metric units.

As the British found out, mass education is needed. In the process of their changeover, the British Metrication Board is using newspapers, magazines, radio, television, and other media to inform the people about the metric units they are likely to encounter in everyday living—trusting them to pick up on their own any more technical details they may desire to know.

"Soft change" is the term used when referring to the switchover from one language of measurement to another—without changing the design of the product—for example, labeling the contents of a container in grams rather than ounces or specifying the dimensions of our very complicated splines in millimeters instead of inches, as had already been done by our Society of Automotive Engineers. The term "hard change" refers to altering sizes, weights, and other dimensions of physical objects—for example, packaging milk in a liter instead of a quart container or designing roller bearings in millimeter modules rather than inch modules. Small business will be concerned in varying degrees with both types of changes.

Increased use of metric system is becoming more and more common in industry. A similar situation exists in our educational system. It is likely that before long the

THESE PREFIXES MAY BE APPLIED TO ALL SI UNITS

Multiples and submultiples	Prefixes	Symbols
1 000 000 000 000 = 10^{12}	tera	T
1 000 000 000 = 10^9	giga	G
*1 000 000 = 10^6	mega	M
*1000 = 10^3	kilo	k
100 = 10^2	hecto	h
10 = 10	deka	da
0.1 = 10^{-1}	deci	d
*0.01 = 10^{-2}	centi	c
*0.001 = 10^{-3}	milli	m
*0.000 001 = 10^{-6}	micro	u
0.000 000 001 = 10^{-9}	nano	n
0.000 000 000 001 = 10^{-12}	pico	p
0.000 000 000 000 001 = 10^{-15}	femto	f
0.000 000 000 000 000 001 = 10^{-18}	atto	a

*Most commonly used.

metric system of weights and measures will be taught in every school in the United States. Government assistance may be needed to help develop teacher training, plans, and materials.

If this article has started you thinking of problems that may arise in your own business when you try to use the metric system, the reading has been worth your time. It is always better to anticipate problems than to be caught unaware by them. Regarding America's conversion to metric, what should you do about it now? The main thing is to keep informed about its status. Be alert for news that discuss the matter as it relates to your line of business. Of most importance, stay current with respect to the status of those engineering standards, if any, that are pertinent to your business.

SOD FOR THE PROFESSIONAL

*Valley Farms
Turf Nursery Inc.*

MERION BLUE GRASS • FYLKING

C-1 : C-19 • PUTTING GREEN SOD

PENNCROSS PUTTING GREEN SOD

SIMSBURY, CONN.

Mail Address:

BOX 81

AVON, CONN.

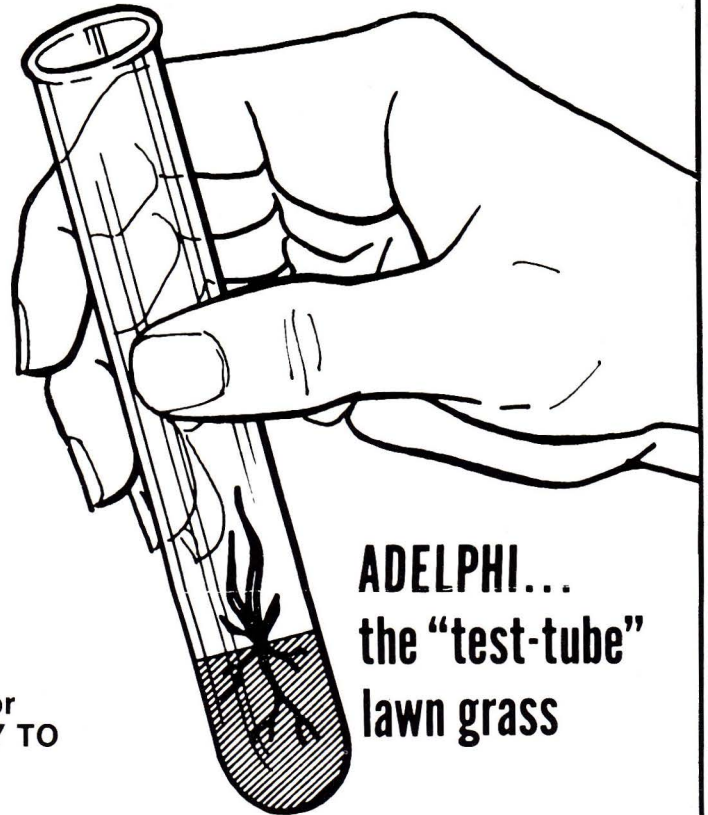
Phone Area Code 203 658-6886

...a product of
man's ingenuity!

created by
laboratory
breeding

Man's plant breeding efforts have successfully revolutionized agriculture and horticulture but never Kentucky Bluegrass. NOW, for the first time, 10 YEARS OF MAN-CONTROLLED PARENTAGE BREEDING brings us ADELPHI KENTUCKY BLUEGRASS... with most of the desirable features hoped for in turf!

