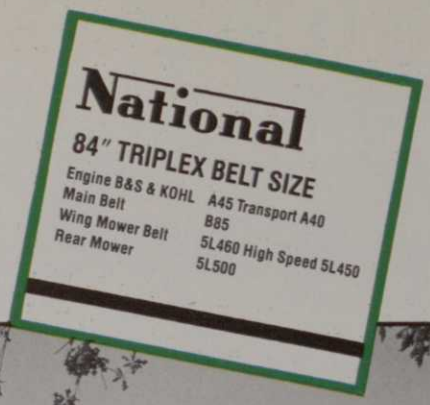
You'll find one on every National . . .

The little decal that means big savings!



It does more than tell you the belt sizes used on National mowers. It signifies our commitment to build a mower that can be maintained easily and inexpensively. It tells you that these are standard, off-the-shelf items available from your local supplier, not a special, high-priced belt designed by a manufacturer to be available only from him. **It means less down time!**

But standard belts are only part of National's value. There's the normal maintenance factor which is reduced by National's obviously easy accessibility. Field reports tell us that **National mowers are one-third to one-half the cost** of maintaining competitive models.

Then there's greater fuel economy. National's simple, functional design means as much as 44% to 62% less fuel consumption than competitive, power-robbing, hydrostatic type rotary machines.

Best of all, **National's initial cost is less** than that of other mowers sold to do the same job.

In these days when purchase price, fuel economy, continuous performance and longevity are most important, look to a National to do more work, with easier and faster maintenance, over a longer period.

Model 84" Triplex

Write to us for the name of your nearest dealer. Then call for a demonstration.

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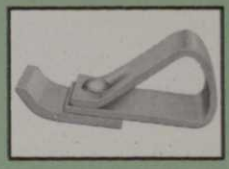
We still cut our own gears, forward, reverse and differential, out of solid steel blanks. These durable gears, carborized, hardened and tempered, are heavier than those used in many automobiles today.



Bed knives have upturned lips for extra wear and longer service. It prevents scalping and will not allow small objects to enter and damage reels.

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Integrated Pest Management for turfgrasses

By Dr. Leon T. Lucas, Professor, Department of Plant Pathology, North Carolina State University, Raleigh, NC

Integrated pest management (IPM) is a system for reducing populations of different pests by using combinations of compatible management and pest control practices. Extensive IPM programs have been developed for some agricultural crops in recent years, but have not been developed for turfgrasses. Many IPM principles can be used in growing turfgrasses, and some are being used without recognizing them as part of an IPM program.

IPM for turfgrasses means to manage turfgrasses and all pests that are present simultaneously using all available environmentally acceptable and economical methods. The effect of pest management practices on other pests, nontarget organisms, and the environment must also be considered. Various regulatory, research and educational agencies are involved in IPM programs and are encouraging the development of programs for urban areas. Such programs may reduce the dependence of turfgrass managers on pesticides and encourage the use of alternative methods of pest control to minimize the exposure of humans, nontarget organisms and the environment to pesticides. An IPM program for turfgrasses uses normal management practices for growing turfgrasses, biological control methods and pesticides to keep pest populations below economic or aesthetically damaging levels.

Some turf management practices that are normally used affect pest populations and the damage caused by pests. These include construction methods, soil mixtures, selection of varieties, time of seeding, fertilization, irrigation, mowing, aerification, verticutting, top dressing, modification of environments, and the use of various pesticides. These practices are used to encourage better growing and quality of turfgrasses which, in many cases, involves the control of pests. A good healthy turf is one of the best methods for pest management that is available. Examples of some management practices that turf managers can use to reduce pest problems are discussed below.

The construction of golf courses can affect the growth of turfgrasses and the management of pest problems. Construction of contours so that good surface drainage results to remove excess water and to avoid high-dry mounds will help reduce weed and disease problems. Incorporation of fertilizer and lime according to soil test results at this time will help grow a healthy turf that can better overcome and compete with pests during establishment and years later. Removal of nearby trees and correction of drainage problems at the time of construction will help prevent weed and disease problems that might be encouraged by these conditions. By constructing a turf correctly, many problems with pests may be eliminated or reduced for years by providing conditions favorable for a good healthy turf.

