

ACTI-DIONE®

STILL YOUR FIRST CHOICE FOR A TURF DISEASE CONTROL PROGRAM.

NO. 1 FUNGICIDE CHOICE

Acti-dione has an established record of performance on greens and fairways. In continuous use for more than 20 years, Acti-dione has earned an untarnished reputation for reliability. Widely respected for its broad spectrum activity, Acti-dione is a leading choice as a pivotal fungicide in a total disease management program.

COSTS LESS, TOO

Acti-dione is the most economical fairway fungicide program available today and equally accepted for use on tees and greens.

WORKS ON CONTACT

Acti-dione, a contact fungicide, eradicates as well as prevents many turf diseases. Regular application protects greens and fairways year-round.



TUCO

Division of The Upjohn Company

NO DISEASE RESISTANCE BUILDUP

Acti-dione continues to work effectively, with no reported evidence of resistance buildup. It degrades quickly and is environmentally sound.

NON-CONTRIBUTOR TO THATCH BUILDUP

Acti-dione ingredients do not interfere with beneficial bacteria necessary for thatch breakdown.

WATER-SOLUBLE

Acti-dione is easy to mix and keep in suspension, gives uniform coverage, and is compatible with most commonly used fungicides and insecticides.

PROXOL® FROM TUCO CONTROLS GRUBS

Proxol 80 SP insecticide wipes out grub problems along with sod webworms, cutworms and armyworms.

Sprayers and spraying: Good equipment must be maintained

Of all the equipment on a golf course, the sprayer requires the most attention. A spraying mistake on just one green can cause several thousand square feet of irreparable damage. The turf must then be completely renovated. The mistake can be one of not mixing the chemicals properly, not calibrating the sprayer properly, or not operating consistently at speeds and pressures that the sprayer has been calibrated to. Any of these can lead to serious charges by the Environmental Protection Agency, in addition to a loss of player revenue and renovation costs.

A trained and certified applicator is required for the application of pesticides, either directly on the job or readily available to the job site. It is a matter of regulation and just good business that he use the best available equipment in a manner consistent with the pesticide label, the environment and the pest that is being controlled.

There are three basic types of sprayers. The large **airblast sprayer**, also called mist sprayer or fogger, uses a high-speed, fan-driven stream of air to produce a fine mist that moves with the air stream. This stream can be directed to either or both sides as the unit moves forward.

There are several advantages to a fogger. Good penetration and coverage result from the high pressures used, often up to 350 psi. The pump runs at low pressure, moving, in some uses, as low as 10 gallons per minute. The fogger can cover a large area in a relatively short period of time.

Disadvantages include a tendency of the fine spray to drift. It is difficult to operate in winds greater than five or six miles per hour, although a good operator might use the wind to advantage. Nozzle wear is a problem because of the high pressure. A nozzle made of harder materials is necessary to insure the right rates over a period of time. It might be necessary to change a nylon or brass nozzle each trip around the course. See the discussion on nozzles further in the text for a comparison of materials and life spans.

A **high pressure**, or hydraulic,

sprayer is designed to spray large volumes at very high pressures. This type of sprayer is most often used by professional arborists to cover the canopy of large trees. A high pressure sprayer can be converted to low pressure spraying by changing the pressure regulators.

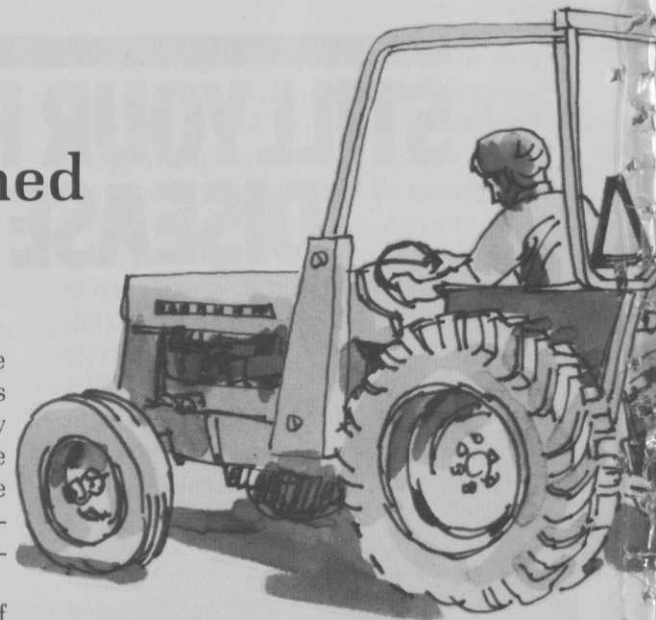
Probably the most common type of sprayer on the course today is a **low pressure boom** sprayer. This sprayer delivers a low to medium volume of spray at pressures ranging approximately 15 to 50 psi. A low pressure sprayer can be limited by its low pressure output. This low pressure tends to limit penetration into foliage and the sprayers have a reputation for poor agitation systems. These sprayers are, however, relatively inexpensive, have a medium to high capacity, and are very versatile.

