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THE ERICACEAE OF ILLINOIS

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The family Ericaceae, or heath plants, as represented in Illinois, are chiefly woody plants ranging from creeping shrubs to large shrubs and even small trees, e.g., *Vaccinium arboreum*. Some of the species look like herbs, but are actually small woody evergreens, e.g., *Pyrola*. Some of the herbaceous species lack chlorophyll and live saprophytically in rich woodland areas. The family contains several plants of economic importance, including blueberries, cranberries, and others, such as rhododendron, familiar to us because of their ornamental value.

According to Swingle, there are eighty genera and 1350 species in the family Ericaceae.[1] Twelve genera are represented in Illinois, and only twenty species occur here, most of them rarely.[2] Owing to their large numbers and social habit, the Ericaceae are very characteristic of the vegetation in many portions of the earth. They are found everywhere except in deserts and tropical regions. Ericaceae in North America is chiefly found in the acid bogs of the northern region and on high exposed hilltops, as in southeastern United States. In some areas, members of Ericaceae form vast stands to the exclusion of other plants.

The heaths, except for the monotropas, are plants of rocky and sandy soils. The prairie soil which covers most of Illinois is too heavy for them. Most of the ericaceous plants in Illinois are either in bogs in the extreme north or on well-drained slopes of the extreme south. Suitable northern areas are becoming smaller as the bogs are drained or gradually filled in by growth of sphagnum and by the washing in of mineral matter.

Nearly all Ericaceae, regardless of their environment, are more or less markedly xerophytic. The usefulness of this adaptation is easily seen when considering the species on dry hillsides or in sandy areas, but many of the Ericaceae grow in bogs, and even in shallow water. However, the ability of peat-bog plants to obtain water is limited by poorly developed root systems, the low oxygen content and poor aeration of the water, and root excretions and bog toxins. The various xerophytic adaptations of the plants enable them to live in this "physiologically dry" environment. The strongly cuticularized epidermis, the absence of stomata on the upper leaf surfaces, the well-developed palisade layer, the frequently sunken stomata, and coatings of waxy "bloom," hairs or scales, all tend to reduce the amount of water the plants lose by transpiration. In some ericaceous plants, notably Andromeda, the leaves are revolute, and the curled leaf margins reduce water loss by cutting down the circulation around

[1] Swingle, D. B., A textbook of systematic botany: New York, 1946.
[2] Jones, G. N., Flora of Illinois: Notre Dame, 1950.

the stomata. One xerophytic adaptation, the loss of leaves in winter, is not characteristic of bog ericads. It is vital to the existence of the plants that transpiration be at a minimum when the soil around their shallow roots is frozen. In winter, the leaves are upright with their dark upper surfaces curled inward, thus reducing the amount of radiant heat absorbed. The heat would raise the temperature of the mesophyll cells and lead to greater loss of water. Also of special value in winter is the ability of ericad leaves to absorb water vapor directly from the atmosphere.

This study of the Ericaceae of Illinois is based largely upon herbarium materials, supplemented by reference to literature on the subject. In any work concerned with plants it is essential to study the records in our herbaria—actual plant samples and information about their collection. The earliest plant collections in Illinois, by Michaux, were made 160 years ago. Though most of the collections are modern, the records of hundreds of collectors kept during this long period form the basis of our present work.

The Ericaceae have been treated by some authors as several families, largely because of differences in growth form. The saprophytic monotropas are placed in the Monotropaceae, the herbaceous pyrolas and chimaphilas in Pyrolaceae, and the woody plants, such as the vacciniums and Chamaedaphne, in the Ericaceae. Other workers have divided the Ericaceae, in its more limited sense, into two groups; one, with superior ovaries, includes Rhododendron and most other genera, and the other includes the vacciniums, which have inferior ovaries. The first division is based on vegetative characters derived from greater or lesser adaptation to parasitic or saprophytic habit; but the remarkable similarity of flower structure throughout the group leads to its treatment as a single family.