A FLORISTIC STUDY OF A SOUTHERN ILLINOIS SWAMPY AREA

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In the western part of Union County in southwestern Illinois is a unique area of swamps and woodlands of low ground. This paper is an endeavor to discuss floristic relationships of the species of vascular plants which occur in this area.

These swamps of Union County occur in the following sections of T 11 S, R 3 W: 9, 16, 17, 21, 28, and 33. A small portion of T 12 S, R 3 W, sections 3 and 4 is also included (fig. 1). Within this area, numerous habitat types are found. This study deals only with the floristics of the swamp-inhabiting plants. A high range of hills forms the eastern border of the swamp. At the western limits of these hills, massive limestone bluffs which once bordered the Mississippi River are exposed. These often nearly vertical bluffs are in places almost 350 feet high. They are dissected by numerous east-west ravines which are covered with dense vegetation. Hill prairies are located along the western-facing edges of many of these bluffs. These treeless areas are minute replicas of prairies to the west.

The swamp vegetation is found in an area from one-eighth of a mile to nearly a mile wide and for a length of about six miles. The southern end of the area is occupied by a finger-shaped lake known as Wolf Lake. The lake extends for nearly two miles, becoming shallower at its northern end where it gives rise to a deep swamp. For convenience of study, the area has been divided into three regions: Wolf Lake, Wolf Lake Swamp, and LaRue Swamp.

DESCRIPTION OF THE THREE AREAS

Wolf Lake

Wolf Lake (fig. 2) is a finger-shaped body of water located northeast of the village of Wolf Lake, Union County, Illinois. It extends for nearly two mi and is 350 ft across at its widest point with a maximum depth of about 20 ft. It becomes progressively more shallow and narrow at its northern extremity and gives way to a swamp called Wolf Lake Swamp. Wolf Lake is an old channel of the Big Muddy River.

Dense patches of vegetation surround Wolf Lake, particularly where it gives rise to Wolf Lake Swamp. No trees grow in the lake proper, but several encroach upon the borders. The red maple (*Acer rubrum*) and swamp cottonwood (*Populus heterophylla*) are predominant along the shore, while red ash (*Fraxinus pennsyl-*

vanica), honey locust (*Gleditsia triacanthos*), and silver maple (*Acer saccharinum*) occur occasionally. Buttonbush (*Cephalanthus occidentalis* and its variety *pubescens*) often forms thickets along the shore, frequently occurring in shallow water. It is exceedingly abundant in the transition zone between Wolf Lake and Wolf Lake Swamp.

Along the shore of Wolf Lake are numerous rooted herbs. The swamp mallow (*Hibiscus lasiocarpus*) is common, particularly at the southern end of the lake. Species of beggar's-ticks (*Bidens* spp.) are abundant. Occasional plants of water dock (*Rumex verticillatus*), aster (*Aster simplex* and *A. vimineus*), and cardinal-flower (*Lobelia cardinalis*) may be encountered. Several sedges occur in clumps along the shore—*Carex frankii*, *C. squarrosa*, *C. typhina*, *C. vulpinoidea*, *Cyperus erythrorhizos*, and *Cyperus ferruginescens*. The species of shore grasses are fewer in number, but where grasses occur, they form dense stands. These shore grasses include species of barnyard-grass (*Echinochloa* spp.), species of cutgrass (*Leersia* spp.), Munro grass (*Panicum agrostoides*), and creeping bent-grass (*Agrostis palustris*). Scattered carpets of pony grass (*Eragrostis hypnoides*) are known.

A short distance from the shore, but growing in the shallow water of Wolf Lake, are several coarse but attractive herbs. These include pickerel-weed (*Pontederia cordata*) (fig. 5), arrowleaf (*Sagittaria latifolia*), American lotus (*Nelumbo lutea*), watershield (*Brasenia schreberi*), American water-lily (*Nuphar advena*) (fig. 7), fragrant water-lily (*Nymphaea odorata*), sweet flag (*Acorus calamus*), and arrow-arum (*Peltandra virginica*). Mild water-pepper (*Polygonum hydropiperoides*) is very common. In deeper waters where fewer species are found, pond-weed (*Potamogeton diversifolius*), coontail (*Ceratophyllum demersum*), cabomba (*Cabomba caroliniana*), and naiad (*Naias flexilis*) are most frequent. A few free-floaters, many of them exceedingly rare in Illinois, exist in more or less stagnant waters near the shore. Numbered among these are watermeals (*Wolffia columbiana* and *Wolffiella floridana*), duckweeds (*Lemna minor* and *Lemna perpusilla*), *Spirodela polyrhiza*, and sponge-plant (*Limnobium spongia*) (fig. 3).

