

The Composition of a Black Willow Forest In South Central Oklahoma¹

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The black willow forest under discussion is located on the north shore of Lake Texoma, approximately one mile west of the University of Oklahoma Biological Station, near Willis, Oklahoma. It had its origin on river sand of quaternary age when the lake was impounded in 1945. The stand (about seven acres) slopes gently to the south with the soil of the lake-ward fringe usually covered with one to six inches of water. The forest consists of a nearly pure stand of black willow (*Salix nigra*)² with an average measured height of fifty-five feet and an age of fifteen years. The understory comprises a shrub stratum of *Cephalanthus occidentalis*, a tall herb layer of *Eupatorium serotinum*, and a low stratum of *Diodia virginiana*, *Hydrocotyle verticillata*, and *Rubus trivialis*.

Trees were sampled by means of the arms-length rectangle method (Penfound and Rice, 1957). The method was modified by using a predetermined length of rope so that the rectangles being studied would be of constant size (0.01 acre). Woody shrubs and vines were sampled by means of quadrats of four square meters, and herbs were studied by the aid of 0.1 square meter quadrats.

The forest comprised five species of trees, two shrubs, five woody vines, three herbaceous vines, and thirty-six herbs. The upper canopy consisted entirely of black willow with 357 trees per acre and a relatively high basal area of 113 square feet per acre. No willow seedlings or saplings were encountered. Occasional seedlings of *Diospyros virginiana* were observed. It is improbable, however, that sufficient seedlings and saplings of this species will be available to revegetate the area when the willow trees have disappeared. Under the circumstances, one cannot help but wonder what the future of the area will be.

The fragmentary shrub stratum consisted primarily of *Cephalanthus occidentalis*, which possessed a very low areal cover. The herbaceous cover, however, was comparatively heavy and almost continuous (Table I). This was due, presumably, to the relatively high light intensity that prevailed (695 footcandles) in the forest. A notable zonation of herbs occurred in this stand of black willow. *Hydrocotyle verticillata* was the dominant species in the very wet and often inundated soil near the lake shore. Near the middle portion of the stand *Diodia virginiana* was the predominant species but was replaced by *Eupatorium serotinum* on the driest portion of the stand.

SUMMARY

1. A black willow forest in south central Oklahoma was sampled by a modified arms-length rectangle method supplemented by nested quadrats.

¹ This project was done under the auspices of the Oklahoma Biological Survey, Dr. Carl D. Riggs, director, and with the help of the members of the plant ecology class: Everett Bobbitt, G. L. Casey, R. J. Huskey, Myra Lamb, R. T. Lynn, Shirley Miller, Ann Miller, C. W. Prophet, and R. G. Richardson.

² Nomenclature after Waterfall (1952).

2. The black willow trees were fifteen years old, fifty-five feet high, numbered 357 per acre, had a basal area of 113 square feet per acre, but were not reproducing themselves.
3. The most abundant shrub was *Cephalanthus occidentalis*, and the most important herbs were *Hydrocotyle verticillata*, *Diodia virginiana*, and *Eupatorium serotinum*. These herbs exhibited a striking zonation based on the water content of the soil.

LITERATURE CITED

- Penfound, William T. and E. L. Rice. 1957. An evaluation of the arms-length rectangle method in forest sampling. *Ecol.* 38: 660-661.
- Waterfall, U. T. 1952. A catalogue of the flora of Oklahoma. The Research Foundation, Stillwater, Oklahoma.

TABLE I. FREQUENCY AND COVER OF IMPORTANT HERBS IN THE BLACK WILLOW FOREST.

Species	<u>Relative Frequency</u>	<u>Relative Cover</u>
Hydrocotyle verticillata	16.0	29.4
Diodia virginiana	13.3	25.3
Panicum hians	13.3	8.8
Eupatorium serotinum	9.3	10.4
Polygonum hydropiperoides	5.3	6.1
Other species	42.8	20.0
