TURF, TREES AND TRAPS: *A GREAT DAY IN JUNE*

Being Host Superintendent and Editor of *HOLE NOTES* gives me a neat perspective into a monthly meeting, especially when the meeting is held on your very own home turf. One hundred ten members of the MGCSA made the trip to Faribault Golf and Country Club. An excellent equipment display was laid out by North Star Turf, and Dr. Tony Koski from Colorado State University was brought in by Turf Supply Co. to give members of the MGCSA a very informative talk about subjects that ranged from "grass mites" to using Polymers in turfgrass. After a terrific lunch, it was time to grab the sticks and attack the golf course, or would the golf course be attacking the golfers? Maybe the latter of the previous sentence is true, but only if you happened to stray into the rough and found a couple dozen pines between you and and the green. Putting for dough was the venerable Russ Adams, driving for show was Denny Owen and the most accurate awards went to Harvey Boysen and Steve VanNatta.

On July 13th it's the First Annual Scholarship Scramble at Tartan Park. Host Superintendents Joe Moris and Randy Allen will look forward to seeing you there.

WHY ARE SAND TRAPS CALLED "BUNKERS"?

"Bunker" comes from the Scottish bonker, meaning a chest or box where coal is kept, usually dug into the side of a hill. Often cows would graze in the marshlands adjacent to the old links courses, standing alongside the dunes and creating a depression that reminded Scottish players of these chests. Eventually these area became known as bunkers.

WHY IS THE WORD "BOGEY" USED TO DESCRIBE A SCORE OF ONE OVER PAR?

The term comes from an imaginary Colonel Bogey of the Great Yarmouth Club in England. It is believed that a Major Charles Wellman, while playing against ground score (par), referred to failing to get par as "getting caught by the bogey man," a phrase from a popular 18th Century tune. The members of the club began referring to an imaginary new member, Colonel Bogey, who would always shoot even par. As the game spread to the United States, "bogey" was narrrowed to represent a score of one over par on a hole.

WHY IS THE TRADITION OF "HAVING THE HONOR"—ALLOWING THE PLAYER WHO SCORED THE LOWEST ON THE PREVIOUS HOLE TO TEE OFF FIRST—USED, AND WHAT, IF ANY, ADVANTAGE DOES IT BESTOW?

Having the honor is part of the rules, establishing a uniform system of order for playing first off the tee. To hit first can be a distinct advantage, as a good shot may put pressure on an opponent.

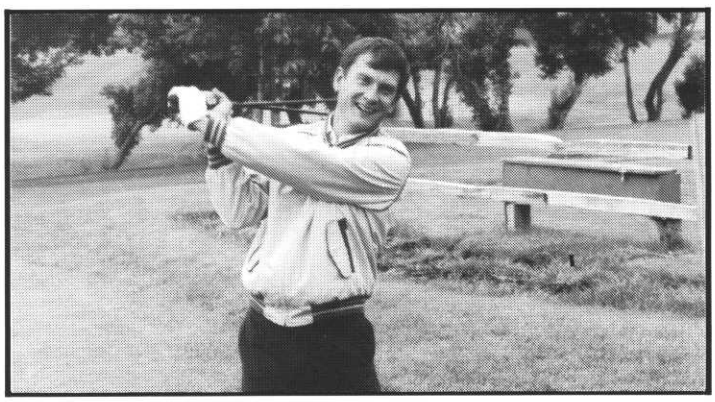
WHY IS THE WORD "DIVOT" USED TO DESCRIBE A PIECE OV EARTH DISLODGED BY A CLUB STROKE?

"Divot" is a Scottish word for a piece of turf.

