



1. Prof. Dale Norris (left, hatless with jacket) addresses group at Bidrin demonstration.



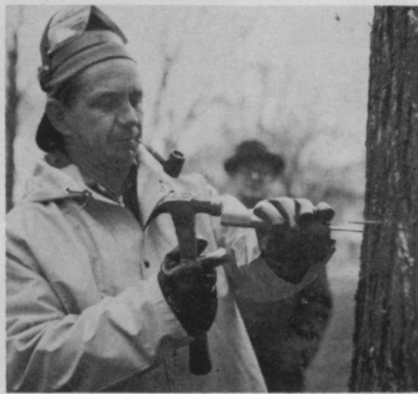
2. Prof. Norris demonstrates insertion of aluminum tube into elm tree; later used hammer.



3. Divided into groups and under eye of supervisor, applicators begin tree injections.



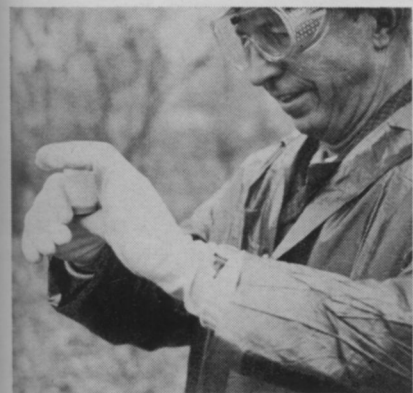
4. Rubber coveralls and face masks are worn by applicators to avoid contact with Bidrin.



5. Hammer and special tool are used to insert aluminum tube into cambium layer of elm.



6. Ringing tree with injectors at five-inch intervals, breast high, assures best results.



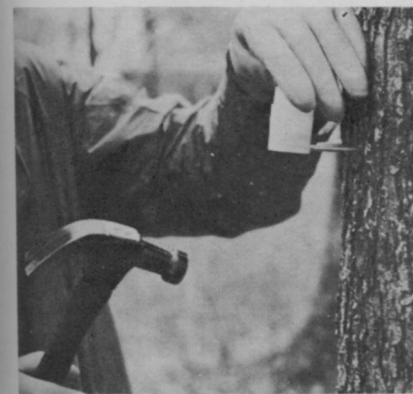
7. Applicator, properly dressed, compresses Mauget injector containing Bidrin. Note gloves.



8. Gentle tapping of hammer inserts container onto aluminum tube, bottom side upward.



9. Container is turned in upright position beginning Bidrin flow into tree's system.



10. Container of Bidrin remains in upright position until tree has absorbed insecticide.



11. Aluminum tubes are removed from tree with pliers; disposal requires precautions.



12. Holes made in tree are sprayed with water and alcohol after tubes are removed.

Labor Management in the Tree Business

By **FREDERICK R. MICHA**

Monroe Tree Surgeons
Rochester, New York



Inclement weather keeps men indoors busy with equipment maintenance.

A CLOSE LOOK at labor in the American tree business reveals deep-twisting problems. Problems of how to cope with what we have; how to improve what we have; and how to hold what we have.

There is nothing new or outstanding about these labor problems, for all industry has the same labor situations. Only ours seems to be a little more unique and difficult.

This article will cover *five* important segments of the tree business. There are innumerable others to discuss; but for the sake of clarity and brevity, we shall confine ourselves to:

- A. Tree Climbers
- B. Field help in general
 - 1. Rates
 - 2. Fringe Benefits
 - 3. Lost Time
 - 4. Safety
- C. Labor-saving Equipment
- D. Office Efficiency
- E. Management's Attitude Toward Tree Help

A. Tree Climbers

Let's first look at the heart of the tree business—the "good tree climber."

This skilled person is rapidly becoming extinct. He is more difficult to find, hire, and hold. The underlying makeup of a qualified tree climber is his individuality. Here is a person quite different from any other in any industry. He is, in fact, quite dif-

ferent from others in the same business. On an average, a good tree climber is a floater, sometimes a "prima donna," proud, and very individualistic.

