

# Looking for extra growth? Give the job to JOBE.

When you use Jobe's Tree and Shrub Spikes, it's like adding a gentle giant to your groundskeeping crew. Forget expensive and time-consuming hole-drilling. Just one man with a hammer can get the job done quicker, more easily and with remarkable results.

## Sands Point Golf Club Gave the Job to Jobe.

John Gresh, superintendent of Sands Point Golf Club in Sands Point, L.I., New York, tells of his results: "Where I used Jobe's Spikes, pines and evergreens

grew 9 inches in 1978, compared to only 4 inches on unfertilized trees. In 5 years, that means two feet of extra growth."

John Gresh found Jobe's Spikes save time, equipment and labor costs. "Pouring tree and shrub fertilizer into drilled holes used to be a time consuming and expensive way to feed trees. That's probably why more of them didn't get fed."



## Try Jobe's Triple 5 Program

A 5" diameter tree needs only five spikes. You can pound them into the soil around the tree in 5 minutes. Jobe's exclusive patented binder compresses 16-8-8 fertilizer into easy-to-drive spikes that provide uniform release of plant food for fast but sustained tree growth.

Call your Jobe's distributor and order as many cases as you need. Or order direct. \$30 per case (105 spikes) prepaid, 5 case minimum. 15 or more cases, \$25 per case; 36 or more, \$22.50 per case. Also try Jobe's Evergreen Spikes 12-6-8 and Fruit Tree Spikes 5-15-15.

**Jobe's**  
...the big  
tree maker

**Jobe's**  
**TREE & SHRUB SPIKES**

The easy method for professional tree care.

International Spike, Inc., P.O. Box 1750, Lexington, KY 40593



# Now's the time for two of the BEST.<sup>®</sup>

## Turf Supreme plus Balan\*

Ideal for late winter or early spring application. Contains Turf Supreme, the West's number one turf food, plus Balan, recognized by professionals as a consistently-effective pre-emergent herbicide that can be used with confidence. Gives long-term control of Crabgrass, Poa Annua, Goosegrass, Foxtail and Barnyard grasses. Rain won't leach Balan out of weed control zone. May also be applied prior to weed germination in late summer and early fall.



## Turf Disease Control

The professional's choice for dependable control of a wide variety of turf and ornamental lawn diseases. Specifically formulated with 2.5% Dac-onil\*\* granules for use on more than 25 grass species and varieties. Apply in late winter or early spring for effective control of 8 common turf diseases including Large Brown Patch, Curvularia, Gray Leaf Spot, Helminthosporium Leaf Spot, Melting Out, and Copper Spot in turf and Stem Rust on Bluegrass. One bag covers 4,000-6,000 square feet.



For more information, contact your local Turf Product Distributor or Best Sales Representative.

\*Balan is a registered trademark of Eli Lilly.



BEST PRODUCTS

Western Division      Southwest Division  
P.O. Box 267      P.O. Box 5356  
Lathrop, CA 95330      Houston, TX 77012  
(209) 858-2541      (713) 923-2014  
Division of ZOECON CORPORATION

\*\*Daconil is a registered trademark of Diamond-Shamrock.

# MICHIGAN NURSERYMAN BOASTS OF TRICKLE IRRIGATION BENEFITS

By Dan Hager, Lansing, Michigan

Trickle irrigation may not be for everyone, but as far as David Farley of Farley Bros. Nursery, Inc., of Albion is concerned, it's the best way to go. Eventually his entire stock of deciduous shade trees will be watered by that system. He's also trying it out on spruce and pine.

Trickle irrigation is especially well suited to his type of operation, he feels. He grows his trees larger than most nurserymen and spaces them out more widely in the fields. His soil is also lighter than in many nurseries. It's been classified as a Hillside sandy loam.

But trickle irrigation is a booming technology that has developed far beyond the experimental stage. Most of the early bugs have been worked out. Michigan fruit growers are sold on it and have been converting their orchards to it by thousands of acres per year. For nurserymen it's a technology worth knowing about.

Basically what the systems do is deliver very small amounts of water to the growing stock exactly where it needs it the most — directly to the root zone. Water reaches each such zone through a network of pipes, usually consisting of a large main line and smaller laterals running down the rows of trees. The key to the effectiveness of a trickle irrigation system is the emitter — the tiny opening in the pipe network at each tree, permitting minute amounts of water to trickle out at precisely the correct spot and at precisely the correct rate.

