

NATIVE PLANT SOCIETY OF NORTHEASTERN OHIO

Founding Chapter Of

THE OHIO NATIVE PLANT SOCIETY

6 Louise Drive
Chagrin Falls, Ohio 44022
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On the Fringe

THE JOURNAL OF THE OHIO NATIVE PLANT SOCIETY

Volume No. 8

May/June 1990

No. 3

Welcome to the Shawnee Nature Club of Portsmouth, down on the old Ohio River. This is a long-standing group of ardent natural history buffs who voted on March 8th to affiliate with the Ohio Native Plant Society. In the near future we will be including their programs and field trips in our calendar. They are in a particularly interesting area right on the fringe of Shawnee State Forest.

Dr. Tom Cooperrider of Kent State University is offering Systematic Botany from July 16 to August 18. The hours are Monday and Friday 7:45 to 9:15 a.m. and Tuesday, Wednesday, Thursday from 7:45 a.m. to 12 noon. Tom Cooperrider is one of the outstanding botanists of Ohio and a marvelous teacher. This is a fabulous opportunity to take a course with him in one of the basics of botany. Call 216/672-2375 or 672-3613.

Contrary to previous information, Spring Hill Nurseries of Tipp City, Ohio, near Dayton, Ohio, is STILL selling Pink Lady's Slipper and White Trilliums in their 1990 catalog!!! Write them and tell them that what they are doing is wrong and that you will not patronize their business and you will tell others not to. We can all avail ourselves of the post office, no matter how busy we are or what the state of our health, so no excuses. Let's mount such a big campaign that they can't ignore us!

The Eastern Native Plant Alliance Annual Meeting will be held August 17-19 at the Holden Arboretum. This is a marvelous chance for Ohioans to find out what this worthwhile organization is doing and to participate. They have some excellent speakers lined up and field trips going each afternoon. If interested, call the Holden Arboretum at 946-1600.

CALENDAR OF VARIOUS CHAPTER ACTIVITIES:

Please call chapters if you wish to join them in an activity - phone numbers are listed after the calendar.

SNP = State Nature Preserve / **DNAP** = Division of Natural Areas and Preserves / **LBC** = Little Beaver Creek / **WC** = Wilderness Center

May 5 (Saturday) 10 a.m. - Hike at Clifton Gorge SNP.

May 5 (Saturday) 10 a.m. - Hike at new Davey Woods SNP.

May 5 (Saturday) 10 a.m. - Hike at Fowler Woods SNP.

May 5 (Saturday) 10 a.m. - Wildflowers of Rockbridge SNP.

May 5 (Saturday) 9 a.m. - Sheldon Marsh SNP Spring Migratory Bird Hike.

May 5 (Saturday) 1 p.m. - Lake Katharine SNP Wildflower Walk.

May 5 (Saturday) Athens Chapter - 8:30 a.m. - Wildflower Hike at Waterloo Wildlife Refuge - Call.

May 6 (Sunday) LBC - 1:30 p.m. - Plant Century Day in Sheepskin Hollow - Call.

May 6 (Sunday) WC - 1:30 p.m. - Rich Spring Flora of Pee Wee Hollow - Call.

May 9 (Wednesday) LBC - 1 p.m. - Gard Vodrey Hollow Hike - Call.

May 10 (Thursday) 6:30 p.m. - Irwin Prairie SNP Warbler Walk.

May 12 (Saturday) Cincinnati Chapter - 10 a.m. - Shawnee State Forest Field Trip - Call.

May 12 (Saturday) 9:30 a.m. - Goll Woods SNP Hike.

May 12 (Saturday) 10 a.m. - Conkles Hollow SNP Wildflower Walk.

May 12 (Saturday) 10 a.m. - Shawnee State Forest Wildflower Tour - Call DNAP.

May 13 (Sunday) Mohican Chapter - Lakeside Daisy SNP Field Trip - Call.

May 13 (Sunday) WC - 2 p.m. - Wildflower Walk at Wilderness Center.

May 13 (Sunday) 1 p.m. - Lake Katherine SNP Wildflower Walk.

May 13 (Sunday) 2 p.m. - Goll Woods SNP Wildflower Walk.

May 18 -20, (Fri., Sat., Sun.) WC - Field trip to Adams County - Call.

May 19 (Saturday) Dayton Chapter - 10 a.m. - Fort Hill Nature Preserve Hike - Call.

May 19 (Saturday) Cincinnati Chapter - 9:30 a.m. - Harrison-Crawford State Forest Field Trip - Call.

May 19 (Saturday) LBC - 9 a.m. - Field Trip to Highlandtown - Call.

May 19 & 20 (Sat. & Sun.) 10 a.m. - Lakeside Daisy SNP Open House - Call DNAP.

May 19 (Saturday) 3 p.m. - Lake Katharine - A Walk on the Water. This nature "walk" will be done by canoe. Ten to 12 people will use Lake Katharine's canoes to view the beautiful display of mountain laurel and umbrella magnolias at their peak along with a wide variety of plants and animals along the lakeshore. **Reservations are required!**

May 20 (Sunday) 6:30 p.m. - Lake Katharine - The Beavers of Lake Katharine. The life of the beaver is explored during this program as 10-12 people use canoes to see feeding areas, lodges and usually the beavers themselves. But beavers are only one of the attractions of this program. Great blue and green herons, osprey, kingfishers, bats, rough winged swallows and turtles are some of the other creatures sometimes seen. Canoeing in the twilight is an experience to be remembered for a long time. Canoes and life jackets are provided as well as instruction for novice canoeists. **Reservations are required!**

May 20 (Sunday) 1 p.m. - Adams Lake Prairie SNP Wildflower Walk.

May 20 (Sunday) 2 p.m. - Clifton Gorge SNP Wildflower Walk.

May 23 (Wednesday) Mohican Chapter - 6:30 p.m. - Field trip to Clearfork Reservoir - Call.

✓ **May 26 (Saturday) Cleveland Chapter - 9 a.m. - Columbia Run Field Trip.** In the Cuyahoga Valley, the Columbia Run watershed provides a scenic area for hiking. Steep terrain and creek crossings will be encountered. Meet at the parking lot of the Happy Days Visitor Center of the Cuyahoga Valley National Recreation Area on the north side of Rt. 303, 1 mile west of Rt. 8 in Peninsula.

May 26 (Saturday) 10 a.m. - Conkles Hollow SNP Ecology and Flower Walk.

June 3 (Sunday) 10 a.m. - Howard Collier Scenic River Area Hike.

June 6 (Wednesday) Mohican Chapter - 6:30 p.m. - Brown Lake Bog Field Trip - Call.

June 6 (Saturday) WC - 1:30 p.m. - Field trip to Hemlock Hollow - Call.

June 9 (Saturday) LBC - Geology Field Trip - Call.

June 10 (Sunday) Cincinnati Chapter - 12 noon - Glen Helen & Cedar Bog Field Trip - Call.

June 10 - (Sunday) Dayton - 1:30 p.m. - Springfield Fen Field Trip - Call.

June 10 (Sunday) 2 p.m. - Fowlers Woods SNP Tree Hike.

✓ **June 23 (Saturday) Cleveland Chapter - 9 a.m.** - Cleveland State University. One of the fascinating but elusive aspects of botany is the structure of cells and tissues. Dr. George Wilder will conduct a laboratory with the use of microscopes on this subject. Even though this may sound esoteric, it is for everyone. You will learn about plants in a way that you may never have thought was possible. Fee \$5. Please call Bob Bartolotta at 231-4600 Ext. 254 to register.