There are some aspects of a good spray unit to look for in any of the above three. A spray tank should have a large accessible opening on the top for adding chemicals, water and for cleaning the tank. The tank and fittings should be of a good quality material to resist corrosion from any chemicals you plan to use in it. There should be no "hidden pockets" inside the tank that would prevent complete and thorough cleaning.

Speaking of cleaning, the tank should have an easily accessible drain that allows complete emptying of the contents of the tank. Being able to clean that tank after a day's use quickly and thoroughly minimizes labor and makes the spray unit that much more efficient.

NOZZLES

A flat fan nozzle with tapered edges is commonly used on boom sprayers. These nozzles produce an overlapping, tapered spray pattern that, with proper spacing, provides an even pattern the length of the boom. Boom height and nozzle spacing depend upon the nozzle used. A 65 degree series of nozzles, for example, requires a 20-inch spacing with a 21- to 23-inch boom height, while an 80 degree series requires a 20-inch spacing and boom height of 17 to 19 inches. Information such as this can be found in manufacturers' charts which



describe the nozzles and their functions.

A boomless flooding nozzle works at a much lower pressure than the fan-type and gives a uniform coverage across its width. They prove effective when applying liquid fertilizers. Wide off-center nozzles can be used to extend the effective swath width of a boom when attached to either end of the boom.

Hollow cone nozzles produce, as the name indicates, a hollow cone spray pattern. The pattern is circular with tapered edges and little, or no, coverage from the center. It is generally used at higher pressures and provides good foliage penetration.

Some general guidelines for selecting nozzles include:

For weed control: Flat fan, flooding fan, hollow cone.

For fungicides: hollow or solid cone

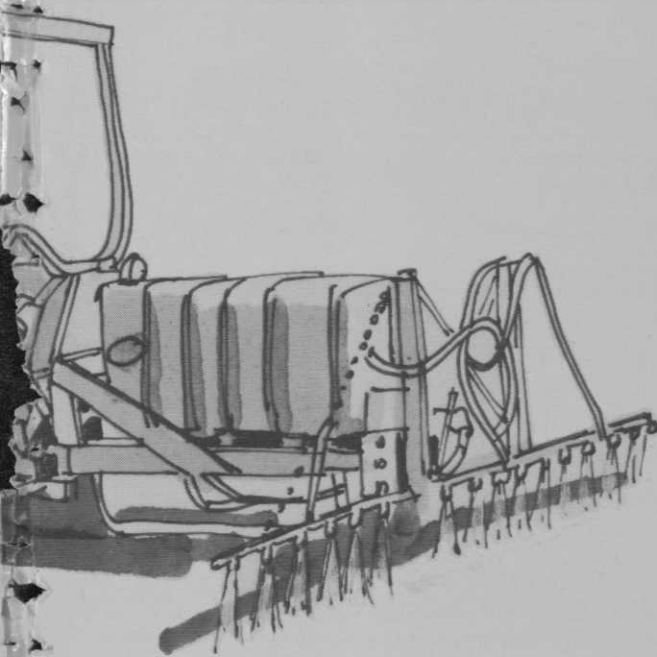
For insecticides: flat fan or solid cone.

A flooding fan or whirl-chamber hollow cone will minimize drift when operating pressures are kept below 30 psi.

Materials

Plastic, nylon, aluminum and brass nozzles have essentially the same life expectancy, or wear time before the wear begins to affect uniformity of application. Nylon and brass are relatively inexpensive. Aluminum will resist corrosion by most materials but is easily corroded by some fertilizers. Plastic or nylon will swell when exposed to some solvents. Stainless steel has three to four times the wear expectancy of brass and increases to 10 to 15 times if the stainless is hardened. Tungsten carbide nozzles have a wear expectancy of 150 to 200 times that of brass. Price increases with life expectancy but circumstances might prove the expense.

