Underside of mushroom showing gills. Note size of mushroom in relation to the thumb and hand.

Everything You've Always Wanted to Know About Fairy Rings *(But Were Afraid to Ask)*

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MUSHROOMS ARE popping up all over; on greeting cards, shirts, sweaters, salt and pepper shakers, kitchen utensils and even golf courses! Artists for centuries have been enchanted by their design. The forces of nature have joined to provide the climatic conditions that favor their growth and proliferation, not to mention their artistic touch to the landscape.

With the weather of 1977 exhibiting a wide range of characteristics; from the hottest to the coldest, wettest to the driest; it is only natural to expect a multitude and variety of turfgrass management phenomenas to occur. One, among many, was the increased incidence of mushrooms.

Mushrooms grow in a circular or crescent pattern and are commonly referred to as Fairy Ring. Early man believed the rings were made by witches, dancing fairies or even lightning. Many types of mushrooms grow in this circular pattern, Fairy Ring Champignon *Marasmius oreades*, an edible species, is only one of them. They discolor, weaken and sometimes destroy the turfgrass plant.

Fairy Ring and fruiting bodies.

A certain number of mushrooms are poisonous, some are even fatal. Their number is relatively small, about 30 species among the thousands that can be found in the wooded areas, fields and roughs of golf courses. Unfortunately, the most poisonous species are also fairly common, and a real danger lies in wait for the imprudent gourmet.

First of all, put aside any notion that there are simple tests to determine whether a mushroom unfamiliar to you is safe to eat. Do not give the least credence to the silver coin test. The silver coin is supposed to turn black when brought into contact with a toxic mushroom. Many people have died because they believed this. Because no more silver coins are being minted, the aforementioned procedure is difficult to complete.

You may have been told if you see a slug nibbling on a mushroom that it may be eaten without fear. What you were not told is that slugs can eat the deadly Amanitas without ill effects, whereas the same Amanitas will be fatal to you.

Also, if you are told that a mushroom will lose its toxicity if it is marinated for several days in water and vinegar — do not believe it!

Blanching, plunging briefly into boiling water, may eliminate bitter taste and irritants to the digestive tract from some mushrooms, but it does not eliminate the poisons of the truly dangerous species.

Whether you like it or not, there is only one way to avoid poisoning: to be completely familiar with the botanical characteristics of the dangerous species. You should even be able to identify mushrooms without question when they are damaged or develop imperfectly.

The best advice, really, is to leave all wild mushrooms alone, unless you are completely familiar with their taxonomy.

Since most Fairy Rings that appear on fairways and greens are mowed regularly, few mushrooms have the opportunity to mature and develop completely. Mycelium is the underground organism or plant part of which the mushroom itself is only the fruit. The mycelium results directly from the germination of spores. The germination of spores results from a network of extremely fine threads called hyphae. The accumulation of hyphae and mycelium growth contribute to the decline of turfgrass that one associates with Fairy Ring. They compete with it for soil moisture and nutrients.

Unfortunately, chemical control of Fairy Ring is not very effective. However, some golf course superintendents have reported varying degrees of control by coring the area, followed by applying a solution of mercuric and mercorous chloride suspended in a wetting agent or surfactant.

The mercuric and mercorous chloride may or may not have an effect on the mushrooms or their parts. Whereas, the surfactant or wetting agent will help to minimize the hydrophobic soil condition that contributes to the decline of the turfgrass plant.

Mushrooms are part of the fungi family and fungi span the world. They are just as numerous

and varied as flowering plants. They range from microscopic organisms to large fruiting bodies; from live savers like penicillin to killers such as ergot; from rust, powdery mildew, dollar-spot and brown patch that are damaging to turf, to yeasts which have been used for centuries in the baking of bread and fermentation of wine.

Although they are varied in size and appearance, all fungi have one thing in common — their lack of chlorophyll. Unlike green plants, they cannot utilize sunlight and carbon dioxide to convert inorganic materials into organic tissue. They must extract their nourishment, like man and animals, from organic materials, and in doing so, they destroy or "eat" whatever they are feeding upon. Consequently, when a golf course superintendent tells his chairman or club officials that the fairways were eaten alive with **Pythium**, the truth has been spoken.

In order to survive, fungi must have moisture and oxygen and usually warm, humid conditions. There are exceptions, however, such as snow mold organisms that require a lower temperature to grow actively. All fungi have specific temperature, moisture, light and nutrient requirements to survive and grow actively.