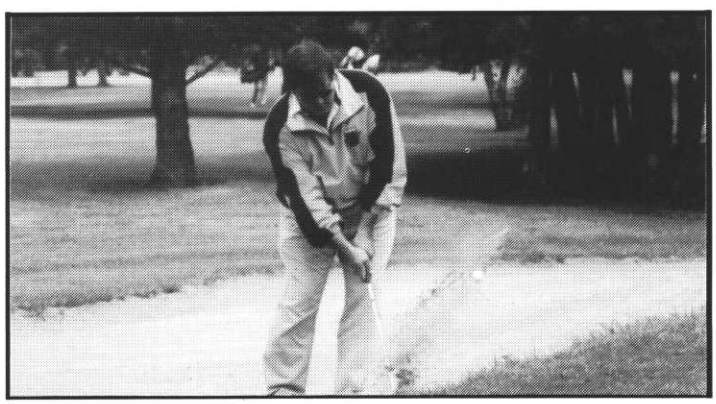
WHY IS THE TERM "DORMIE" USED WHEN SOMEONE IS AHEAD BY THE SAME NUMBER OF HOLES LEFT IN THE MATCH?

"Dormie" probably comes from the Latin *dormire* "to sleep." "The player who is ahead cannot lose though he go to sleep."

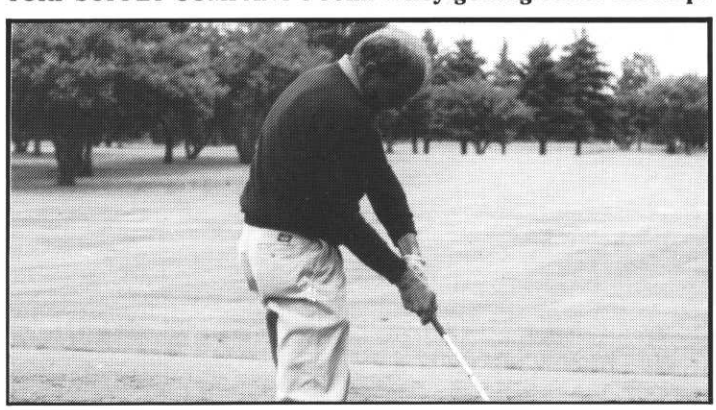
THE BOYS FROM NORTH STAR TURF, INC. (L to R) Scott Liestman, Dan Miller, Joe Churchill and Jeff Churchill.



DR. TONY KOSKI of Colorado State University.



TURF SUPPLY COMPANY's John Wiley getting out of the trap.



DALE PARSKE just before sudden impact.

Biology and Control—

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First, several common classes of soil organic matter were extracted from two different sites, using several extraction sequences, were quantified and analyzed structurally using several techniques. Structural analyses of lipids (compounds that are similar to oils) were accomplished by gas chromatography/mass spectroscopy (GC/MS) and the large molecules that were extracted in alkaline solution, i.e. fulvic and humic acids, were analyzed by IR and nuclear magnetic resonance (NMR) spectroscopy.

Second, particle size distributions were determined and the extent of non-wettability determined for each size range. While particle size distributions have been determined in previous studies, there were no reports of which fractions were the most hydrophobic, if any. Also, the area in the soil profile that displayed the most hydrophobicity was determined using soil columns collected from greens with LDS, allowed to dry down, re-wetted from the bottom, and the distance that was infilitrated recorded at one and two minutes. Finally, since bentgrass roots have been reported to be colonized by various fungi, both pathogenic and non-pathogenic, roots associated from wettable and non-wettable areas were stained and examined for the extent of fungal colonization present.

Results obtained from the organic matter extraction and analysis indicated that LDS soils had greater amounts of all organic matter fractions studied than soils that were wettable. The only structural difference observed was from LDS that occurred on greens that were three years old, and this was only detected following an initial extraction with methanol. It appears that there is either a unique structure, or interaction between several structures, occurring in the LDS sample. One possible scenario to explain these results is that a unique structure or structures act to "prime" the LDS areas, and then the syndrome is intensified by subsequent drying cycles, which after several years may mask the unique component that initiated the LDS. The origin of the organic compounds could not be determined in these studies, but it is probably derived from bentgrass roots, soil microflora, or both.

Particle size distribution analysis showed no significant differences between the wettable and non-wettable soils. Hydrophobicity, as determined by how long it took a water drop to penetrate the sample, indicated that particles less than 0.25 mm in size were the most hydrophobic. Since the greens are constructed with 85-90% sand, this size fraction has been largely ignored in previous studies on LDS, but since this is the most chemically reactive fraction, due to the presence of clays, it would not be surprising that this is where organic-inorganic interactions would be the most prevalent. The hydrophobicity was the greatest in the area immediately below the thatch-soil interface. This is the area in the soil profile with the most biological activity, especially in regards to root colonization and thatch degradation. Electron micrographs of soil particles that were approximately 0.1 mm in diameter showed that the particles in LDS samples had an extensive organic coating compared to particles from wettable soils.