To cope with these idiosyncrasies can be a tremendous task for any foreman, personnel manager, or owner.

Generally a climber works only for wages. He is not concerned with fringe benefits or extra offerings of tree companies. He likes good working conditions and prefers "take downs" to routine tree trimming. Usually a good climber caters to the more difficult tree removals.



Impressive array of modern equipment includes trucks, staff cars, skyworkers, stump pullers, etc.

Author Micha believes in efficiency and applies it throughout his entire operation.





Radio equipment increases truck efficiency, especially in disaster work.



Grinding machines, brush chippers, chipper body dump trucks, and other rolling stock.

Tape recorder, electric machines, radio, voice box provide efficient communication.



In this way he can best utilize his talents.

Most tree companies *must* take it upon themselves to find ways and means to hold good climbers or at least "stem the tide" of constant movement from one company to another.

It is impossible to give a con-

crete answer on how to hold climbers. Possibly one is through the use of increased mechanization, i.e. hydraulic lifts and similar equipment. This will help make the climber more available to jobs he dislikes. Less foul weather work; more opportunity (through training and experi-

Effective labor management in a tree business is crucial to success, Author Micha points out in this pull-no-punches article. There are phases of work where money can and must be saved, but there are other places, equally important, where the author believes more money must be spent. Management must take a close look at its attitudes toward labor. Continued success of the majority of tree firms hinges on decisions coming from self-scrutiny. Author Micha, an experienced arborist himself, presents some valuable money-saving tips for all arborists.

ence) to work up to foreman's levels; and improved fringe benefits, i.e. bonuses and commissions.

B. Field Help

Probably the most maligned work group in the whole tree business is the groundman. These are the men that do the "bullwork" or heavy ground work. They are expected (and sometimes forced) to work in all kinds of foul weather. Some companies consider them expendable; they are *not* usually allowed to think for themselves and they are generally the lowest paid.

This is the group that needs the greatest amount of thought and consideration. Itemized improvements are as follows:

1. Training.
2. Giving sufficient time to thoroughly learn good groundmen's techniques.
3. Plan work loads to allow these men to work inside during foul weather.
4. If work must be done during inclement weather, have sufficient foul weather gear available to them.
5. As the good groundman progresses, prepare a clear path for him to follow onto the next level.
6. Give him tree-climbing training, especially if he

shows a desire to do this type of work.

7. Pay adequate wages, commensurate with jobs of a similar nature. Consider what other companies in the tree industry are paying and pay accordingly.

Since we have reached the heart of the tree labor problem, let's discuss this more thoroughly.

The following excerpt is taken from a talk given by Dr. Paul Tilford, Executive Secretary of the National Arborist Association.

Example of Average Hourly Rates Paid

Midwest and Western Areas

Year	Foreman	Climber	Groundmen
1950	\$1.50	\$1.30	\$1.12
1952	1.76	1.46	1.20
1954	1.91	1.62	1.37
1956	2.10	1.75	1.46
1958	2.20	1.87	1.52
1960	2.22	1.93	1.52
1962	2.25	1.98	1.61
1964	2.40	2.07	1.67
1966*	2.65	2.25	1.85

* (Author's projected rates)

Now let us compare our tree industry with the average of other occupations. This compilation is taken from the Department of Labor Occupational Wage Survey for 1963. (Plus my own 1966 projected wage scale)

Occupation	Akron, Ohio	Projected
		Midwest 1966
Carpenters	\$3.21	\$3.36
Electricians	3.24	3.39
Mechanics	3.26	3.41
Painters	3.06	3.21
Pipe Fitters	3.24	3.39
Janitors	2.71	2.76
Truck Drivers	2.93	3.01



A well-filled, orderly stockroom prepares a tree business for any need. Here Mike Milazzo (left) and Harold Seaver take inventory. Note peg board on far wall which makes valuable wall space useful.

Reviewing the preceding charts, it would appear field men for our industry are drastically underpaid.

Fringe Benefits Valuable?