June 23 (Saturday) WC - Field trip to Wakatomka Creek, Licking County. Call.

June 23 (Saturday) 10 a.m. - Clifton Gorge SNP Woods Walk.

June 23 (Saturday) 10 a.m. - Conkles Hollow SNP Gorge Ecology Hike.

June 24 (Sunday) Mohican Chapter - Willard Marsh Wildlife Area Hike - Call.

June 24 (Sunday) 7:30 p.m. - Beavers of Lake Katharine SNP. (See previous information under May 20th.)

✓ **June 30 (Saturday) 10 a.m.** - Cranberry Bog SNP Open House - Call DNAP.

CHAPTER CONTACTS

Athens	Jean Andrews, 33 Woodward Ave., Athens 45701 (H) 614/593-7810
Cincinnati	Dr. Vic Soukup, 338 Compton Road, Cincinnati 45215 (H) 513/761-2568
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Natural Areas & Preserves	Call: 614/265-6453
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Portsmouth	David Riepenhoff, R.R. 2, Sciotoville, OH 45662 (H) 614/820-8382
Toledo	Peter Montion, 6950 Providence St. Whitehouse 43571 (H) 419/877-9261
Wilderness Center	Marvin Smith, 7236 Camp Rd, West Salem 44287 (H) 419/869-7575

The Kentucky Native Plant Society Annual Wildflower Weekend will be at Natural Bridge State Park May 4-6. Dr. Robert Mohlenbrock will be the keynote speaker. For further information call 800/325-1710.

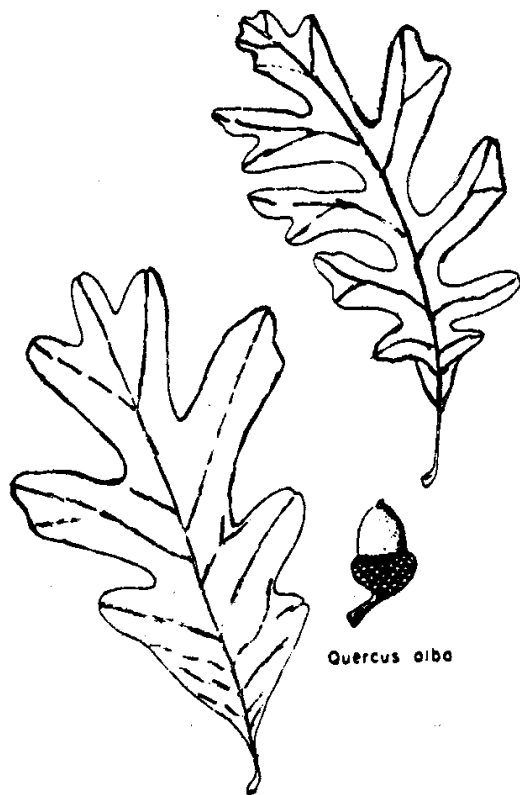
DYSART WOODS: AN OUTSTANDING EXAMPLE OF A MATURE FOREST COMMUNITY by Dr. Irwin A. Ungar

The protection of Dysart Woods, a remnant of the magnificent virgin forests which formerly covered southeastern Ohio, was a high priority for the Ohio Chapter of the Nature Conservancy when they obtained the area from the Dysart family in 1963. The Dysart Woods Laboratory was purchased by Ohio University from the Nature Conservancy in 1966, with the expectation that it would be maintained as a natural area. Ohio University, under the leadership of President Charles Ping, and the first director of the Dysart Woods Laboratory, Dr. Warren A. Wistendahl, has been an excellent steward for this magnificent forest. The area has been allowed to develop naturally since the time it was purchased by the University twenty-three years ago. The woods are used by educational institutions in the state, including the public school system in Belmont County, as a significant resource for teaching of science. Ohio University students and faculty have used the area as a site for teaching and research activity in ecology. Visitors from all over the nation visit the forest, which is a small virgin remnant of the once extensive mature forests of eastern North America. In 1968 the Department of Interior, recognizing the significance of this magnificent nature forest community, placed Dysart Woods on their list of Registered National Natural Landmarks.

Dysart Woods is one of the last remnants of virgin forest present in the eastern United States. Thanks to the preservation of this white oak dominated woods by the Dysart family, we can see at Dysart Woods a remnant of a forest containing white oaks and other trees that probably range from 300 to 400 years in age. The total area of the Dysart Woods Laboratory is about 455 acres, while the mature forest occurs, in about a 50-acre area. The remaining 405 acres of the original farm is in various stages of secondary plant succession, characterized by a large area of young, 10 to 20 year old forest stands.

The Dysart Woods Laboratory of Ohio University is located in Belmont County, Ohio. It occupies portions of sections 33 and 34 in Smith Township, with most of the Laboratory being in section 33. The area is hilly with local relief exceeding 200 feet.

The forest can be classified as a mixed mesophytic deciduous forest. The largest and dominant trees in the woods are *Quercus alba*, White Oak. Other species that are prevalent and are

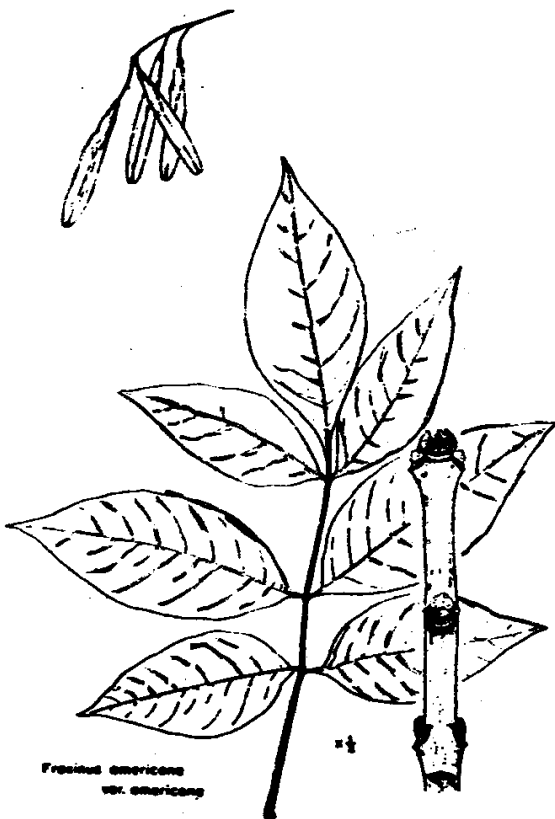


Quercus alba

represented by large trees are *Prunus serotina*, Wild Black Cherry; *Quercus rubra*, Red Oak; *Fraxinus americana*, White Ash; *Fagus grandifolia*, American Beech; *Nyssa sylvatica*, Sour Gum; *Acer saccharum*, Sugar Maple, and *Liriodendron tulipifera*, Tulip Poplar. The White Oaks are represented by a number of magnificent large trees ranging from 105 to 170 ft. in height and from 29 to 47 inches in diameter. Unfortunately, since 1984 some of the larger White Oak trees have died but their large trunks remain standing as of 1989. The largest tree at Dysart Woods is a Tulip Poplar, which is about 66 inches in diameter and 160 feet tall. We estimate that the very large trees at Dysart Woods are about 300 to 500 years old.