Soil mixtures that are specified for golf greens provide good drainage, retain the proper amount of moisture and help to avoid compaction and too much drying of the soil. Good soil drainage and aeration encourage root growth and help to prevent many diseases by removing excess water from around the plants. Less soil compaction helps to develop a healthy turf that can prevent or overcome some weed problems that often develop in compacted soils.

Time of seeding is an important disease control practice, particularly for cool season grasses. By seeding cool season grasses in early fall when temperatures are cooler, diseases are less of a problem on young seedlings than in hot weather. Diseases such as brown patch and Pythium blight may kill many of the seedlings during warmer months. Seeding too late in the fall may result in more damage from cold weather. Warm season grasses should be seeded during early summer so that plants can become well established before cold weather in the fall.

The selection of the best adapted and most disease resistant turfgrass varieties for an area is an important practice for a turf IPM program. The best varieties will result in a better turf that can compete with weeds and overcome many disease and insect attacks.

Continues on page 44

Aerification holes shown above, provide better water drainage and allow oxygen to the roots when filled with sand.

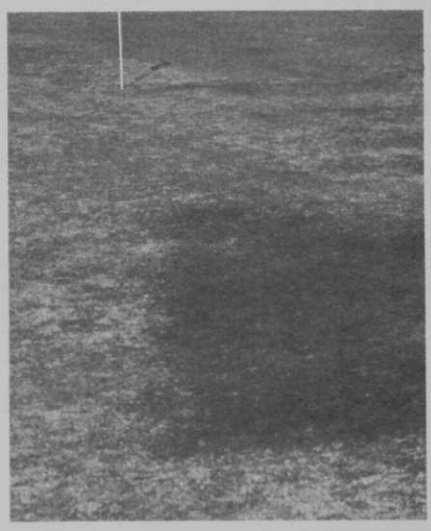
Fertilization practices can affect pest problems that might develop or are present in turf. Cool season grasses, particularly in the transition zone, should be fertilized with nitrogen in the fall, winter and spring and not as much during the summer. The cool season grasses grow best during the cool time of the year and should be encouraged to grow at that time. Fertilization with nitrogen during the summer encourages top growth and not root growth which produces plants that are more susceptible to drought stress and some diseases. Diseases such as brown patch and Pythium blight are more severe following heavy summer nitrogen fertilization. The diseases can cause the turf to become thin which allows weeds to grow in affected areas and become a problem. Adequate amounts of phosphorous and lime are needed in soils that are deficient in these elements to develop healthy seedlings that can compete with weeds and overcome diseases. Soils with high pHs and high amounts of soluble salts can also cause problems. Proper fertilization will help turfgrasses recover from insect damage. Fertilization of warm season grasses during early summer encourages growth of the turf that can compete with or overcome weeds in the area. These grasses should not be fertilized with high rates of nitrogen during late summer which would make them more susceptible to damage from cold weather in the fall and winter. Extra potassium is needed in soils that are low in potassium in late summer on both warm season and cool season grasses to help improve winter hardiness and prevent weed problems.

Irrigation is an important practice in an IPM program. Extra water is often necessary during the dry, hot months of summer but should be applied only when needed. Water should be applied infrequently, but enough should be applied to wet the soil 6 inches deep. Frequent irrigations with small amounts of water will cause plants to develop shallow root systems that will be more susceptible to drought stress, and some disease and weed problems. Frequent irrigation may keep the leaves of plants wet for long periods of time and encourage the development of certain diseases. Irrigation of cool season grasses on golf greens in early morning can help reduce diseases by allowing the leaves to dry quickly and removing exudates from the surface of leaves. The use of irrigation systems to syringe bentgrass golf greens during hot weather may help these grasses grow better and overcome pest problems. Also, proper use of irrigation during the establishment of young seedlings will help seedlings compete with weeds. Irrigation may affect pesticides that are used. Some insecticides may need washing into the soil to be effective on some soil insects, whereas irrigation following the application of some insecticides, fungicides, and herbicides should be avoided to prevent washing the pesticides off the leaves.

Mowing practices can affect pest problems. Mowing grass when it is wet may spread pathogens from diseased plants to healthy plants. Also, mowing plants too high or too low may encourage the development of diseases or favor competition from weeds.