As might be expected, most of the development of trickle irrigation systems was done in arid regions of the world, where a little water has to do a lot of work. The basic concept appears to have originated in greenhouse applications in England, according to Dr. A. L. Kenworthy of the Michigan State University horticulture department, the pioneer trickle irrigation researcher in the Midwest. "The technology was picked up and used in Israel in the late '60s, where it was called drip irrigation," Kenworthy said. "Next it moved to Australia, then it came into the U.S. by way of California, and then to Michigan. As far as the eastern states are concerned, there is more trickle irrigation in Michigan than anywhere else. I'd guess there are 70,000 acres with it now in Michigan orchards."

Farley got involved in 1972. "As far as we know, we were the first in the world to use trickle irrigation in the field production of nursery stock," he said. "There's more interest in it now, and more nurseries are using it."

Farley worked closely with MSU doctoral student Harry Ponder, who wound up his dissertation on trickle irrigation in 1975 after doing all his field research at Farley's nursery. It dealt to some extent with earlier technology, some of which has become superseded in the fast-moving trickle irrigation world. Kenworthy says, "There is a lot of development still going on. They do take a lot of maintenance."



**Emitter**, inserted directly into laterals through a hole punched at the base of each tree, simplifies and shortens the installation process.

The problems are outweighed by the advantages, however, in the opinion of Farley and his foreman Barry Benson, both of whom take little prodding to start talking enthusiastically of their own trickle system.

"One of the most significant advantages is the capability of tailoring the root system, that's the specific area that excites me the most," Farley said.

"We get a greater root system with a greater root surface. We not only increase the amount of feeder roots, we also get a greater amount of structural roots. We've determined to our satisfaction that we can influence the location of the roots, to where we have them nearly all in the soil ball."

To do so, however, takes precision — "the right rate of water, the right duration, and water directly at the tree." The principle is rather simple, though. The roots develop mostly where the water is, so if the bulk of the moisture is localized within the zone which will make up the eventual ball, the roots will proliferate right there.

That regulated supply of localized moisture leads to another advantage. "Trickle irrigation keeps the soil in a good moisture condition for digging," Farley said. "That's particularly helpful for our summer or early fall balling."

Trickle irrigation also minimizes transplant shock for the trees the first year in the field. "The risk of first-year loss is reduced," Farley said. "Daily watering from the time of planting does the trick." Farley is now able to keep his tree mortality down to about one-tenth of one percent the first year in the field.

The trees even start growing that first year. "Ordinarily their energy goes into the roots the first year to overcome the shock," Benson ex-





# STOP

**Before you do anything to your lawn this spring, the following should be of interest and great help:**

## **NATURE'S METHOD *Produces* THE GREEN MAGIC SYSTEM**

### **TO REINFORCE WHAT YOU ALREADY KNOW . . .**

1. Nature has a method and a rhythm that makes plants (lawns) grow healthy & beautiful.
2. Man has a distinctive ability that quickly destroys nature's positive responses.

**Learn how you can help nature improve your lawn & your own professional image.**

#### **GREEN MAGIC SYSTEM**

If you are looking for a positive approach to turfgrass management that will produce better results than any other method available, one that will build your image as an authority on a truly professional basis, then you will want to consider the GREEN MAGIC SYSTEM.

There are available a vast number of fertilizers, weed killers, pesticides and other types of chemicals designed for general application but very few of these take into consideration local soil and environmental conditions.

Because of the wide use of these products, and due to the fact that they are manufactured for mass consumption on a national basis, the general public believes that these products are the "cure-all" and therefore, the only method of obtaining desired results. But, the opposite has become more and more evident. Instead of grasses and ornamentals becoming more beautiful and stronger, they are becoming weaker and more susceptible to stress conditions, wear and tear, insects, disease, etc.

Over 30 years of extensive research has been expended by Agro Chem in developing a system to overcome such problems. As we investigated man's synthetic approach to improving the health and vigor of turf grasses and ornamentals, it has become evident that natural methods were far superior and that man's artificial approaches just create more problems.