“A mistake on one green can wipe out several thousand square feet of expensive turf.”



Uniformity

The nozzles on a particular boom should be checked periodically for uniformity of dispersal. This can be accomplished by allowing each nozzle to discharge into a calibrated jar for a specified amount of time and then averaging the resulting amounts of liquid. A nozzle should be replaced if its flow is 5 percent more or less than the average.

A good way to check the pattern on a boom sprayer is with WATER over a stretch of asphalt. Any nozzle that streaks should be first cleaned or replaced if that doesn't solve the problem. Nozzles should never be cleaned with an object of material harder than the nozzle. A toothpick is generally best.

PUMPS

Replacing a pump brings with it the thought that there may be a type that will do the job better. There are three types of pumps.

Piston pumps have a long life, are dependable, and operate at tractor PTO speeds. They are more expensive and output is limited because over 10 gpm generally cannot be mounted on a PTO shaft. A piston pump is a good choice for abrasive suspensions.

Centrifugal pumps deliver higher volumes at low pressures but require an auxiliary power source because of the speeds required. They generally have a capacity of 70-130 gpm and can develop pressures up to 170 psi. Volume falls off rapidly above pressures of 30-40 psi.

Roller pumps are probably the most popular. They generally have a lower initial cost, operate well at PTO speeds, are easily repaired and are compact.

A sprayer that is used for many

different types of chemicals usually requires changing nozzles, spacing, ground speed or other factors that affect calibration. It is these changes which may require a larger or different type of pump. The need for agitation is another factor in pump selection. It is best to take your requirements to a reputable pump manufacturer who can supply you with charts that point out which pumps will perform best under your requirements.

CALIBRATION

Calibration of a sprayer before actual application is a most important step. There are several methods. Should you manage to master some of the more abstract methods you would be qualified to teach physics at any university. The simplest method involves filling the tank with water, spraying a certain distance, then measuring the amount of water it takes to refill the tank. The calibration run and future applications should be made at the same ground speed. Make careful note of it.

Total square feet covered in the calibration run can be determined by multiplying the length of the spray width, NOT boom width, times the length of the run. If the spray width is 10 feet and you spray for 100 feet, you have covered 1000 square feet.

Multiply the total gallons in a full spray tank times the square feet in the test area and divide by the amount that it takes to refill the tank after the calibration run to find the square feet that a full tank will cover. If you wish to convert square feet to acres, divide by 43,560. To convert acres to square feet, multiply by 43,560.

MIXING CHEMICALS

Chemicals should not be mixed unless the label indicates such a mixture. EPA regulations state that a mixture is handled as a new chemical and not just a combination of materials.

Chemicals that may be mixed are often incompatible because of formulation or chemical nature. An adjuvant might overcome these problems. Adjuvants should be selected as carefully as the chemical itself. The wrong adjuvant can eliminate the selectivity of herbicides, for example, risking damage to non-target species.

Stability and compatibility of

various mixtures can be checked. Using conversion figures, determine amounts needed to fill a pin jar with the spray solution. Mix this solution in a quart jar and shake until the mixture is well dispersed. If the materials remain in suspension for a reasonable amount of time, or if they are easily redispersed by shaking, good agitation in a spray tank will ensure even spray coverage.

If, however, the chemicals rapidly settle to the bottom of the jar or form a precipitate, further testing with an adjuvant will be necessary. Prepare the same mixture in another jar, add an appropriate amount of adjuvant and shake the mixture. If the results are still not good, you might want to try more of the same adjuvant or a different one.

Before applying the above steps, it might save time to consult the various chemical manufacturers. Such compatibility information might be readily available. They should also be able to advise you of any restrictions on such a mixture, if it is allowed at all.

WATER pH

Some chemicals may be affected by a process known as alkaline hydrolysis. Water with a pH higher than 7.5 can cause problems with some chemicals. In general, insecticides are affected more severely than are fungicides or herbicides. If you suspect your water, have a test done by a good laboratory. Standard litmus paper tests can often be off one or two pH units.

Adjuvants can also solve this problem if you have it. Sold specifically for this purpose, they can lower the pH of your water into a more acceptable 4-6 range. Again, consult your chemical dealer for information and advice.

Some chemicals may be adversely affected by water with an acid pH, such as fungicides containing copper, which may solubilize and cause plant injury.

