

# HERBICIDE SAFETY

## *An Attack on Ignorance and Carelessness*

By DR. BLAIR BAILEY  
Pesticide Safety Specialist  
University of California, Berkeley

**W**E are experiencing poisonings caused by herbicides. These are caused by carelessness, or ignorance, or both. Those guilty of either or both of these two counts will not be pleased to hear the charge made. But what of the lives—human or animal—of those endangered by improper handling of herbicides?

Every worker handling toxic materials should be advised of possible danger to him, and should be instructed on correct rates of application and proper protective measures.

**Possibly more important than this is to tell workers in advance what to do in case of a severe splash or spill of the concentrated chemical into eyes or onto skin.**

An example of the cases of poisoning reported, what types of poisonings they were, and what types of herbicides caused them, is offered by California. The State Department of Public Health, Bureau of Occupational Health, issues an annual report entitled "Occupational Disease In California Attributed to Pesticides and Other Agricultural Chemicals." The types of poisonings included in a recent report fall into three categories:

1. systemic poisoning
2. respiratory condition
3. skin conditions

This report lists 66 cases of poisoning attributed to herbicides and defoliants. However, there were also 18 additional cases attributed to phenolic compounds which may very well have been caused by herbicides such as pentachlorophenol, DNBP, and related materials. Therefore, there probably were more than 66 cases of herbicide poisoning. And there may be even more, because not all cases of pesticide poisonings are reported—only workers covered by Workmen Compensation insurance are included, as required by law.

Five of the 66 known herbicide poisonings were of the systemic type, which is often severe but rarely fatal.

There were 10 reports of respiratory conditions, and 57 of skin conditions. The latter conditions can cause the victim pain and loss of work.

About 500 reports of "eye conditions" and "chemical burns" were reported by physicians but not tabulated because of lack of clerical help. However, a review of a prior year's report showed that approximately 100 chemical burns and eye conditions were attributed to herbicides. I believe that it is obvious that there is a gross under-reporting of pesticide poison cases.

In the report in question there were no occupational deaths recorded or attributed to pesticides. This is only the third year in the 18 years of these reports that we have no record of such deaths. However, in previous years herbicides such as sodium arsenite, pentachlorophenol and paraquat have caused accidental death of a number of humans and livestock. These deaths occurred because someone was ignorant or careless and left chemicals where they could be accidentally consumed by humans (mostly children) or by livestock.

Eating or drinking pesticides, often from unlabeled containers, including soft drink and wine bottles, has been the main cause of accidental deaths of a number of children as well as adults. So, the rule is to keep all pesticides in their original labeled containers and locked at all times when they are not being used by a trained person.

Not all deaths from pesticides are caused by eating or drinking them from a container. In the past few years throughout the country, at least 95 cattle have died from grazing on grass which had received accidental drift of arsenical herbicides from near-by spraying operations. Arsenic trioxide and sodium arsenite were the materials most frequently causing these deaths. However, one of the newer organic arsenicals, MSMA, caused the deaths of a two-

year-old girl and 41 beef cattle during 1967-68.

Pesticides can enter the body in any one or all three of the following ways:

1. through the lungs—by inhalation
2. through the mouth—by ingestion
3. through the unbroken skin—by absorption

Occupationally, the most common route of absorption is through the skin. However, under certain working conditions, inhalation is also an important route of entry.

Oral ingestion of pesticides by workers has not occurred often.

You do not have to be a toxicologist to know how toxic or hazardous a pesticide is. You simply read the label on the container and look for certain key words such as "DANGER" "POISON" "WARNING" or "CAUTION." These "signal words," and in some cases the skull and crossbones symbol, will provide the approximate toxicity rating of the chemical in the container.

**Toxicity ratings are as follows:**

1. The signal words "DANGER," "POISON," and the skull and crossbones symbol are required on the labels for all highly toxic compounds. These materials all fall within the acute oral LD<sub>50</sub> range of 0 to 50 mg/kg.

2. The word "WARNING" is required on the labels for all moderately toxic compounds. These materials all fall within the acute oral LD<sub>50</sub> range of 50 to 500 mg/kg.

