

STUDIES OF CAMPTOSORUS RHIZOPHYLLUS, AN ABSTRACT
 OF THE DEVELOPMENT OF THE PROTHALLIUM OF
 CAMPTOSORUS RHIZOPHYLLUS,* AND THE
 RESISTANCE OF THE PROTHALLIA OF
 CAMPTOSORUS RHIZOPHYLLUS
 TO DESICCATION.†

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As is well known the Walking Fern, *Camptosorus rhizophyllus*, is found chiefly on rocky ledges in more or less shaded places, where the water supply is irregular and slight at all times. The colonies in the neighborhood of Bloomington, Ind., have abundant water supply only at times of heavy rain and of course enjoy such supplies for but brief periods. The fact that this fern could not only withstand the many longer or shorter periods of drought but could multiply in the regular way under such conditions suggested the probability of some special structural or physiological adaptation. The scheme for vegetative increase by means of stoloniferous leaves is well known and gives the plant its specific name. But the presence of many small plants which could not have had such origin and so must have been produced through the production of the prothallial or sexual stage, along with the fact that the prothallia of many of our ferns cannot survive the lack of a normal supply of moisture for more than a few hours, suggested another possible adaptation as well as a point of attacking the problem.

Cultures were made of sowing spores on sterilized soil in clay saucers protected under bell jars. Both the peculiarities of form and the resistance to desiccation were studied.

The following peculiarities of form and development have been noted. The development of a plate of cells is not uniform, beginning sometimes immediately after the germination of the spore and at other times not

* Bot. Gaz., 57: 228-238, Mar., 1914.

† Bull. Torr. Bot. Club, 40: 641-645, Nov., 1913.

until a protonemal thread of two to five cells has been formed. The differentiation of an apical cell or group is late and irregular, resulting in unsymmetrical growth. The marginal cells show unusual growth, producing variously formed outgrowths, sometimes bearing antheridia and occasionally producing extra growing regions which may even become independent proliferations.

With reference to drought resistance the following facts have been noted: Allowing a culture to become dry for one or two days in the normal air of the greenhouse seems in no way to injure the plants beyond checking growth during the dry period. One culture left in dry air with slight additions of water once a week showed nearly all the prothallia alive and in good condition after a period of three months. The major part of the plants of another culture are in good shape and have produced a number of sporophytes although subjected to such irregular moisture conditions for a period of nine months. In a culture receiving only air which had been dried by passing through pure glycerine, most of the prothallia were in good condition after four weeks and a few survived such treatment for a period of six weeks.

In conclusion, the two specially important adaptive features are, the unusual power of promiscuous growth of prothallial cells, and the ability to resist extreme desiccation in intermittent periods.