RATED NO. 1
in 7 YEARS OF UNIVERSITY TESTING for
OVERALL PERFORMANCE and THE ABILITY TO
PRODUCE MARKETABLE SEED



ADELPHI...
the "test-tube"
lawn grass

A First in Turf!

MAN-MADE

Adelphi

KENTUCKY BLUEGRASS

U.S. Plant Patent No. 3150

- **ADELPHI GROWS NATURALLY** to a **DEEPER, RICH GREEN COLOR** which it maintains throughout the entire growing season!
- **ADELPHI IS LOW GROWING** indicating tolerance to close mowing!
- **ADELPHI YIELDS TURF OF EXCELLENT DENSITY** due to good rhizome and tiller development!
- **ADELPHI EXHIBITS GOOD RESISTANCE TO COMMON DISEASES** such as Stripe Smut, Leaf Spot, Typhula Snow Mold, Crown Rot and Leaf Rust!

For details contact:

J & L ADIKES, Inc. • **VAUGHAN-JACKLIN CORP.**
Jamaica, New York 11423 Bound Brook, N.J. 08805

Performance of Five Fungicides for Control of Snow Mold

Paul R. Harder and Joseph Troll

Introduction

As newer and more sophisticated fungicides for control of turf diseases become available, the need to examine their effectiveness in field trials arises. This study was the second of a two-year program to index certain chemicals for their control of Gray Snow Mold (*Typhula* spp.). In 1971-72 time of application was also considered as a factor in the control process. Since the results of those trials did not show any differences between application dates, the 1973 study focused only on types of chemicals and rates of application.

Materials and Methods

A 160' X 45' area of Penncross Creeping Bentgrass was seeded in April 1972 at the University Farm. The area was maintained throughout the growing season at 3/4" mowing height and was in excellent condition when chemicals were applied on November 21, 1972. The area was divided into 144 10' X 5' plots. There were sufficient numbers of plots so that each treatment could be replicated six times. The chemicals and rates used appear in Table 1. Hand-pump sprayers were used to apply the materials with sufficient water to provide good coverage.

TABLE 1. FUNGICIDES AND RATES USED

Fungicide	Rate per 1000 sq. ft.		
	3 oz	6 oz*	12 oz
Tersan SP (WP)	3 oz	6 oz*	12 oz
Caddy (liquid)	2 oz	4 oz*	8 oz
Cadminate (WP)	2 oz	4 oz*	8 oz
Acti-Dione TGF (WP)	3 oz	6 oz*	12 oz
+Thiram			
Thiram (WP)	2 oz	4 oz	8 oz
and Lime	5 lbs/1000	5 lbs/1000	5 lbs/1000

*Manufacturer's recommended rate
WP - Wettable Powder

TABLE 2. % DISEASED AREA
(AVERAGE OF SIX REPLICATIONS PER TREATMENT)

Fungicide	Rate/1000 sq. ft.	% of Plot Infected	Severity of Infection*
Tersan SP	3 oz	3.6	Slight
	6 oz	.6	Slight
	12 oz	2.5	Slight
Caddy	2 oz	8.0	Moderate
	4 oz	7.0	Moderate
	8 oz	3.5	Slight
Cadminate	2 oz	.33	Slight
	4 oz	.33	Slight
	8 oz	0	
Acti-Dione TGF +Thiram	3 oz	5.5	Moderate
	6 oz	3.6	Slight
	12 oz	1.5	Slight
Lime +Thiram	2 oz	14.0	Moderate
	4 oz	12.3	Moderate
	8 oz	9.3	Moderate
Check		6.5	Moderate
		14.1	Moderate
		17.6	Heavy

*0-5% Slight; 5-15% Moderate; 15-100% Severe

Discussion

There were no phytotoxic symptoms of any of the chemicals at any rates when observed 24 hrs. after spraying. Environmental conditions favored the development of Gary Snow Mold and some injury occurred on most of the plots. Plots treated with all rates of Cadminate had the least damaged area and were in excellent condition. Tersan SP also gave excellent control. The remainder of the chemicals examined had greater areas of damaged turf and, therefore, were not as effective in controlling the disease. No attempt was made to apply additional treatments during the winter months although the area was free of snowfall and additional applications would be recommended during golf green maintenance.

Acknowledgement

The authors wish to thank the Northeast Golf Course Superintendents Association for their contribution to this work.



*Snow time
is no time
to start thinking
about SNOW MOLD*

start winter disease control NOW
with **TUCO Acti-dione® Thiram**

Cold weather and snow cover before the ground is frozen are ideal conditions for Snow Mold. Apply Acti-dione Thiram late fall before the first snow cover and during winter thaws to fight fungi. See us today for help in winter disease control.



