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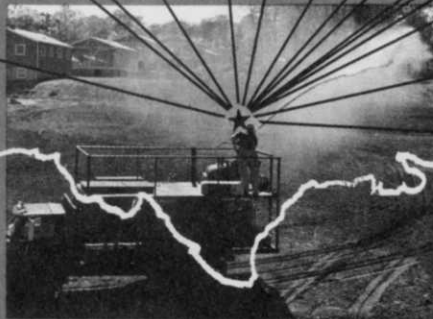
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## —insect report—

### TURF INSECTS

#### SOUTHERN FIRE ANT

(*Solenopsis xyloni*)

TEXAS: Numerous mounds of this ant and *S. geminata* (fire ant) noted on home lawns in Pearsall, Frio County, and in College Station, Brazos County.

#### GRASS WEBWORM

(*Herpetogramma phaeopteralis*)

FLORIDA: Heavy on turf grasses, mainly Bermuda grass, in south area; population 85 percent *H. phaeopteralis* and 15 percent *Crambus* sp. Severely damaged 50 percent of half-acre Argentine Bahia grass lawn at Leesburg, Lake County. Damaged mixed lawn grass at Orlo Vista, Orange County. Heavy on 750-1000 square feet of St. Augustine grass in yard, and damaging mixed grass lawn (including St. Augustine grass) at Gainesville, Alachua County.

#### SOUTHERN CINCH BUG

(*Blissus insularis*)

CALIFORNIA: Nymphs and adults in St. Augustine grass lawn at Bakersfield, Kern County. This is a new county record.

#### RHODESGRASS SCALE

(*Anotonina graminis*)

CALIFORNIA: Adults on St. Augustine grass at San Clemente, Orange County, a new location.

#### BERMUDAGRASS MITE

(*Eriophyes cynodoniensis*)

FLORIDA: Still heavy in Bermuda grass golf course at Sarasota, Sarasota County; Naples, Collier County; Ft. Lauderdale, Broward County; and Miami, Dade County.

#### SOFT SCALE

(*Toumeyella pini*)

MISSISSIPPI: Collected from slash pine in Greene County during late September. This is a new county record.

### BENEFICIAL INSECTS

#### FLEA BEETLE

(*Longitarsus jacobaeae*)

OREGON: Appears established at test site in Marion County from population of 500 beetles released last November. Adult feeding damage on tansy ragwort leaves moderate in 64 square-foot caged area. About 10 adults noted, indicates substantial number have completed one generation. Additional 500 beetles released into a cage near 172 release site.

#### BRACONID WASP

(*Chorebus rondanii*)

MASSACHUSETTS: Reared from puparia of *Ophiomyia simplex* (asparagus miner) collected at South Deerfield, Franklin County. This is a new United States record. Introduction of *C. rondanii* into U. S. was probably accidental.

### TREE INSECTS

#### ELM LEAF BEETLE

(*Pyrrhalta luteola*)

WASHINGTON: First adult emergence noted March in Wenatchee, Chelan County.

#### FALL CANKERWORM

(*Alsophila pometaria*)

WEST VIRGINIA: Caused about 1,900 acres of moderate to heavy defoliation in Dolly Sods area of Grant County during 1972. Egg sampling survey based on Fall Cankerworm Sequential Plan conducted during February showed about 2,000 acres will be heavily defoliated in 1973. Defoliation predicted to be concentrated in north-south direction along eastern front of Dolly Sods area.



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# NUTRIENT NEWS

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### New 5-to-6-Month Controlled Release Fertilizer

Turfgrass contractors can no longer afford to repeatedly return to jobs to apply fertilizers. They need a nonburning, complete fertilizer that can be mixed into the soil to feed grass for several months.

Agriform 16-7-12 (+ Iron), a new landscaping fertilizer with resin coated granules, meets this need by harnessing the principle of osmosis. It gradually meters nutrients into the soil and can sustain uniform growth for 5 to 6 months from a single application. A moderate amount of uncoated fertilizer is included in the formula. The product cost per square foot is reasonable considering that savings in labor costs can be substantial.