As the current canopy dominants of the forest die, they will be replaced by other species in the understory of the forest. Plant succession is a process by which populations of species change over time in a given location. The oaks and tulip poplar, which currently play a significant role in the canopy of Dysart Woods are not represented in the understory of the forest and few if any saplings or seedlings of these species are found. They will be replaced mainly by *Acer saccharum*, Sugar Maple and *Fagus grandifolia*, Beech, the most shade tolerant canopy trees in the forest. The basis for this prediction is the abundance of Beech and Sugar Maple in the seedling, sapling and small tree size classes. Young shade tolerant trees, such as Beech and Sugar Maple, make rapid growth when gaps are formed in the canopy because of the death of older trees.

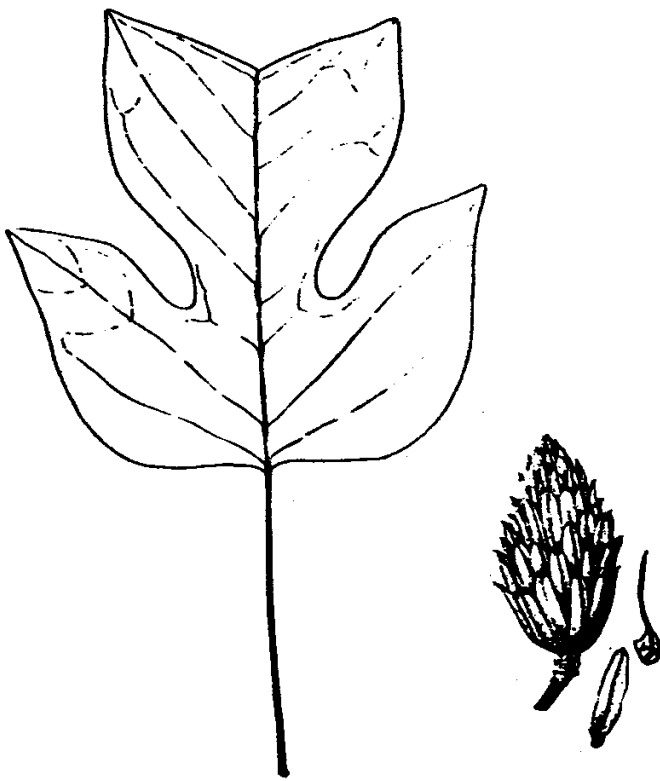
In the process of plant succession the early invaders of a field will be replaced quickly. Relatively short lived trees such as *Crataegus* spp., Hawthorn; *Cornus florida*, Dogwood; and *Cercis canadensis*, Redbud are replaced by the longer lived oaks and hickories. The latter species do not reproduce well in their own shade, but an established community may live for several hundred years. Finally, the more shade tolerant species such as American Beech and Sugar Maple replace the oaks, because they have the ability to reproduce and grow in their own shade. Some species such as *Liriodendron tulipifera* have the ability to invade during the early stages of old field succession and because they are long lived become a significant part of the mature forest, whereas most other early invading trees and shrubs are short lived and are replaced after about 20 years by longer lived trees.



Like all natural forest lands, Dysart Woods has changed over time. The exciting thing for ecologists is to observe and monitor the changes in population sizes

of species over successional time. Currently, some of the larger trees are dying and gaps are being formed in the woods that permit other trees to become established. Death of trees may be due to disease, old age, windthrows, ice storms and other environmental factors which are beyond the tolerance limits of the tree species.

One of the problems that we face in maintaining the forest is the possibility of coal mining in the vicinity. Belmont County is very heavily mined, both by surface strip mining and room and pillar and long wall form of deep mining. In 1970 a successful effort was made to establish a buffer zone around the Dysart Woods Laboratory to avoid strip mining (Figure 1). Strip mining in the vicinity of the woods would destroy the natural vegetation of the region, adversely affect the hydrology and change the quality of water in the area. In recent years the problem of deep mining in the buffer zone area and its effect on the hydrological system has been considered. There are two main problems associated with long wall mining that may adversely affect Dysart Woods. Firstly, there would be direct damage to trees if deep mining were done in the area of Dysart Woods because of subsidence of the ground. Secondly, mining could affect the depth of the underground water table, by lowering the water table in the area. Any decrease in the availability of soil water would negatively effect the Dysart Woods ecosystem. We feel that the buffer zone should be acknowledged by all mining interests to avoid damage to this National Natural Landmark. The State of Ohio should not issue mining permits within the area bounded by the buffer zone surrounding the Dysart Woods Laboratory to avoid damage to this magnificent mature forest remnant, which is one of the best examples of the Mixed Mesophytic Deciduous Forest in the eastern United States.



Liriodendron tulipifera

Further Reading:

- Braun, E.L. 1964. Deciduous Forests of Eastern North America. Hafner Publishing Co., New York, 596 pp.
- Drury, W.H. and I.C.T. Nisbet. 1973. Succession. Journal of the Arnold Arboretum 54: 1-113.
- Gordon, R.B. 1969. The natural vegetation of Ohio in pioneer days. Bulletin of the Ohio Biological Survey 3:1-113.
- West, D.C., H.H. Shugart, and D.B. Botkin. 1981. Forest Succession Concepts and Applications. Springer-Verlag, New York, 517 pp.

DYSART WOODS BUFFER LINE

COSHEN TWP.

SMITH TWP.

The darkest area
#33 is Dysart Woods.

The surrounding area
is the buffer.

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Table 1. An estimate of tree Density (D), Percent Frequency (F), and Basal Area (BA) and Importance Value (IV = sum of relative density, relative frequency and relative dominance) per 100 m² for North and South facing slopes at Dysart Woods. Tree = >2.5 cm DBH. (From Smith, J.R., 1979, Composition and structure of Dysart Woods, a mature forest ecosystem in southeastern Ohio, M.S. Thesis, Department of Botany, Ohio University.

Species	SOUTH FACING SLOPE				NORTH FACING SLOPE			
	D	F	BA	IV	D	F	BA	IV
<i>Fagus grandifolia</i>	25.0	73	0.942	104	11.6	40	0.609	48
<i>Acer saccharum</i>	14.9	63	0.354	64	31.4	97	1.555	124
<i>Quercus alba</i>	3.3	30	1.450	62	0.6	7	0.483	18
<i>Acer rubrum</i>	3.7	20	0.157	20	0.6	7	0.037	4
<i>Nyssa sylvatica</i>	2.0	7	0.145	11	1.6	13	0.159	11
<i>Quercus borealis</i> var. <i>maxima</i>	0.6	13	0.154	11	0.3	3	0.001	7
<i>Cornus florida</i>	1.7	7	0.006	6	1.7	13	0.001	1
<i>Ostrya virginiana</i>	2.0	3	0.009	5	—	—	—	—
<i>Fraxinus americana</i>	0.3	3	0.056	3	2.6	23	0.210	18
<i>Sassafras albidum</i>	0.7	7	0.044	6	—	—	—	—
<i>Prunus serotina</i>	0.7	3	0.001	3	10.3	33	0.009	26
<i>Liriodendron tulipifera</i>	0.3	3	0.049	3	1.0	10	0.228	12
<i>Prunus virginiana</i>	0.3	3	0.001	2	3.0	10	0.001	8
<i>Ulmus rubra</i>					5.3	37	0.045	21
<i>Crataegus</i> spp.					0.3	3	0.002	2

Table 2. Sapling density/100 m² of selected tree species at Dysart Woods. (From Smith, J.R., 1979).