There are a few disturbed areas along the shore, caused primarily by fishermen who frequent their favorite fishing spots. In these disturbed areas, the small-flowered morning-glory (*Ipomoea lacunosa*) often completely over-runs the other species. Occasional plants of heliotrope (*Heliotropium indicum*) may be found.

Wolf Lake Swamp

Where Wolf Lake becomes narrower and shallower at its northern limit, Wolf Lake Swamp originates. The northern border of this swamp arbitrarily is set at the road which extends from Illinois Route 3 eastward to the base of the massive limestone bluffs known as the Pine Hills. These bluffs form the eastern limit of the swamp. To the west, a gradual rise in elevation is responsible for the dissipation of the swamp into a low woodland area.

A large portion of Wolf Lake Swamp is inundated throughout the year. Along its periphery, the area is covered by water for only a part of each year.

In the constantly inundated area, the standing water varies from one in. or so at time of lowest water to about five ft in depth. Different groupings of plants are recognized with relation to the depth of water in the swamps. In areas which may become covered by five ft of water, buttonbush is most abundant. Trees are numerous, but only a small percentage of them are living. Among the trees present are black willow (*Salix nigra*), swamp cottonwood, and red maple. Occasional plants of pondweed and naiad are found. Growing as an epiphyte on the bases of some of these trees is the water horehound (*Lycopus rubellus*).

In water that sometimes is two ft deep, large monocotyledonous perennials such as sweet flag, arrow-leaf, arrow-arum, and bur-reed (*Sparganium eurycarpum* and *S. androcladum*) are common (fig. 9). Trees are more abundant where the water is shallower. Pumpkin ash (*Fraxinus tomentosa*), red maple, swamp cotton-

wood, water locust (*Gleditsia aquatica*), and honey locust are rather common. Coarse sedges abound in this shallow water area. Numbered among these are *Carex lupuliformis*, *Carex lurida*, *C. hystricina*, *C. lupulina*, and *C. stipata*. Free-floaters present are sponge-plant, watermeal, species of duckweed (*Lemna trisulca* and *L. minor*), and mosquito fern (*Azolla mexicana*).

A distinct woodland community of low ground, in which the area is inundated for only a portion of each year, exists in the outer regions of the swamp. Tree composition is somewhat different from the swamp proper. Swamp cottonwood, red maple, and honey locust still occur, but in smaller numbers. With these are silver maple, pin oak (*Quercus palustris*), box elder (*Acer negundo*), and sweet gum (*Liquidambar styraciflua*) in appreciable numbers while occasional plants of slippery elm (*Ulmus rubra*), swamp chestnut oak (*Quercus prinus*), and white oak (*Quercus alba*) occur. Only gray dogwood (*Cornus obliqua*) and Virginia willow (*Itea virginica*) are found in the shrub layer. The understory is sparsely populated, but a large variety of species occurs. Most abundant are pink St. John's-wort (*Triadenum walteri*), hydrolea (*Hydrolea affinis*), water parsnip (*Sium suave*), monkey-flower (*Mimulus alatus*), and bedstraw (*Galium obtusum*). Gerardia

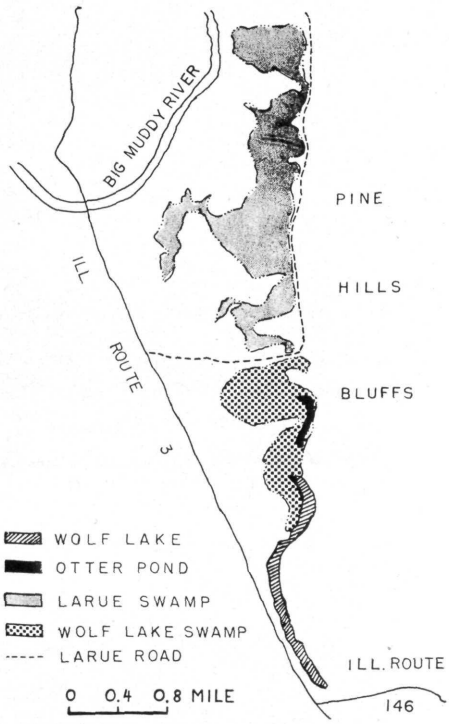


FIGURE 1. Map of the study area in southwestern Illinois.