Aerification is used to help overcome soil compaction and provide better soil drainage and aeration. Better drainage removes water from around the crowns and leaves of plants and results in an environment less favorable for most diseases. Removal of soil compaction allows for better turf growth and less weed problems in most cases. Aerification might be a disadvantage with some insects such as the black cutworm which will hide in the aerification holes during the day. However, this is not a severe problem and the benefits of aerification are much greater than the problem with cutworms. Disturbing the soil surface following the application of some preemergence herbicides may reduce the effectiveness of these types of chemicals.

Verticutting is used to help control thatch in turf. By controlling thatch, some pest problems can be reduced and better control can be obtained when pesticides are needed. Where too much thatch is present, some pesticides may become attached to thatch and not be available to control the pests. Verticutting could be detrimental and cause more pest problems in some cases. For example, verticutting cool season grasses heavily during the summer months would reduce the stand of the grass so that weeds could invade and become a problem. Also, disturbing the soil face may interfere with the action of some herbicides. Verticutting should be used to prevent the accumulation of thatch and to encourage the growth of turfgrasses. Localized dry spots may develop in areas with excess thatch that become dry and are difficult to wet again. Diseases and weeds may be more of a problem in or around the dry areas.



The solid areas were treated with Nemacur for sting nematode. Weeds are encroaching in the weakened, non-treated areas.

Top dressing with soil is a management practice that is commonly used to smooth turf surfaces and to aid in thatch decomposition. Top dressing mixes soil into the thatch layer which encourages biological activity in the thatch and increases the rate of decomposition. Pathogenic fungi that survive in the thatch may also be affected and numbers could be reduced by competition and the production of antibiotic substances from saprophytic microorganisms. Topdressing can also be used to modify the top few inches of existing soil by aerifying and filling the aerification holes with an appropriate type of soil. Heavy soils can be modified for better soil drainage and less compaction by top dressing with sand. This management practice may help reduce disease problems because of a healthier plant and less moisture on the surface of leaves and crowns of the plants. Also, it may help overcome weed problems by developing a stronger turf that can compete better with the weeds.

Excess shade on turf areas often contributes to weed and disease problems. Diseases are often a problem in a partially shaded area because of more humidity and more susceptible plants. Weeds are often a problem in shade because of a poor

Continues on page 46

Roseman hydra power mowing reels

Vertical thatching mowers are interchangeable with spiral blade reel mowers. Eliminates thatch build-up on creeping bent and hybrid Bermuda turf.

The Roseman pull type Hydra-Gang™ mower offers a lightweight unit which considerably reduces compaction of turf. Perfection in mowing under soft or wet conditions can be accomplished.

Drive power for the reels is taken directly from the tractor engine, eliminating excessive draw bar pull. Hills and banks can be mowed easily with a minimum demand of tractor horsepower.

The individual mower units follow ground contour with unlimited flexibility. Crowns of undulations can be mowed without scalping. The short wheelbase positioning of the mowers in the hitch permits clean up in trench depressions of drainage and irrigation lines.

3 steps for a 3-point tractor.

The Hydra-Pack supplies hydraulic power input for driving the motors on each mower.

A Universal Drive mounts to the tractor P.T.O. shaft operating at the standard 540 R.P.M.

Attachment of the Hydra-Pack is handled by one man using the lift arms of a 3-Point tractor. A built-in support stand positions the Hydra-Pack conveniently for reattaching. Hydraulic hoses separate by means of quick disconnect couplers.

Assembly or disconnect requires less than 10 minutes. No tools required. Tractor is now available for use with any 3-Point implement.

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Bermudagrass located on the south slope (left) appears very healthy, while that on the north slope (right) has suffered some damage.

turf that does not compete well with weeds. Another example of problems associated with shade was seen following the severe winters in the transition zone during which the bermudagrass was damaged. Bermudagrass was often killed on the southern side of fairways and greens that were shaded by evergreen trees. Weeds such as crabgrass and goosegrass invaded the poor turf areas during the summer. Several years of good weed control and turf management were needed to reestablish desirable turfgrasses in areas that were killed. Removal of lower limbs or entire trees may be needed to eliminate shade problems. Certain ground covers that grow well in shady areas could be used in low maintenance areas.