3. The word "CAUTION" is required on the labels for all slightly toxic compounds. These chemicals all fall within the acute oral LD<sub>50</sub> range of 500 to 5000 mg/kg.

4. No special signal words or symbols are required on labels for compounds that have an acute oral LD<sub>50</sub> greater than 5000 mg/kg. However, unqualified claims for safety are not acceptable on any label and all labels must bear the statement "Keep out of the reach of children."

# ASPHALT PARKING LOTS —HOTHOUSE FOR WEEDS

WEEDS are perhaps the greatest cause of asphalt parking lot breakdown, according to a pair of California parking lot specialists. Despite several inches of asphalt, and soil preparation which includes blading and compaction, weed seeds can germinate and extend an upward force of 1700 pounds per square foot, quickly breaking through the asphalt.

Asphalt works like a hothouse, says Jerry Krizman of California Weed Control — Industrial. "It's moist and warm underneath. Weeds thrive and soon exert enough pressure to break through the blacktop.

"And once a hole gets into asphalt," Krizman emphasizes, "you can bet that it's going to get larger."

That's why parking lot maintenance costs can be substantially reduced by the use of a pre-emergence herbicide applied just before the asphalt is laid. In fact, more and more contractors and municipalities are requiring this as part of their specifications.

"Use of a soil sterilant or pre-emergence herbicide is an insurance policy against premature asphalt breakdown," adds Leland May, also a partner in the custom application firm. "For example, in Ontario and many other California cities, all city streets must have a soil sterilant treatment. That's the trend today."

Typical specifications state: ". . . Prior to placing any surfacing material the subgrade shall be completely sterilized by application of an approved weed killer applied in accordance with directions and recommendations . . ."

For the past 12 months Krizman and May have been participating in an experimental herbicide program with CIBA-GEIGY Corporation. They have used Pramitol 25E, a liquid concentrate pre-emergence herbicide on more than a dozen parking lots with excellent results.

The tests are being conducted to provide Geigy and prospective users with additional information on the effects of the herbicide under asphalt prior to marketing the product for use in such asphalt applications. Pramitol is presently widely used as a pre-emergence herbicide for other industrial and non-crop uses.

As a subcontractor, California Weed Control must guarantee its work for at least 12 months and sometimes 24 months. To date, they have had no failures with Pramitol and as long as proper application procedures are followed, they do not expect any.

In past years, California Weed Control has used granular Polybor-



California parking lot specialists Jerry Krizman, left, and Leland May.



A typical parking lot is bladed to remove existing weed growth and compacted for better surface — prior to application of herbicide and asphalt. Pramitol 25E is applied on the  $\frac{1}{3}$ -acre parking lot below in less than an hour, with difficult areas sprayed by hand.





An hour after herbicide was applied to the parking lot, an asphalt crew went to work. The herbicide used is designed to cling to soil particles and not leach out from under asphalt. As a pre-emergence it is used to kill weeds before they are large enough to damage asphalt.

Chlorate herbicide at 800 lbs, per acre in 800 gal. of water. Although it gives results comparable to Pramitol, the excessive bulk of the herbicide, high volume of water and constant agitation necessary make it undesirable.

The large amount of Polybor-Chlorate requires greater warehousing facilities and greater handling time, both resulting in higher labor costs. Since Polybor-Chlorate also requires a much greater volume of water, in the arid Southwest this means bigger equipment to haul the water. This is especially time-consuming when the work site is far removed from headquarters.

Pramitol 25E has been used at 20 gal. per acre in 100 gal. of water. When especially hard-to-kill weeds are encountered or a two-year weed control guarantee is required, the rate may be increased to 30 gal. per acre. At these rates, the costs of Pramitol per acre is about the same as Polybor-Chlorate, but the overhead and labor involved are much reduced with Pramitol.

California Weed Control's most

recent job involved a one-third acre parking lot in a retail development in Riverside, Calif. The adjacent vacant lot was covered with deep-rooted, hard-to-kill weeds which could have presented control problems in the new parking lot.