Virtually none of the nutrients from the coated granules is lost to leaching, even on sandy soils under high rainfall or irrigation. Furthermore, because Agriform 16-7-12 (+ Iron) is not dependent on the activity of soil bacteria for release, it can supply a steady diet of nitrogen, phosphate, potash and iron on soils that are low in organic matter.

For specification sheets, prices, and the name of your nearest distributor, contact Dept. WTT-174



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### TROUBLE SHOOTING

(from page 24)

turbine pump may not be delivering to the centrifugal quite as much water as the centrifugal is trying to pump. If the difference in the amount of water is slight, this might be hard to spot as the pump may not be noisy and the pressure gauge may not fluctuate much. The pressure will be just slightly under design condition. A combination, vacuum-pressure gauge on the suction line or the suction side of the pump will show the operator if he is maintaining a steady input pressure to the pump or fluctuating between pressure and vacuum on the suction side of the pump.

Many systems are being put in today with the pump having a flooded suction. This does not automatically avoid the problem of insufficient water to the pump. If the suction piping is too long and/or too small the friction losses in the line can still prevent sufficient water to get to the pump.

There are many other ways by which we can fail to get sufficient water to the pump, much too numerous to go into here.

If an operator will remember that if the impeller of the pump is free of foreign objects and is turning in the right direction—the pump is working.

If he will then go on and find out why he is not delivering water to the pump or not delivering sufficient water to the pump, he will have the \$28.00 end of his trouble solved and can then go on to the .17 cure.□

### Cast Iron Pipe Research Assoc. Offers Booklet

The many advantages of a modern golf course irrigation system are explained and illustrated in a 24-page booklet offered by Cast Iron Pipe Research Association.

It tells about the increasing demands imposed on golf courses by the tremendous growth in player popularity. It also updates in concise form the facts on proper watering systems and gives general design considerations for planning an irrigation program.

For a copy of this booklet, circle (719) on the reply card.

## GOLF DEVELOPMENT

(from page 10)

California and Texas each (26), Ohio (21), North Carolina (20), Colorado and Michigan each (14), Indiana and South Carolina each (11), Illinois and Washington each (8), Arizona (7) and Virginia (6).

At year's end, NGF files also contained a list of 292 prospective golf course developments. Regulation courses comprised 245 of the prospects; 23 were for executive type courses and 24 for par-3 layouts.

Leading states in the prospect list were California (29), Florida and Ohio (19), Colorado (18), Virginia (17), Michigan (15), Illinois (12), Arkansas, Indiana and North Carolina (11), Arizona and Pennsylvania (10).

As the nation's official clearing house for golf information, the National Golf Foundation has records on golf course growth since 1931. Each year all new courses are added to NGF's computerized national inventory of golf facilities.

For 1931 — the first year for which figures are available — there were 5391 golf courses of all types in play. In 1961 — thirty years later — the total was 6623 or a net increase of only about 16%. But during the period from 1961 through 1973 the inventory jumped to about 10,870 — a whopping increase of 64% in 12 years! A look at the relative growth of all types of golf courses in play from 1931 through 1973 is shown below.

Table 3. Four decades of golf course growth.

| TYPE      | 1931 | 1973   | CHANGE |
|-----------|------|--------|--------|
| Private   | 4448 | 4825   | + 377  |
| Daily Fee | 700  | 4610   | +3910  |
| Municipal | 543  | 1436   | + 893  |
| Totals    | 5691 | 10,871 | +5180  |

The tremendous growth in public golf courses reflected in the above figures brings clearly into focus the trend in golf course development in recent years. **Golf no longer belongs solely to the few; it is Everyman's game.**

Population growth, urbanization, more leisure time and increased personal income and mobility continue to put enormous pressure on public recreation facilities including golf courses. A good solution to the demand is more municipal courses owned and operated by cities, counties, states or regional park-recreation districts.

Why municipal golf courses? Practical politics and economics dictate such action.

Land costs and operating expenses, including rising taxes, make it increasingly difficult for member-owned clubs and private courses to financially survive in many communities.