Biological control methods specifically for turfgrasses have not been developed for most pest problems, however, biological factors are involved in many pest management practices on turf. Biological control methods on turf for diseases include the use of resistant varieties and competition and antagonism among microorganisms in the soil or on the plant. Biological control methods for insects include the uses of diseases of insects, predators, sterilization of insects and the use of resistant plant varieties. Several insecticides that have a bacterium of the genus *Bacillus* as the "active ingredient" are being used on turf at the present time. Biological control methods for weeds includes the use of competition by turfgrasses and diseases of weeds. Competition involves growing a good healthy turf that does not allow weeds to become established or that can compete with weeds that develop in the area. Biological control methods for nematodes include the use of resistant types of grasses and antagonism. Many soil microorganisms are antagonistic to nematodes and certain types of cultural practices may help increase this antagonism.

Dollar spot is showing in the dry-soil areas of this turf.

Research is underway to develop more resistant varieties to diseases, insects and nematodes. Relatively little is being done in the area of biological control with competition and antagonism for microorganisms. Research has shown that the use of large amounts of certain types of pesticides often reduce the level of microbial activity in the soil and thatch. As a result, thatch often increases more quickly in an area that has been treated with large amounts of certain fungicides. Competition is an effective biological control method for weeds, and a good healthy turf is one of the best weed control programs. More research is needed to identify more biological control factors for pests of turfs.

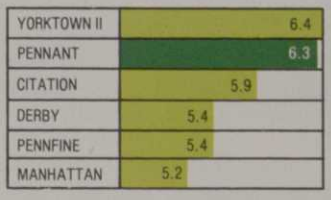
Integrated Pest Management will continue in the next issue of Golf Business South.

What do turfgrass experts say about Pennant* ryegrass?

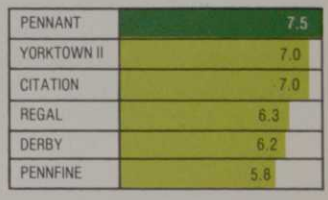
The Turf Trial results speak for themselves. **Pennant** is a champion. Rigidly controlled, comparative testing involving **Pennant** and competing varieties of perennial ryegrasses were conducted by turf experts across a broad region of the U.S.—the Pacific Northwest, the Southwest, the Northeast.

Pennant topped many of its competitors in these tests, including overseeding and heat tolerance trials in the Southwest. Some of the expert's findings are illustrated below.

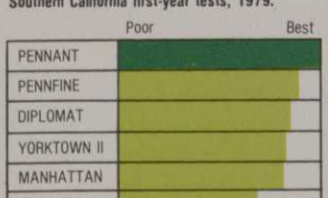
Turf performance scores. North Brunswick, N.J. 1975-78. (9 = Best).



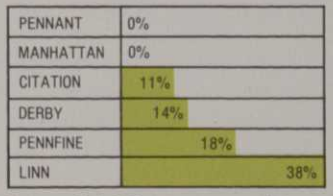
Reaction to brown patch disease (Rhizoctonia), Adelphia, N.J., 1978. (9 = least damage)



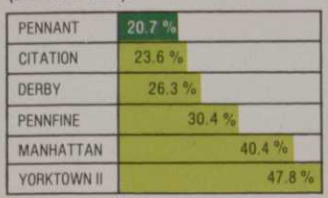
Warm and cool season average turf score, Southern California first-year tests, 1979.



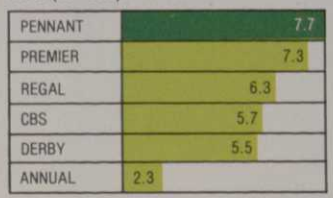
Percent winter injury. Adelphia, N.J. March 1978. (10 of 26 varieties tested showed no significant injury.)



Pennant was best among 12 varieties tested for red thread disease (Corticium fuciforme) in 1-year average, 1979-80. Western WA. (Low score = Best).



Average Turf Performance scores, February 1980. Southern Arizona turf overseeding on Tifgreen Bermuda. Sixteen entries seeded October 1979. (10 = Best).



*Plant variety protection pending and anticipated

Pennant was also found to maintain its excellent turf color and quality late into the season. **Pennant** will impress you with its rich, moderately dark green hue, its fine leaf blades, and its improved mowing properties. We call it "The Trophy Turf". We think you will, too.

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For additional information regarding **Pennant's** truly remarkable Turf Trial performance, contact: Agriculture Service Corporation, 5240 Gaffin Road S.E., Salem, OR 97301 (503) 581-8899

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'Sunbelt' superintendents face tough equipment problems

by **Steve Watson**

Billy Fuller knows what is means to run a golf course in the South. He knows the problems with equipment maintenance and he knows that superintendents in the North usually aren't faced with quite the same problems.