Roots from both areas on the sand greens were heavily colonized by several fungi including vesicular-arbuscular mycorrhizae (VAM), *Phialophora* spp., *Pythium* spp., and *Polymyxa graminis*. The VAM appeared to be more extensive in the roots associated with wettable areas, but definitive conclu-

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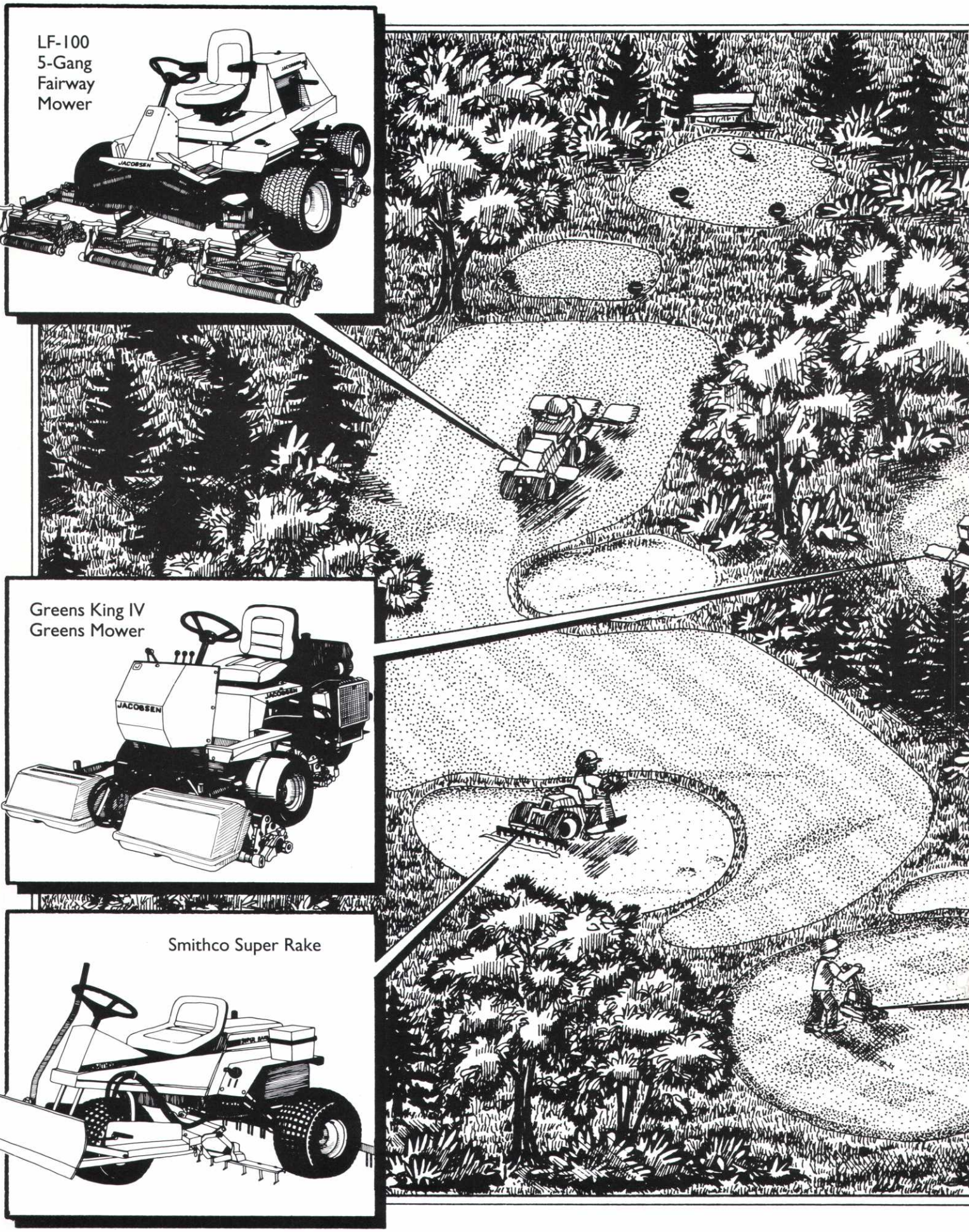
Biology and Control—

(Cont. from Page 12)

sions should be avoided since the soil was already exhibiting LDS when the samples were collected. Therefore a cause and effect relationship could not be determined. No attempt was made to rate the colonization by the other fungi they were just observed in roots from both areas.