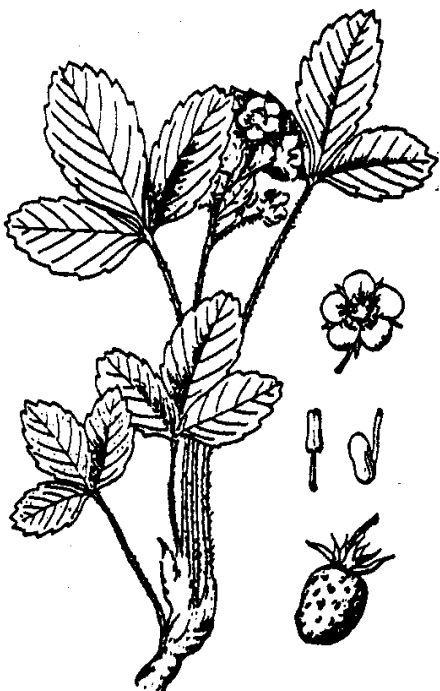
Species	SOUTH FACING SLOPE	NORTH FACING SLOPE
<i>Fagus grandifolia</i>	168	58
<i>Acer saccharum</i>	133	285
<i>Quercus alba</i>	0	0
<i>Acer rubrum</i>	109	13
<i>Nyssa sylvatica</i>	11	14
<i>Quercus borealis maxima</i>	4	13
<i>Liriodendron tulipifera</i>	3	0

Dr. Irwin A. Ungar is a Professor of Plant Ecology in the Department of Botany at Ohio University, Athens, Ohio. He is also the current Director of the Dysart Woods Laboratory.

WILD STRAWBERRY (*Fragaria Virginiana*) by Sheldon H. Cohen

Few of the multitude of edible plants in the world can approach *Fragaria virginiana*, wild strawberry, for pure enjoyment to the palate. This species is found over a wide region of the northern and eastern parts of North America, from New Brunswick to South Dakota, south to Florida and Louisiana. It grows in colonies in a variety of habitats. These vary from dry soils of open woodlands and sloping prairies to the damper ground along streams. This member of the Rose family grows from a short woody perennial rootstock which generates many coarse fibrous roots. The leaves, flower and runners all connect directly to the roots. The species multiplies, to a very large extent, with the use of horizontal runners, which develop new root systems and leaves that are miniature versions of the adult ones. The three to six inch high erect leaves are found on hairy stems. Each leaf, one per stem, consists of three sharp-toothed leaflets. In April through June, the hairy flower stem, a little shorter than the leaves, produces a few less-than-an-inch-across white flowers. The saucer-shaped blooms, which look like small single rose flowers, consist of five rounded white petals with a green bract beneath each. The flowers can be bisexual or unisexual. In the latter case some may lack fully developed functioning pistils while others lack stamens. Those without pistils cannot set fruit. Bees, flies and butterflies are the chief insect pollinators. The berry, which is similar to the domestic scarlet strawberry except smaller and tastier, develops in June and July. The one-half to two-thirds of an inch in diameter fruit has small seeds (actually achenes) imbedded in pits on the surface and, therefore, is not really a berry by the strict botanical definition (seeds in a pulpy flesh).

The genus name, **Fragaria** is from the Latin **fraga** which means "having scent," and refers to the fragrant smelling fruit. **Virginiana**, the species name, signifies "of Virginia." The common name, strawberry is an extremely old one, going back to the tenth century. There is some uncertainty about the rationale for this designation, but Stevens, in his book "Kansas Wild Flowers," suggests the first part of the name refers to the similarity of the runners covering the ground to thinly scattered straw.



To the hiker who has stopped to refresh himself with a few of the sometimes tart and sometimes sweet wild strawberry, no comments of the quality of that moment are needed. The question is not if you will enjoy this wonderful fruit, but if you can find a

patch large enough to furnish adequate berries. If fruit is left after eating it raw, wild strawberries make excellent jams, sauces, jellies, tarts, shortcakes and preserves. A few people are allergic to the fruit so a little care should be exercised. One reason for the difficulty in finding great concentrations of the ripe fruit is that it is also a favorite of many wild animals. Grouse, pheasants, quail, many songbirds, rabbits, opossums, chipmunks, squirrels and even deer have a preference for strawberries. Although the parentage of the domestic strawberry is not perfectly known, the garden plant, which is a hybrid, has some of this wild species in its ancestry.

Fragaria virginiana, surprisingly, has a long history as a herbal medicine. Linnaeus believed that the fruit of the wild strawberry was a good remedy or even a cure for gout and rheumatic disorders. The pioneers used the berries for the same purpose. The seeds were used along with other parts of the plant as a remedy for problems of the liver and gallbladder. At one time in England it was believed to be useful in the treatment of gonorrhoea. Tea made from strawberries was also thought to be helpful in "cleaning" both the alimentary and urinary tracts. The tasty tea made from the leaves is very rich in Vitamin C and, therefore, an excellent preventer of scurvy. The fresh fruit eaten raw is an outstanding source of quickly assimilated iron, potassium, sulphur, calcium, malic and citric acid. A more unusual use of this plant is as a tartar removing dentifrice. Fresh juice allowed to remain in contact with the teeth for a few minutes will both decrease tartar and also remove dental discoloration. The largest medicinal use of strawberry has been, however, more traditional. It was and is still used as a flavoring syrup to be mixed with less pleasant tasting drugs.

For those individuals who wish to grow this species the cultivation is the same as for the common domesticated strawberry. My own prejudiced opinion is that if you go to all the effort of preparing a plant bed you probably want a reasonable yield. Therefore you are better off using the commercial June or Everbearing hybrid in the garden. If you have a well drained meadow you might wish to naturalize a few **Fragaria virginiana** plants in with the other wildflowers. With luck you might be rewarded with the joy of eating a few of Nature's best.

This article is a reprint from the Spring, 1990 issue of **Kansas Wildflower Society Newsletter.**

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The Wilderness Center Botanizers are taking a May 18-20 field trip to Adams County to visit five preserves in that area. They are staying at Woodland Altars, site of the 1989 State Weekend and the costs are minimal. This is a very knowledgeable group of people. If interested call president Marvin Smith at 419/869-7575.

VERSATILE VIBURNUMS by Erik A. Neumann

The genus **Viburnum** is perhaps one of the most diverse groups of landscape shrubs. It is a member of the honeysuckle family, **Caprifoliaceae**.

Viburnums are deciduous or evergreen shrubs or small trees, a number of which are popular as ornamentals in American gardens. Many species are hardy and are valued for their attractive flowers, decorative foliage and rich autumn colors; some for their colorful fruit; and others for their evergreen foliage. They are good background plants for other ornamentals.

They are found in many parts of the world, primarily in the northern temperate zone. Most of the species that are extensively cultivated are introductions from Asia. Only a few species from Central and South America have been introduced.

Species native to the United States have good growth habits and are attractive in flower, foliage and fruit. They are dependable under cultivation and do well even under adverse growing conditions.

Viburnums as Small Trees

Among the species of **Viburnum** that attain the size of small trees are **V. lentago**, **V. prunifolium** and **V. rufidulum**.