The **GREEN MAGIC SYSTEM** has been developed through these years of extensive research. It is a system that actually works with nature, her rhythm and her many natural complexities; one that encourages plants to grow naturally stronger and more resistant to unfavorable environmental and soil conditions and other adversities.

Rather than trying to create a product to offset an adverse condition, which has been the standard method of developing products and processes to help grow plants healthfully, Agro Chem has directed its research & development towards finding out how plants, especially turf grasses, have been able to sustain themselves and continue to grow for millions of years without the aid of man. With every step of research new discoveries were made, unlocking the secrets of nature and resulting in a complete system that actually encourages plants to grow naturally. This means that they become hardier, sturdier, deeper green in color, have deeper, stronger root systems and become healthier than ever before possible. When the plant becomes stronger, it is more capable of resisting insect and disease attacks, adverse weather and other unfavorable conditions that are common to the life of all living organisms.

#### **THE DEVELOPMENT OF GREEN MAGIC AS A COMPLETE SYSTEM INVOLVED THE FOLLOWING CONSIDERATIONS:**

##### **1. PROVIDING A COMPLETE NUTRITIONAL DIET IN THE PROPER CHEMICAL & PHYSICAL FORMS FOR THE PLANTS DESIRED.**

Each species of plant requires certain conditions for ideal growth. If these conditions are met, the plant will grow luxuriantly. Con-

versely, when these conditions are not met, plants will slow down in their growth, weaken, and eventually be replaced by other, less desirable plants that are more adaptable to a change in environmental conditions. This process is called "The Evolutionary Process"; where one plant will replace another plant as conditions change in a local soil or geographical area.

Nutrient availability is one of the most important of these conditions and Agro Chem has determined exactly the nutritional requirements of the various turfgrasses to provide optimum vigor and growth. Nutritional requirements encompass a complex system that involves not only the primary nutrients (nitrogen, phosphorous, potash), but the secondary and micro nutrients (calcium, magnesium, sulfur, iron, manganese, copper, zinc, boron and many others), all contained in a natural form that can be absorbed by plants without weakening or damaging the plant, soil or micro organisms life within the soil.

Strange as it may seem, most of the ingredients supplied to the soil artificially, by man, are in a form that is often quite toxic to the plant, soil and micro organism life, as well as being unnatural. Our research studies have shown us that many ingredients used to stimulate plant growth are applied to the soil without any consideration or knowledge of what the plant requires and how this whole nutritional system works in nature and without any regard to the entire natural cycle that makes nature work so well.

Research has shown that nature is not so ready to accept these synthetic, unnatural applications. Even though there may be initial positive signs in growth response, many detrimental things happen with repeated applications. Thus, a natural system must take all this into consideration in order to get a natural growth response.

##### **2. IMPROVING THE SOIL**

In the turf grass field, the soil has been taken for granted and not much concern has been shown for its improvement or what soil conditions are best for growing turf grass. Agro Chem's extended research has shown that the soil is one of the most critical components of this natural system and it must be handled very carefully because the condition of the soil determines the quality and depth of the root system and the over-all health and beauty of desirable turf grasses.

It has long been known, especially in the farming communities, that continual application of chemical fertilizers and pesticides to the soil reduces the productivity of the soil by killing soil microbes and destroying soil aggregates which causes many problems such as: Excessive amounts of unnatural erosion run-off and pollution of the underground water tables, streams, ponds and other natural water holding areas.

The soil, instead of becoming more productive and building up its organic matter residues and its micro organism activities, becomes drastically depleted of its organic matter content and often times becomes stratified, with layers of sand, silt and clay making the soil more compact and less penetrable by air, water

and nutrients. The soil becomes less suitable for the growth of desirable plants and encourages their roots to grow toward the surface instead of deeper into the soil.

### 3. THE IMPORTANCE OF SOIL ORGANISMS

Soil organisms are responsible for natural decomposition of dead organic matter and development of the essential organic matter and humus within the soil. A highly organic soil is a very productive soil which is capable of supporting optimum plant growth. Soil organisms include bacteria, fungi, and virus organisms, plus many other living creatures within the soil. These contribute to the soil complex and are responsible for the natural relationships between plants and soils.

The application of various types of fertilizers, herbicides and pesticides has an immediate impact on the life within the soil. From continual use or misuse of such products, the soil can be changed from a desirable to an undesirable condition which diminishes the health and vigor of the desirable plants.