During a recent meeting of the New York State Arborists Association, the subject of fringe benefits was discussed.

Needless to say, it was a very interesting topic of discussion. Fringe benefits offered to field personnel ranged from practically nothing, to adequate pension plans plus bonus. The greatest majority of smaller tree companies paid a Christmas Bonus to their men. Even this offering

had its problems, especially when the company failed to give a bonus due to a poor year. This raised havoc with the men because they came to expect it every year. Employees admitted they were not overly fond of this type of compensation.

Other tree companies offered well thought-out pension plans with the company contributing from half to the total amount of pension payments. Most of these companies indicated their pension plan was working quite well. Others stated their pension plans did not work as planned, for it did not "stem the tide" of constant labor turn-over. They felt the tree man in general is not interested in the future, but in immediate cash in hand. All in all, though, pension plans have merit as fitted in each individual company's needs. More exploration of this avenue of approach should be carried out by tree companies in America.

The greatest fringe benefit that the tree men respected and admired was a guaranteed 32- to 40-hour week for the entire year. Those offering this inducement seemed to be having a steadier day-to-day work force.

Lost time was also discussed at the meeting. This likewise did not end with any conclusive result.

All admitted the morning cof-



A private, fully equipped payroll office increases accounting efficiency. Payroll clerk Don Lopa (seated) prepares draft for Foreman Carman De Nardo. Window adds to the office privacy.

fee break was here to stay and no force on earth could curb it for any length of time. All companies participating in the panel felt holding the coffee break to a minimum was the most adequate step they could take. Supervision and qualified foremen were necessary to curb excessive coffee break time.

Other lost time elements were touched upon: travel time, inclement weather, dump time, breakdown time, and tool time. Most tree company owners gave close supervision as the strongest answer to correct lost time situations. One item — inclement weather — brought much response from the participating audience.

Some companies just sent their men home if poor weather persisted beyond an hour after dispatch time. Others paid an hour or two for show-up time. Finally, the more progressive companies used inclement weather for tool and equipment repair and safety meetings.

It would appear that those companies sending men home without pay were in the minority because of the unfairness to the men that took the time to come to work. There is an area here for improvement in the tree industry.

Safety Still Paramount

Safety, a far reaching topic, was insufficiently discussed during the New York State Arborists meeting. It was impossible to adequately cover all of its many ramifications. One of the most important segments of safety is lessening the incidence of accidents.

Hundreds of training programs, devices, and meetings have been used to keep accidents to a minimum. Minimization is still the biggest "bug-a-boo." Only the tried and true method of constant day-to-day hammering, plus close field supervision seems to work.

One company used a unique program of offering a safety bonus cash award for good accident records. It went something like this: For every accident-free month, the foreman received \$20 and the climber received \$5. In

addition to this monthly award, a year-end initial jackpot of \$3,000 was to be split up among all the men working a full year.

For each accident recorded, \$20 was deducted from the total pot. After 12 months, the remaining money was divided. The best-record men received more, and so on down to the last man.

It was reported after three years in operation the total number of accidents was not sufficiently reduced and the program was scrapped for a year end Christmas Bonus to deserving men.

Numerous other programs have been devised and tried. It seems to remain that "on the

stumps, the topping operation will be handled with a two-man crew and aerial lift or tree crane. Follow up simultaneously with a two- or three-man cleanup crew using a brush chipper, a large enclosed dump chipper truck, and a heavy-duty winch truck for the large butts. Finally follow up the same day, or a day later, with a stump grinder and operator. If the contract calls for soil and seeding the stump holes, then some companies will subcontract this more-or-less landscape detail. Other companies may use the new heavy duty 4-in-1 bucket waders on rubber to load most of the heavy wood and brush.



A Dodge Power Wagon with tank, pump, hose, and a guardrailed rear platform is heavy-duty equipment for roadside spraying. In the background is a hydraulic Skyworker for utility line maintenance.

job" safety lectures, constant exposure to safety thoughts and methods, plus close supervision are still the only real ways to eliminate constant accidents.