For the most part, superintendents use the same equipment in both regions, but golfers demand play year-round in the South, and this puts a heavy demand on equipment there.

"In the South you've really got to work hard at preventive maintenance," says Fuller, who moved in May from the Kiawah Turtle Point Golf Course at Kiawah Island, South Carolina to take charge of Augusta National in Augusta, Georgia.

"Up North they don't seem to worry as much if something goes wrong with a piece of machinery," he explains. "They know if they can just rig up something to keep it going for a couple of months, the course will close down and they'll have time to work on it thoroughly."

Not so on Fuller's courses. Daily attention to maintenance commanded top priority on Turtle Point, and Fuller says that other top quality courses in the South cannot afford to relax on maintenance if they expect to keep their equipment lasting long. It can be a real problem at times. It's a problem that calls for a good mechanic.

"It's so very important to have a good mechanic down here where equipment never gets much of a rest," he says. "A lot of places don't even have a full-time mechanic, and this is a big mistake.

"You should really have two mechanics if you can, not just one. If you have just one, a lot of times you end up putting out fires every day on a piece of equipment that's a couple years old, and that's not so good. With two mechanics you can keep things running every day like they should."

John Hilton, superintendent at the Country Club of Spartanburg in South Carolina, agrees that a good day-today equipment management and maintenance program is critical in the South. In fact, Hilton, who runs a course that gets play every month of the year, goes even further in emphasizing the importance of the mechanic in a year-round golf course operation.

"I've always believed that, down here, the mechanic is more important than the superintendent in many ways," says Hilton. "He makes the difference in a greens mower lasting six or seven years versus three years."

Everyday cleaning, greasing, and general care plays an extremely important role in the successful operation of a course that's open year-round.

"It's especially important to follow the manufacturer's specifications on how often to change oil and filters and such on your equipment," explains Hilton. "I think a lot of superintendents in the South used to be a little lax in keeping up their equipment, and as hard as we work our mowers, this being lax will lead to early deterioration of the machinery."

Hilton believes that if the course gets year-round play it's important to keep a good supply of critical spare parts on hand. Down-time can really hurt.

"A lot of us don't think far enough ahead," he says. "A good superintendent in the South will determine through their mechanic what the most critical parts are (such as belts, bedknives, throttle and choke controls, filters and reel assemblies), then keep a good supply of these parts on hand all year."

Some would say that to keep a southern course and all its equipment running smoothly, spare parts are great but in the end it pays to keep more units than you need at a given time. So says Dr. Jim Watson, vice-president, customer relations, the Toro Company, in Minneapolis.

"It's important to consider keeping additional units on courses in the South," Watson says. "I think that because a greens mower or a rotary mower gets used more heavily in the South, you would probably find more superintendents there keeping reserve units than you would in the North."

Watson notes that, with a couple of

If golfers play year 'round, mowers mow year 'round. Being able to send a set of reels in for grinding, as in the photo above, means having a back-up set.

exceptions, the equipment used in the North and South, whether Toro, Jacobsen, or another brand, is identical. The exceptions are that sprigging-type units find a place in the South where bermudagrass, zoysia, St. Augustine grass, and other vegetatively propagated species are used. In the North there are more aerator-seeders for seeding bluegrasses, bentgrasses, and the fescues.

Superintendents usually use no special equipment in overseeding bermudagrass greens. Scarifiers, verticutters and aerifiers find a home on courses in New York as readily as they do in Georgia, where over-seeding is common.

Bermudagrass and zoysia, two mainstays in much of the South, will often wear a mower's parts out more readily than bentgrass and bluegrass will, Watson says. As a result, there's more lapping and bedknife wear in the South. It's important to keep on top of the situation.

"Because equipment in the South wears out quicker than in the North, the timing of maintenance is probably more critical in the South," explains Watson.

On a course that closes for three or four months during the winter, the maintenance crew can afford to take the time to thoroughly work over a piece of equipment. Sometimes this can mean that a seven or eight-year old unit can come humming out of the shop every spring looking almost brand new, says Ned Brinkman, general sales manager of the Jacobsen Division of Textron, Inc., Racine, Wisconcin. It can be a real advantage to a superintendent in the North, an advantage the superintendent in the deep South can only dream about.