If these beneficial soil organisms are missing, they are replaced under the GREEN MAGIC SYSTEM. Such continual chemical applications destroy the beneficial microbes that play a major role in bringing nitrogen into the soil and making the complete chain of nutritional elements available for plant consumption. These micro organisms are responsible for the decomposition of plant litter (mat & thatch in lawns) and when the microbes are destroyed, mat & thatch does not decompose, but instead, accumulates at the soil surface, restricting the penetration of air, water and nutrients, which therefore restrict the penetration of roots into the soil. This situation encourages these roots to grow on the surface — creating additional mat & thatch accumulation.

Mat & thatch is unnatural and undesirable because it holds moisture (like a sponge) on the surface of the soil. Sunlight warms it and creates a condition of high humidity and high temperature which is ideal for the invasion of pathogenic disease, insects and other unfavorable occurrences.

Considerable research was undertaken to look into the pathogenic organisms and insects that primarily invade turf grasses. Insects, fungus and viral disease are constantly associated with turf grasses in nature; only when man interferes, using his artificial methods, do these pathogens commonly get out of control where attacks reach epidemic proportions. Once the growth characteristics and life cycles of such pathogenic organisms were understood, there was a much better chance of providing a natural control program without the use of extensive amounts of fungicides and pesticides. THE GREEN MAGIC SYSTEM is a natural control program and therefore, helps destroy such pestulance problems.

### 4. ATMOSPHERIC CONDITIONS

Because plants respire or breathe just as animals do, consideration must be given towards the quality of the air and what it contains in the form of gasses and other elements which could be regarded as pollutants. Air quality plays a vital role in the plant environment. This relationship has been studied and the knowledge gained by Agro Chem has been applied in the development of the GREEN MAGIC SYSTEM.

### 5. SOIL TESTING

"You don't know what you don't know". One of the prime reasons for the gradual weakening of the grass and the destruction of the soil is the mis-application of fertilizers and chemicals which creates toxic conditions and most often, imbalances of all the nutrients and other vital complex soil components.

Elimination of the "guessing" technique of applying plant nutrients and replacing it with the application of precise nutrients and soil building additives, formulated to soil test requirements — produces positive grass growth responses and helps nature rebuild the soil effectively, properly and inexpensively.

Our 30 year research program dedicated to studying natural soil conditions, has resulted in the development of the Agro Chem Soil Analysis, the most complete and practical soil test available. This test has become an integral part of the GREEN MAGIC SYSTEM.

### 6. SPECIAL MANUFACTURING FACILITIES

Since Agro Chem does not produce specific products that are to be consumed on a national basis, our dynamic success has been due to producing positive results whenever our system has been used. These positive results are due primarily to the fact that we take into consideration the total requirements of the turf grasses and the supporting soil. But, in order to provide positive results all the time, we have had to develop our own specialized manufacturing plant.

The facilities of Agro Chem are unique in the fact that we are able to custom-manufacture for each individual customer. Under normal conditions, this would be most costly, but because of our computerized operation, we can prescription formulate very inexpensively since labor is at the bare minimum and there is no storage of finished products. Only raw materials are stored in the plant and by simply pushing buttons on a computer, any formulation can be compounded, packaged and shipped, immediately. This computerized functioning of the plant helps make the GREEN MAGIC SYSTEM so unique and successful.

### 7. TRAINING

In order for our dealers to have the ability to completely satisfy their customers, they require special training in the total GREEN MAGIC SYSTEM. Because our system is based on the complex interactions of nature and how our unique formulations work with Mother Nature, when applied at the correct rates and at the proper times, it is of added importance to have all of these facts to obtain positive results on a repeatable, authoritative, professional basis.

Because commercially available products do not have the same characteristics or behavior reactions of the GREEN MAGIC SYSTEM, it is also most important to learn the characteristics of these unique formulations and when, where and how to use them so that results are always the same.

Our unique training system provides the information needed in a very simple, logical way so that everyone can thoroughly understand the GREEN MAGIC concept and be able to apply it in the operation of their own business, immediately and profitably. In addition to this technical information, we also personally help each dealer set-up an efficient marketing system and business operation based on his individual situation.