Results from these studies indicate that the role of the bentgrass root system, and associated microflora, on the development of LDS should be investigated in more detail. Previous studies have attempted to characterize the chemical and physical properties of LDS soils, but the impact of biological influences on its development cannot be ignored.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Greens Mower
JACOBSEN
Smithco Super Rake

Cankers on Trees

By CONNIE REEVES
Plant Pathology Technician

Cankers are localized dead areas on the branches, twigs or trunk of a tree. They can be caused by mechanical damage (especially weed whips and lawn mowers), environmental conditions (frost cracks, sunscald, etc.) chemical injury, insects or diseases. The canker may appear sunken on young and thin-barked trees or it can be hidden under the bark on older thick-barked trees. On young or smooth-barked trees, the surface of the canker may appear discolored in contrast to healthy bark. Callusing of the tissue around the canker can cause excessive enlargement of the stem, or in the case of some perennial cankers, a target-shaped area (Fig. 1). The size of the canker can range from small irregularities on a stem to massive dead areas in the bark and cambium.

On fungal cankers small, pimple-like reproductive structures can often be seen growing on the surface of the canker (Fig. 2). These structures release spores during wet weather. These spores infect other branches or trees through wounds and occasionally through healthy intact bark. Trees under stress are especially prone to infection and canker development.

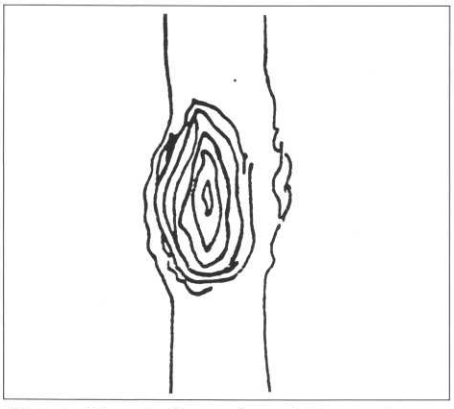

Fig. 1. Target-shaped nectria canker.

Cankers caused by environmental stress or physical injury may be invaded by saprophytic fungi. These fungi grow on dead tissue, but do not attack healthy wood. They may also form reproductive structures on the dead wood, thereby complicating the diagnosis.

CAUSES

Injuries can kill the cambium and result in cankers. Infectious cankers are caused by fungi or fungi in combination with mechanical injury, although a few bacteria can also cause cankers.

EFFECTS

Cankers on young trees and fruit trees can be very debilitating and may kill the tree. Cankers seldom kill established shade trees but can deform and weaken them, making them more susceptible to windthrow and invasion by wood decay fungi.

Healthy trees respond to injuries quickly and form a defense barrier that halts further expansion of the canker organism. Stressed trees may not be able to form the barrier, and cankers spread

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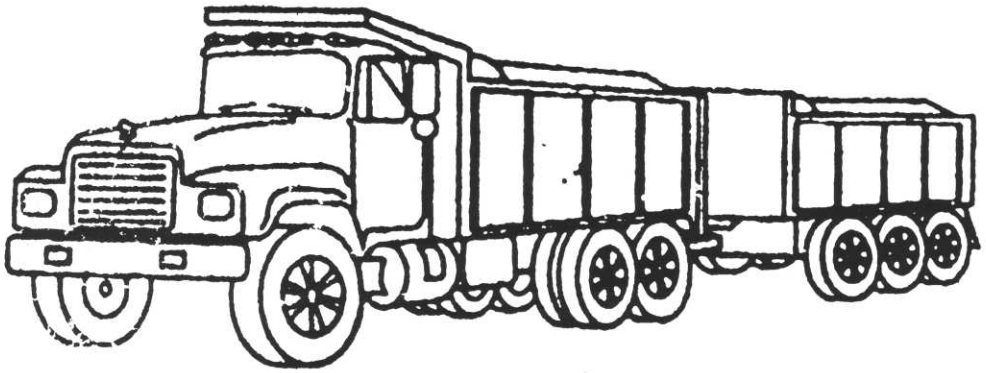