JAMES H. SMITH
4 Honey Hollow Drive, Bethel, Connecticut 06801
(203) 744-1588

STANFORD'S PATCO
LAWN AND GARDEN PRODUCTS
"For The BEST LAWN in Town"
CROWN VETCH — Our Specialty

Seed — Crowns — Plants in Peat Pots

FERTILIZERS

Lawn Fertilizer 25-5-10
 Lawn Food 10-8-3
 Sod Maker 12-4-8
 Allganic 4-6-2
 Weed & Feed 10-6-4
 Rose Food 6-9-5
 Evergreen & Shrub Food 7-8-7
 Garden Food 6-12-12
 Fertil Rich 4-6-2
 Bulb Food 4-10-4

CHEMICALS

Crabgrass Preventer (Dacthal)
 Rout (Diazinon)
 Crabout (Tupersan)
 Weedkill (2, 4D & Silvex)
 Lawn Medic
 Turfkare (Chlordane)
 Lawn Chinch Bug Control (Aspon)

Wild Bird Food Mixtures — Purgrain Pigeon Food
Turf Grasses — Spreaders — Special Mixes

Orders or Inquiries may be directed to:

Stanford Seed Co. Oxford, Mass. 01540 617—987-0311
 Stanford Seed Co. Buffalo, N.Y. 14240 716—825-3300
 Stanford Seed Co. Plymouth Meeting, Pa. 19462 215—825-1240

Reprinted from *Fertilizer Solutions*, March-April 1973

The Making of a Label

By Dr. C. T. Dickerson, Jr.
Technical Manager, Proprietary Herbicides
Monsanto Company

Inevitably, agriculture always has directly and personally affected everybody—the rich, the poor, the primitive, the sophisticate. This is particularly true in the U.S. today, since most of us wear clothing made from agriculture's fibers, and all of us eat rather well. Consequently, a byproduct of our affluent society is a thriving \$60 billion agriculture industry.

In 18th century America, the business of farming consisted primarily of man and beast working as a team to coax a livelihood from the soil. The practice was transformed into a commercial enterprise by machinery from the 19th century's industrial revolution. It was second-staged to new technological heights by the 20th century's chemical revolution.

In their relatively short history, crop-protection chemicals have contributed greatly to the vast improvements in the business of farming. If technology of 30 years ago were used today, our current 300 million acres of croplands would have to be doubled to equal today's productivity.

The chemical revolution in agriculture is still going on. As its products continue to improve and multiply, producers must follow stringent requirements developed early by the Food and Drug Administration, the Department of Agriculture and more recently, by the Environmental Protection Agency.

The most important component in any package of farm chemicals is the label on the package itself. The label documents the exhaustive efforts in industry and government to insure every conceivable safety and per-

formance advantage possible before the product is introduced. It is the purpose of this article to describe what goes into the making of such a label and to underscore the importance of following its recommendations.

For each crop-protection chemical that reaches the market, about 7,500 chemical compounds are passed over. As soon as the management of a producing company believes it has discovered a useful new product, testing and clearance procedures involving the proposed commercial formulation are initiated. The procedures ultimately will require approximately 70 man-years of expert attention, an average expense of five to seven million dollars and about seven years of elapsed time.

Tests by the prospective producer, which require a minimum of three years, include toxicological studies, rate and mechanism of degradation in treated crops, soils and animals, possible impact on the environment and the compound's ability to control the target pests or infestations under a wide range of geographic conditions.

Toxicological Studies

A minimum of 20 toxicological studies are required in order to evaluate possible hazards of the new material to man, animal life and the environment. Short-term tests determine the amount of material that will kill 50 percent of test rats and rabbits, both by feeding and by skin absorption. Other tests on rabbits evaluate the possibilities of skin and eye irritations or danger of vapor inhalation.

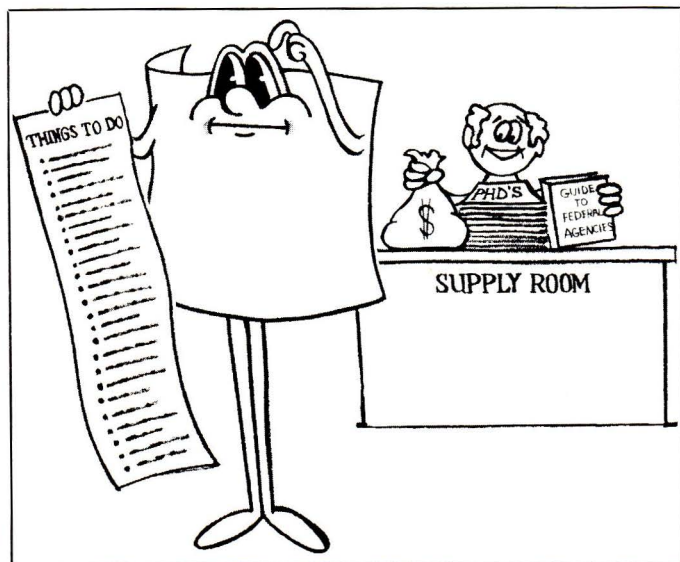
Long-term chronic feeding studies are designed to explore the new material's potential for causing injury or cancer. Other tests measure potential for genetic changes, reproductive effects or malformations of offspring.

