Journal of the Minnesota Academy of Science

Volume 11 | Number 1 Article 7

4-1943

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# MINNESOTA SPECIES OF ALEURODISCUS

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The genus *Aleurodiscus* is a Basidiomycete of the family THELEPHORACEAE which was formerly included in the genus *Corticium*. Rabenhorst separated it as a distinct genus under which have been described a number of species many of which are doubtful. Most widely distributed in Minnesota is *Aleurodiscus Oakesii* of Cooke. This is a bark inhabitant occurring on Ironwood, Burr Oak, and White Oak, and in lesser degree on other broad-leaved trees. So commonly does it occur on these species that it seems safe to say that its distribution is the same as the distribution of these species of trees.

The fruit bodies are of irregular shape, varying in size from a millimeter to dimensions up to two centimeters. The context is leathery and the margin of each fruit body is fringed by slender hyphae that have a white cottony appearance, particularly when dry. The surface of the fruit body inside this border is smooth and of a light gray to light brown color. The fruit bodies originate as globose masses of hyphae, which gradually develop into minute cup-shaped structures having the appearance of those of *Peziza*. In fact, the species has been described under that genus. The cup form is, however, gradually obliterated as the hymenial surface flattens out. So long as the plant is moist it keeps the flat shape with the white fibrous margin framing it. However, on drying out, it again assumes a cup shape, even to the extent of the edges becoming quite involute. On drying, the hymenial surface whitens and the large protruding basidia as well as the paraphyses appear as powdery white grains under the hand lens, suggesting wheat flour, a characteristic of the genus that suggested to Rabenhorst the name *Aleurodiscus*.

On oak trees, the fruit bodies appear most abundantly on those areas in which the outer rough bark is not too thick. If a part of the outer cork segments have by chance been rubbed away at an earlier time, the area makes a most favorable site for the growth of the fruit bodies. The mycelium makes stromata beneath the cork and finds exit through cracks in the cork layer. These cracks are en-

larged by the subsequent growth of the strands of hyphae. As they emerge on the surface, the hyphae immediately spread out to form the leathery fruit body. There is only a suggestion of a stipe. The absence of a stipe was used as the main character to separate this genus from the genus *Cyphella.*

Recognition of this species is easy for anyone who has not learned to recognize it at sight if he will but make a casual dissection of the hymenium and examine it under low magnification. The mark of certain identification is the presence of paraphyses that have numerous spiny outgrowths of various lengths, suggesting a bottle brush or the conventional spiked club of the cave man. Not all of the paraphyses in the hymenium are of this type. Smaller ones are present without any characteristic markings. Others have a tendency to grow moniliform, though this is not so pronounced as in the species *A. amorphus.* The basidium is large and its nucleus presents one of the most favorable objects for the study of the origin of the spore nuclei, their migration through the sterigmata, and subsequent development in the spores.

The fruit bodies may be found the year 'round on living trees. When moisture is lacking they remain in a quiescent state, reviving when rains return. Sometimes most of a fruit body dies over winter, but a new mass of tissue, or several such masses, will resume growth on the return of spring rains, thus establishing new growths on the old basis.

Related species are *A. apiculatus* with short irregular spines on the paraphyses, *A. candidus,* with long branched divisions of the paraphyses, and *A. penicillatus,* with short small hair-like appendages at the tips of the sterigmata. The writer has not collected any of these species. It is to be questioned whether these species are anything other than variations from the typical *A. Oakesii.*

The other common species of Minnesota is *Aleurodiscus amorphus* (Pers.) Rabh. which is distributed probably as widely as the Balsam Fir in this state. Its fruit bodies grow on the bark of twigs and young branches of the Balsam Fir only after the trees or branches have died. It has not been observed on living trees, nor on trees before they have been dead at least a year. Nor do they continue their growth after the tree has been dead for several years. In Itasca County it was found that the fungus inhabited the bark of twigs and young branches of almost all the recently fallen Balsam Firs. This species does not tolerate dry conditions as well as does *A. Oakesii,* and its fruit bodies are found on the under sides of twigs and young branches or on those surfaces not exposed to drying. The young fruit bodies are of an orange to yellow color. The fruit bodies are paler in age and assume a more discrete form than the confluent bodies of *A. Oakesii,* and tend to more uniformity of size. They are from one to five mm. in diameter. At first they are cup-shaped, then they assume a flat hymenial surface and later be-

come cushion-shaped. There is no white fringe of white hairy hyphae at the margin, though there is a tendency for young hyphae of small size to fringe the edges.

The stromata form under the cork layer and cause swellings of this tissue to the point where it eventually breaks and thus permits eruption of the stromata. The hyphae then grow into the characteristic fruit bodies, frequently somewhat stiped at base. This species is easily recognized by the characteristic moniliform paraphyses in the hymenium. A hand lens is sufficient to reveal these diagnostic necklace-like hyphae. Sometimes they give the appearance of conidiophores budding off their conidia. They may extend above the hymenial surface as far as the protruding basidia.

*A. amorphus* has been described as growing on spruce and even on the Western Giant Arborvitae, *Thuja plicata,* though the writer has never seen it on any species other than Balsam Fir.

## LIMNOLOGICAL NOTES ON LAKE SUPERIOR

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Although Lake Superior is the largest freshwater lake in the world, very few limnological studies have been made of this important body of water. Brief surveys by Agassiz (1850) and Smith (1871) have yielded scanty information about the fauna. Some studies on fishes have been made by various workers, such as Koelz (1929) and Greene (1935).

In 1930 a study of the plankton of Lake Superior was undertaken in cooperation with the Minnesota State Board of Health and the Duluth Water Department. The investigation was enlarged in 1933 and 1934 with the aid of grants from the Graduate School of the University of Minnesota to include the bottom fauna and the general limnological features of the waters off the Minnesota North Shore. In 1935 the data were assembled, and it seemed desirable to secure more data particularly from the deeper water before making a complete report. However, other work intervened, and further investigations were postponed indefinitely. As it is uncertain as to when further studies can be resumed, and as so little is known about the limnological conditions of Lake Superior, a preliminary report may be of some value.

Lake Superior has an area of 31,000 square miles, and a mean depth of 475 feet. Depths as great as 1,040 feet have been reported, but the greatest depth found in the north shore area was about 900 feet about seven miles off Grand Portage. Depths of 800 feet were found about four miles off Beaver Bay. Farther out the lake became more shallow.