The lot had previously been bladed to remove any existing weed growth and then compacted for a better surface. Using a specially rigged spray truck, the herbicide was applied about an hour before the lot was asphalted.

Seven gallons of Pramitol 25E was applied in 150 gallons of water with only minimum agitation required. The entire application — including hand spraying of hard-to-reach corner areas—was accomplished in less than 45 minutes.

To achieve the same results with Polybor-Chlorate on a one-third acre lot with such problem weeds would have required at least 300 lbs. of herbicide in 300 gal. of water. This would have also required additional tank agitation.

Yeager Construction Co. of River-

side applied a 2¾-in. asphalt layer and compacted it to 2½-in. Since the herbicide is applied shortly before the asphalt, there is little chance of Pramitol leaching away from the area of application.

Pramitol is a triazine herbicide which is held tightly by soil particles. As weed seeds germinate the chemical is absorbed by plant roots, interfering with the growth process and killing the weeds before they develop sufficient size and strength to penetrate the asphalt.

The spray was applied in early morning while the air was still. The tank pressure was low — about 40 psi. — and the resulting coarse spray presented little problem of wind-carried drift. Herbicides should only be applied on days of little or no wind to avoid spray drift to non-target areas.

Application of Pramitol 25E can also be combined with standard and special cutback asphalts if mix temperatures do not exceed 170°F. Combining the operations can save time, labor and equipment costs.

# The Widening Potential Of Tree Injection

By DEL KENNEDY  
President, CLM National  
San Jose, California

**T**REE INJECTION can be a valuable asset to the commercial arborist. It offers an almost complete pollution free method of chemically treating trees. And it can be done with less labor than normal spray operations. Further, timing of treatment is not influenced by weather conditions, as is true with spraying.

My interest in this system began a few years ago when I first tried the system. Having been involved

in the tree surgery field more than 20 years, I was enthused to the point of helping form a new company based on this method. This was the beginning of CLM National. I sold my very successful tree service company in northern California and became part owner in this new corporation, which began operating in January. Headquarters are at San Jose, Calif.

CLM operates as factory distrib-

utors for the J. J. Mauget Co., makers of tree injection products. We are presently setting up dealers to use these products across the US and Canada, using the Mauget tree injection system. We will not sell to the homeowner. We want only professional tree people to use our products.

My first experience with this Mauget tree injection system was some three years ago. I started using it immediately in my own business. At the time I was a bit skeptical as is most everyone when first using a new product. But after using it on a few problem trees I was convinced beyond doubt at the positive results. I was able to get trees to respond where other methods failed, thus my enthusiasm for the system.

It also increased the earnings of my tree business.

I have been a member of the National Arborist Association for some years and when I was asked to speak at the 1970 annual meeting at Phoenix, Ariz., on DDT substitutes, I agreed at once. At this time I was not associated with the J. J. Mauget people, other than by using their products in my own business. I felt that with the problems tree companies were experiencing with state bans on chemicals plus the public emphasis on pollution, that tree injection had to be reckoned with. I was glad to pass this information on my experience to my many friends, who were also feeling the squeeze on their spray business. It is their livelihood.

Some N.A.A. members then began using the injection system with very good results. Others did not, because the system was new to them.

In light of this, let's consider some problems of the spray business. First, how many times has a crew been dispatched to the job and failed to complete the work because of high winds or because of rain? Further, most businessmen in this industry have had customers demand repeat treatments "because it began to rain, shortly after your crew sprayed the trees." Adroit salesmen, as most custom applicators are, can usually convince customers that the stickers and spreaders used in the chemical have kept the rain from washing the material off, and that it will still do the job. Customers may accept this, for the time being, but if they subsequently see so much as one insect on their trees, they will be right back on the phone demanding another spray application. They may be a regular customer, or a new one. Regardless, the man in business cannot afford to

**Editor's Note:** Mr. Kennedy, author of the accompanying article on tree injection is president of CLM National. A veteran tree care operator, he has been working with the J. J. Mauget Company in developing tree injection as a practical means of treating trees. A new area being researched is the use of Dupont's Benlate, a benomyl fungicide, to treat trees infected with Dutch elm disease via the Mauget injector system. Mauget has developed a carrier for chemicals which apparently speeds circulation of chemical through the tree system, basis of the CLM Company's market approach, for the entire Mauget product line.