In addition to toxicological studies, tests are required of the new material's compatibility with crops, animals and the environment. Called metabolism studies, these are to determine how the compound breaks down in treated crops, animals, soil and water. In metabolism studies, radioactive elements are incorporated into the compound and traced during all phases of its use.

Residue studies determine the quantities of original material or its breakdown products that remain. Sophisticated analytical techniques used in these tests include the use of gas-liquid chromatography. This can measure parts or fractional parts per million of residual compounds. Residues down to one-tenth of a part per million are usually measured readily. That figure represents five drops of water in one thousand gallons.

Another test series includes the determination of amounts of residues of the chemical in the meat of cat-

(Continued on Page 14)



LABEL CLEARANCE REQUIRES exhaustive field and lab tests, dozens of trained researchers, reviews in Washington and expenditure of several million dollars.

(Continued from Page 13)

tle, swine and poultry, and also in the milk of cows and the eggs of chickens.

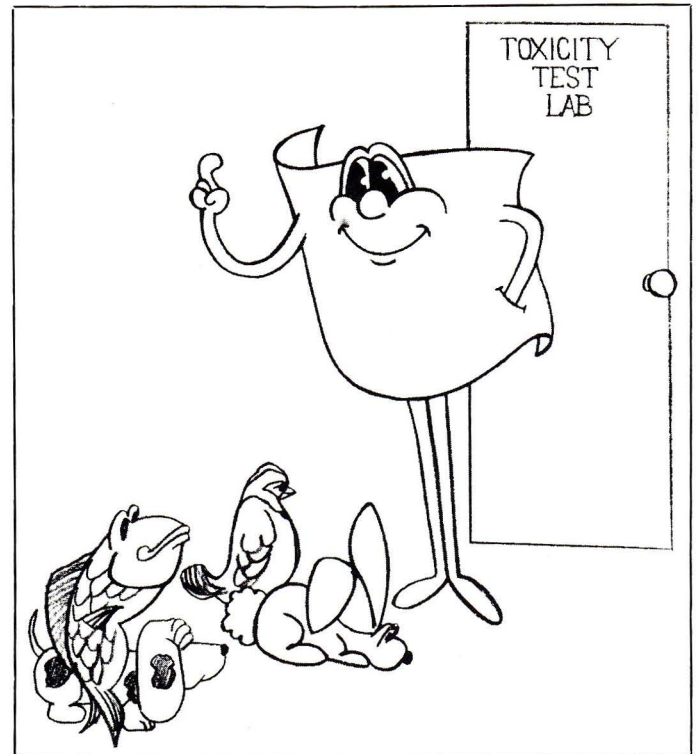
Extensive environmental tests are to measure the new material's movement ability in soils and ground water, its degradation and dissipation patterns and its possible tendencies to persist in the soil where it might be absorbed by crops planted later in the same field. The possibilities of residue accumulations in wildlife are checked with fish and bird studies.

In conjunction with the tests already described, evaluations must be conducted in regard to the proposed new material's practical value as a crop-protection tool. Efficacy data which must be accumulated, covering each crop for which clearance is being requested, encompass variety, soil type, organic matter, date and frequency of application, plot size and ratings of pests controlled (plus those not controlled).

Of prime importance is the effect on the crop itself and final yields. To simulate natural application conditions for these tests, some of the plots must be field size. The essential objective of the tests is to insure not only that the new material is compatible with the environment, but also that it is a worthwhile product for the intended use.

Mixtures

In many areas, of course, materials are applied as a tank or package mixture. With pesticide mixtures, studies are conducted to show that residues are similar when combined materials are applied as compared to usage of the single components. Tested also is the chemical stability of the material when mixed with another and the breakdown characteristics of such a combination. Two-year results of field data are required for the evaluation of the mixtures.



DOGS, RABBITS, QUAIL, fish and other lab animals are involved in toxicological tests.

For package mixtures, 21-day subacute tests on rabbits and four-day tests on two species of fish must be conducted to determine possible differences in toxicological properties.

The tests on mixtures include evaluations of the material's behavior when mixed with sprayable fluid fertilizers. Specifically, tests should determine whether the end results will be similar to those involving other carriers, such as granules or water.