"When they close down the course for the winter the crew can take the time to literally clean, paint and lubricate every screw on all their equipment," Brinkman says. "They can keep their crew busy during the winter doing this sort of thing."

A quick patch-up job on a mower late in the season up north will often suffice until the course closes, but in the South a superintendent can't afford to relax for long. Like John Hilton says, daily care is not just important in the South, it's essential.

Brinkman adds that a superintendent in the South may be better able to justify buying an expensive piece of equipment than his northern brothers because of the year-round use it must endure in the South.

Maybe so. But one thing's for sure —whatever equipment the superintendent in the South buys, it pays to keep it in top-knotch shape every day of the year.**GB**

Products

Rotary nozzle

Applies uniform 250 micron droplets

The Broyhill Company is pleased to announce its membership in the exclusive team of Micromax Rotary Nozzle distributors in the United States. The Micromax Controlled Droplet Applicator has been used in various forms the past 20 years throughout the world. Through uniform droplet size of 250 microns (accepted as ideal size for minimum drift and optimum chemical efficiency), the Micromax Rotary Nozzle brings laboratory conditions into the field.

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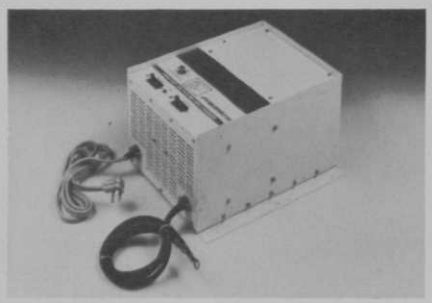
Battery charger



Charges fast, extends battery life

Dynamote Corporation has developed a battery charger that increases battery life, charges batteries faster than other chargers, and maintains the batteries at the optimum charge level. The FA40 Series Charges completely charge the batteries to the cell equalization voltage on each charge cycle. The charger operates continuously at 40 amps. while equalizing the batteries. This is double the effective charge rate of widely used taper chargers of comparative rating.

After equalization, the charger switches to a float voltage of 2.17 volts per cell to maintain the batteries without boiling away the electrolyte. This charging method maximizes battery capacity and life. In addition, the FA40 chargers have automatic line compensation to keep the output to the batteries constant even if the input drops as low as 100VAC.

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Drainage tubing filter

Special wraps control siltation

Advanced Drainage Systems, Inc. of Columbus, Ohio is offering its corrugated plastic drainage tubing in a choice of two synthetic wrap materials for protecting subsurface drains against the most challenging siltation problems. ADS Drain Guard, a 100% nylon envelope, is an ultra-porous filter that restrains and stabilizes problem soils such as fine sands and silts. ADS Sock is a knitted polyester protective material that is best suited where rough handling conditions are encountered.

ADS Drain Guard ® and ADS Sock each serve unique drainage functions. Both are factory applied on the drain tubing, and delivered ready for installation, using conventional drainage equipment. Continuous lengths up to 5000', in sizes from 3" to 15" diameter are available. Applicable specifications include ASTM F-405, ASTM F-667, AASHTO M252 and SCS Engineering Standards Code 606.

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Insecticide implants

Provide direct tree protection

ACECAP Systemic Insecticide Implants have been granted an amended label for use on ornamental trees by the Federal Environmental Protection Agency, according to the manufacturer, Creative Sales, Inc., Fremont, Nebraska. The basis of the amended label includes a substantially higher concentration of active ingredient, an expanded number of insect pests and host trees, and an extension of treatment sites.

According to Warren D. Wolfe, President of Creative Sales, Inc., the utilization of 97% Acephate facilitates the use of a much smaller cartridge implant. The tiny 3/8 inch diameter tree implants, containing the encapsulated ORTHENE concentrate, are designed to be implanted directly into the tree's "vascular system" without need for measuring,' mixing, or spraying of chemicals.

Added host trees include banyon, ficus, and plumeria, for control of whitefly. Bagworms, cankerworm, California oakworm, pine needleminers, and scale crawlers were added to the list already including gypsy moth, tent caterpillars, Fall and mimosa webworm, birch leafminer, elm leaf beetle larvae, aphids, etc.

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Continues on page 52