Use of benomyl via this method is in the test stage. It is not as yet labeled. However, the use of benomyl for treatment of trees infected with DED is being researched by scientists in both this country and elsewhere. Problem appears to be to get trees to absorb the chemical in sufficient amounts to be effective against the disease. Newspaper

articles, though vague regarding details, have listed costs as high as \$400 per treated tree where soil was dug up around the tree and benomyl placed in the ground (Cleveland Press, Aug. 5, 1971).

A Canadian researcher, Dr. Edward S. Kondo, has used benomyl by cutting major roots and then pumping the chemical under pressure into the tree. Damage to roots admittedly places a severe strain on the tree. He is now testing the Mauget injection system.

Because of the apparent effectiveness of Benlate as a treatment, the Mauget system does hold promise for the future. Early reports, though unofficial, indicate that the injection system has been able to circulate sufficient benomyl into the tree system.

In brief, the article by Kennedy is his own testimonial for the tree injection system and one hope of the industry for an effective method of using a fungicide to treat trees infected with Dutch elm disease.

—A. E.

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lose them. Even so, when you have to repeat a job, you usually have lost your profit.

There are other hazards in spraying. These include spray drift on cars, windows, lawn furniture, etc. The list is almost endless. If I were asked to name the greatest hazard, it would be the expense of paying men while they wait in the shop for wind or rain to cease. Secondly, I would name pollution and contamination of the environment. Remember, it is the responsibility of each of us to try to provide a safe place for our children and grandchildren to live and to lead normal lives.

Tree injection offers an alternative system. Application of plant foods and pesticides directly into the sap flow of trees has been of interest for several hundred years. Like some basic medical practices, it was initiated by Leonardo da Vinci! Until recently, however, systemic materials and the methods for injecting them were limited.

Some supposedly professional tree companies are still using the crude method of drilling into the cambium layer and putting chemicals in the hole, which is then plugged, usually with putty. I only wish they could see some of the beautiful trees on the grounds of the California capital at Sacramento which suffered severe damage by this type of work. Rotten spots and slime flux which oozes down tree trunks are common. Such results are tragic for the industry and not to be condoned.

The Mauget Tree Injector, which is patented in both the US and abroad, is one method by which tree injection can be accomplished, without undue damage to the tree. The principle of the device is much like that of the medical hypodermic needle in that the fluid is introduced internally. There is a minimum of damage to the intervening tissue. Healing is as rapid as the condition of the tree will allow.

CLM's most widely used product, Inject-A-Cide is a special, concentrated grade of organic phosphate, systemic insecticide. It is called Meta-Systox-R and is produced by Chemagro Corporation under license by Farbenfabriken Bayer, A.G. of West Germany.

This new system of shade tree care is a breakthrough in effective control of insect pests that damage trees. It utilizes a completely closed system which implants the chemical directly into the sap stream, and eliminates the hazards of drift in spraying.

The injector unit is made of two

interlocking plastic cups containing the premeasured quantity of Inject-A-Cide. A small length of metal tubing called a feeder tube is used to connect the injector unit to the tree trunk. The feeder tube is embedded in the trunk by means of an inserting tool. Feeder tubes are driven into the tree every six inches around the trunk at approximately breast height.

Once feeder tubes have been installed, the operator then squeezes the units of chemical together causing them to be pressurized. Once the operator places the units of chemical on the feeder tubes and ruptures the seal, chemical is blown into the sap stream under pressure. It then flows by systemic action into the tree, up through the branches and leaves, where it is toxic only to those insects feeding on the tree. It does not offer a hazard to birds, wildlife, humans, or such beneficial insects as bees. It takes only a short time for the units to empty. They can then be removed and the feeder tubes pulled out with a pair of pliers. Injecting can be done in any weather. High winds, heavy rain, or even darkness fail to foil the operation.