### SUMMARY

As can readily be seen, the GREEN MAGIC SYSTEM is correct and very unique. It is highly successful due to the consideration given each condition. In order to be totally successful in the system, one must have the basic knowledge of how nature works in growing the various plants on this earth. The benefits of the GREEN MAGIC SYSTEM are many and include the following:

DEEPER GREEN COLOR — SLOWER LEAF GROWTH — GREATER DENSITY — UPRIGHT LEAF GROWTH — DEEPER, STRONGER ROOTS — STRONGER, MORE AGGRESSIVE RHYZOME ACTIVITY — LESS WATERING & CUTTING — LESS SUSCEPTIBILITY TO DISEASE & INSECTS — FEWER WEEDS — LESS RE-SODDING & RE-SEEDING — LESS COST — MORE FRIABLE & PRODUCTIVE SOIL — BETTER WATER & NUTRIENT RETENTION — LESS EROSION & POLLUTION — MORE ORGANIC MATTER DECOMPOSITION (REDUCES MAT & THACH) — HAPPY CUSTOMERS — YOUR IMAGE AS A TRUE PROFESSIONAL, CAPABLE OF OBTAINING POSITIVE RESULTS.

Seeing is believing and the positive results will readily reflect your ability. Your professional workmanship creates greater desire for others to have the results you can provide with the GREEN MAGIC SYSTEM.

### DEALERSHIP AND PROFESSIONAL USAGE:

Dealerships are now being offered to individuals and companies desiring to sell these GREEN MAGIC SYSTEM Products and/or apply such products as a professional application service.

Because of the uniqueness of this natural system it is of utmost importance for the dealer and user to know and understand the natural and complete system along with having the ability to diagnose problems and recommend a solution (cure) with prevention procedures that will allow nature to work effectively. Therefore, the training is provided FREE OF CHARGE with the purchase of the initial dealer product package. (A slight leasing charge for individual usage.)

Our dealer history shows that because the dealers are successful, they always desire more knowledge; therefore, advanced training is available on a continuing basis, FREE OF CHARGE to active Agro Chem dealers.

Because of varying requirements of potential dealers, a number of dealer packages are available — one to suit each and every potential dealer.

If you want to get started quickly, call us at (312) 455-6900



Phone: 312-455-6900

11150 Addison  
Franklin Park, Ill. 60131

## AGRO CHEM'S Professional spray unit for the small, applicator, and — it is expandable for the larger area.

The basic unit includes  
(as pictured)



- 1—Rectangular 300 gallon holding tank — 110 lbs. w/4" fill cap & man way
- 1—250' light weight pressure hose
- 1—Electric hose reel
- 1—Gas engine & special Pump
- 1—Lawn gun with assorted nozzels
- 1—Pressure regulator and bi-pass unit
- 1 each—Suction & Bi-pass hose
- 1—Root feeder



This basic spray rig is designed to fit in a pick-up truck, the tank situated between the rear wheel well and cab of truck. The motor, pump and hose reel on the right side leaving the remainder of the truck bed for other equipment and supplies.



Van pictured shows the basic spray unit in the van, leaving the entire rear area for storage of products.

As you will see, these sprayer units have been designed with a great deal of thought, research, and years of experience. They are designed and built by professionals, for professionals. For more details, either call or write Mr. Joseph.

This basic 300 gallon unit can be expanded to whatever size spray rig desired by simply adding more tanks — eliminates purchasing new equipment as business expands.

### Pictured:

16' Flat bed truck carrying 5 — 300 gal. tanks + 1500 gals.

2 — 500' hose reels & ability to apply as many as 5 different products or any combination required.



Phone: 312-455-6900

11150 Addison  
Franklin Park, Ill. 60131

## Trickle Irrigation from page 63

plained. "But under trickle irrigation, we actually get top growth that first year."

The systematic application of adequate amounts of water reduces the stress that accompanies nature's erratic watering pattern, and the trees thrive accordingly. Farley calculates that trickle irrigation boosts tree growth by about 20 percent ahead of normal.

Tree health is also improved by the systematic application of fertilizers, which are introduced into and distributed throughout the trickle irrigation network. There is also grower health involved in that setup — remarkable reductions in fertilizer costs because smaller amounts are used and they're used more effectively. There is practically no wastage because of the targeted applications — just the root zones are fertilized, not the weeds out in the rows and not the nearby creek that gets the runoff. Farley estimates that fertilizer savings of 96 percent can be realized.