(*Gerardia tenuifolia*), butterweed (*Senecio glabellus*), swamp milkweed (*Asclepias perennis*), and enchanter's nightshade (*Circaea latifolia*) are less common. Rare species are skullcap (*Scutellaria nervosa*) and bishop's-weed (*Ptilimnium costatum*). All except butterweed flower during the summer and fall.

Near the base of a limestone bluff in T 11 S, R 3 W, section 18 is an area of deeper water. This is called Otter Pond. The borders are thickly populated with buttonbush and Virginia willow.

LaRue Swamp

North of the road extending from Illinois Route 3 to the Pine Hills is the southern end of the LaRue Swamp (fig. 4, 6, 8). This swamp, also bounded to the east by limestone bluffs, is much more extensive than the Wolf Lake Swamp. It covers an area nearly two-and-three-fourths mi long and from one-eighth to one mi broad. It is fed by refreshing limpid springs which are at the base of the limestone bluffs. Colonies of beavers live in LaRue Swamp. The presence of their dams across the swamp results in the constant back-up of the water. In more quiet areas where the water seldom is in motion, stagnation frequently occurs. The animals of this swamp (termed the Pine Hills Swamp), particularly the fishes, have been discussed by Gunning and Lewis (1955).

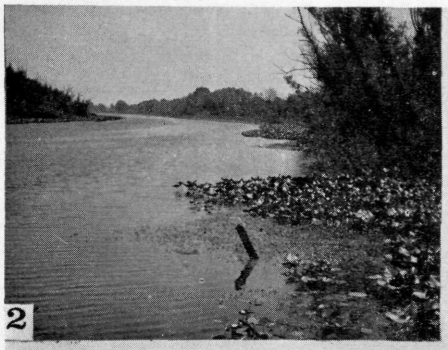
As it emerges from the springs the water has a temperature the year around between 56° and 58° F (Gunning and Lewis, 1955). In the rapidly flowing water at the springhead, only water-cress (*Nasturtium officinale*) thrives. In adjacent areas where there is moderate water movement resulting from the rapid currents of the spring's main channel, additional species occur. These, for the most part, are species which also inhabit the borders of streams in southern Illinois. Included here are ditch stone-crop (*Penthorum sedoides*), water plantain (*Alisma plantago-aquatica* var. *parviflorum*), pink swamp milkweed (*Asclepias incarnata*), and mild water pepper, along with manna grass (*Glyceria septentrionalis*) and sedge (*Carex vulpinoidea*). In a zone from three to 15 ft wide on either side of the spring's main channel is a unique community of plants. The area inhabited by these plants is inundated by one to six in. of water for most of each year. Unusually occurring species, many of which are found in no other place in the swamp, are in this zone. Among the rarer ones are bulrush (*Scirpus validus*), two grasses (*Glyceria pallida* and *G. arkansana*), and American featherfoil (*Hottonia inflata*). Cat-tail (*Typha latifolia*) is common at this site.

The water from the spring flows into the area occupied by the beavers where it accumulates to a depth of nearly five ft. LaRue Swamp is constantly inundated in its more central areas, although toward the periphery, the water is shallower and the area is inundated only nine to ten months of the year. Beyond this, low swampy woods prevail and these, in turn, give rise on somewhat higher elevated areas to deep mesophytic woodlands. It is these rich woods that are the most prolific areas in southern Illinois for spring wild flowers. Scores of violets (*Viola* spp.), dutchman's-breeches (*Dicentra cucullaria*), bloodroots (*Sanguinaria canadensis*), wake robins (*Trillium recurvatum*), larkspurs (*Delphinium tricorne*), and numerous others abound. Since this community is not properly a swamp community, no further discussion of it will be pursued in this paper.