Usually when one speaks of fungi, most people imply the word to mean the larger members of this huge group, i.e. mushrooms, "toadstools," bracket fungi, puff balls and the various other and often strange, exotic-looking organisms which are big enough to be noticed fairly easily. Generally, it is not realized that these visible and often brightly colored fungi are not the whole story. They are merely the fruiting bodies, more or less equivalent to the flower clusters of green plants. A large and important part of the fungus remains hidden in the soil. It may not give any visible proof of its presence on the surface for long periods of time.

The bottom side of a mushroom showing the stem and gills.

Fungi reproduce themselves through minute spores, which are formed in different ways. In the common mushroom, and similar fungi, the spores are shed from flanges known as gills on the underside of the cap. Whereas, in other types of fungi, the gills may be replaced by a mass of narrow tubes whose pore-like openings are clearly visible. In puff balls and similar fungi, the ball itself is one large spore container.

In most fungi, the spore production is immense. It has been calculated that in an ordinary mushroom, a square millimeter of gill surface can produce approximately 130,000 spores, which can be discharged in a matter of five or six days.

Fortunately, only a small proportion of the spores end up in situations exactly suited for germination. When germination does occur, they send out little tubes which elongate into hyphae. These branch and extend as well as join with similar hyphae produced by other spores which have landed in the same proximity. Several hyphae develop to form a white mass of thin filaments, known as mycelium. Mycelium may be colored black, brown, gray or white.

The mycelium is one of the factors that contribute to the hydrophobic soil conditions that one associates with Fairy Ring. In woodland areas, it is the mycelium which actually chemically decomposes the dead branches, old stumps, rotting leaves or whatever substance it is growing on. The fruiting bodies are not formed until the fungus has received sufficient nutrients from its surroundings. When climatic conditions are favorable, small knobs appear on the mycelium where large numbers of the fine threads grow together into a knot. This knot or large bump gradually pushes towards the surface and finally appears as a mushroom, toadstool or other form of fungus. When the fungus has reached full maturity, spore production starts and can be extremely rapid. From beginning to end, the process can be completed in a matter of hours.

Consequently, it is easy to understand why mushrooms and Fairy Rings reappear quickly after the fairways have been mowed. As a result of an excessive amount of nitrogen that the mushrooms develop, it is only natural to find a dark green area developing along the outer edge of the circular pattern.

Since treating with fungicide solutions and wetting agents has produced unpredictable results, most individuals report fairly successful coping by applying light and frequent applications of fertilizer in an attempt to mask the dark green color, as well as frequent irrigation to keep the mycelium growth from monopolizing or utilizing all the water intended for the turfgrass plant.

Unfortunately, Fairy Rings are not only an inconvenience and annoyance to the golf course

Fairy Ring in a landing area. Find the golf ball.

superintendent, but also to the player. For example, imagine a nice long drive coming to rest in the vicinity of a group of Fairy Rings and the frustration of trying to find the golf ball!

Since an effective control for Fairy Ring does not currently exist, if possible, fertilize and irrigate frequently to mask the appearance of the saprophytic fungi. Mowing frequently, even daily, will help keep the fruiting bodies to a minimum and hopefully the frustrations the players experience in looking for the ball.

Remember the saying, "Stop and smell the roses as you walk down life's path . . . " You may also want to remember; "Don't eat or hit the mushrooms unless you are sure they are edible or playable."

News Notes for JANUARY

USGA Green Section Conference in San Francisco, January 27, 1978

In conjunction with the first USGA Annual Meeting ever to be held on the West Coast, the USGA Green Section Conference on Golf Course Management will be held on January 27, 1978, at the Mark Hopkins Hotel, San Francisco, California. The theme for the one-day meeting is "Turfgrasses for Golf and How They Affect You — The Golfer." Seventeen speakers will cover a host of topics. Registration is at 9 a.m. and all USGA Member Club officials and staff are invited to attend.

GCSAA 49th International Turfgrass Conference & Show, February 12-17, 1978

The GCSAA's 49th International Turfgrass Conference & Show will be held in San Antonio, Texas, from February 12th through 17th, 1978. The conference attracts over 5,000 turfgrass managers annually. The educational theme this year is "Economy Through Ideas." The exhibit hall is already sold out for displays of turfgrass management equipment, irrigation, etc. Further details are available from the GCSAA Headquarters, 1617 St. Andrews Drive, Lawrence, Kansas 66044.