C. Labor-saving Equipment

Equipment in today's tree business is changing to meet the demands for speed and efficiency. The use of tools, equipment and other devices to save time is now an important part of a well-operated tree company. The aerial lift is one of the best of the latest labor-saving devices.

When 10 years ago it took a five- or six-man crew to do removals and trimming, today two or three men do the same work with a "Bucket."

Let's use an example to point out some of the newer methods of labor utilization using modern techniques.

For removal of 20 to 30 municipal trees (in wires) and their

Average costs for these removals can and do range from \$70 to \$95 per tree, sometimes lower.

Our industry needs more efficient equipment such as:

- A. Large equipment on rubber to grind the entire tree with the exception of the large butt.
- B. More efficient heavy-duty hydraulic loading equipment.
- C. Greater velocity mist spray machines.
- D. New systemic fungicide and insecticide materials and devices so one man can treat trees in all kinds of weather.

D. Office Efficiency

Another area of improvement to the tree business is office efficiency. Here again is a topic of far-reaching proportions. Today,

(Continued on page 32)



Chipping machine installed on service truck makes excellent mulch and compost.

Making Money with Waste Brush

ONE OF THE most effective ways of waste brush disposal on right of way or land clearing throughout the State of New York is by burning. This is accomplished by piling the brush with a bulldozer, where possible, over used tires which are soaked with diesel oil. Once ignited, the bulldozer must continue to pile brush and pack the fire in order to keep it burning.

In many instances where clearing is contiguous to a populated area and where smoke control becomes a problem, contractors find that the use of a fire fan becomes the most effective method of brush and tree disposal. There are two major types of fire fans on the market which have been used successfully throughout the State. One is a simple gasoline powered fan which merely fans the fire. The second is a fan with a diesel oil spray attachment. This type of fan spreads a regulated amount of diesel oil on the fire as it fans it. In dealing with heavy brush, especially evergreen, this type of fan is almost a must.

Another effective method of brush removal is by the use of a tripole boom mounted on a winch truck. By piling the brush across the extended winch cable it is possible to double load ca-

By **FREDERICK W. DONOVAN**

Donovan Tree Service, Inc.
Mechanicville, New York

capacity. This is done by squeezing the brush together with the power of the winch. This type of operation is most effective on short hauls where dumping is no problem to the contractor.

Chips Are Valuable By-product

Where there is a heavy concentration of brush, your waste could become a valuable asset as chips. By use of a brush chipper your brush, properly chipped, makes excellent mulch and compost for orchards, vegetables, berries, and flowers. Absorbent wood chips will carry plant nutrients to cropland, supplying crops with a source of humus that lasts. Rather than dispose

By-products made from trimmed brush can be sold to nurserymen, farmers and horticulturists. Brush, properly chipped, can be used as bedding for livestock or mulch for berries and flowers. Organic content of soil is increased if brush chippings are added with nitrogen fertilizers.

of waste chips in a dumping area, the contractor may do well to check with local farmers, nurserymen, and the like to market these otherwise waste products.

Cow comfort has long been recognized as a leading requisite for the housing of dairy cattle. While research is still being done on the comforts cows prefer, the presence of adequate bedding is well accepted as necessary. If straw is scarce in a particular area, use of sawdust chippings and wood chips have been found to be effective supplements to the bedding supply. In many states, such as Maine, New Hampshire, Vermont, and northern New York, sawdust and chippings have been the only bedding (except poor quality hay) for years.

Wood chips make good litter in broiler houses. They absorb well, give good footing, and are coarse enough not to pack. In the broiler areas of Maine, the contractor will find a ready outlet for his chipped waste products. In addition to livestock bedding, wood chips can be used by the farmer to add to soil organic matter. In Minnesota, wood chips added to the soil along with 60 pounds of nitrogen produced a 363 bushel yield crop,

118 bushels more than in past years.