TUCKAHOE
TURF
FARMS

Indian Corner Rd.
 Slocum, R.I.

- ★ **Merion Blends**
- ★ **Shade Grass**
- ★ **Penncross Bentgrass**
- ★ **Beck's Big Roll**
- ★ **Sod System**
- ★ **Sod Palletized**
- ★ **Delivery Anywhere
 In New England & N.Y.**

★ **Call Toll Free** ★
800 556-6985
R.I. Res. Call 294-3377

Evaluation of Test Data

After all test data in support of the proposed new label are prepared, the information is submitted to the Environmental Protection Agency in Washington, D. C. For the first few months, EPA's pesticide regulation division evaluates data regarding the utility of the proposed new compound.

If all is found in order, the material is certified as being of value for the requested label usage. The petition is then passed on to EPA's pesticide tolerance division. Reviewed there are toxicology, residue, metabolism and environmental data. A successful journey through that division culminates with the establishment of tolerance levels which are published in the Federal Register.

The next step is a final overall review by the Pesticide Regulation Division of the petition to determine if sufficient data have been presented to support all claims on the proposed label.

Following a minimum of three years of field and laboratory evaluations, a petition for clearance logs an additional year or more of travel time in Washington. During the period, the petition can grow into a document large enough to fill one file drawer. EPA is making progress in its attempts to speed up the clearance process.

The Label

A new crop-protection chemical compound which has been accepted by the EPA for registration must contain the following information:

1. NAME—the chemical name of the new product, its brand name or trademark and manufacturer.

2. SIGNAL WORD AND STATEMENT—this includes a required word such as "caution," "warning," "danger," or "poison." The statement, "keep out of reach of children," must also appear on the front panel. If the product is an economic poison which is highly toxic to man, the label must additionally show "poison" and a skull-and-crossbones insignia (red, on a white back-

ground), a statement of antidote and directions to call a physician immediately. This section of the label reflects potential hazards due to eating, skin exposure, inhalation, flammability or explosion.

3. INGREDIENTS—name and percentage of each active ingredient by weight, including the total percentage of inert ingredients.

(Continued on Page 16)



KARANDREW TURF FARMS, INC
 1338 RIVER BLVD., SUFFIELD, CONN.
 TELEPHONE 203-668-2076
 617-828-1065

QUALITY SOD SINCE 1957

- Merion Bluegrass
- Merion/Fescue Mixtures
- Penncross Bentgrass
- 0217 Fylking Bluegrass
- Karandrew Bluegrass Blends

**All Sod Delivered on Pallets
and Unloaded on Job Site.**

Over 400 Producing Areas

BOSTON AREA REPRESENTATIVE
SAMUEL S. MITCHELL
 15 Longmeadow Drive
 Canton, Mass.

E. ROSS SAWTELLE
(1905 - 1964)
CHESTER M. SAWTELLE

SAWTELLE BROTHERS

565 Humphrey St. (Route 129)
(Former New Ocean House Convention Hall)
SWAMPSCOTT, MASSACHUSETTS

Parts Dept. to remain at "The Barn" at Jcts. Rtes. 128 & 62
Danvers, Mass. Tel. 774-4200

Telephone SWAMPSCOTT
599-4856
P.O. Box 267

— Over 35 Years Experience —

(Continued from Page 15)

4. CONTENTS—actual amount of active ingredient and net weight of container.

5. NUMBER—the EPA registration number assigned to the new product.

6. DIRECTIONS—how to use the product for obtaining desired results and how to use it safely.

Under the “directions” category, the label must point out whatever further information is appropriate for the product, such as:

Specific crop or type of site to be treated;

Purpose of treatment, naming pests to be controlled and the nature of the type of control intended;

Dosage rate of each application in terms of equivalent broadcast rate per acre;

Timing of application depending upon growth stage

of both crop and infestation;

Method of application, such as injection or sprays (and whether the carrier should be water or fertilizer);

Whether application should be by ground equipment, airplane, backpack sprayer, or other;

Type of placement, such as overall or directed, band sprayed or broadcast, etc.; and

Number of recommended applications per year and interval between applications.

In addition to the foregoing required information, many labels will also include information designed to assist the applicator in obtaining maximum performance from the new product. The section does not tell the applicator what kind of sprayer to use, but rather offers guidelines regarding desirable performance features pertaining to such things as agitation, screens and nozzles.

R. F. MORSE & SON, INC.

“Growth Through Service”

Power Equipment

Irrigation Supplies

Chemicals

Fertilizers

CRANBERRY HIGHWAY

WEST WAREHAM, MASS. 02576

TELEPHONE

617-295-1553



TURF MAINTENANCE EQUIPMENT AND SUPPLIES

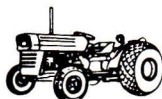
THE MAGOVERN COMPANY, INC.