Feeding trees is another use for tree injection, using the same injecting methods. In reality, the system is used to introduce a balanced plant food into the system of the tree. This treatment is particularly useful for problem trees with advanced stages of chlorosis where other methods have failed. One reason for this is that it is possible to bypass the roots. Thus, vigor is quickly restored to nutritionally starved trees.

Fertilizers used for injection must be a certain type and strength, compatible with the tree. After many years of actual field testing, the Mauget people have developed a liquid nutrient called Stemix. Stemix contains dilute quantities of nitrogen, phosphorous, potassium, zinc, iron, manganese and copper, fortified with vitamins and hormones.

Stemix will show noticeable results quickly, usually within one to two weeks. Once improvement is observed, the recommendation is that normal applications of fertilizers be made via the soil.

We have other chemicals that are being field tested. These include chemicals for gypsy moth and the dreaded Dutch elm disease. I am confident more data on these will shortly be available. These new data may provide the big breakthrough for control of both.

Annual Meeting Report  
International Pesticide Applicators Association

# National Attendance at Seattle Applicator Conference

By LEW SEFTON, secretary-treasurer

The annual conference of the International Pesticide Applicators Association was held in Seattle, Wash., Sept. 16-18. The merit of its recent name change from "Pacific Northwest Pesticide Applicators" to "International" was upheld by attendance from New York, Washington D.C., Utah, California, and British Columbia. These applicators are enthusiastic over the possibility of joining the charter members, Washington and Oregon, in establishing a truly representative "International." This affiliation should greatly enhance the sprayman's cause.

The word, "C-A-U-S-E," introduces the theme of this year's meeting: Controlling And Using a Safe Environment. For possibly the first time since "Silent Spring," a group of scientists, with facts, were assembled, at one place at one time, to bring proof of the pesticide fallacies that have been foisted on the public with an approach based on hysteria and its resultant sensationalism. It is the Association's intent that taped speeches will be edited, approved by the speakers, and made available on request.

Examples of excellence through their **factual** research were such speakers as Dr. William Hazeltine, Butte County California Mosquito

Abatement District; Dr. Gordon Edwards, Entomologist—San Jose State University; Dr. Griffith Quinby, Consulting Toxicologist—Wenatchee, Washington—a nationally recognized authority on DDT and PCB's. Collectively, and with indisputable **data**, these experts (1) destroyed bird depopulation findings; (2) debunked residues located in Oceans including the Pacific, Arctic, Antarctic, and such; (3) showed conclusively that substitutes were more dangerous and less effective than chlorinated hydrocarbons; (4) illustrated the need to return to pesticides with proven safety to man rather than use more-toxic-to-man chemicals; and (5) even gave proof of the benefits of DDT in man's health and in the increase of habitat for wildlife.

This meeting was not confined to only those people who would say what the sprayman wanted to hear. Represented were eminent environmentalists, ecologists, and marine biologists. Most were cooperative, some appeared confused. It was notable that those appearing confused were unable to substantiate their findings as having been validated by research updated since the use of mass spectrometry to identify

between DDT and PCB's.

This program was arranged by the Washington Chapter. Oregon will be next year's sponsor. One helpful aspect for next year is that these same fact finding scientists will have updated information, and that hopefully their search for truth will bring more, like them, out of the bullrushes. It is the hope of the Association that, by 1973, these annual meetings can be hosted by new chapters in other states. Formation has started in California and British Columbia.

Charles Seibold, Portland, Ore., was elected association president for the coming year. Don Mock, Seattle, Wash., is the new vice-president. Election of these two leaders insures continued advancement of the organization. Past president Lew Sefton, Lake Oswego, Ore., was elected secretary-treasurer.

Anyone, spray applicator or associate industry, wishing to join this cause, may do so as a chapter or as an individual. For information about joining the International Pesticide Applicators Association, please contact the secretary-treasurer, as follows: L. F. (Lew) Sefton, 5600 S. W. Rosewood, Lake Oswego, Oregon 97034. Telephone: (503) 636-6443.