More financial resources are available to municipalities. Among them are sale of general obligation or revenue bonds, Federal grants, private development with leaseback and outright public or private donations. Among the Federal programs that have assisted municipalities greatly in recent years are those of the Bureau of Outdoor Recreation (Department of Interior). These are fifty percent matching grants for land acquisition and development of outdoor recreation facilities and the Federal surplus property program whereby certain Federal lands are conveyed gratis when used for recreational purposes.

Current emphasis on recreation and open space has created more official and citizen support for golf/recreation complexes. Such complexes often include, in addition to a well designed and constructed golf course, tennis courts (sometimes lighted for night play), swimming pools, artificial ice skating rinks, playground and picnic areas, a community center building, camping, hiking, nature study and sometimes ski areas.

All the above listed factors are making it easier to sell a municipal golf course proposal to the public. While many new municipal golf

courses have been built in recent years, NGF studies reveal there is still an enormous need for more public golf facilities in numerous areas throughout the nation.

Providing assistance in the planning and development of golf courses is one of the principal functions of the National Golf Foundation. Highly trained NGF facility development consultants are available to assist golf course planning groups in making feasibility studies to ascertain their need for golf and outlining a plan of action including methods of financing and operation. Facility development consultants are located at eight strategic locations throughout the country. For further

information on these services contact Don Rossi, Executive Director, National Golf Foundation, 707 Merchandise Mart, Chicago, Illinois 60654.□

## Future Of Turf Research Toward The Basics

The need for stepped-up research to obtain basic information related to turfgrass was emphasized by a Cornell University scientist.

Prof. John E. Kaufmann, a turf specialist at the N.Y. State college of agriculture and life sciences, Cornell, said that the trend is toward basic research in turfgrass science.

"Turfgrass science must progress beyond the point of merely summarizing research information based on observations," he said.

Kaufmann made his remarks in a talk discussing future directions of turfgrass research at the Cornell Seed Conference in December.

Pointing to the uniqueness of turfgrass science, Kaufmann said that many species of grasses are used as ground cover for home grounds, athletic fields, and recreational areas under a wide range of climatic and soil conditions across the country.

"Despite tremendously divergent growing conditions facing turfgrasses, they are universally expected to do well," he pointed out.

Home lawns, for example, are subjected to wear and tear of a variety of physical as well as environmental stresses such as human traffic, heat, cold, drought, shade, and sometimes floods.

"No one dares to walk on vegetables and flower beds, yet people expect the lawn to do well under heavy traffic and play," Kaufmann pointed out.

Growth and performance of grasses are highly variable because of extreme environmental variations under which they are to survive.

"What works for one turfgrass professional does not necessarily work for another," he said.

In developing research, emphasis should be placed on the effect of stressful conditions on growth, development, and related characteristics of the grasses.

"The object is to come up with a prediction of the performance of a turfgrass species or variety under a specific set of growing conditions," Kaufmann said.

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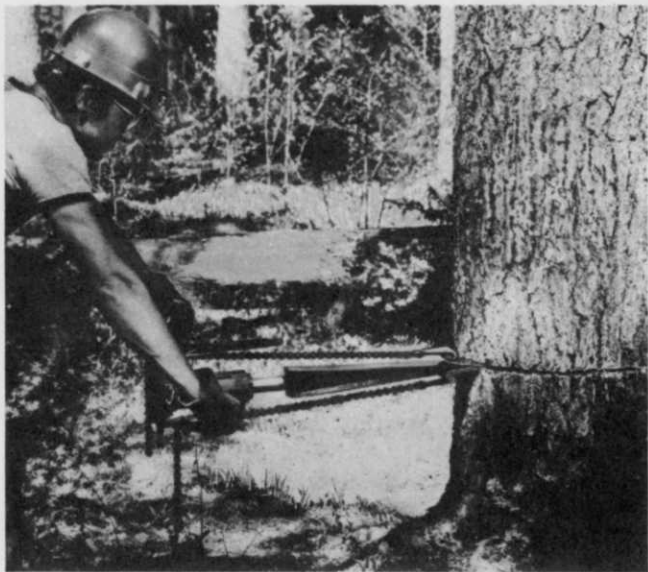
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**SAFETREEJACK:** Great Eastern Enterprises, Inc., Bucksport, Maine