The nurseryman will find chipped wood very effective in providing him with a protective moisture cover against summer dry spells or winter drying. Wood chips keep moisture in and weeds out. Many contractors feel that even with stockpiling wood chips for eventual sale, money could be saved by the use of a brush chipper. Use of a brush chipper eliminates the ever-present fire hazards, open burning, and the accompanying annoying smoke and ashes. The danger of accidental or mischievous fires is effectively minimized when brush is reduced to chips and quickly removed. The disposal problem itself is done in less time and at less cost than hauling and burning. No time is lost loading and unloading brush to and from hauling-away trucks, thus the contractor is able to dispose of greater quantities of brush with fewer trips to the dump site.

Another asset of chipping is that normally less manpower is required. One man will be able to convert a truckload of brush into a small pile of chips in a fraction of the time it would take to load the truck. Bulky brush is actually reduced to as little as 1/15th its original volume, condensing up to 15 truckloads of brush to a single truckload of chips.

Brush chips are also useful to help solve erosion problems on slopes. The State of Massachusetts has been experimenting with chips as a seeding mulch along their public highways. Chips are used in place of hay or straw and being heavier than the hay or straw, leave less of a chance of blowaway or erosion.

Lately there has been a big demand by nurserymen for wood chips as a mulch for their transplants. They have found that using the chips as a mulch is very effective in their transplant operation. Again the principle of keeping moisture in and heat out has been applied for this type of operation and the result is far superior and less expensive than other types of mulch formerly used.

Why the spring-activated feed plate – an exclusive feature of the **FITCHBURG CHIPPER SAVES YOU MONEY!**



Take a good look at the Fitchburg feed plate. It's patented – no other chipper has this feature. Because the feed plate is *spring-activated*, it "gives" and automatically adjusts to size of wood, up to the machine's rated capacity. Result: No sudden shocks to rotor assembly, engine can be run on lower r.p.m., chipping is smoother, quieter and faster.

No hard-to-control fly wheel. The spring-activated feed plate makes a fly wheel unnecessary. No waiting for fly wheel to speed up, no worries about safety, bearing troubles, or clutch strain. Compare the ease and efficiency of a Fitchburg with *any other* chipper!

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- **SOLENOID SWITCH** (optional equipment). Motor can be idled between feedings. Saves fuel and engine wear.
- **PATENTED QUICK-OPENING 2-WAY CHUTE.** * Operator directs chip flow, front or side with flick of wrist. Easy access to steel alloy blades.

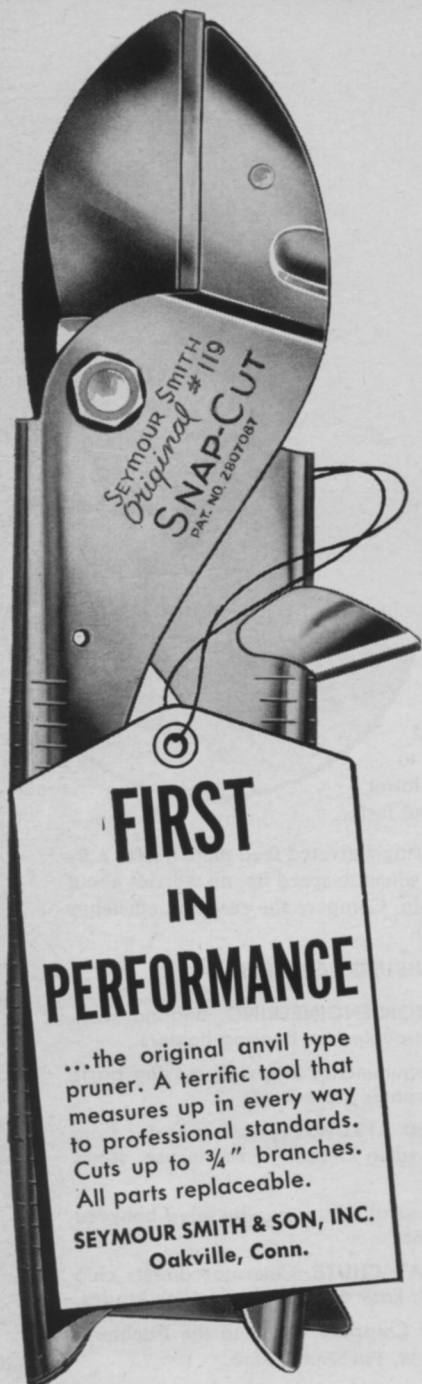
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Lightweight but powerful **MAC 2-10** chain-saw said to make arm's length tree work easier, safer.

