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## Fruit and Seed Project of the Cedar Creek Natural History Area

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FRUIT AND SEED PROJECT OF THE CEDAR CREEK  
NATURAL HISTORY AREA

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The program was initiated with the support of the Graduate School of the University of Minnesota in May, 1960 through the interest of Dean T. C. Blegen. There are four major objectives: (1) To establish a collection of ripe fruits and seeds to provide a permanent reference file of the entire seed plant flora of the area newly mapped through a grant from the National Science Foundation. (2) To prepare duplicate sets of standard herbarium mounts of material with ripe disseminules, one set for the laboratory at Cedar Creek, the other for the Herbarium of the Department of Botany of the University at Minneapolis. (3) To photograph the various fruits and seeds in Kodachrome and black and white showing both external and internal morphology. (4) To prepare eventually an illustrated manual with keys for identification of fruits and seeds.

These collections of ripe fruits and seeds, of detailed photos, and of pressed voucher specimens of the seed plants, which it is estimated will eventually include about 700 kinds from this area of 21 square miles in east central Minnesota, constitute basic reference files for identification of plant materials in several kinds of biological researches. These include: (a) studies of the food habits of animals in which the contents of stomachs and feces are analyzed, (b) studies of the ecological life histories of plants in which viable seeds and fruits are recovered from the soil and tested for ability to germinate and to become established in various environments, and (c) studies of vegetation development upon bare surfaces that have recently been cleared of vegetation, as for example, abandoned cropland or burned-over areas, or where erosion or deposition have recently occurred. When numerous seedlings appear on these surfaces at a distance from parent plants, identification is often difficult because of lack of suitable keys for identifying juvenile stages. But if seed coats can be found associated with the seedlings, identification often can be quite rapid and precise. The reference files are needed also in geological research involving the identification of plant macrofossils in peat deposits to provide a sound history of the vegetation sequences that have displaced one another since the ice receded from the area about 12,500 years ago. The photos will provide much needed illustrative

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material for the identification manual and for the teaching and service functions of the University.

In the first year of the project, 21 collecting sites were established in the following habitats: lake, creek, bog, swamp, swale, meadow, abandoned farm and home sites, cultivated fields, roadsides, high prairie, oak savanna, deciduous forest, pine forest, and mixed conifer-angiosperm forest. Duplicate collections of over 200 species with attached fruits or seeds were prepared for herbarium mounts; 59 families including 158 genera were represented. Seeds and fruits have been separated at maturity from living plants for a special reference collection. This seed herbarium will also include seeds that have overwintered on the plants, and others that have been recovered from a floating seed trap launched in Cedar Creek.

Because of their ephemeral nature, the fleshy fruits were photographed with Kodachrome as soon as possible after collection; measurements and other pertinent data were recorded. Approximately 125 different Kodachrome studies have been made of collection sites, inflorescences, external and internal morphology of seeds; black and white photos have been made from the Kodachromes for an illustrated glossary in the identification manual.

Kodachrome slides of 21 species were shown during the oral presentation to illustrate some of the detail and diversity of the coverage. These were: Northern White Cedar or Arbor Vitae (*Thuja occidentalis*), White Pine (*Pinus strobus*), Sandbur (*Cenchrus longispinus*), Clintonia (*Clintonia borealis*), Starry False Solomon's Seal (*Smilacina stellata*), Showy Orchis (*Orchis spectabilis*), American Hazelnut (*Corylus americana*), Northern Pin Oak or Hill's Oak (*Quercus ellipsoidalis*), Rhubarb (*Rheum rhaponticum*), Russian Thistle (*Salsola kali* var. *tenuifolia*), Bittersweet (*Celastrus scandens*) with its unusual green cotyledons, Dwarf Blackberry, (*Rubus pubescens*), Choke Cherry (*Prunus virginiana*), Staghorn Sumach (*Rhus typhina*), Common Mullein (*Verbascum thapsus*), Bishop's Cap (*Mitella nuda*), Strawberry (*Fragaria vesca* var. *americana*), Hoary Puccoon (*Lithospermum canescens*), Woolly Plaintain or Indian Wheat (*Plantago purshii*), Bush-Honeysuckle (*Diervilla lonicera*) and Sunflower (*Helianthus grosse-serratus*).

It will be noted that there are representatives of the three great natural vegetation formations of Minnesota, the northern conifer forest, the eastern deciduous forest, and the tall grass prairie, as well as weeds and food plants introduced by European man from the Old World. It is this great diversity of flora which makes the Cedar Creek Natural History Area of such unique interest and importance for biological study, and which insures the applicability of the ultimate fruit and seed identification manual to a much broader portion of the Upper Midwest than the immediate environs of the Cedar Creek Area.

The floating seed trap mentioned earlier was set in operation as a supplementary study on mechanisms of seed dispersal. It consisted of a wire mesh trap with attached wooden block floats which was launched in Cedar Creek for the duration of each field trip. Clusters

of ripe disseminules as well as the individual seeds have been recovered. The following have been collected in the trap: *Carex* spp., *Scirpus* spp., *Pinus strobus*, *Potamogeton zosteriformis*, *Sagittaria latifolia*, *Calamogrostis canadensis*, *Glyceria grandis*, *Leersia oryzoides*, *Phalaris arundinacea*, *Setaria lutescens*, *Alnus rugosa*, *Polygonum hydropiper*, *Impatiens capensis*, *Cryptotaenia canadensis*, *Rumex orbiculatus*, *Rubus idaeus*, *Cornus stolonifera* and *Bidens cernua*. It is interesting to note that several of the species, though suspected to occur in the area, had never been reported officially there; furthermore several of the disseminules are from species which are not ordinarily considered to be dispersed by flowing water.

The floating specimens listed above were identified by seed morphology. The problem of seed identification is a difficult one, for there is surprisingly little available literature on the subject. One depends on experience, specialized training, and a good seed reference collection. A few important reference works which are of special aid in identification are listed below:

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