Viburnum lentago, known as the sheepberry or nannyberry and introduced into gardens about 200 years ago, is considered to be one of the finest viburnums for autumn coloring. Found wild from Hudson Bay to Georgia on moist soil along stream banks and in light woodlands, this viburnum will tolerate sunshine or shade. A handsome shrub or small tree, which may attain a height of up to 30 feet in nature, it generally remains somewhat smaller under cultivation.



x 1/2

Viburnum rufidulum

The sheepberry has fragrant, creamy white flowers, measuring up to 4 inches to 5 inches across, which open in May and early June. The flower is similar to those of the wild carrot or Queen Anne's lace, being made up of hundreds of small, white flowers. The flowers are followed by attractive red fruit which later turns blue-black and remains on the shrub throughout the winter. This is a good shrub for borders and thickets. It is useful in large, naturalistic plantings; but it is not as effective as a lawn specimen or for small home grounds.

Its fruit is eaten by birds and

small mammals during summer, fall and winter. It also is planted as cover for wildlife and provides browse for deer and rabbits. The fruit is edible and has been used for jellies.

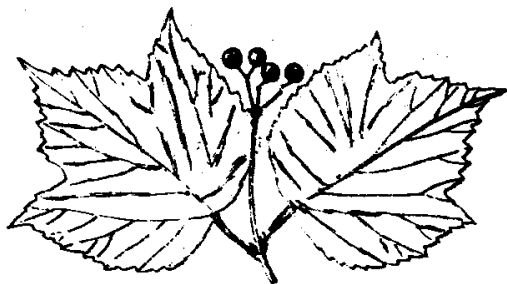
The native black haw, **Viburnum prunifolium**, is an excellent upright shrub or small tree which reaches 15 feet at maturity. This viburnum bears a resemblance to the crabapple. Black haw displays brilliant fall foliage and showy, dark blue fruit. Occurring naturally from Connecticut to Florida, this shrub tolerates drier soil than the majority of the viburnums, and black haw does best where it is exposed to sunshine. The black haw is found along roadsides and fences, and it is planted to serve as a screen and as background for smaller shrubs. This slow-growing species will live 75 years or longer.

Viburnum rufidulum is the southern counterpart of the black haw. It is native from Virginia to Florida. The southern black haw attains a maximum height of 30 feet in the form of a large shrub or small tree. Considered one of the best viburnums for autumn coloring, this shrub is well used in naturalistic settings. However, its use is somewhat limited because of its unpleasant odor.

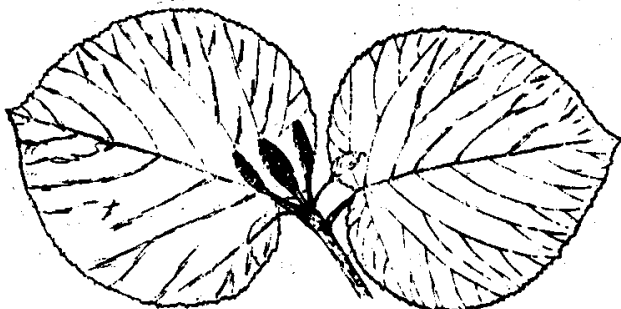
This deciduous species has spreading, stiffish branches, lustrous foliage, and clusters of white flowers; it is characterized by a reddish fuzz on the winter buds, leaf stalks and the lower surfaces of the leaves. As southern black haw ages, its branches often are more spreading and open in growth.

American Shrub Species

Viburnum trilobum (high-bush cranberry), **V. alnifolium** (hobblebush), **V. dentatum** (arrowwood), **V. acerifolium** (dockmackie), **V. cassinoides** (withe-rod) and **V. nudum** (smooth withe-rod) are perhaps the best known shrubby species.



Viburnum acerifolium



Viburnum alnifolium

The high-bush cranberry or American cranberry bush, **Viburnum trilobum**, is native from New Brunswick across North America to British Columbia and as far south as New Jersey. It is found on hummocks in acid bogs, along streams and wooded uplands. It likes rich, moist soil and will grow in deep shade or sunshine. The American cranberry bush will survive severe winters and is immune to aphid distortion which attacks some of the other viburnums. It is a deciduous, broad-spreading shrub, attaining

a height of 12 feet. The dark green, maple-shaped leaves turn orange-yellow to reddish-purple in the fall. Its creamy white flowers appear in May to June. The berries are attractive and usually remain on the shrub into the winter since they are not generally eaten by birds. They may be made into jellies since they are rich in pectin. Somewhat course in appearance. **V. trilobum** is well suited for planting in large places as a shrub border and as a screen, or as undergrowth in moist woodlands. The plant does not thrive in extreme heat or dry soils. The U.S. Department of Agriculture selected three cultivars—'Andrew,' 'Wentworth' and 'Hans'—with higher pectin and larger fruit as superior ornamental cultivars.

The hobblebush or American wayfaring tree (**Viburnum alnifolium**) of the eastern United States derived its name from people tripping over its low branches, which take root in the soil, as they walked in the woods. In its natural habitat (moist woods), the hobblebush reaches a height of 10 feet. It is found native from New Brunswick to North Carolina to Michigan.

This viburnum is characterized by its broad, round leaves, from 4 inches to 8 inches long—perhaps the largest of any of the viburnum leaves. The leaves are green, the underside covered with gray, felty hairs. The white flowers, borne in flat heads, are followed by red fruit which later turns black as they ripen. **Viburnum alnifolium** is an appropriate species for moist woodland sites. It thrives in peaty, acid soils, but does poorly in chalky soils.

The arrowwood viburnum, **V. dentatum**, receives its common name from the supposed use, by Indians, of its straight, narrow branches in making arrows. It is found in the wild from New Brunswick to Minnesota and Georgia, where it occurs on any soil, both upland or wet valley. It is a vigorous, upright shrub which attains a height of up to 10 feet. This shrub does well in full sunshine and deep shade, and is useful in a shrub border, as a screen and in naturalistic plantings. This shrub possesses a noticeable odor on rainy or humid days, when there is less air circulating and greater decomposition.

The arrowwood viburnum (**V. dentatum**), and the downy arrowwood viburnum, (**V. rafinesquianum**), are worthy of consideration for their attractive white flowers in June when few other shrubs are in bloom. While the arrowwood viburnum tolerates shade and moisture, a dry bank approaches the native habitat of the downy arrowwood viburnum. A naturalistic landscape is enhanced by the red-orange autumn foliage of both species. The fruit of the arrowwood is a blue-black color when ripe in the late summer to early fall. Resembling the arrowwood viburnum is **V. molle**, which is of lower stature, possesses darker foliage, and flowers somewhat later.

Viburnum nudum and **Viburnum cassinoides** are plants of marshlands

or bogs that thrive in moist garden situations. The fruit is spectacular with pink, light blue, and dark lilac on the same inflorescence in late summer as it matures. The autumn foliage is brilliant red.

Viburnum cassinoides is a hardy shrub that is native from Newfoundland to North Carolina and Minnesota. While it is a versatile garden shrub, it should not be planted where the odor of its ill-scented fall foliage would be a problem. The withe-rod attains a height of between 6 feet to 12 feet.

The smooth withe-rod, **V. nudum**, ranges from southern New York south to Florida and Louisiana. It is not hardy north of its native range. It attains a height of about 15 feet.