You may elect to have a custom applicator do the spraying. Be sure they are professionals. There are some very good ones. Helicopter spraying is one method that is quick and can be done when turf conditions do not favor ground application. Before using any service, however, consult with some of the service's customers.

Replacement parts: Part III

A summary of important points

(Editor's note: This is the third and final installment of the GOLF BUSINESS Roundtable discussion on replacement parts held in Florida. This installment begins by putting the turf replacement part market into perspective. As it progresses, the sophistication in some areas becomes apparent and a need for sophistication in others is obvious. We hope that this series has been helpful in understanding replacement parts. Just as understanding turfgrass lends the knowledge to cope with adversity, understanding what happens when a replacement part is needed should allow you to better cope with emergencies.)

The turf equipment business cannot compare with, say, the automotive industry. If you were looking for a part for your car or pickup truck, you might be able to call three dealerships if you

live in a medium-sized city. If none of the three had the part you wanted, you would still have many parts stores to call. By having so many sources for a part, it is hard to single out and criticize any one for not having the part. That's not so with a turf equipment distributor. Many times he is the only representative for that piece of equipment for miles around. If he doesn't have the part, you're out of luck, your equipment is down for the period of time it takes to get the part in, you come under some hassle (or maybe a lot), and it is easy to transfer the bitterness to the distributor. Perhaps that is no excuse, but it is what often happens. So you swear you'll never buy that brand of equipment again.

Some of the companies involved with turf maintenance equipment do have a large organization behind them, the large tractor manufacturers

are a good example. Such a company might have half a million inventory of active part numbers that are serviced through a large network of distribution centers and an even larger network of dealers.

Some of the more sophisticated ones are computerized. Go into one of these dealers with a parts request and if they don't have it on the shelf, you can get a computer search of all their regional warehouses. The part can be found across the country and the computer writes the order and it is on the parts peoples desk who ship it out yet that day. Not only is such a system fast, it is efficient. There are no telephone messages to be misread, no misunderstandings between distributors and warehouse clerks, no searching the shelves to see if you have one. In a few minutes, the dealer can say they have one in Indiana and it's on the way, it'll be here tomorrow

NOT JUST A SPRAYER. A BETTER WAY TO SPRAY.

Cushman's Sprayer attaches to the 18-hp Cushman Turf-Truckster, a vehicle that's light enough to drive onto greens, and mobile enough to take into most turf areas that require spraying.

But the Turf-Truckster doesn't just give the sprayer mobility. The vehicle's optional PTO, which attaches directly to the transmission and the ground speed governor, keeps the spray rate consistent regardless of terrain, insuring accurate spray distribution and less chemical waste.

The Cushman Sprayer

has a lightweight, corrosion-resistant polyethylene tank.

And, a jet agitator that keeps solutions in constant suspension.

For ground spraying, there's an

optional 15' rear boom. Its two arms swing on 4-way hinges to let you maneuver easily between trees. For spraying trees and bushes, there's also an optional handgun applicator.