Unique feature of the curriculum at Catawba Valley Technical Institute at Hickory is summer employment in a commercial recreational facility. At Rock Barn Club of Golf, Conover, N.C., are, left to right: Ray W. Avery, Lincolnton; Guy E. Hollar, Jr., and Rock Barn Superintendent Guy Hollar, Sr., of Conover; and Kenneth L. Evans, Claremont.

## Commercial Turfgrass School Opens at Hickory, North Carolina

A new 2-year course for commercial turfgrass care is being developed at the Catawba Valley Technical Institute, Hickory, N. C.

Aimed primarily at training men for golf course technicians leading to golf superintendent, the course also prepares young men for positions such as park and cemetery supervisors, highway beautification planners and supervisors, landscaping contractors, public grounds and athletic field supervisors, and sod producers. Formal name of the curriculum is Recreational Grounds Management.

Courses lead to an associate in applied science degree and includes subjects such as soil science, plant science, drafting and surveying, landscaping design, and agricultural chemistry. A summer work program at some type recreational grounds facility — most likely a golf course — is also a part of the program.

The first students for the course began classwork in late September when the Catawba Valley school opened. This institute is one of North Carolina's community college sys-

tem schools which offer career training based on practical experience and classroom instruction.

The first summer, students were employed by Rock Barn Club of Golf, Conover, N. C., and at Grandfather Mountain Golf Club, Boone, N. C.

## California Weed Book Increased In Size

A looseleaf handbook, the University of California Growers Weed Identification Handbook, has been increased in size by 12 pages. It is now a 79-page full-color publication which shows weeds as both seedlings and when mature, and it also contains detailed descriptions of each weed.

It is available at a cost of \$15 from the Public Service Office, U of C, 2200 University Ave., Berkeley 94720.

For those already holding copies, the 12 new pages may be ordered alone for \$2.

## Tennessee Short Course Planned For Turfgrass

A one-week winter short course in turfgrass management has been announced by the University of Tennessee, Nashville. Dates are Jan. 24-28, 1972.

Purpose is to provide intensive instruction in the fundamentals and applied aspects under the direction of seven University professors who will serve as instructors.

Subject matter areas include soil relationships for growing turf, soil fertility and acidity, selecting grass species and varieties, seedbed preparation and planting, fertilization, irrigation, mowing, identification for weeds, insects and diseases plus controls, special maintenance practices for golf courses and other commercial turfgrass areas and tree and shrub planting and care.

Details on the course are available from Dr. Lloyd M. Callahan, Department of Agronomy, Plant Sciences Bldg., Knoxville, Tenn. 37916. (Tel. 615/974-7161. Cost is \$25 for primary registrants and \$15 for each assistant accompanying the primary registrant.



# Canadian Sod Giant

## *Fairlawn is a Study in Management and Marketing*

A major force in the Canadian sod industry is Bill Campbell, a grower at Brantford, Ontario. He has worked closely with the Canadian growers association as an officer and director through the years and is currently helping develop a major summer meeting for next year when the group hosts the American Sod Producers Association.

Campbell's company, Fairlawn Sod Nursery Ltd., is now growing some 1550 acres of cultivated sod. He has 700 acres at Brantford which is the headquarters farm, 650 at Montreal, and 200 near Windsor.

Like most sod production in Canada, his acreage is on mineral soil and turns over about every 30 months. Canadian sod culture, Campbell says, is quite similar to methods used in the northern sections of the U.S.

However, growers apparently have somewhat less in the way of disease problems. Also, they do little irrigation, except just prior to harvest when necessary. Sales are growing and approaching 30 million yards yearly in the Province of Ontario, with another 5 million in other Canadian areas. A few more growers are entering the field each year as popularity of the industry progresses. Campbell estimates that about half his total production goes to residential construction. The balance, he says, goes to all sorts of commercial uses such as schools, factory lawns, parks, and highways.