EXPLANATION OF FIGURES IN PLATE

2. Looking south along Wolf Lake. The large colonies of plants along the right shore of the lake include pickerel-weed (*Pontederia cordata*).
3. Sponge-plant (*Limnobium spongia*) and species of duckweed (*Lemna* spp.).
4. April in LaRue Swamp.
5. Pickerel-weed (*Pontederia cordata*) in Wolf Lake.
6. June in LaRue Swamp. Numerous sprouts of red ash (*Fraxinus pennsylvanica*) growing from old stumps.
7. *Nuphar advena* in a more shallow area of the swamp.
8. Late August in LaRue Swamp. Water surface is covered by many tiny free floating plants.
9. Bur-head (*Sparganium eurycarpum*) growing in LaRue Swamp. Water surface is densely covered with mosquito fern (*Azolla mexicana*). Damaged tree has resulted from the work of beavers.

(Figures 2, 3, 4, 5, 8, 9 by John W. Voigt, Southern Illinois University, Carbondale. Figures 6, 7 by Karl U. Kramer, University of Utrecht, Netherlands)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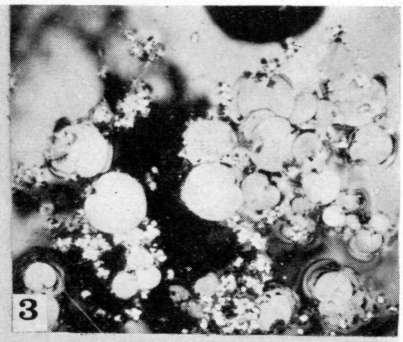
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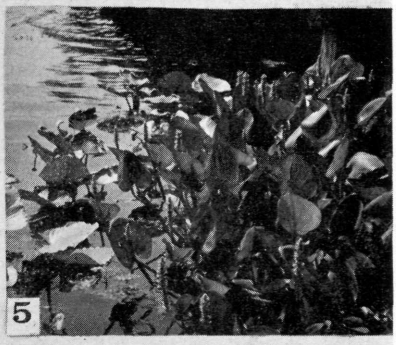
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The constantly inundated regions of LaRue Swamp are similar to those of Wolf Lake Swamp except that more species exist in LaRue Swamp. Trees are common, with pumpkin ash clearly comprising 60 percent of those present. In moderate numbers are red ash, red maple, swamp cottonwood, southern hackberry (*Celtis laevigata*), and water locust. In the most remote parts of the swamp are a few scattered trees of bald cypress (*Taxodium distichum*) and Drummond's red maple (*Acer drummondii*).

Shrubs are plentiful in the standing water. Buttonbush again is encountered most frequently, but thickets of water willow (*Decodon verticillatus*) and swamp rose (*Rosa palustris*) become established locally.

Herbaceous members of the standing water community are not frequent, but those that are present usually have vivid flowers. Yellow water-crowfoot (*Ranunculus flabellaris*), water primrose (*Jussiaea decurrens*), water mustard (*Neobeckia aquatica*), and American featherfoil are particularly attractive. In more shallow water are the coarse monocotyledons. Some of these are *Carex lupulina*, *Carex lupuliformis*, *Carex retrorsa*, *Carex comosa*, *Carex stipata*, and *Carex crus-corvi*. Growing as epiphytes on the bases of pumpkin ash and southern hackberry are clumps of the cypress-knee sedge (*Carex decomposita*). A few small unusual herbs such as bladderworts (*Utricularia vulgaris* and *U. gibba*) and red iris (*Iris fulva*) occur. In the stagnated areas, free-floaters abound, among which are mosquito fern, duckweeds, watermeal, and sponge-plant.

The partly inundated periphery of LaRue Swamp contains species which also occur in other open moist habitats in southern Illinois. Spring flowering species include mousetail (*Myosurus minimus*) and Pennsylvania water cress (*Cardamine pennsylvanica*). Those which begin to flower in June are water dock, lizard's-tail, water parsnip, and bishop's-weed.

The swamp gives way to a woodland community on low ground which is essentially like the low woodland community bordering the Wolf Lake Swamp. Dominant trees are red maple, honey locust, and swamp cottonwood, with silver maple, sweet gum, and pin oak present in considerable numbers. Swamp holly (*Ilex decidua*) is the most frequently encountered shrub. The understory has the same composition as the Wolf Lake Swamp lowland woods except that the pink St. John's-wort and hydrolea are not as common in the former.

GEOGRAPHIC RELATIONSHIPS OF THE SWAMP SPECIES

In the swampy area treated in this study, eighteen species of trees, six species of shrubs, and three woody vines were encountered. Some of these grow almost exclusively in standing water; others seem to tolerate standing water for a small portion of each year; still those of the low woodland communities generally are not covered by water during any part of the year.