It may also be possible to effectively apply pesticides through a trickle irrigation system. Farley is cooperating with MSU entomologists in research on this application. More work will be done next summer. If the efforts prove successful, fruit growers are also likely to adopt the technique.

All these benefits have prompted Farley to plant each year's deciduous tree crop with trickle irrigation — between 20 and 30 acres each year. He has a total of about 120 acres now under the system, with about 50 acres of older trees still with conventional watering. His evergreen shrubs, which constitute about one-third of his plantings, will continue to get overhead irrigation. He's still making up his mind how big to go with trickle irrigation on his evergreen trees, most of which are still watered conventionally.

Farley is now phasing out the system of micro-tube emitters that he adopted at first. The micro-tubes are just that — narrow pieces of plastic tubing with very fine openings through the center for the transmission of the water.

But they have presented a lot of headaches and, according to Kenworthy, are not widely used in the industry any more. The fine holes are susceptible to plugging, either from very small sediment particles or mineralization. Farley found that his got fragile too readily and broke. And the birds loved them and apparently pulled some of them out from their connections to the lateral lines. "Maybe the microtubes wiggled and the birds thought they were worms," Farley speculated. "Or maybe the birds were smart enough to know that if they pulled them out, they'd get some water flowing out."

The microtubes also required extensive calculations in order to get the proper amounts of water to trickle out of them. The length of each such tube had to be cut exactly to compensate for differential pressure relating to distance from the water source and slope of the land.

A host of complex pressure-compensating emitters is now on the market, most featuring internal diaphragms and springs. Farley has settled on a less complicated, and hence cheaper, emitter made by Spot Systems of Redmond, Wash. It provides pressure compensation by spinning the water internally through a vortex pattern. "They work real well, and they're relatively inexpensive com-



# THE PROVEN PERFORMER



## TURF BLAZER 72"

Time tested, field tested, this rugged front mounted 72" mower is built for high capacity mowing, day in and day out, and with our "O" turning radius, you have the trimming capabilities of a small push-mower in congested or confined areas. A commercially constructed hydrostatic transmission enables the operator to establish a

ground speed conducive to his varied mowing conditions.

Other sizes manufactured are 48", 60", 82" and 180" plus a full line of attachments. Are you looking to get the most for your mowing dollar? Call your local Turf Blazer distributor and ask for a demonstration.

Circle 119 on free information card

Manufactured by



18155 Edison Avenue  
Chesterfield, Mo. 63017



REMOVER

For the turf you care for: season-long protection against crabgrass, *Poa annua* and other annual grasses and weeds with America's leading preemergence turf herbicide.

# Dacthal





Dacthal is number one in its field. Not only because it is so effective, but because it controls more than 20 unwanted weeds and grasses. Applied properly, it lays down a barrier that stops early and late germinating annual weeds without affecting healthy, growing turf grasses. Tough weeds like crabgrass and *Poa annua* can't stand up to Dacthal.

**The help you need  
for total turf care.**

**Dacamine®** provides post-emergence control of over 70 broadleaf weeds including dandelion, annual chickweed, knotweed and Canada thistle. It works right down to the roots. So tough perennials don't return.

**Daconate®** is the postemergence herbicide that knocks out nutsedge, chickweed, wood sorrel, sandbur and other grassy weeds. It's a ready-to-use liquid herbicide with a built-in surfactant for uniform wetting.

**Daconil 2787®** is the broad-spectrum fungicide that stops nine fungus diseases on turf. Use it from spring to fall to prevent dollar spot, leaf spot, red thread, stem rust of blue grass, large brown patch. It's effective even in hot weather. Provides disease control on a number of ornamentals.

Count on the big four from Diamond Shamrock to make your job easier.

Circle 111 on free information card



**Diamond Shamrock**  
The resourceful company.

See your turf chemicals supplier, or contact the Diamond Shamrock Agricultural Chemicals Division sales office nearest you:  
Three Commerce Park Square, 23200 Chagrin Blvd., Beachwood, OH 44112 • 1760 The Exchange, Suite 100, Atlanta, GA 30339 • 5333 Westheimer, Suite 850, Houston, TX 77002 • Commerce Plaza Bldg., 2015 Spring Rd., Oakbrook, IL 60521 • 617 Veterans Blvd., Redwood City, CA 94063.





pared to the other pressure-compensating emitters," Farley said. "They're more expensive than microtubes, but we can justify the extra cost by the better performance and the time saving."

