RESISTANCE OF FUNGOUS SPORES TO LOW TEMPERATURES

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The study of the effects of very low temperatures on lower plants has been mainly limited to bacteria and yeasts. In 1902, Macfayden and Rowland (*1*) exposed some yeast cells and several types of bacteria to liquid hydrogen temperatures (about -252° C.) for a period of six months. In no case was the vitality or the physiological properties of the micro-organisms impaired by such treatment. Tanner and Williamson (*3*) and Tanner and Wallace (*2*) cite other experiments in which the resistance of bacteria and yeasts to low temperatures was shown. Experiments by Tanner and Wallace (*2*) with *Clostridium botulinum* indicated that spores of this organism are able to withstand freezing at -16° C. for a period of fourteen months. On the other hand, Tanner and Williamson (*3*) have shown that prolonged action of freezing temperatures destroys certain yeasts and bacteria.

The writers undertook experiments to determine the resistance of fungous spores to liquid air temperatures (about -185° C.). The organisms used were: *Melanconium fuligineum* isolated from Grape, *Coniothyrium* sp. isolated from Elm,[1] *Eurotium herbariorum*, culture obtained from C. V. S., Baarn, Holland, and *Cytospora chrysosperma*, isolated from Willow.

Several methods of subjecting the spores to liquid air temperatures were employed: 1) A suspension of spores in sterile water was placed in a test tube and the latter immersed in liquid air; 2) spores were inoculated on a corn meal agar slant and the tube immersed in liquid air; 3) a sterile glass rod was dipped into a sterile water suspension of spores and after the water was allowed to evaporate the glass rod was immersed directly into the liquid air. All three methods were employed with each of the organisms used and controls were maintained in each case.

After an hour's exposure to -185° C. the spores were brought to the laboratory and inoculations were made on corn meal agar with spores taken from the water suspension and from the glass rod. In all cases, germination of the spores and normal growth took place, the colonies resulting from frozen spores being in all ways similar to those resulting from untreated spores.

There were some indications that the mycelium of certain fungi was fatally injured by exposure to liquid air temperatures, transfers made from treated mycelium failing to grow. Experiments will be continued with both spores and mycelium and the results will be reported later.

LITERATURE CITED

(*1*) MACFAYDEN, A., and ROWLAND, S., On the suspension of life at low temperatures, Ann. Bot., 16:589-590, 1902.

(*2*) TANNER, F. W., and WALLACE, G. I., Effect of freezing on micro-organisms in various menstra. Proc. Soc. Exp. Biol. and Med., 29:32-33, 1931.

(*3*) TANNER, F. W., and WILLIAMSON, B. W., The effect of freezing on yeasts. Proc. Soc. Exp. Biol. and Med., 25:377-381, 1928.

[1] Isolated by Mr. H. Harris of the Illinois Natural History Survey, whom the writers wish to thank for supplying them with a culture of the organism.