Woody Species of Constantly Inundated Areas

Acer drummondii
Acer rubrum
Celtis laevigata
Cephalanthus occidentalis
Decodon verticillatus
Fraxinus pennsylvanica
Fraxinus tomentosa
Gleditsia aquatica
Itea virginica
Populus heterophylla
Rosa palustris
Salix nigra
Taxodium distichum

Of the 24 swamp trees and shrubs which occur in the study area, 13 of them (roughly 54%) may grow in sites which are completely covered by water throughout the year. The most common of these are the broad-bottomed pumpkin ash, black willow, red maple, and swamp cottonwood. Drummond's red maple and bald cypress are known only from the most remote parts of the swamp. Button-

bush is common throughout the swamp, while water willow, Virginia willow, and swamp rose are local.

When the approximate geographical ranges are plotted for these 13 species, two basic patterns of distribution are evident. In one, the species are centered in the southeastern United States, extending westward usually to Louisiana or eastern Texas, then northward across southern Missouri, southern Illinois, and southwestern Indiana. Then the boundary of the species continues either slightly southward to Virginia and thence along the coast to Florida, or northward through Ohio and into New York and in some cases Connecticut. The southern Illinois stations mark one of the range limits of these species. Such a species may be called extraneous in southern Illinois (following a system of classification developed by Cain, 1930). The other basic pattern is one which includes species whose range is broader and extends usually from northeastern Canada to Manitoba, southward through Minnesota or North Dakota to Kansas or Texas, and finally south-eastward to Florida. For these species, Illinois is more nearly in the center of the range. Such species may be called intraneous in southern Illinois.

Seven of the woody species of the constantly inundated areas fall into the extraneous group. These are Drummond's red maple, southern hackberry, pumpkin ash, water locust, Virginia willow, swamp cottonwood, and bald cypress. On close observation, these are mostly the species which dominate the swamps of the southeastern United States. In southern Illinois, these species are limited usually in their occurrence to our swampy regions. Only the southern hackberry is ever found in considerable numbers in areas which are not continuously inundated.

The intraneous woody species of constantly inundated areas are six in number. They are the red maple, black willow, red ash, swamp rose, water willow, and buttonbush. These range from eastern Canada to Minnesota or North Dakota to Florida and Texas. In southern Illinois, they are more common than the preceding extraneous species. They may be found along streams and in damp woods. Water willow is the only one in the area covered by this study which is confined exclusively to standing water.

Woody Species of Areas Inundated only a Part of Each Year

Acer rubrum
Celtis laevigata
Cephalanthus occidentalis
Fraxinus pennsylvanica
Gleditsia triacanthos
Itea virginica
Populus heterophylla
Rosa palustris
Salix nigra

The nine species which fall into this category comprise 35 and one-half percent of the woody species of the swamp. The majority of them are species which are intraneous and sometimes occur in completely inundated areas. Virginia willow, swamp cottonwood, and southern hackberry are extraneous. The honey locust is the only species in this group which may not also occur in standing water throughout the year. It is intraneous, as one may infer from the variety of habitats in which it is found in southern Illinois.

Woody Species of Low Woodlands Which May Never Grow in Water

Acer negundo
Acer rubrum
Acer saccharinum
Betula nigra
Celtis laevigata
Cephalanthus occidentalis
Cornus obliqua
Fraxinus pennsylvanica
Gleditsia triacanthos
Ilex decidua
Itea virginica
Liquidambar styraciflua
Quercus alba
Quercus palustris
Quercus prinus
Ulmus rubra

Sixty-six per cent of the woody species encountered in this study (16 out of 24) may grow in areas which are never covered by standing water. Of these, six may occur also in standing water. Virginia willow and southern hackberry are the only ones of these which are extraneous. Elsewhere in southern Illinois the intraneous species may be found in woods bordering streams or in somewhat xeric areas.

Herbaceous Species Which May Be Free Floaters

Azolla mexicana
Cabomba caroliniana
Lemna minor
Lemna perpusilla
Lemna trisulca
Lemna valdiviana
Limnobium spongia
Naias flexilis
Potamogeton diversifolius
Spirodela polyrhiza
Wolffia columbiana
Wolffia papulifera
Wolffiella floridana

Of the 52 herbaceous species recorded from constantly inundated areas of the swamp, 13 of them (25%) may occur as free floaters. Three of these may also root on occasion—cabomba, pondweed, and naiad. These are found in water which is little if at all stagnated. The other ten species are more common in stagnant waters.