The dockmackie, **V. acerifolium**, native from New Brunswick to North Carolina and Minnesota, attains a height of from 5 feet to 6 feet. It is of upright form and has deciduous, maplelike leaves which turn an attractive rosy-pink to wine-purple in the fall. Its fruit and flowers are not outstanding; this fruit is really more effective when still in its unripe red stage. The dockmackie is a shrub of somewhat dry, shaded hillsides and is useful in the wildflower garden or an undergrowth in woodlands. The autumn foliage is a range of orange to dark reds that persist for an extended period.

Evergreen and Semi-Evergreen Viburnums

The Japanese viburnum, **V. japonicum**, introduced from Japan, is an upright shrub reaching a height of 6 feet. It is one of the hardiest evergreen species. The leaves are thick and glossy. The white flowers, which open in the summer, are borne in clusters 4 inches across and are later replaced by red berries. This species is suited to sun or partial shade but thrives best in woodland.

The leatherleaf viburnum, **V. rhytidophyllum**, native to central and western China, was introduced for cultivation in gardens in 1900. It attains a height of 10 feet; has strap-shaped, almost evergreen leaves up to 8 inches long; creamy white flowers, which appear from April to June; and fruit, which is red and later turns to black. This shrub should be planted in good soil in a sheltered location away from strong wind and drought. In its native habitat in China, **V. rhytidophyllum**, is reported to grow in colonies and reach up to 20 feet high.

Viburnum rhytidophylloides 'Allegheny,' a hybrid of **V. rhytidophyllum** and **V. lantana** 'Mohican,' is another National Arboretum selection. It is a medium-sized shrub with very dark green, leathery leaves which are deciduous to semi-evergreen. In May its abundant inflorescences of yellow-white flowers are effectively displayed above the dark green foliage. The fruit, in large clusters ripens in September and October to a brilliant red, and later turns to black at maturity.

'Allegheny' is hardy as far north as Minnesota and its foliage is resistant to bacterial leaf spot. This highly ornamental introduction has a dense, globose growth habit and is considered to be superior to its parents.

Sandankwa viburnum, *V. suspensum*, is a handsome evergreen grown extensively in southern gardens, and in cool greenhouses or indoors in tubs in more northern locations. This shrub is native to the Liu-kiu Islands of southern Japan. It attains a height of 4 feet to 6 feet and in early spring bears small clusters of pinkish-cream colored flowers, which are later replaced by red fruit.

Additional National Arboretum Selections

Additional viburnum cultivar introductions from the National Arboretum's Shrub Breeding Project, under the direction of Donald R. Egolf, research horticulturist, include two superior selections of *Viburnum sargentii* 'Onondaga' and 'Susquehanna.'

'Onondaga' has fine textured, velvety, pubescent foliage that is dark maroon. The flowers are white, borne in flat-topped cymes that bloom in May. Its flowers are followed by sparsely produced red fruit that is showy in August through September. It forms a globose shrub 6 feet high and 6 feet wide.

'Susquehanna' is a superior selection of *Viburnum sargentii* distinguished by its heavy branched, corky trunk, dark green foliage, its abundant large creamy white flowers in late May, and its large fruit clusters which mature to a dark glossy red in September.

This large shrub attains a height and width of more than 12 feet in maturity.

Viburnum lantana is often used for massing, in the shrub border, and for hedges and screens. Its winter coarseness, however, needs to be considered when using the species. *Viburnum lantana* 'Mohican' was singled out for its orange-red fruit which colors in July and remains for a month or more. Its flowers are creamy white, opening in late April into early May. 'Mohican' is a compact deciduous shrub with thick dark green leaves that are resistant to bacterial leaf spot. It is hardy as far north as the Carolina border.

Another noteworthy introduction is *Viburnum sieboldii* 'Seneca,' which was selected primarily for its large pendulant inflorescences that are multicolored shades of orange-red and red displayed on red pedicels that persist on the shrub for several months before they finally turn black and fall. *V. sieboldii* fruit is normally eaten by birds leaving the colorful red pedicels on the shrub contrasting with the leathery, green leaves in an attractive display. The fruit of 'Seneca' however, is quite firm and generally not eaten by birds. The creamy white flowers are produced in panicles borne on stout, spreading branches.

'Seneca' grows as wide as it does high and forms a tree-like habit, but it can be trained from its base with several branches and may be kept as a large spreading shrub. It may ultimately reach a height and spread of up to 30 feet. 'Seneca' is hardy as far north as Minnesota.

It can be seen from these descriptions that the viburnums are a diverse group of landscape plants that nursery professionals can use in many parts of the country and for a wide range of landscape situations.

Erik A. Neumann is head of education and public services for the U.S. National Arboretum in Washington, D.C. — This article is a reprint of **Nursery Manager**, September, 1989 issue.

A UNITED STATES FOREST SERVICE SIGN gave the following information on how some litter lasts in the environment:

- Plastic film container (Kodak or others) **20-30 years**
- Aluminum cans and tabs - **80-100 years**
- Glass bottles - **1,000,000 years**
- Plastic bags - **10-20 years**
- Plastic coated paper - **5 years**
- Nylon fabric - **30-40 years**
- Rubber boot sole - **50-80 years**
- Leather - **up to 50 years**
- Wool socks - **1-5 years**
- Cigarette butts - **1-5 years**
- Orange and banana peels - **2-5 weeks**

This information was taken from the October 1989 Newsletter of the Alaska Native Plant Society.

The N.E. Ohio Native Plant Society office has the schedule of a series of advanced seminars in natural history at Eagle Hill Wildlife Research Station at Steuben, Maine, on the coast. Dr. Herb Wagner of the University of Michigan will be taching a class on ferns and their allies; Dr. Howard Crum will do a class on mosses and liverworts; Dr. James Duke will teach field ethnobotany; and others. These are the outstanding experts in their fields and more information can be obtained by writing to the Research Station at Steuben, Maine 04680, or calling 207/546-2821.

The leathery leaves of American beech, (**Fagus grandifolia**), were gathered before frost and used for mattress stuffing by early settlers.

A MERMAID BY MISTAKE by John Theiret

A forest is certainly no place to go looking for a mermaid, but Kentucky and Ohio—in common with many other states in the Northeast—is alledged to have one in its woodlands: an unassuming wildflower named "false mermaid" (Fig. 1). This common name is, in my opinion, notable for being really quite ridiculous. Also notable, but for its intimidating aspect, is the plant's scientific name—**Floerkea proserpinacoides**. The Flora of North America logo is based on the flower of this species.

Seek for false mermaid in mixed, mesic forests, often along streams, under sugar maple, silver maple, beech, white ash, white oak, and American elm. In this habitat, annual plant species are not common. Those few that may be found with false mermaid are bedstraw (**Galium aparine**), wild chervile (**Chaerophyllum procumbens**), chickweed (**Stellaria media**), and jewelweeds (**Impatiens capensis**, **I. pallida**). The mermaid grows in dense populations, even as dense as one individual for each square inch of soil surface. Often with thousands of plants, these populations tend to be, in my experience, few and far between, at least in Kentucky, where our plant is known to me only from the extreme northern counties.

The seeds of false mermaid, shed in spring and early summer, germinate the next winter, but seedlings develop hardly at all until the advent of warmer weather in March or early April (later further north). From then on, growth is rapid, the first flowers appearing about two weeks after the seedlings emerge above the leaf litter on the forest floor. Finding a way through this litter is probably the greatest challenge in the life of the plant. A recent study has shown that a single, isolated seedling has perhaps only a 40% chance of getting through the maze of fallen leaves.