Problems, according to Campbell, are closely associated with those in the U.S. segment of the industry. Fixed costs are high. Land must be bought and a considerable investment made in establishing the crop, and then getting it to market. Specialized equipment is needed. And production must be tailored to what the market can utilize. Like this country, from time to time, growers experience the problem of some surplus. Land where most of his sod is grown, Campbell says, runs between \$300 and \$400 per acre.

Campbell originally was a soils extension specialist at the University of Guelph. He formed a partnership

with a friend who maintains only a financial interest and went into the sod production business. The first crop by Fairlawn was sold in 1960, was less than 150,000 square yards. By comparison, 1971 sales will approach 2 million square yards.

The Fairlawn Sod Nursery operation is an excellent demonstration of management and marketing. Campbell's theory is that many operators can grow acceptable sod, but it takes good management to efficiently harvest the crop, transport it to market, and then compete in the market for sales. He recently returned to school part time and obtained his masters degree in business administration.

His primary turfgrass is a 50-50 blend of Merion Kentucky bluegrass and common. He stresses, however, that the common is a mixture of known Kentucky bluegrass strains, composed of named varieties, grown

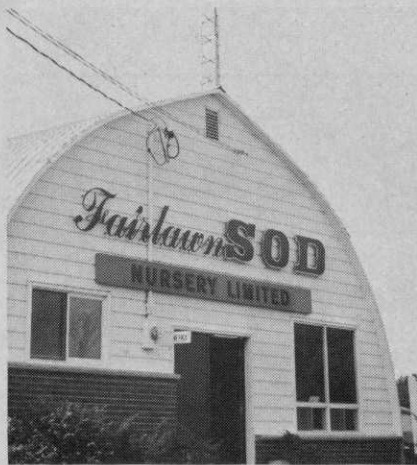
and blended by Jacklin Seed Company, the source of all his seed. The so-called common may include Delta, Newport and other varieties processed by Jacklin which blend well with Merion. This year Campbell is including some Fyking in his blend.

Campbell credits his management team with much of the growth and financial success at the Fairlawn operations. He believes in long tenure for employees. His general manager, Garry Jefferies, 35, has been with the company 10 years, and currently serves as a director of the Nursery Sod Growers Association of Ontario. General farm manager, Ed Strome, 32, has been with Fairlawn for six years.

Management starts with making the crop. Besides a creditable source of seed, Campbell depends on special equipment, not only to get the job done right, but to cut the labor and



Bill Campbell, left, with his general farm manager, Ed Strome.



Office headquarters



Office manager, Ray Dunham

equipment costs. For example, a J & M bulk fertilizer unit which holds 8 tons is used to eliminate bags. The bulk unit feeds fertilizer into a tractor pulled 1-ton Lely spreader. In short, Campbell says this saves handling 40 bags of 50 pounds each for every ton. He uses about 200 tons of fertilizer yearly at his Brantford farm. Savings are two-fold. First, fertilizer delivered in bulk is \$6/ton less in cost than bags. Second, the 1-ton Lely can be filled mechanically in five minutes. It would require about one-half hour to open and dump 50 bags.

On new seedings, Campbell uses a 12-foot Brillion Pulvi-mulcher in soil preparation. He plows once and then pulverizes rather than disking. Disking, he feels, ridges and fluffs the soil too much, thereby increasing packing and levelling operations.

The harvesting system is a pallet operation. Ryan sulky rollers are used to lift and roll sod and pallets are piled by hand. Trucks are then loaded with a forklift.

A typical crew consists of a foreman, a cutter operator, four men to build pallets and a forklift operator. Such a crew can harvest an average of 700 square yards per hour

throughout the working day. This includes time lost in moving from field to field and also routine break-downs.

Campbell keeps daily records of yards harvested and hours worked and credits good foremen for keeping his phase of the operation efficient.

Pay per hour for labor runs \$1.90 to \$2.00 per hour.

Sod is transported to market on a contract basis, with contracts being made with owner operated units. These carry the Fairlawn emblem. Rates are paid on a per yard basis. This appears the best bet since trucks are needed only 7 months of the year.

Pallet losses are a nuisance and Campbell estimates that he will lose about 700 per year in moving his crop. This represents a \$2000 yearly loss.