Most of the free floaters are rare in Illinois. *Wolffiella floridana*, *Wolffia papulifera*, *Lemna valdiviana*, *Limnobium spongia*, and *Cabomba caroliniana* are known in Illinois only from one other station in addition to the one in this study area.

In analyzing the distribution of the free floaters, two basic patterns may again be recognized.

Species whose distribution falls under pattern one are the most wide-spread species encountered in the swamp. Their general range is from Newfoundland or Labrador to British Columbia and California and southward usually to Florida and Texas and often into Mexico and tropical America. These are the intraneous species. Those species exhibiting such a wide range include pondweed, naiad, species of duckweed (*Lemna minor*, *L. trisulca*, and *L. valdiviana*), and spirodela. Two variations from this pattern are found. One, exemplified by *Lemna perpusilla*, *Wolffia columbiana*, and cabomba, extends westward only to the plains states, rather than to the Pacific. The range of cabomba is the most narrow, extending from Massachusetts westward to eastern Missouri. The second variation is typified by only one species, the mosquito fern. It is essentially the reverse of the first variation; i.e., it occurs throughout the West, but extends eastward only to Wisconsin. It may be called intraneous, with an affinity to the West.

Only three free floaters of the swamp are extraneous. These are sponge-plant, *Wolffia papulifera*, and *Wolffiella floridana*, predominantly southeastern plants with southern Illinois forming one of their range limits.

All but two of the free floaters are monocotyledons.

Rooted Herbaceous Species Which May Be Found in Constantly Inundated Areas

Acorus calamus
Alisma plantago-aquatica var. *parviflorum*
Alopecurus aequalis
Asclepias perennis
Bidens polylepis
Brasenia schreberi
Carex comosa
Carex crus-corvi
Carex frankii
Carex lupuliformis
Carex lupulina
Carex lurida
Carex retrorsa
Carex stipata

Ceratophyllum demersum
Echinodorus cordifolius
Galium tinctorium
Glyceria arkansana
Glyceria pallida
Hottonia inflata
Iris fulva
Jussiaea decurrens
Ludwigia palustris
Lycopus rubellus
Nasturtium officinale
Nelumbo lutea
Neobeckia aquatica
Nuphar advena
Nymphaea odorata
Peltandra virginica
Pontederia cordata
Proserpinaca palustris
Ranunculus flabellaris
Sagittaria latifolia
Scirpus validus
Sparganium androcladum
Sparganium eurycarpum
Utricularia gibba
Utricularia vulgaris

The 39 species in the preceding list, along with the sometimes rooted pondweed, naiad, and cabomba, make this community of plants the richest with respect to the number of species. Twenty-three of these are monocots, with many of them being coarse, robust plants.

In the deepest waters of Wolf Lake are pondweed, naiad, cabomba, and coontail. In water that has a depth of 3 ft may be found yellow water-crowfoot, American featherfoil, water mustard, both species of bladderwort, American water lily, American lotus, fragrant water lily, and watershield. None are common, although the American lotus and American water lily may occur in large patches. In water that is one to two ft deep is the coarse monocotyledonous community. Species of *Carex* abound; arrow-leaf, bur-head, sweet flag, and water plantain are frequent; pickerel-weed and swamp red iris are local; and *Echinodorus cordifolius* and arrow-arum are rare.

Areas covered by only a few inches of water throughout the year occur near the transitional zone, between the swamp and the low woodland communities. It is here that water horehound is most abundant. Other less frequent species are *Ludwigia palustris*, marsh bedstraw (*Galium tinctorium*), *Jussiaea decurrens*, bulrush, sedge (*Carex fankii*), water fox-tail grass (*Alopecurus aequalis*), and two species of manna grass (*Glyceria pallida* and *G. arkansana*).

The distributional patterns for these rooted herbs of constantly inundated areas are more complex than those for the woody swamp species or for the free floaters. A classification for the distributional patterns may be outlined as follows (the number of species in each category in parentheses):

Intraneous (35)
- Continental (14)
- Eastern U. S. (17)
- Southern U. S. (4)

Extraneous (7)
- Southeastern (5)
- Northern (2)

Eighty-three percent of these species are intraneous. Continental intraneous species are those whose range is approximately from eastern Canada westward to British Columbia and southward, usually at least to California, Texas, and Florida. Forty-six percent of the free floaters also fall into this group.