But the seeds usually occur in rather great numbers, often in bunches, under the litter. A bunch of seedlings, then, which all develop at the same time and rate, is actually able to push aside or lift the dead leaves, thus removing this barrier to upward growth, a fine example of botanical cooperation. The stems of false mermaid are delicate, rather weak, and unbranched or branched only near the base. The longest ones I have seen were about 35 cm, but most are only about half this length. As the season progresses, they become increasingly floppy, often prostrate. Alternately arranged on the stem are the plant's few leaves. The first leaf—and sometime also the second—have only three leaflets, but succeeding ones have mostly five.



Fig. 1. False Mermaid (*Floerkea Proserpinacoides*). Note vague resemblance of the middle and upper leaves to the submerged leaves of mermaid-wood.



Fig. 2. Mermaid-wood (*Proserpinaca palustris*), submerged leaves below, emerged leaves above.

Flowering continues until the death of the plant in late spring or early summer—the life span is only about 60 to 70 days. The long stalked flowers grow singly in the leaf axils (except the lowest); typically their parts are in 3s although exceptions are known. The sepals are about 5 mm long; the translucent white petals, less than half this length. The most distinctive part of the flower is the three ovaries, which share a common style—much like the mints and borages. The fruit consists of one or two (very rarely three) egg shaped seedlike sections 2–3 mm long, their red- to brown-purple surface somewhat roughened. At maturity, the individual "seeds" simply fall to the ground. No special dispersal mechanism is known for them. They may contain poisonous substances—this point should be investigated—which might account for the fact that they seem not to be sought after by animals of any kind, so far as known. The seeds remain dormant until the following winter—and the cycle repeats.

C.L. Willdenow, the German botanist who gave this plant its binomial in 1801, named the genus **Floerkea** in honor of one Gustav Heinrich Floerke (also spelled florke)—another German botanist—who lived from 1764 until 1835. I learned that Floerke worked in Berlin from 1799 until 1816. It was probably then that he became acquainted with Willdenow. They were friends, perhaps even drinking companions. Floerke's scientific writings are mostly about lichens—I gather he was highly regarded as a lichenologist. Floerke also wrote a number of "popular science" articles on natural history, physical geography, astronomy, and paleontology.

As early as 1849, Asa Gray used the common name "false mermaid" for our plant. This name is based on the plant's specific epithet, **proserpinacoides**, which means "like **Proserpinaca**." **Proserpinaca**—like Ceres' daughter, Proserpine, their namesake—lives in two worlds: the lower part of the plant usually remains submersed, but the upper part is typically emersed. The name "mermaid weed" alludes to this growth form. Willdenow mistakenly thought our plant was one of aquatic habitats: he wrote that it "grows in lakes and ponds"—exactly the habitat, of course, **Proserpinaca**. This misinformation about **Floerkea** apparently came from the person who sent dried specimens to Berlin for Willdenow to study. Not only did Willdenow have reason to believe that **Floerkea** and **Proserpinaca** might grow together, but he also noted a general resemblance of **Floerkea** leaves to the submersed leaves of **Proserpinaca** (Fig. 2). Logically enough—to him—he called attention to this resemblance by means of the word "proserpinacoides." And thus, eventually, our plant came to be known as false mermaid, a name based on an error. Look for it this spring—we need more knowledge about its distribution. The woodlands where it grows are the places to see best-known and showiest vernal wildflowers. If there you find **Floerkea**—relatively little known and anything but showy—consider the discovery to be a bonus.

John Theiret is a professor at Northern Kentucky University and author of several definitive books on ferns.

This article is a reprint from Flora of North America Newsletter 3 (5 & 6):37.

NATURAL DYES FROM PLANTS BY Stephen L. Williams & Jane Rosenthal

We are now in the "Synthetic Age" where synthetics dye synthetic fibers bright primaries, pastels, or even fluorescent colors. Before the Industrial Revolution, the mid-19th century, fibers and dyes were made from natural materials and colors were more subtle. Animal fibers such as wool, hair, and silk made of protein, and plant materials such as cotton (**Gossypium**), flax (**Linum**), Indian hemp (**Apocynum**), milkweed (**Asclepias**), yucca, agave, and various grasses made of cellulose were colored with natural dyes. The dye sources can be either animal, vegetable, or mineral. Except for the common use of hematite or limonite (red and yellow ochre) minerals, or the classical use of shellfish ("royal purple") and red cochineal (a scale insect), most natural dyes come from plants.

Plant materials were a readily available source of several colors: yellow, green, beige, and rosy red. Since many plant pigments are water soluble, they can be easily extracted to form a dye by soaking and boiling the plant in water. A typical recipe uses four ounces of plant material to dye one or two ounces of fiber or basketry material.

Protein fibers like wool bond to the dye molecule more readily than cellulose fibers, so they often produce brighter, stronger colors. To increase the dye molecule's affinity with the fiber and to increase the dye intensity, an intermediate inorganic chemical called a mordant is added to the dyepot during dyeing. Today these mordants include salts of aluminum, chrome, tin, iron, and copper. These mordants, besides increasing the intensity of color, may also add a character of their own. Alum has a slight yellowing effect, chrome and tin brighten colors, iron saddens colors by giving a gray or brown hue, and copper has a greening effect.

Among the mordants used today, probably only alum (aluminum sulfate) and possibly iron (as an oxide) were used by native Americans prior to European contact. Native Americans also used various organic mordants including stale urine and tannin obtained from oak bark (**Quercus**) and sumac (**Rhus**) leaves and stems. Some plant dyes take on a different hue in acidic or basic solutions. Native sunflower seeds (**Helianthus**) and purple corn kernels (**Zea mays**) used by the Hopi Indians to dye basketry materials, give a purple dye if vinegar is added to the dyebath but a blue dye if ammonia is used.

Almost any plant (lichen, moss, tree, shrub, or herb) or plant part (root, stem, leaf, flower, or fruit) will yield a dye of some color. Often the dye color is predictable: yellow rabbitbrush (**Chrysothamnus**) or yellow goldenrod (**Solidago**) will give a dye with yellowish hues depending on the mordant. Other times the color of the dye is unexpected and disappointing: purple lupine (**Lupinus**) flowers do not give a blue or purple dye but rather a yellow green. In general, yellow flowers will yield a yellow dye, but few flowers will give a red or blue dye. Therefore, red and blue plant

dyes were highly valued throughout the world. Two of the most valuable blue dyes were indigo (*Indigofera*) in both the Old and New World, and woad (*Isatis tinctoria*) in the Old World. Woad has become a weed in the New World, and is particularly common in northern California. It was found on Peavine, but was eradicated. It is spreading in eastern Nevada. Indigo is still used to dye blue jeans. The most valuable plant source of red dye in the Old World was madder root (*Rubia tinctoria*). This Mediterranean weed has been found in Nevada at Panaca Hot Springs in Lincoln County, and also in Clark County. In England madder was used to dye the British army uniforms (redcoats). The roots of other members of the madder family (*Rubiaceae* including species of *Galium*) also make red or pinkish dyes.

Nevada Indians historically made colorful baskets from various plant materials. Northern Nevada Indians used local plant materials with strong natural colors. For example, the Washoe used black from bracken fern (*Pteridium aquilinum*), red from redbud (*Cercis occidentalis*), and occasionally brown or brownish red from mountain birch (*Betula*) in giving color to their willow baskets.