The wedge in the center of the jack penetrates between shims placed in the saw kerf of a tree. The hydraulic ram is hand-operated, allowing the operator to wedge just the right amount. Result is easier sawing with fewer pushovers, less damage to undergrowth, easier skidding and no damage to property. Unit can be used to give 360 degree selective felling to ease a tree over a predetermined spot. Recommended size is 5 ton. For more details, circle (701) on the reply card.



**PROPANE-POWERED GOLF CAR:** Model Tee Cart Corp. Keyport, N.J.

This four-wheel golf car powered by propane will be available in most sections of eastern U.S. this spring, says the manufacturer. No powering batteries to charge, no gas and oil to mix and fill, no fuel pump or carburetor — virtually little or low maintenance. Car weighs only about 850 pounds. Has rugged steel chassis and fiberglass body. Length is 96 inches, width 47 inches, speed 12 mph. One 33 lb. ICC propane cylinder provides the power source.



**WALKER/RIDER:** Gravelly, Clemmons, North Carolina

With just a flick of the wrist the Commercial 12 tractor is converted from a riding unit to a well-balanced walking unit. Just pull one pin and riding sulky is released. Tractor features instant forward and reverse, all-gear-drive, electric starter. Mower is a 40-inch rotary. It features right angle bevel gear drive through a cast iron housing with tapered roller bearings. For more details, circle (703) on the reply card.



**POWER KART:** G.E.M. Products, Inc., Carol Stream, Ill.

Here's a three wheel turf vehicle that's powered by an eight horsepower engine. Unit has seat capacity for two people. It hauls up to 350 pounds in its all steel 23 inch by 46 inch by 8 inch box with tailgate. Power Kart has variable speed, automatic torque converter primary drive. Low pressure tires protect turf from compaction or other damage while at the same time allow unit to buck through mud and sand. For more details, circle (704) on the reply card.



# BENT ON BETTER FAIRWAYS



By **DR. JOHNNY R. THOMAS**  
Research Director  
North American Plant Breeders



The bentgrass fairways of this Pennsylvania course (top) become most inviting to area golfers. Note the well-groomed appearance and overall beauty. Bent fairways can be kept in top shape with modern irrigation (center). The fairway at the bottom is on an Illinois course. Many champion golfers prefer bentgrass because it improves shotmaking and reduces the chance for divots.

**N**OTHING contributes more to the overall beauty of a golf course than healthy, well-groomed fairways. The feelings of exhilaration and mental relaxation that result from the sport of golf when played on acres of green grass are difficult to describe, but are well understood by all lovers of the game.

Unfortunately, fairways are usually at the mercy of the economic situation prevailing at each course. Greens and tees must be maintained to certain minimum standards no matter what the budget is. Thus when a budget is tight, fairways will suffer relatively more than will tees and greens.

However, the increased popularity of golf and the greatly expanded inter-club and tournament schedules means more attention must be paid to fairways. The "greener grass" of other courses can be embarrassing as well as costly (in lost memberships).

In recent years there has been increasing interest in creeping bentgrass as fairway turf. The increased interest has been mainly caused by a greater use of fairway irrigation; improvement in equipment; a trend toward lower cutting heights for fairways; and the development of varieties bred especially for golf courses such as Emerald and Penn-cross. With the well known ability of creeping bentgrasses to tolerate low cutting heights and to rapidly heal divots and other injuries, even with heavy play, the bents can make excellent fairways.

In addition to looking first class, bent fairways improve shotmaking and reduce divots by holding the ball up better.

If a "perfect fairway grass existed, it would probably have the following characteristics: The leaves would be rather broad and stiff to hold the ball up firmly. It would tolerate a cutting height down to at least one half inch and also possess rapid healing characteristics. It should also be seed propagated, wear resistant, and not so vigorous as to require excessive management due to thatch or "puffiness."