Eastern United States intraneous species have smaller ranges than the continental species. They occur from New England or southeastern Canada to Minnesota, south to Texas and Florida. This is the range exhibited by many of the climax species of southern Illinois.

An uncommon pattern is that designated southern United States intraneous, represented by sedges (*Carex cruscorvi* and *C. frankii*), beggar's tick (*Bidens polylepis*), and *Echinodorus cordifolius*. These species are more common south of Illinois, but do extend northward, often into Wisconsin. These seem allied to the more characteristic swamp species, and may represent species which are

better able to survive somewhat drier conditions and are therefore not limited to isolated swampy situations in southern Illinois.

There are only seven species of rooted herbs in constantly inundated areas which are at one of their range limits in southern Illinois. These extraneous species have either an affinity to the southeast or to the north. The southeastern extraneous species are the more truly swamp species; i.e., they are seldom found outside of swampy situations. Included here are swamp red iris, swamp milkweed, American featherfoil, *Jussiaea decurrens*, and manna grass (*Glyceria arkansana*). The latter has an exceedingly limited range, being known only from areas adjacent to the Mississippi River from southern Illinois (where it has one station) to Louisiana.

The northern extraneous species, *Carex retrorsa* and *Alopecurus aequalis*, make up only a small fraction of the natural vegetation of southern Illinois.

Herbs in Partly Inundated Areas, No Canopy

Agrostis palustris
Asclepias perennis
Aster simplex
Aster vimineus
Cardamine pennsylvanica
Carex vulpinoidea
Commelina diffusa
Cyperus erythrorhizos
Cyperus ferruginescens
Cyperus inflexus
Epilobium coloratum
Eragrostis hypnoides
Eupatorium coelestinum
Glyceria striata
Heliotropium indicum
Hibiscus lasiocarpus
Ipomoea lacunosa
Leersia lenticularis
Leersia oryzoides
Lindernia dubia
Lobelia cardinalis
Lycopus americanus
Lycopus rubellus
Mentha spicata
Muhlenbergia frondosa
Muhlenbergia schreberi
Myosurus minimus
Panicum agrostoides
Paspalum fluitans
Paspalum geminum
Pluchea camphorata
Polygonum hydropiper
Polygonum hydropiperoides
Polygonum sogittatum
Ptilimnium costatum
Rumex verticillatus
Saururus cernuus
Scutellaria lateriflora
Sium suave

These 39 species are found in the transition zone between the constantly inundated areas of the swamp and the low woodlands. This area is inundated for a portion of each year. Trees are usually absent in this zone, and the abundance of grasses gives this zone the appearance of a meadow. Over 25 percent of the species in this community are grasses or sedges. Munro grass is common, as is *Carex vulpinoidea*. Lizard's-tail occurs in scattered patches. Plants of water pepper and mild water pepper are found scattered. Some of these species also make their way into the low woodlands. A few are encountered in very shallow water throughout the year.

Eighty-three percent of these species are intraneous. Seventeen species are continental intraneous; eleven are northeastern intraneous; and two are southern intraneous. These last two, mist flower and small white-flowered morning-glory, range from New Jersey through central Illinois to eastern Kansas and south to Florida and Texas.

Six species may be called extraneous. These have affinities to the south and southeast. They include bishop's-weed, marsh fleabane, hibiscus, swamp milkweed, and two species of bead-grass (*Paspalum geminum* and *P. fluitans*).

Herbs of the Low Woodland Community

Apios americana
Asclepias perennis
Aster simplex
Aster vimineus
Bidens comosa
Bidens connata
Bidens discoidea
Bidens vulgata
Cardamine pennsylvanica
Circaea latifolia
Galium obtusum
Gerardia tenuifolia
Glyceria septentrionalis
Hydrolea affinis
Hypericum perforatum
Lycopus americanus
Lycopus rubellus
Lysimachia ciliata
Mimulus alatus
Ptilimnium costatum
Scutellaria lateriflora
Scutellaria nervosa
Senecio glabellus
Sium suave
Stachys tenuifolia
Triadenum walteri

The herbaceous members of the low woodland community form a diverse assemblage of species. Some are small and usually rather inconspicuous—*Triadenum walteri*, *Hydrolea affinis*, *Circaea latifolia*, *Scutellaria nervosa*, and *Cardamine pennsylvanica*; others are coarse and vigorous—*Sium suave*, *Asclepias perennis*, and *Ptilimnium costatum*. Large areas of bare ground occur beneath the trees in this community. The herbs that do occur are usually found singly. Occasional patches of manna grass (*Glyceria septentrionalis*) may be found.