EST. 1896 - INC. 1928

P. O. BOX 270, LAWNACRE ROAD, WINDSOR LOCKS, CONNECTICUT 06096
WINDSOR LOCKS 203-623-2508



41 MEADOW STREET
FAIRFIELD, CONN. 06430
(203) 255-2817



57 ALLEN STREET
SPRINGFIELD, MASS. 01108
(413) 733-6638



279 DALTON AVENUE
PITTSFIELD, MASS. 01201
(413) 443-4450



Calculations for Turfgrass Culture I: Fertilizers

by Dr. Robert N. Carrow

This article is the first in a series which will be concerned with basic calculations used by turf managers. The three main areas to be covered will be fertilizer, pesticide, and irrigation problems.

Terminology

A turfgrass *fertilizer* is any material which contains at least one of the essential plant nutrients and is applied to the soil or plant for the purpose of improving turfgrass quality. The nutrients most commonly applied are nitrogen (N), phosphorus (P), and potassium (K). The *analysis* of a fertilizer is the plant nutrient content of the material expressed in terms of percent N, P_2O_5 (phosphorus pentoxide), and K_2O (potassium oxide). For example a 12-6-4 fertilizer has 12% N, 6% P_2O_5 , and 4% K_2O present, while a 38-0-0 fertilizer has 38% N, and no P_2O_5 or K_2O . The remainder of the material in the bag is filler or carrier. The fertilizer *ratio* refers to the relative percentages of N, P_2O_5 and K_2O present. Thus, a 16-4-8 fertilizer has a ratio of 4-1-2 and a 25-10-15 fertilizer a ratio of 5-2-3.

Calculations

1. The most common fertilizer problem is calculation of how much material from the bag to apply in order to obtain the desired quantity of a specific nutrient. For instance, more pounds of a 10-10-10 fertilizer is required to obtain 1.0 lb actual N than for a 33-0-0 fertilizer. The following examples illustrate the procedure:

a) For a 1.5 lb application of N per 1000 sq. ft., how many pounds of 25-5-10 is required? The general formula is:

$$\frac{(\text{lbs of nutrient desired}) (100)}{(\text{percent of the nutrient in the fertilizer})} = \frac{\text{lbs of fertilizer to obtain}}{\text{desired quantity of nutrient}}$$

$$\frac{(1.5 \text{ lbs N desired}) (100)}{25\% \text{ N}} = 6 \text{ lbs of 25-5-10 needed per 1000 sq. ft.}$$

b) For a 3 lb application of P_2O_5 per 1000 sq. ft., how many pounds of superphosphate (0-20-0) is required?

$$\frac{(3 \text{ lbs } P_2O_5 \text{ desired}) (100)}{20\% P_2O_5} = 15 \text{ lbs of 0-20-0 needed per 1000 sq. ft.}$$

II. The above calculations were for a 1000 sq. ft. area, however, most often the turf manager wishes to apply fertilizer to a larger area. The simplest way is to calculate the quantity of material needed per 1000 sq. ft. then multiply by the number of 1000 sq. ft. areas in the site to be fertilized. A couple of examples will illustrate the procedure:

a) A lawn area is to receive 1.5 lbs of N per 1000 sq. ft. The fertilizer is a 20-5-10 and the lawn is 1/4 acre in

size. How much 20-5-10 will be required?

1 acre is about 43,500 sq. ft.

1/4 acre = 10,800 sq. ft.

$$\frac{(1.5 \text{ lbs N desired per 1000 sq. ft.}) (100)}{20\% \text{ N}} \times \frac{10,800 \text{ sq. ft.}}{1000 \text{ sq. ft.}} =$$

81 lbs 20-5-10 needed for the 1/4 acre lawn

b) A 7,000 sq. ft. golf green is to receive 2 lbs K_2O per 1000 sq. ft. The fertilizer is muriate of potash (0-0-60)

$$\frac{(2 \text{ lbs } K_2O \text{ desired per 1000 sq. ft.}) (100)}{60\% K_2O} \times \frac{7,000 \text{ sq. ft.}}{1,000 \text{ sq. ft.}} =$$

23.3 lbs 0-0-60 needed for the 7,000 sq. ft. green

III. One of the considerations when selection a fertilizer is its cost. However, other factors such as low foliar burn probability, little leaching potential, longer residual, bulk, absence of dust and good storage characteristics are also important.

Because most fertilizers do not have the same analysis, their cost cannot be compared on the basis of dollars per ton or dollars per 100 lbs. Instead, the cost per pound of nutrient is the basis most often used. If the fertilizer is being applied mainly for its nitrogen content,

(Continued on Page 18)

Creeping Bent Stolons
(C-1 & C-19)

Windy Acre Farm

1361 Suffield St. Suffield, Conn.
Tel. 203 623-9030

E. J. Pyle, Prop.

**Nursery ideally located for
New England plantings**

Twenty years growing stolons

Original stock from R.I. Expt. Sta.