At this time such a "perfect" grass does not exist. The two species most nearly fitting the bill are bluegrass and bentgrass. The better bluegrasses possess the stiff leaves and aren't difficult to manage, but only the very best varieties under almost ideal conditions can persist for any length of time under a one half inch cutting height. At this height wear tolerance is low and healing is very slow.

On the other hand the creeping

bents will persist nicely at one half inch or less. They will retain good wear resistance and heal rapidly. However, their leaves are not stiff and upright and excessive vigor leading to thatch and puffiness can be a problem, particularly with improper management.

Seventy-one percent of the complaints against bentgrass in a recent survey were (1) it requires too much chemicals and (2) it produces too much thatch. The use of less aggressive varieties such as Emerald and proper management can do much to eliminate the latter problem.

The other cool season species offer little hope of ever being bred to produce a good fairway variety. The colonial bents have all the problems of creeping bents and few of the advantages.

Colonial bent usually competes poorly with *Poa annua*, will not heal rapidly, and is more disease susceptible than creeping bent.

The red fescues, particularly the newer varieties such as Highlight and Jamestown, can form excellent fairway turf in the shade. However, they don't compete well in the sun and heal injuries very slowly.

The new turf-type perennial ryegrasses, such as Manhattan and Pennfine, are excellent for seeding injuries and bare spots on fairways and tees. However, they also spread very slowly and aren't completely winter hardy in the northern areas.

### THE COST OF MAINTENANCE

What are the economic aspects of creeping bent fairways? Is their average maintenance cost significantly greater than that of a mixed bluegrass, fescue, *Poa annua* type fairway? Although generalizations are difficult and vary with the local area, the maintenance cost of a creeping bent fairway will usually average slightly higher than other types. However, ten percent of the golf course superintendents recently surveyed indicated bent fairways would be cheaper in the long run, despite higher initial cost and high chemical cost.

Fairway irrigation is essential with bent fairways, but the total water volume used should not significantly exceed that of any other type fairway cut at the same height. The fertilizer bills should also be comparable. Bent fairways should be fed only enough to keep the turf healthy and maintain good color. It is not true that bents must be fertilized much more heavily than other grasses. Over fertilization con-

(continued on next page)

### Bent Down South

Golfers in southeast Texas may soon be playing on turfs of creeping bentgrass.

Bentgrass, which grows year round in Texas, is currently under fullscale research by the Texas agricultural experiment station. The project is under the direction of Dr. Richard L. Duble, associate professor in the department of soil and crop sciences, Texas A&M University.

The grass is well-known throughout the cool, humid northern United States, but research suggests that with proper culture it may also be grown in hot, humid environments.

Creeping bentgrass has a growth habit similar to bermudagrass and forms a very close-knit sod that makes a smooth, true putting surface with excellent resilience, emphasizes Duble. Bentgrass has a softer texture than bermudagrass and because it grows year round the problems and inconveniences of overseeding bermudagrass can be avoided.

"While the grass will grow in a wide variety of soil conditions, it produces the best turf in slightly acid soils where fertility, aeration and moisture relationships are good," Duble said. To meet these requirements, golf greens must be constructed according to the specifications established by the United States Golf Association Green Section in cooperation with the Texas agricultural experiment station. Essential features of these specifications include subsurface drainage, a perched water table and a highly permeable soil mixture.

On hot summer days, light irrigation or syringing may be required at noon to cool the turf below atmospheric temperature. On occasions two syringings may be necessary, but with automatic irrigation systems and properly constructed greens little inconvenience is encountered.

Bermudagrass greens constructed according to USGA Green Section specifications can easily be converted to bentgrass with a herbicide treatment which allows immediate seeding of bentgrass. Two seeded varieties of bentgrass, Penn-cross and Emerald, are currently recommended in Texas. □

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tributes to the potential thatch and  
puffines problem.

The mowing frequency of bent  
will be greater than for other  
grasses. It will probably average  
about 1/2 to 1 more mowing per week  
than other cool season grass fairways.  
Thatch is a potential problem. But,  
if the grass is mowed frequently,  
particularly when growing vigor-  
ously, and fertility is not excessive,  
thatch formation can be controlled.