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New Corporate Program Will Benefit GCSAA S&R

A national commercial safety products distributor has agreed to donate 1 percent of revenues generated from golf course sales to help fund the scientific and educational efforts of the GCSAA Scholarship & Research Fund.

SafetyMaster Corp. will distribute its specially-designed, 81-page golf course safety equipment catalog—offering personal protective clothing, respirators, eye and face protection, hearing protection, first aid supplies, gloves, boots and spill clean-up products—to GCSAA member superintendents in mid-May.

In addition to the donation, the company is also offering GCSAA members a 5 percent discount on all catalog orders.

William R. Roberts, CGCS, president of the S&R board of trustees, said he was delighted that SafetyMaster had stepped forward with the donation program. "Safety products are a critically important part of our efforts to protect our employees and this program fits very well with the goals of the GCSAA S&R."

Ted Rieple, SafetyMaster's president, said the program was part of the company's philosophy of industry involvement. "We wanted to do something to show that we're committed to the golf course maintenance marketplace. The superintendents told us that support for the Scholarship & Research Fund was the best way to do that.

"Superintendents will find that our catalog gives them a simple and extremely affordable way to meet their safety needs," he said, adding that SafetyMaster has technical experts to answer any questions about regulatory requirements or other safety concerns. Those questions can be directed towards SafetyMaster's toll-free number 800/825-7233.

The SafetyMaster donation program is one of a number of new "partnership" agreements that benefit GCSAA S&R, the 36-year-old non-profit foundation dedicated to providing resources for scientific and educational advancements in professional golf course management. For more information on GCSAA S&R or the SafetyMaster program, contact the GCSAA Development Department at 913/841-2240.

Aphids on Trees & Shrubs—

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Large aphid numbers can be controlled readily with insecticides such as acephate (Orthene), malathion, diazinon, chlorpyrifos or insecticidal soap. Some aphids may move from one plant to an alternative host plant depending on the season of the year. Dormant oil, applied in March, can be used effectively to control aphid eggs on twigs and bark of the winter host plant. It is very important to follow all label directions and check for application restrictions.

Cankers on Trees:

(Continued from Page 16)

rapidly. Some fungi break through the host's defenses every year to form perennial cankers (Fig. 1). A few fungi are capable of invading healthy trees and killing them. An example is chestnut blight. The fungus responsible, *Endothia parasitica,* decimated American chestnut trees earli-

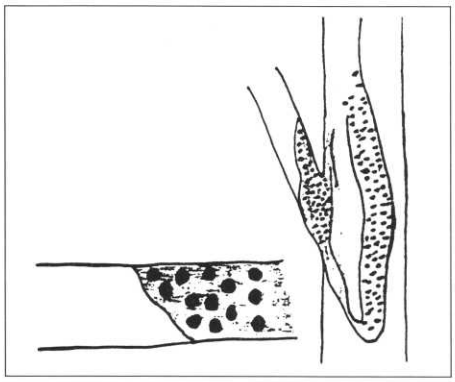

Fig. 2. Closeup of twig with fruiting bodies.

er this century.

CONTROL

Most canker-causing fungi attack stressed or injured trees. Therefore, the best treatment for cankers is PREVENTION. Keep trees healthy and prevent wounds. In winter, wrap thin-barked trees such as maple and apply to prevent sunscald and frost cracks. In periods of low rainfall, water valuable trees thoroughly once per week, twice per week on sandy soils. Do not plant trees too close together. As trees mature, overcrowding causes stress due to increased competition for water and nutrients. Proper fertilization and removal of dead wood is also helpful.

Remove branches with expanding cankers caused by fungi and bacteria several inches below the canker. Prune during dry weather to minimize spread and disinfect pruning equipment between each cut (a 9 parts water to 1 part household bleach works well).

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