Fairlawn sod is sold mostly to landscapers with direct retail business accounting for less than three percent of the total. Considerable credit is given but accounts are normally paid in 60 days. Service charges are applied to all past due accounts. Bad debts range from one to two percent of sales in a normal year. They are minimized by credit investigations of new customer and ageing of receivables with prompt follow up on overdue accounts.

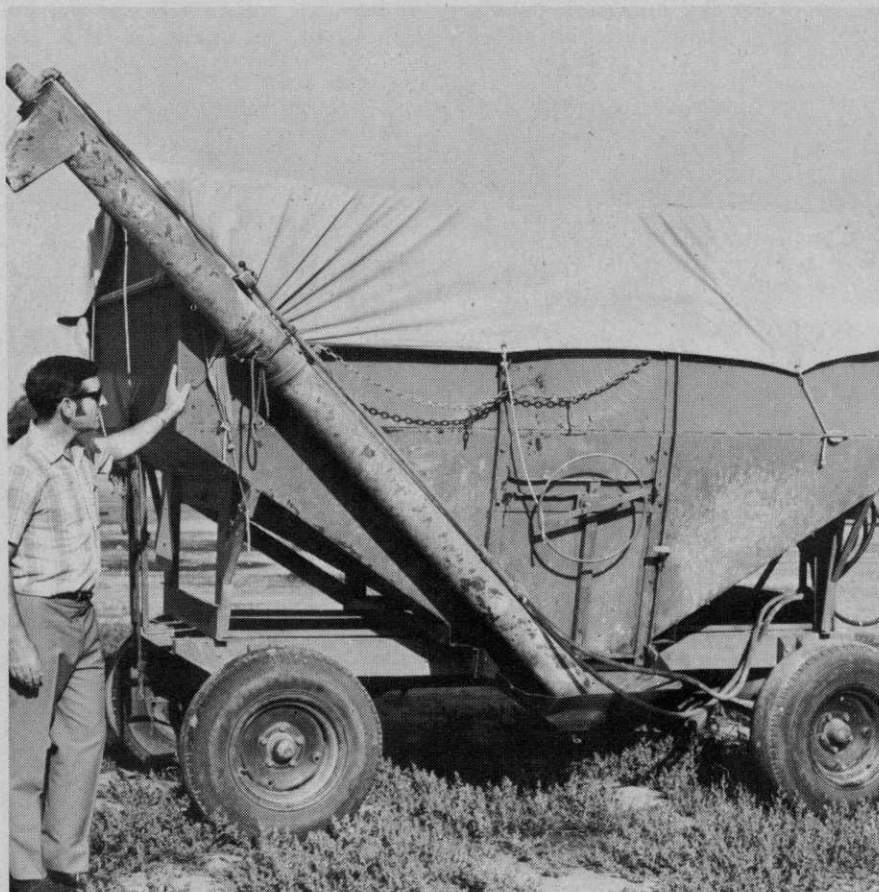
Prices vary, but the normal wholesale farm price has been running 25¢ per yard. A 10 percent volume discount is given on total season's purchases of 50,000 yards or more. Around Toronto, the price has been about 20¢ this year with some sod selling as low as 18¢.

Campbell reports that metropolitan Toronto has to be the sod using capital of the world. New housing includes sodded lawns, both front and back, and the city quite likely has the highest use of sod on a per capita basis in the world, he says. About 65 of Canada's 100 growers today are located within 60 miles of this major market.

The business of growing sod commercially in Canada started in the early 1950s. Campbell says that the late William Ruthven of Alliston, Ontario, noted the large amount of pasture sod being utilized in the Toronto area and planted a field to Merion bluegrass.

This field was mowed, fertilized and sprayed as any fine lawn. Landscapers early noted the superiority of this cultivated product and for a number of years the Ruthven Merion Sod Co. Ltd., found it difficult to meet the demand.

Campbell states that the rapid



Campbell says use of J&M bulk fertilizer unit saves handling 40 bags of 50 pounds each for every ton. The unit holds 8 tons and feeds into a tractor-pulled 1-ton Lely spreader.