**Address: 133 Chester St.
Hartford, Conn. 06114
Tel. 203 249-4059**

(Continued from Page 17)

then the cost of nitrogen per pound should be the basis for comparison. Two examples are as follows:

a) A fertilizer has an analysis of 35-10-20. It costs \$350 per ton. What is its cost per pound of nitrogen?

1 ton = 2000 lbs, however, only 35% (or .35) of the ton is actually nitrogen.
 (2000 lbs 35-10-20) (.35 is N) = 700 lbs N per ton of 35-10-20

To calculate the cost per pound of nutrient the general formula is:

$$\frac{\text{(cost per unit weight of fertilizer)}}{\text{(lbs of nutrient per unit weight of fertilizer)}} = \frac{\text{cost per unit weight}}{\text{of fertilizer}}$$

or

$$\frac{\text{(\$350 per 2000 lbs of 35-10-20)}}{\text{(700 lbs N per 2000 lbs of 35-10-20)}} = 0.50\# \text{ per lb of N}$$

b) A 10-5-5 fertilizer costs \$3.00 per 40 lb bag. What is the cost per pound of nitrogen?

A 40 lb bag of 10-5-5 is only 10% (or .10) nitrogen
 (40 lbs 10-5-5) (.10 is N) = 4 lbs N per 40 lb bag of 10-5-5

$$\frac{\text{(\$3.00 per 40 lbs of 10-5-5)}}{\text{(4 lbs N per 40 lbs of 10-5-5)}} = 0.75\# \text{ per lb of N}$$

Conversion Factors

- 1 pound = 16 ounces = 454 grams
- 1 ounce = 28.4 grams
- 1 gallon = 3.785 liters
- 1 acre = 43,560 sq. ft.

Teddy Temper

We can't do anything about Teddy Temper. But when weed, insects and disease show up on your turf, we have something for almost everyone of them. Chipco Turf Kleen. Chipco Turf Herbicide MCPP. SUPR-FLO Maneb Flowable. Chipco Microgreen Liquid. Chip-Cal Granular. And Chipco Spot Kleen. Everything to help keep your greens (and fairways) in the pink.

From Rhodia Chipco Products.



"He's not just another duffer. He's chairman of the greens committee."



... It pays to use
AQUA-GRO



- AQUA-GRO** Quality Blended Wetting Agent
 - AQUA-T** Low Cost Blended Wetting Agent
 - STOMA-SEAL** Chemical Control of Wilt
- Convenience of Application*

AQUA-GRO GRANULAR



The Heavy Duty Line. One year warranty on complete unit because it is built for heavy duty commercial use.

BUNTON LAWN LARK

Power turning, trim with either side, six forward speeds, mows without scalping, mows grades up to 45°, rider attachment optional. 24" to 52" cuts. Ask about new 21", 4 H.P. self-propelled.

BUNTON TRIMMERS
 Trim and edge with either side, 8", 10", 12" cuts.



BUNTON "C-TWENTY ONE"
 Heavy, reinforced frame and adjustable handles, extra-life engine, up to 5 H.P., machined-steel blade driver and ball bearing steel wheels.



For additional information, write Dept. WT

ALLEN LAWNMOWER CO.
 20 River St., West Springfield, Mass.
 Phone 733-7837 — Sales & Service

Is He responsible?

Growing problems this year? Don't feel bad just about everyone is in the same boat. Experts are already saying it may be the worst growing season in forty years and certainly it has been a disastrous one for the area turf growers.

For, what began as a good season, soon became riddled by periods of torrential rain followed by extended hot spells which all but wiped out large areas of turf at the various clubs throughout the northeast. The question must be asked "What about the club superintendent? Is he responsible?" Well, the obvious answer is no. But why, then, the widespread job turn over that is occurring presently? Are the greens committees becoming too quick to condemn the superintendent for a condition not within the realm of his control?

Of course, this situation must be treated fairly and one excellent method is through education. Greens Chairman and Superintendents should make it their responsibility to provide plenty of journals, research reports, etc. to committee members, thus insuring a group that is well informed on the various factors involved with growing fine turf. Through this learning one could understand clearly what many superintendents were up against during this past growing season.

Certainly this year shows that bare spots don't always indicate poor management practice. For with conditions that were almost always placing the grass plant in a stressed condition and weather which was constantly optimum for disease the superintendent had his hands more than full. As one can clearly see the elements can either work for or against the superintendent in what is already a hard enough job in keeping his course in top form. So as in all fields of agriculture in which a grower can experience an off season, this was an exceptionally poor season for turf growers and committees and members alike should rate the performance of the superintendent with this fact firmly in mind.