Most of these species flower during late summer and fall. Usually only butterweed and enchanter's nighshade can be found in bloom before May 15.

The affinities of these species in general follow those of the other herbaceous communities. Seventy-seven percent of the low woodland herbaceous species are intraneous, half of them being continental intraneous and half northeastern intraneous. Six species (23%) are extraneous with affinities predominantly to the southeastern United States. These are butterweed, pink St. John's-wort (*Triadenum walteri*), bishop's-weed, swamp milkweed, hydrolea, and skullcap (*Scutellaria nervosa*). These extraneous species are confined in Illinois to the swamps of the southern counties; only butterweed is more tolerant in its habitat requirements.

One hundred thirty-three species of ferns and flowering plants have been collected from the study area and deposited in the herbarium of Southern Illinois University. These are distributed among 51 families. Eighty-one species are dicotyledons, 50 are monocotyledons, one is a gymnosperm, and one is a pteridophyte. Cyperaceae is represented by 16 species, Gramineae by 14, Compositae by 11, Lemnaceae by seven, and Labiatae by six species.

Nearly 78 percent of the species recorded from the study area are intraneous (table 1). Of the remaining extraneous species, 93 percent have affinities to the south or southeast.

Species of Other Southern Illinois Swamps

Several swamps are known in southern Illinois, although few have been studied extensively. Many are found in the Cache River bottoms of Johnson and Pulaski Counties. These swamps have a species composition similar to the ones treated in this study although a few species are found in them that have not been recorded from the Wolf Lake area. Conspicuous among these are the water or tupelo gum (*Nyssa aquatica*), water hickory (*Carya aquatica*), willow oak (*Quercus phellos*), storax (*Styrax americana*), planer elm (*Planera aquatica*), and southern buckthorn (*Bumelia lycioides*). Among the herbs may be mentioned *Dulichium arundinaceum*, *Carex louisianica*, *Carex oxylepis*, and *Triadenum tubulosum*.

TABLE 1

Geographical affinities of the species recorded from the swamps

Growth Form and Habitat Type	Number of Species	Geographical Affinities: Intraneous					Extraneous		
		Continental	Northeastern	Western	Southern	Total	Southeastern	Northern	Total
Woody; Area Constantly Inundated	13	0	6	0	0	6	7	0	7
Woody; Area Partially Inundated	9	0	6	0	0	6	3	0	3
Woody; Low Woodland Plants	16	0	11	0	0	11	5	0	5
Herbaceous; Free Floaters	13	6	3	1	0	10	3	0	3
Herbaceous; Area Constantly Inundated	42	14	17	0	4	35	5	2	7
Herbaceous; Area Partially Inundated	39	17	14	0	2	33	6	0	6
Herbaceous; Low Woodland Plants	25	11	8	0	0	19	6	0	6
Totals (adjusted so that no species is counted more than once)	133	41	56	1	6	104	27	2	29

SUMMARY

In the northwestern section of Union County, Illinois is a swampy area which is rich in flora and fauna. This area may be divided into three regions: Wolf Lake, Wolf Lake Swamp, and LaRue Swamp. The vegetation may be grouped according to growth form and to the amount of water in which the plants grow. One hundred thirty-three species of ferns and flowering plants have been recorded from the study area. Concerning the woody species, those which grow in constantly inundated areas are for the most part at one of their range limits in southern Illinois. Such species are called extraneous. As the area becomes less swampy, the composition of the woody species becomes increasingly intraneous; i.e., southern Illinois is not one of the geographical boundaries for the species. These species are not confined to swamps in southern Illinois. Herbs are classified into free floaters and rooted floaters. Nearly 78 percent of the total species recorded from the swamp are intraneous. Of the remaining extraneous species, 93 percent have affinities to the south or southeast. Thus, the floristic make-up of the Union County swamp area has a distinct southeastern United States character.

REFERENCES

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