McCulloch Introduces Two Ultra-lightweight Chain Saws

Two power chain saws in the 10-pound class are now marketed by McCulloch Corp. The 10½ lbs. MAC 1-10 and the 10¾ lbs. MAC 2-10 are said to be 25% lighter than saws of comparable performance.

Although "ultra-lightweight" (as McCulloch calls them) and small, the gasoline powered MAC 1-10 and MAC 2-10 perform all cutting jobs where maximum power and handling ease are desirable, McCulloch claims. Other features include a safety-designed slider-type ignition switch and a right hand automatic starter.

Both MAC 10 saws have a fingertip primer which eases starting and an idle control device which ends the need to hold the throttle open when the starter is pulled. Write McCulloch Corp., 6101 W. Century Blvd., Los Angeles 45, Calif., for further information.

Chemicals Group Meets Oct. 17

The National Agricultural Chemicals Association holds its 32nd Annual Meeting Oct. 17-20 at the Diplomat Hotel, Hollywood-By-The-Sea, Florida.

Know Your Tree and Shrub Pests

For some time the editors of *Weeds Trees and Turf* have been aware of the need for a color identification chart of insects of ornamental plants. Many requests for sources of color guides and booklets reach WTT offices. Suppliers of fine color printing of insect pests are few, and when one is announced, the agency producing such a guide quickly finds its supplies exhausted by orders.

Hearing that Purdue University, Lafayette, Ind., was preparing a four-color insect guide, the editors arranged to have extra copies printed at the same time so that every WTT reader would receive one in his magazine.

These attractive full-color photo prints are original with Purdue entomologists. Controls recommended on the back are in accord with product directions and the latest test results.

Do you know that there are two color phases of the oyster-shell scale? Or that fall webworm is a pest in the spring also, because it has two generations per year? Answers to these and other questions may be found on the reverse side of the facing page.

Eleven species and controls are presented in detail. Each section gives the common and technical name of the pest and lists common plants the insects are found on. Plants shown in each color picture are identified.

There are descriptions of each pest's habitat and range, the season when the insect is most plentiful, and some habits of each. Controls included are both mechanical and chemical; chemicals of choice are listed.

Requests for extra single copies will be accepted as long as supply lasts. These are free as a reader service. Write to Reader Service Department, *Weeds Trees and Turf* magazine, 1900 Euclid Avenue, Cleveland, Ohio.

COMMON TREE AND SHRUB PESTS

FOR SAFE AND EFFECTIVE USE OF INSECTICIDES, ALWAYS IDENTIFY THE PROBLEM CORRECTLY.



1. Oystershell scale



5. Bagworm



8. Elm leaf beetle



2. Flatheaded borer



6. European pine shoot moth



9. Twig girdler injury



3. Fall webworm injury



10. Yellow-necked caterpillar



4. Boxelder bug



7. Red-headed or
LeConte's sawfly



11. Spruce mite injury

DESCRIPTION AND CONTROL

1. Oystershell Scale (Brown Race), *Lepidosaphes ulmi* (L.). Picture shows mature scales on twig.

Commonly found on hybrid lilac, poplar, redbud, dogwood, ash and fruit trees. The insect overwinters as a white egg beneath the scale. There are two generations each year with young scales present in early June and again late July. The grey race (often present on common lilac) has only the spring generation.

Control with oil sprays during dormant season or with malathion or DDT sprays when the young are present.

2. Flatheaded Apple Tree Borer, *Chrysobothris femorata* (Olivier). Picture shows mature larva in tree trunk.

A common pest of maple and fruit trees. It often kills trees the first **two** or **three** years after transplanting. There is one generation each year. Adults are present in May and June.

