XVIII. FAIRY RINGS OF LEPIOTA MORGAN PK. IN OKLAHOMA

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The term "fairy ring" is used in two different senses. Sometimes it is used to designate spots or circles in pastures which are either less densely covered with vegetation and of a pale color, or thickly covered with a deep green and luxuriant growth. Sometimes it refers to the ring of fungi which has caused the variation in the vegetation. Frequently a bare ring appears like a foot-path, with green grass in the center. This ring may sometimes be sceveral yards in diameter, but is often imperfect due to some accidental circumstance that has arrested the growth of the mycelium on one side:

By ancients, the ring was long involved in mystery, being attributed to the dance of the fairies, to witchcraft, etc., and thus clothed with popular supersition, it has found its way into many folk-legends and has figured in lore of elfs and goblins, to whom, in the absence of scientific knowledge, the strange fungus-haunted circle was referred.

These fairy rings began to attract the attention of men of science in the latter part of the nineteenth century. Various hypotheses were advanced to account for them. Some imagined that they might be due to the effect of lightning; some attributed them to moles; but to Doctor Withering ,it appears, belongs the credit of being the first person to ascribe fairy rings to the growth of fungi. Doctor Wollaston, Professor Way, Rev. M. J. Berkeley, and other workers have further investigated the subject; and it is now perfectly ascertained and universally admitted that fairy rings result from the centrifugal development of certain kinds of fungi, the older mycelium dying at its original growth center, perhaps because of the exhaustion of its food supply, quite as likely because of the inhibitory effect of its own excretions. Subsequently the living mycelium forms an obvious ring of constantly increasing circumference, but whose thickness may not increase because of the death of the inner hyphae at the same pace as the advancement of the hyphae on the outside.

The outward advance of the mycelium from year to year is rather slow, indicating that a ring of considerable diameter has required many years for its development. A previous worker

Figure 1. Fairy ring of Lepiota Morgani, Pk. Note the large, uniform size of the plants in the ring .

Figure 2. A close-up view of the left pair of plants shown in Figure 1. Note the flakiness of the pileus and the small saucer-shaped area curved up in the center. The pileus of these specimens is seven inches in diameter.

observing a colony of Hydnum suaveolens for a period of nine years, found that during this time, the diameter of the ring had increased from seventeen to twenty-one meters, an outward advance of eight to nine inches per year. At this rate of growth the age of the colony must have been over forty-five years.

Fungi depend on organic supplies of carbon and nitrogen. In this respect they resemble the colorless cells of higher plants in their nutrition. Like the higher plants they require water, small but indispensable quantities of salts of potassium, magnesium, sulphur, phosphorus, and suuplies of carbonaceous and nitrogenous materials in different stages of complexity in the different cases. They are like higher plants also in that they respire oxygen and are independent of light; and their various powers of growth, secretion and general metabolism, irritability, and response to external factors show similar specific variations in both cases.

From the foregoing, the minerals and organic substances required for the growth of the fungus may help to explain why other vegetation is usually scant where the fungus is growing. Later when the fungus growth, which is rich in nitrogen and phosphate of potash, decays, it acts as a highly stimulant manure for grasses and other plants.

Besides Hydnum suaveolens mentioned above, the following have been reported as producers of fairy rings:

Marasmius oreades (Bolt.) Fr. (Agaricus oreades, Bolt.)

Hygrophorus coccineus (Schaeff.) Fries (Agaricus Coccineus Schaeffer).

Tricholoma gambossum Fr. (Agaricus gambosus Fr.).

Tricholoma personatum, Ff. (Agaricus personatus Fr.).

Agaricus campestris, L. sometimes and

Lepiota Morgani, Pk. (Agaricus Morgani, Pk.).

It is of the latter that the speaker wishes to deal specifically in this paper, since so far as the author knows it has never been reported from Oklahoma, hitherto, having been reported from Ohio, Kansas, Alabama, Georgia, Louisiana, Michigan, Texas, Indiana, Wisconsin and Pennsylvania.

Lepiota Morgani Pk. was named by Peck in honor of A. P. Morgan, of Dayton, Ohio, who first reported it. It is said to be one of the largest gill fungi in the world—some specimens reach a diameter of twelve inches or more. It is peculiarly interesting in other particulars. So far as the author knows it is the only Agaric producing green spores. Some people can eat of it abundantly and feel no ill effects while with others only a

small piece of the fungus is required to produce poisonous symptoms.

The attention of the author was first attracted to this fungus in August, 1926. The unusual size of the plant caused it to be observed from the road. The plant was collected but only a casual examination was made of it. A few days later, August 26, 1926, another large specimen was observed in the same spot. This specimen was collected and photographed. Both of these plants and others were found growing in a low wet area in a pasture, the soil being somewhat sandy and apparently rich in humus.

About two months later, October 14, 1926, following a period of moist cloudy weather for about ten days, the writer observed another crop in the same spot, and secured a photograph showing some plants in the button as well as in the mature stage. In the same field on higher ground and among the Western Ragweed, two different, almost perfect fairy rings were discovered. (Figure 1 shows one of these.) In both rings the ragweed plants were less numerous in the immediate vicinity of the fungus plants and more numerous both inside and outside the ring.

In one ring besides the Western Ragweed (Ambrosia psilostachya DC.), Curled Dock (Rumex crispus L.). Spreading Witch-grass (Panicum dichotomiflorum Michx.) and Pink-Weed (Palygonum aviculare L.) were observed. In the other ring the Western Ragweed, the Curled Dock, and the Large Crab-grass (Syntherisma sanguinale (L) Dulac.) were observed, the ragweed and dock being the more abundant in both.

From Figure I, it will be seen that Lepiota Morgani forms very conspicuous fairy rings due to the large size of the plants., the largest found by the writer being nine inches in diameter. It is said that rings of this fungus can be seen for a half mile or more. Note also the peculiar breaking of the pileus, and the large movable annulus as shown in figure 2. Marasmius oreades also forms very beautiful fairy rings, but the individual plants are not so conspicuous, their smallness, however, being overcome by the greater number of individual plants.

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