In Northern California, basketry fibers were dyed also. The most important plant dyes were red from alder bark (*Alnus*) used to dye roots of the giant fern (*Woodwardia*), or grasses. Yellow dye made from lichen, Oregon grape root bark (*Mahonia*), or the introduced Eurasian mullein (*Verbascum thapsus*) was used to dye porcupine quills. An infusion of shells of acorns (*Quercus*) was used to dye grasses black.

Numerous animal dyes are used today by Navajo weavers in Arizona and New Mexico for their popular Wide Ruins style wool rugs and for saddle blankets. The soft natural dyes have also contributed to the current Santa Fe look in interior design. Beige, pink, and yellow pastels are in vogue and all can be obtained using natural dyes. These naturally obtained colors blend easily one with another and add a visual subtlety that is difficult to obtain with synthetic dyes.

This article is a reprint from the April, 1990 issue of NNNPS Newsletter.

The Native Plant Society of N.E. Ohio has made a donation towards the purchase of a *Franklinia altamaha* tree which will be the centerpiece of the new native plant garden at the Chagrin Falls Library. It will be planted at a ceremony on Earth Sunday, April 22nd in Chagrin Falls.

Kimberly Krahl of The University of Georgia needs help on research for her Ph.D. She is studying the genus *Baptisia*. If anyone, particularly in our southern chapters, wants to help her the address is: Horticulture Dept., 1111 Plant Science Bldg., Athens, Georgia 30602.

MAKE FIBERS BLOOM WITH NATURAL DYES by Katy Kram McKinney

As a botanist-turned-weaver, I am beginning to collect and store odd things in my closet. Walnut hulls are suddenly valuable sources of brown dye, and sumac twigs are a source of fixative. Before taking up weaving, I would never have guessed, for instance, that wool dyed with *Atriplex canescens* (four-wing saltbush) comes out a bright yellow. Spinners, weavers, knitters and crocheters have all enjoyed this aspect of native plants for years.

Natural dyes are found in all kinds of plant parts—roots, bark, twigs, leaves, flowers, and seed. The art of plants and plant parts to use, how much to use, when to harvest and where to find the plants. It is also important to use restraint in collecting plants for natural dyes.

Native Americans developed a wide knowledge of North American native plant dyes, but European settlers in North America tended to rely on familiar imported materials rather than experiment with native plants. After synthetic dyes became commercially available in the late 1800s, native plant dyes were nearly forgotten, but they have become popular again among craftspeople.

Plant material can be used fresh, frozen or dried, depending on the species. *Betula lutea* (birch) leaves can be used fresh or dry, for example.

Often, timing is important in collecting plant material. *Coreopsis* spp. flowers should be collected at the time of peak bloom or "just before the petals fade," writes Rita Buchanan in *A Weaver's Garden* (Interweave Press, 1987). The bark of many trees is a source of brown dye and should be collected in fall or winter.

Often, fibers are first treated with a mordant, a chemical that makes pigment adhere to fiber. Varying the mordant gives a range of color.

How successfully a dye "takes" depends on the fiber used. Wool is widely available and the easiest fiber to work with.

Here's a sample dye recipe: Half a peck of *Rhus glabra* (sumac) berries will dye one lb. of wool dark yellow. Simmer fiber and berries together 1-2 hours. Let cool overnight.



Use these species to dye wool fiber these colors:	
<i>Quercus rubra</i> (red oak), bark	Tan
<i>Populus tremuloides</i> (aspen), twigs	Yellow, brown
<i>Sambucus</i> spp. (elder), berries	Plum, lavender

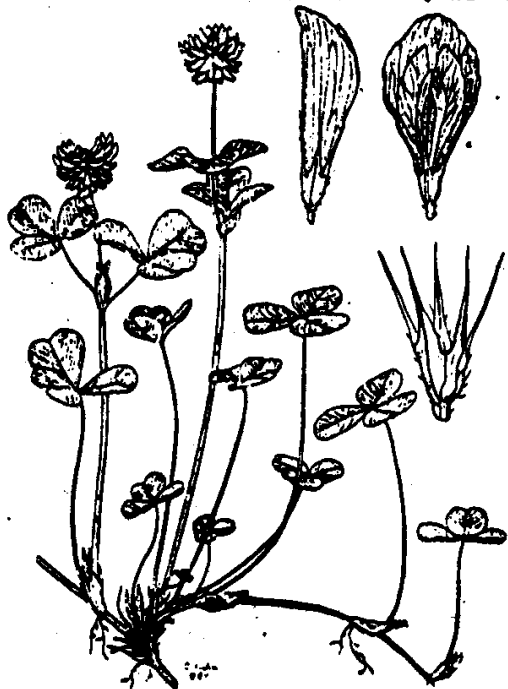


RUNNING BUFFALO CLOVER: An Endangered Species by Ralph E. Brooks

Running buffalo clover (*Trifolium stoloniferum*) is one of three species of clover native to the eastern United States. The species was first described in 1818 and through the 1800s was collected or reported from scattered localities along the drainage basins of the Ohio and Missouri rivers. For unknown reasons the plant has disappeared through much of this region. During this century the species was collected three times up until 1941 and not seen again until 1983.

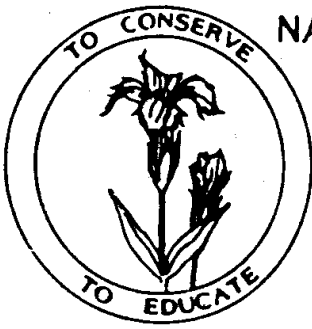
In 1983 the apparent rarity of running buffalo clover landed it on a list of plants being considered by the U.S. Fish & Wildlife Service for protection under the authority of the Endangered Species Act of 1973. In the years to follow, extensive field surveys were conducted throughout the range of the clover. These studies resulted in the discovery of 13 populations scattered in four states—Kentucky, Indiana, West Virginia and Ohio. For the most part, the populations discovered were small and not well protected. In 1987, running buffalo clover officially became listed under the Endangered Species Act as an endangered species.

So what does a person look for, and where does one look? To begin with running buffalo clover looks very similar to a large white clover (*Trifolium repens*) like we sometimes see in our lawns. The plants do not grow upright but instead have stolons, or above-ground runners, that creep along the ground. Along these are borne the typical three-parted cloverleaf and occasionally a flower stalk. The flower stalks bear a single group of creamy white flowers at the top. Most important is that the stalk in its upper half always has a pair of leaves. The flowering stalk on white clover never has this pair of leaves. Another plant sometimes confused with running buffalo clover is buffalo clover (*Trifolium reflexum*). Buffalo clover is strictly an upright plant that produces no runners. In addition, its flowers are borne in several heads along the upright stems and each flower head has a leaf directly below it.



Running buffalo clover is best looked for in the spring between late April and early June while it is flowering. It can be found later too, but it is harder to spot. Most of the populations discovered of late have been in areas where slight disturbance occurs with some regularity. One site was a weedy area surrounding an old cemetery. Another was on a low river terrace that was occasionally grazed, and yet another small group of plants was found along a jeep trail in a wooded river valley. The plants apparently can tolerate full sun or heavy shade and seem to prefer a rather loamy soil.

This article is a reprint from the Spring, 1990 issue of **Kansas Wildflower Society Newsletter**.



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