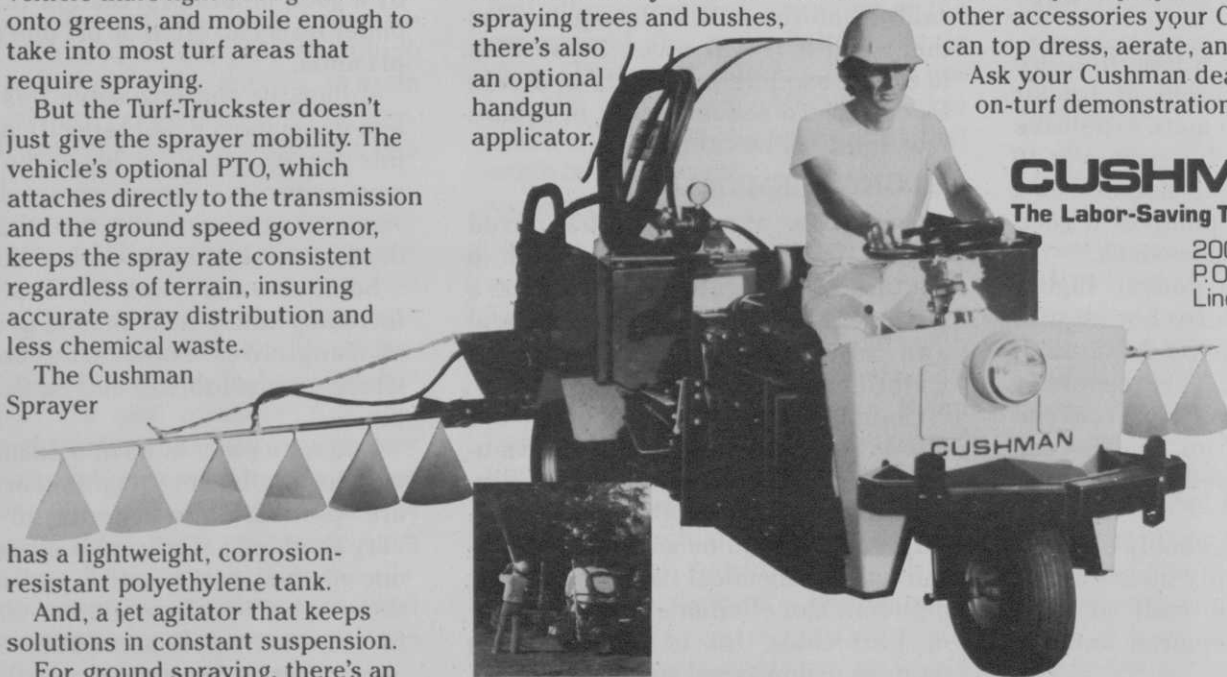
See for yourself how the Cushman Sprayer attachment gives you a better way to spray. And how with other accessories your Cushman can top dress, aerate, and dump.

Ask your Cushman dealer for an on-turf demonstration today.

80-Cut-3

CUSHMAN®
The Labor-Saving Turf System.

2004 Cushman
P.O. Box 82409
Lincoln, NE 68501





Funding the future

Professor H. B. Musser has made an investment in the future. He is the developer of Penncross Bentgrass, Pennlawn Fescue, author of the book *Turfgrass Management*, and a noted educator.

Professor H. B. Musser devoted his career to grass seed research. As a tribute to this outstanding Pennsylvania State University Turf Seed Agronomist, the Musser Foundation was formed.

The foundation's purpose is to assist graduate students in turf research through a fellowship program. This means students who have finished their undergraduate work and are going into turf research may receive financial assistance at this critical point in their careers. Only the interest earned from the H. B. Musser Fund will be used for fellowships, so the dollars you contribute keep on working in perpetuity.

If you or your company are involved in the sale or use of turfgrass or turfgrass-associated products or services, there's no better way to help yourself and the future of the turf industry than an annual contribution to the Musser Foundation.

Contributions may be made in the name of a loved one through the Memorial Fund, or to the Turfgrass Research Fellowship Fund.

"A fellowship involves an exceptional graduate student doing needed research, writing a thesis, adding to turfgrass literature and providing leadership for the future."

THE MUSSER INTERNATIONAL TURFGRASS FOUNDATION
of the H. B. Musser Turfgrass Fellowship, Inc.



Please send contributions in care of:

Dr. Fred V. Grau
P.O. Box AA
College Park, MD 20740

A nonprofit organization dedicated to fostering Turfgrass as a learned profession; to enhancing the lives of people all over the world through Turfgrass, and to supporting education and research in Turfgrass development and management.

Convert to automatic irrigation

Replaces

A summary of important points

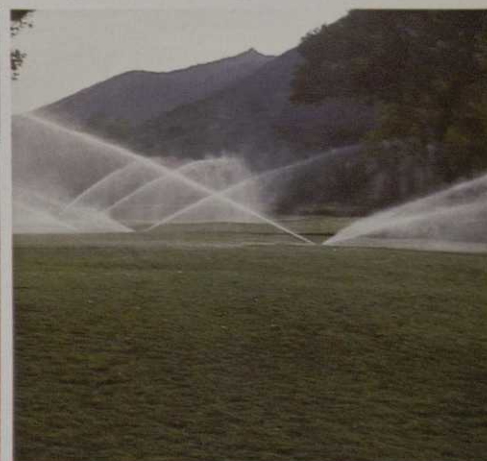
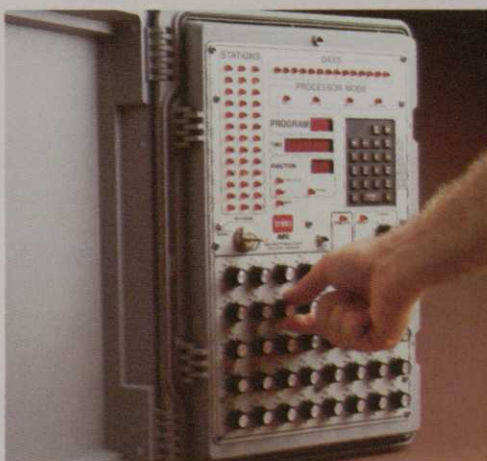


tion without taking a bath.