Weed control is usually less of a  
problem with creeping bents. Even  
at one half inch they are very com-  
petitive with most weeds. By rapidly  
healing divots and other injuries,  
weed invasion is minimized. How-  
ever, in some areas, the fungicide  
bill may be higher than that of other  
cool season grasses. Although creep-  
ing bents cut at one half inch or  
more are much less subject to disease  
than the putting green bent, they  
may still require a little more pro-  
tection than fairways of the other  
cool season grasses.

Seaside, Emerald, and Penn-  
cross are the only seeded varieties avail-  
able at this time. Emerald and Penn-  
cross were bred specifically for fine  
turf usage. Although Seaside is not  
a bred variety, being merely a con-  
glomeration of seed from wild creep-  
ing bents adapted to the Pacific  
Northwest, it performs adequately  
on fairways in some areas. Excellent  
data from Michigan State University  
indicates the relative performance  
of these varieties for tees and fair-  
ways.

Penn-cross is well established in  
the turfgrass industry and usually  
does a good job on greens and tees.  
Penn-cross is the most vigorous  
creeping bent and as such it is often  
difficult to manage on fairways.

Emerald is the newest creeping  
bent to become available. It also does  
a good job on greens and tees, but  
additionally has looked promising for  
fairway use. Although more dense  
and vigorous than Seaside and finer  
textured than Penn-cross, it does not  
possess the extreme vigor of Penn-  
cross and thus is easier to manage.

However, the uniformity of Emerald,  
which is so desirable for greens,  
might be a potential problem on  
fairways — where genetic diversity  
is usually desirable.

In summary, bentgrass should be  
considered for fairway use — to give  
your cause and your players the  
competitive edge. □

## ASPA Winter Conference Slated For New Orleans

The annual mid-winter confer-  
ence of the American Sod Producers  
has been scheduled for the Ramada  
Orleans in the city of New Orleans  
for February 7-9. This represents  
a change from a previously sched-  
uled date, but the change was made  
in order to avoid conflicts with  
other important meetings within the  
industry, according to Jack Kidwell,  
ASPA president.

The sessions will be devoted to  
two major areas. The first will be  
centered around marketing and its  
importance to the success of the sod  
producer. The use of mini-confer-  
ences, participation by various mem-  
bers in a discussion of their effective  
procedures and techniques and a  
free exchange of factual informa-  
tion will highlight the marketing  
sessions.

The second phase of the confer-  
ence will deal with the involve-  
ment of the sod producer in govern-  
ment and regulations which affect the in-  
dustry. ASPA Council William  
Harding of Lincoln, Nebraska will  
provide the latest up-to-date infor-  
mation and will discuss regulations  
of various governmental agencies  
and how they should be handled  
and complied with by the sod pro-  
ducer.

Because New Orleans is a most  
unique city, a number of social  
events are being planned and em-  
phasis is being placed on attend-  
ance by the wives as well, along  
with employees and staff represen-  
tatives of the various member firms.

### Performance of Bentgrass cultivars, Tee-Fairway management<sup>1</sup>

|   | Ratings<br>1/2" cut |
|---|---------------------|
| <b>Seeded Creepers</b>                  |                     |
| Emerald                                 | 2.2                 |
| Penn-cross                              | 2.5                 |
| Seaside                                 | 2.9                 |
| <b>Colonial (seeded non-creepers)</b>   |                     |
| Exeter                                  | 3.7                 |
| Astoria                                 | 3.9                 |
| Hofior                                  | 3.4                 |
| Boral                                   | 3.9                 |
| Highland                                | 4.2                 |
| <b>Vegetatively propagated creepers</b> |                     |
| Pennpar                                 | 2.1                 |
| Cohansey                                | 2.8                 |
| Toronto                                 | 2.2                 |

<sup>1</sup> Performance data were collected at Michigan State University from 1968-1973.  
Scale of ratings: 1-10 with one best.