Prevention is better than control. Spray or dust tree trunks with DDT or dieldrin. Wrap trunks of newly set trees with paper or burlap. Fertilize and water adequately.

3. Fall Webworm, *Hyphantria cunea* (Drury). Picture shows typical webbing on walnut.

A widely distributed pest that feeds on many kinds of fruit, shade and woodland trees. Hairy caterpillars feed inside the web. This pest has two generations each year. Webs are present in both late spring and early fall.

Damage may be prevented by spraying or dusting with DDT. The insecticide must penetrate the webs.

4. Boxelder Bug, *Leptocoris trivittatus* (Say). Picture shows adult and nymph (adult has wings, nymph on left does not).

Adults and nymphs feed principally upon seed-bearing boxelder trees, but are most important as a nuisance in and around homes. In the fall, bugs collect on sunny side of buildings before moving into walls and other protected places to overwinter. They continue to crawl about on warm days throughout the winter.

Control bugs on trees and those which cluster outside buildings by spraying with dieldrin.

5. Bagworm, *Thyridopteryx ephemeraeformis* (Haworth). Picture shows overwintering bags on juniper twig.

A common and destructive pest that feeds on both evergreen and deciduous plants. The eggs overwinter in the bags and hatch in late May and early June.

Control by picking off and burning the bags during the fall, winter and spring. Spraying is necessary for large trees or extensive infestations. Use malathion, diazinon, toxaphene, lead arsenate or DDVP. Spray as soon as possible after the eggs hatch.

6. European Pine Shoot Moth, *Rhyacionia buoliana* (Schiffmüller). Picture shows overwintering larva in terminal pine bud.

An introduced pine pest of increasing importance throughout Indiana. The brown, black-headed larvae feed in the buds and cause dwarfed, malformed trees.

Control by spraying with guthion or DDT in mid-June and repeat in **ten** days. Prune off and burn infested buds and terminals in early July.

7. Red-headed Pine Sawfly (LeConte's Sawfly), *Neodiprion lecontei* (Fitch). Picture shows mature larvae and cocoons on pine terminal.

This is a common species of sawfly which defoliates pine trees by eating the old needles. There are two overlapping generations with colonies of larvae present from late May until late fall. The insect overwinters in brown cocoons.

Control by spraying or dusting with DDT when the larvae are young.

8. Elm Leaf Beetle, *Galerucella xanthomelaena* (Schrank). Picture shows adults on damaged elm leaf.

Adults and the small yellow to black larvae skeletonize elm leaves during the summer. Chinese elms are particularly susceptible. There are two generations each year, and damage becomes evident in late July. In the fall, adults move into sheltered places to overwinter, frequently becoming a problem in homes and other buildings.

Control on elm trees by spraying with dieldrin in mid-June and again in late July. Heavier concentrations of dieldrin applied around doors and windows helps prevent migration indoors.

9. Twig Girdler, *Oncideres cingulata* (Say). Picture shows girdling damage on oak twig.

Twigs and small branches of nut trees and a few shade trees may be girdled in late summer by grayish long-horned beetles. Trees may be deformed and nut crops reduced.

Control by gathering and burning all severed branches in late fall. These contain the eggs and larvae. Spray with DDT at 2-week intervals starting in late August.

10. Yellow-necked Caterpillar, *Datana ministra* (Drury). Picture shows a typical colony of the caterpillars.

These caterpillars attack the foliage of fruit and ornamental trees, especially pin oak. When disturbed, the larvae elevate both ends of the body. There is a single generation each year, and most damage occurs in July and August.

Control by spraying or dusting with DDT.

11. Spruce Spider Mite, *Oligonychus ununguis* (Jacot). Picture shows arbor vitae foliage damaged by the spruce spider mite. Note the discoloration, webbing, and eggs. Mites are not insects but are closely related to them.

The spruce spider mite attacks most evergreen trees and shrubs causing the foliage to turn white, yellow or brown. The overwintering eggs hatch very early in the spring. Damage usually starts at the base of the plant and progresses upward and outward.