Toro has just introduced a new system that lets you install automatic irrigation without digging up your turf. So that means you don't have to dig down into your pocket to afford the conversion.

Toro's new MPC™ concept uses hydro-mechanical operation to control the sprinklers. And that turns the tide of rising irrigation system costs by doing away with new trenches and the installation of control wires or tubing. An MPC system simply responds to controlled pressure signals transmitted through your existing piping.

With an MPC system golfers play right through installation. In fact, your own crews can do most of the work of converting your quick coupler system.



Automatic irrigation pays off. In healthier, heartier turf. Better greens. And knowing that every night the watering will be done exactly right. With nobody around to get wet.

If an MPC system sounds hard to believe, you haven't heard anything until you find out how little the cost will be for your course. Call our Golf Course Marketing Manager, John Skidgel, today. His 24-hour number is 714-359-0701. One thing's for sure. You won't get soaked.

The Toro Company, Irrigation Division, P.O. Box 489, Riverside, CA 92502. International Telex: 676-490.



IRRIGATION DIVISION

Circle 120 on free information card

by UPS or whatever. You know before you walk out whether you're on easy street or have to frantically begin looking for a piece of equipment to borrow until somebody finds out if you can even get a part for your particular problem.

So, if computers are so great, why don't all the equipment people have them? All the money invested would have to be recovered through the price of the replacement parts. When you're dealing with millions of parts you can recover it through only slight price increases. When you only have a few thousand parts, it would be much greater. Most people feel that prices

are too high already. Enough said.

What is a realistic time frame within which you can expect to receive a part that is temporarily out of stock at the dealer level? If you and the dealer are both lucky (you because you need the part, the dealer because he needs your business) it's two or three days at the most. The dealer immediately calls the distributor who has the part, ships it out that day, and depending upon the mode of shipment, the part arrives that day, the next or the next.

You can see what would happen if the distributor didn't have the part, called the manufacturer and the company who casts that part has been on

strike for four months and hasn't even started negotiations yet. What can anyone do? Perhaps try a machine shop if you can afford it.

And speaking of afford, what about the air freight bill for the 150 pound part? What if you tell the parts man just to get it as fast as he can and he hands you a bill that includes more for shipping than the part cost? Do you just kind of shrink up inside or do you lash out at the guy who's just doing what you told him to, trying to help you out? What if the airline goofs and the part ends up in Alaska and you need it in Florida. This is as much a pain to the dealer as it is to you. Most of the people in the turf equipment business are in it because they like it and have made it their life's work. They want to get that part for you, keep you happy with that piece of equipment, and want you to come back and do business with them when you need another piece of equipment. Such a business has a solid foundation and lasts a lifetime or longer.

One of the problems a distributor has, and that eventually winds up being the turf manager's problem, is whether to ship partial orders or wait for completion. If an order is placed for 20 bedknives and there is only 12 immediately available, does he ship the 12 or wait for the other eight to come in? If he ships 12 and then ships eight, the freight bill is larger. Sometimes, however, it requires three, four, five days before the other eight come in. How bad do you need bedknives? If you're down because of bedknives, then you want the 12 right away. Is the dealer or distributor aware of this? Only if you tell him.

Some organizations will ship the partial order automatically. Others will wait unless they hear from you. It is something to be aware of and find out how your dealer handles such a situation.

There are some things available from the manufacturers which can help with routine maintenance. There are the A, B, and C lists available, that were mentioned in a previous article. From the lists, you can determine what parts are likely to go first.

Perhaps the most important message from the Round Table discussion was that you need to be aware in all that goes into getting a replacement part. Be aware of your distributor's methods for getting parts to you. Communicate your needs so there is no confusion. If you have a mechanic, make him aware of the procedure he should take. It may not get the part any quicker if it's not available, but it will let you know what is going on.