Field Day

On the lighter side The University of Mass. Turf Research group headed by Doctors Joseph Troll and Robert Carrow held its first outing on September 5, 1973 at the new turf plots in South Deerfield, Mass. Both Dr. Troll and Dr. Carrow spoke on the new facilities and equipment as well as the areas in which research is to be pursued.

The outing was a good indication of where any money that is contributed will be going. Both Dr. Troll and Dr. Carrow stress that the new test area is only a foundation for future work and research in the field of turf grass science and welcome any donations to further the cause.

The Turf Bulletin would also like to express its sincere condolences to the family of Stanley Priest, who

passed away in May. Mr. Priest was a credit to the Bedford Golf and Tennis Club, Bedford, New York as well as a credit to the industry. In passing, Mr. Priest left to the University Research group an insurance policy of \$1,000.00

The profession has also been saddened with the death of Joseph Zoppo. Mr. Zoppo was a graduate of Stockbridge School of Agriculture and an outstanding superintendent of Nashawtuc, Country Club. He will be deeply missed by the many friends he has made in the Turf Industry.

THE EDITORS

In Memorium Joseph Zoppo

April 1936 - September 1973

CLEARY PRODUCTS for BETTER TURF

- 3336 TURF FUNGICIDE** — A broad spectrum systemic fungicide that prevents and controls all 6 major turf diseases. Non-toxic, non-mercurial.
- BROMOSAN TURF FUNGICIDE** — The newest broad spectrum systemic fungicide for those persistent problem areas or areas that have gotten out of hand.
- CADDY** — Economical Liquid Cadmium Fungicide.
- PMAS (10%)** — Crabgrass and Disease Control.
- SPOTRETE** — 75% Thiram Fungicide.
- CLEARY'S GRANULAR TURF FUNGICIDE** — For snow-mold, spring and summer diseases.
- CAD-TRETE** — Broad spectrum fungicide containing Thiram and Cadmium.
- MCPP** — Control of chickweed, knotweed, clover on bentgrass greens and fairways, bluegrass and fescues.
- MCPP-2,4-D** — Controls chickweed, knotweed, dock, dandelion, plantain, ragweed, pigweed, etc.
- METHAR 80** — Controls Dallisgrass and crabgrass. Water soluble.
- METHAR 30** — A super crabgrass killer.
- AMA PLUS 2,4-D** — Control of Dallisgrass, silver crabgrass, plantain, dandelion, knotweed, chickweed, and other broad-leaf weeds.
- AMA (SUPER METHAR)** — The new "AMA" liquid crabgrass killer.
- ALL-WET** — Added to water, it allows quicker and deeper penetration...enables soil to retain needed moisture.
- CLEAR-SPRAY** — Liquid Hygrostatic Sticker to protect against wilt and winter kill.
- TRU-GREEN** — Liquid Chelating agent.
- GRASS-GREENZIT** — Permanent green pigment, restores green color to dormant or discolored grass. Not a dye.

W-A-CLEARY
CORPORATION

P. O. Box 10 Somerset, N. J. 08873

FROM



RFD #2, HADLEY, MASS. 01035

Attention
Coming Next Issue—
Letters to the Editors

If there's something you feel you'd like to make known, complaints, problems, or anything which may pertain to the turf industry or a related field, take the chance to express yourself in a letter to the editor.

Write: William Clark & William Spence
RM 20 Stockbridge Hall
University of Massachusetts
Amherst, Massachusetts 01002

We would be pleased to hear from you.

Join Your Massachusetts Turf And Lawn Grass Council

For more information write:

Mass. Turf and Lawn Grass Council

attn.: Dr. Joseph Troll

RFD #2, Hadley, Mass., 01035

The Massachusetts Turf and Lawn Grass Council is a non-profit corporation. Its officers derive no benefits except the satisfaction of keeping Massachusetts and its neighbors first in turf. It was founded on the principle of "Better Turf Through Research and Education." We must support our University to accomplish this, and we can with a large and strong Turf Council.

Membership is not restricted to Massachusetts residents or turf professionals alone, all are welcome to take part. Write today.

THE *Clapper* CO.



1121 WASHINGTON STREET, WEST NEWTON, MASSACHUSETTS 02165 / TELEPHONE: (617) 244-7900

TORO ■ REEL, ROTARY, GANG MOWERS. TRACTORS, SNOW THROWERS, UNDERGROUND IRRIGATION SYSTEMS ■
MILORGANITE FERTILIZER ■ FUNGICIDES ■ HERBICIDES ■ INSECTICIDES ■ RYAN TURF TOOLS ■
GIANT LEAF VACS ■ BLOWERS AND TRUCK LOADERS

Our advertisers' contributions help make it possible for us to give you interesting issues of TURF BULLETIN. We shall appreciate your mentioning to them that you saw their advertising in our columns.