Control by spraying as needed with a miticide, such as Kelthane, chlorobenzilate, Tedion, or Ovex.

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prunes, limbs, trims, and cuts
30% Faster!

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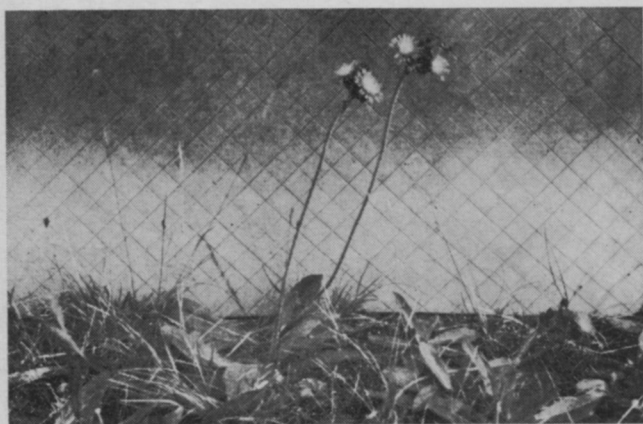
Hawkweed Control

with

Turf Herbicides

By S. W. BINGHAM

Associate Professor of Plant Physiology
Virginia Polytechnic Institute
Blacksburg, Virginia



Hawkweed, *Hieracium sp.*, is shown above in flower. Mature weeds, below, have tops of seed-bearing, small cottony tufts, resembling dandelions.



Hawkweed, or mouseear hawkweed, as this species is also called, can be difficult in lawns. Controls are listed in this article. Author Bingham also relates surfactant effect on control. It is possible to add surfactants, lower herbicide dose, increase control, and save money. Readers will recall WTT's feature on surfactants in the January 1965 issue. Ed.

HAWKWEED (*Hieracium pilosella* L.) is a perennial plant which forms a carpet of stolons and leaves. Leaves form a basal rosette and are hairy on both surfaces. The stolons are thread-like and bristly. Hawkweed develops in dense spots spreading by both seed and stolons. In these studies seedlings emerged over a period from July to October. They formed basal rosettes of leaves but did not produce stolons during the first fall growing season. Stolons of older plants pegged down new rosettes during this same period forming a chain of rosettes linked together. Hawkweed overwinters in the rosette stage. They send up scapes about 6 inches tall and flowers during May and June. The flowers are bright orange, and the spotty appearance is noted distinctly at this time in many turf areas. Seed heads resemble dandelion but are much smaller. It presents a weed problem primarily in lawns, pastures, other turf areas, and abandoned open land in cool climates.

Hawkweed control studies were conducted near Blacksburg, Virginia, in an area that contained a heavy stand of this weed. Since hawkweed is a problem that occurs mainly in turf, herbicides normally used on turfgrasses were selected for these studies. Herbicides included were 2,4-D, dicamba, silvex, MCPP, 2,4,5-T, picloram, and ioxynil. They were applied at three stages of growth: (1) seedling establishment and stolon production of older plants, (2) maturing rosette and degenerating stolons, and (3) flowering stages (July, September, and June, respectively).

As is the case for many weeds, the flowering stage was observed to be the time that is least desirable for treatment with herbicides. This appears to be the most resistant stage of growth. Some control of hawkweed was observed with each herbicide, but dicamba and 2,4-D were most effective. A mixture of these herbicides was not substantially better than dicamba alone.

The herbicides were more effective when applied at a time during vegetative growth of hawkweed. Thus, it responded best to dicamba and 2,4-D when applied in July, next in September, and least during June.

Since hawkweed is a very bristly and hairy plant, the effect of various amounts of surfactant in the spray mixture was studied. In general, increasing surfactant increased the control obtained with each rate of dicamba used. A proprietary formulation of dicamba at one-fourth lb./A with 4% additional surfactant was as effective as one lb./A with no additional surfactant. The benefits of added surfactant decreased as the rate of the herbicides was increased.