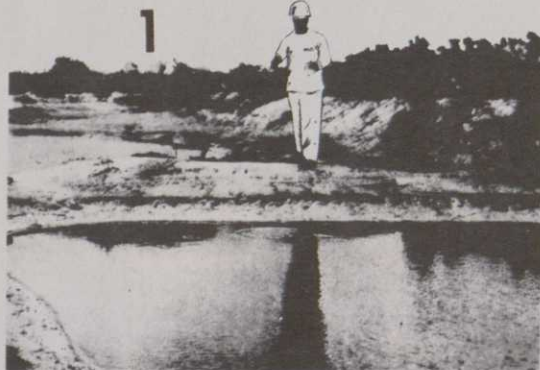
MOSQUITOES BOTHERING YOUR CUSTOMERS?

- FACT:** * Tossits® are specially constructed gelatin capsules containing high concentrations of insecticides combined with special oils which assure a fast "spread" over water surfaces. Within minutes after contact with water of normal temperature, they rupture, covering the surface with an active chemical film that quickly destroys mosquito larvae.
- FACT:** * The cheapest and most effective way to control mosquitoes is by larviciding.
- * No detailed continuing expensive training program needed.
- * Tossits® are biodegradable—insecticide is biodegradable. They do not harm the environment.
- FACT:** * **NO MOSQUITOES IMMUNE TO TOSSITS®.** Our formula, consisting of a combination of pyrethrum and piperonyl butoxide gives a 100% kill of all species of mosquito larvae.
- FACT:** * **NEW PACKAGING** for convenience. TOSSITS® are now packaged in individual teflon coated aluminum cans containing 40 capsules each with 25 cans or 1,000 TOSSITS® making up a unit case.



UNDERWATER PHOTOS OF TOSSIT® KILLING EFFECT

Tossit® capsule, thrown into water (photo 1) only a few minutes before photo was taken has already "ruptured" on the surface and is slowly sinking to the bottom (photo 2) after releasing approximately 90% of its contents. The balance of chemical insecticide in the Tossit® will be released within a few hours as capsule gradually disintegrates, providing additional larvicide on the surface. Note the layer of chemical on surface and the millions of insecticide oil particles floating slowly to the surface. Dead and dying mosquito larvae are sinking slowly to the bottom of the pool... positive proof of Tossit's fast-killing effect.



WRITE FOR FURTHER INFORMATION

WYCO INTERNATIONAL

4811 CARNEGIE AVENUE, CLEVELAND, OHIO 44103

U.S.A. PHONE: 216/391-5047

Don't ask us why you should use Adelphi Kentucky Bluegrass



Ball Parks, Golf Courses, Sod Farms, Schools, Parks, Cemeteries, etc.

ADELPHI customers are happy with its dark green color . . . its thick fine texture and its excellent resistance to drought, heat and cold. Also, it is completely free of noxious weeds.

Try ADELPHI one time, you'll never use any other.

For information, contact:

J & L ADIKES, INC.
Jamaica, N.Y. 11423

NORTHRUP KING CO.
Minneapolis, Minn. 55413

VAUGHAN-JACKLIN CORP.
Bound Brook, N.J. 08805
Downers Grove, Ill. 60515
Post Falls, Idaho 83854

Adelphi

(U.S. Plant Patent No. 3150)

Canadian Inquiries: **ROTHWELL SEEDS LTD.**, Box 511, Lindsay Ont. K9V 4L9
Other International Inquiries: **NORTHRUP KING CO.**, Minneapolis, Minn. 55413

The GREENER Kentucky Bluegrass

Toro® presents a complete built as if they



COMMERCIAL 21-4
Our new rear bagger,
4 hp, 4 cycle, hand-
propelled mower.



COMMERCIAL 25-6
Our high capacity,
6 hp, 4 cycle, self-
propelled mower.



Had it with walk mowers that break down before they're broken-in?

You need a line specifically engineered to take the everyday wear and tear of commercial use.

You need Toro Commercial walk power mowers.

From rugged frames to brawny engines to the tiniest

detail, we build them as if they owe you a living.

Because that's what a commercial mower is all about.

And, with our two newest models, the Toro line is complete:

For light to medium size jobs, there's our new Commercial 21-4 side discharge mower.

It's a lower cost working partner to our 5 hp Commercial 21-5 self propelled and Commercial 21-5 hand propelled mowers. Both are ideal for trimming and medium size mowing applications.

For jobs that require bagging or a fine groomed appearance, you'll want our new Commercial 21-4 rear