The latter is a major item. The microtube installation required from one to three weeks to allow for land survey, calculations, cutting and in-

section of the tubes. With the vortex emitters, the workers can go right down the laterals, punch holes in them where they are adjacent to the tree trunks, and then insert the tiny emitters. And since these laterals are laid at the same time the trees are planted, the whole installation can proceed across a block of trees as smoothly and efficiently as a squad

of soldiers across a parade ground. The trees are getting their water almost before they realize they need it.

The laterals are half-inch flexible polyethylene pipe, of relatively lightweight grade, which is adequate because the water flow through them is of low pressure. Farley snakes the laterals S-fashion around each succeeding tree down the row, with a pile of dirt over the pipe between each tree. The intent is to compensate for the detrimental effects of expansion. As the pipe expands and contracts through varying weather, the differential is taken up between the trees, with sidewise movement, and each emitter remains where it's supposed to be — right at the tree trunk. A wandering emitter would lead the roots to wherever it happened to be, and the localized, compact root ball would not develop properly.

For his main lines, Farley uses two-inch poly pipe, rather than rigid PVC pipe as he did earlier. Again the flexibility pays off. The poly pipe can be unreeled and knifed in like a cable layer beneath the surface. "Stay away from PVC pipe simply for the ease of installation," Farley advised. "The subsoiler blade can put in the poly pipe at one-half mile per hour, and you're really whistling Dixie."

Farley also sticks to a maximum diameter of two inches for his main line. If more water is needed, he will install a second line of the same size next to it, rather than putting in a single larger pipe. He keeps friction loss to a minimum that way and avoids having to go to rigid pipe.

Filtration is critical to efficient operation of the system. Farley uses filters with at least 100 mesh per inch to keep even tiny sediment particles out. The vortex emitters can also be back-flushed for easy cleaning, in case sediment does get in.

A typical block of trees might range up to 45 to 50 acres off a single five-inch well with a five-horsepower motor, but Farley also installs time clocks and solenoids so that each block is broken into zones that are individually watered. Nutrients such as liquid nitrogen can be added to trickle irrigation systems either by injection pumps or pressure-drop devices.

The whole network is set up so that the trees get what they need, most efficiently and at a low cost. In a few years, every deciduous tree in the nursery will be getting the advantages of trickle irrigation. **WTT**

## "Sound Conditioned" M & M Brush Chippers

*for...  
less noise...  
more efficiency*

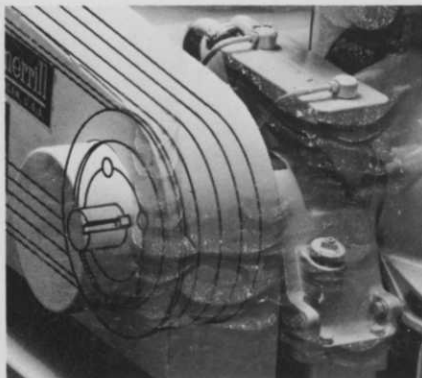


Applying engineering designs which "Sound Conditioned"\* our industrial scrap reduction machinery, Mitts & Merrill can modify our brush chippers for low noise levels. At the same time, those engineering features which have made Mitts & Merrill the leader for years have been retained.

\*Copyright Mitts & Merrill, Inc., 1973, 1974, 1975. All rights reserved.



**Staggered knife pattern**, for years a Mitts & Merrill feature, has always resulted in a lower noise level. First, by segmenting the noise source. Second, through smoother cutting action. Third, by producing smaller chips.



**Optional torque converters** and the heaviest steel cylinder — even without an external flywheel — combine to give positive cutting action under the most rugged conditions. Isolates the engine from shock. Minimizes maintenance.

**Plus** • **Positive safety-lock pin** for greater operator safety • **Swing-away, folding feed chute** protects cutting chamber; allows instant access and increases maneuverability • **Heavy duty construction** includes coil spring, torsion-type suspension, and box tubular steel frame.

**mitts & merrill**



Dept. WTT 52, 109 McCoskry St., Saginaw, Michigan 48601

Circle 109 on free information card