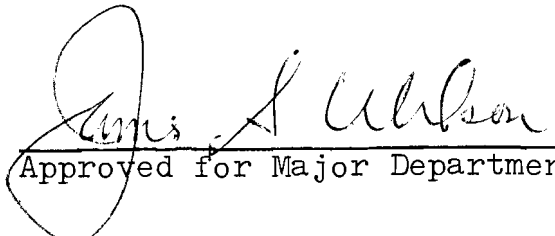



FLORA OF MCKINNEY MARSH

A Thesis
Submitted to
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of the Requirements for the Degree
Master of Science

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Approved for Major Department


Approved for Graduate Council

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INTRODUCTION

Two plant studies which included this area were a county flora by Weatherholt (1967) and a survey of the plants of the marsh by Garner (1962). The purpose of this study was to determine the ecological zones that occur at the marsh and to provide a checklist and keys to the aquatic plants.

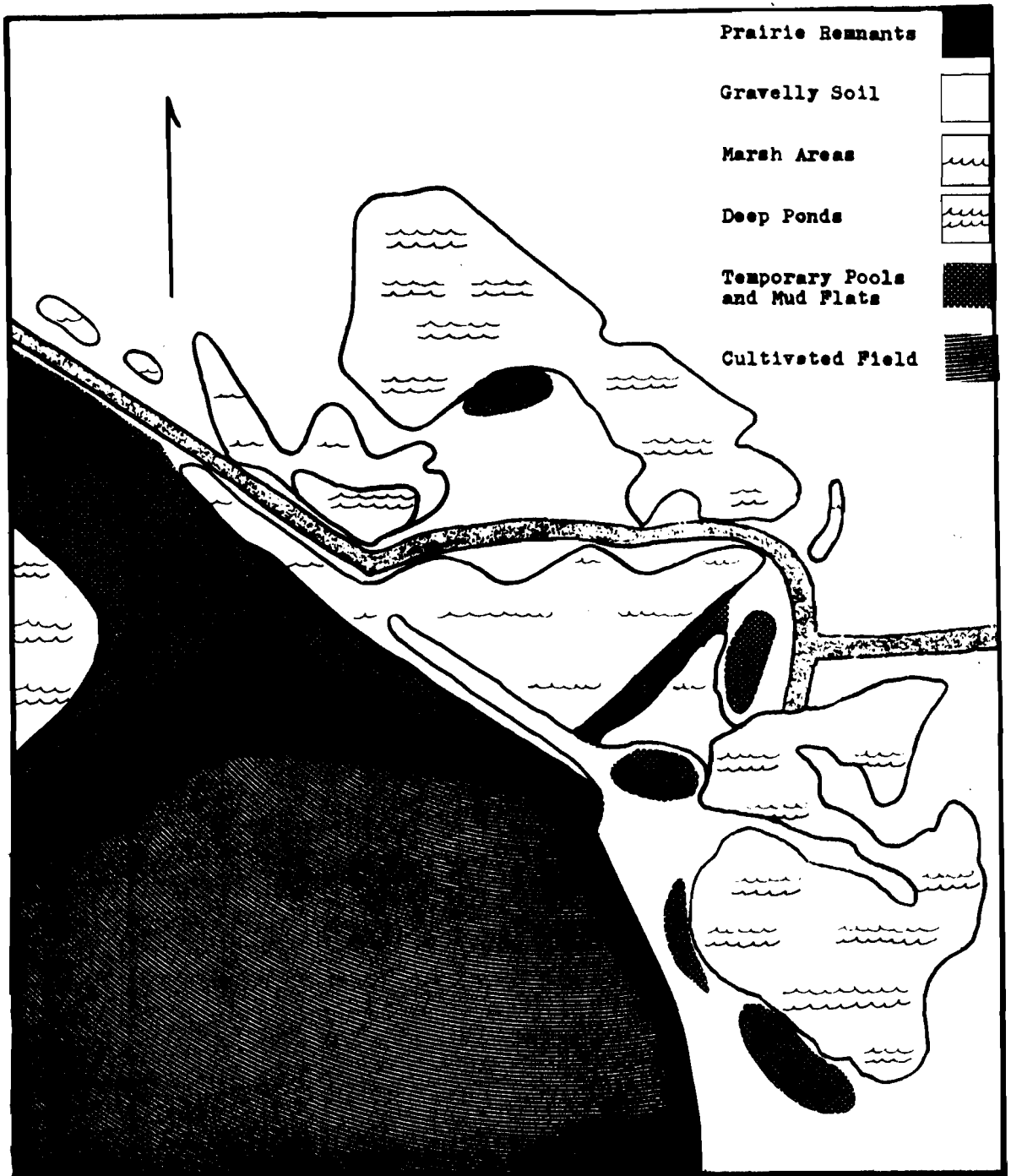
PHYSIOGRAPHIC DESCRIPTION

McKinney Marsh, which lies within the broad floodplain of the Grand (Neosho) River, is dominated by gravel terraces deposited in Tertiary times. Sedimentation of decaying plants and alluvial deposits resulted in the formation of the marshy areas as we know them today. These differences in soil types provides a sharp contrast between the flora of the gravelly and the rich loamy soils.

VEGETATION

The vegetation of the area has been divided into six ecological zones (Figure I) which are generally distinct. These areas were statistically analyzed and compared by an F-test.

Figure I. Ecological zones of McKinney Marsh



Prairie Areas

The prairie remnants are characterized by the presence of typical tall grasses and forbs of the region. These grassy areas, which are located on drier sites where soils are rich and loamy, are usually treeless because of periodic haying.

The seasonal aspect of this area is such that an observer visiting this area at different times of the year will find a unique assemblage of plants adapted specifically to a particular season. The spring flora is influenced by an abundance of soil moisture and plants which are adapted to early flowering. The dominant plants at this time are mainly forbs; some of the common ones include: Yarrow (*Achillea millefolium*), Prairie Ragwort (*Senecio plattensis*), Wild Blue Indigo (*Baptisia australis*), White Wild Indigo (*Baptisia leucophaea*), Spring Beauty (*Claytonia virginica*), Blue-eyed Grass (*Sisyrinchium campestre*), Wild Garlic (*Allium canadense*), and False Garlic (*Nothoscordum bivalve*). Common spring grasses are: Hair Grass (*Agrostis hyemalis*), Panic Grass (*Panicum oligosanthos*), and Kentucky Blue Grass (*Poa pratensis*). The warmer-drier summer aspect is characterized by such forbs as: Partridge Pea (*Cassia fasciculata*), Illinois Bundle Flower (*Desmanthus illinoensis*), White Prairie Clover (*Petalostemon candidum*), Purple

Prairie Clover (Petalostemon purpureum), and Scurfy Pea (Psoralea tenuiflora). The late summer-fall aspect is dominated by members of the Sunflower and Grass families. Common species include: Western Ragweed (Ambrosia psilostachya), Wreath Aster (Aster ericoides), Heath Aster (Aster pilosus), Maximilian Sunflower (Helianthus maximiliani), False Boneset (Kuhnia eupatorioides), Blue Sage (Salvia pitcheri), Big Bluestem (Andropogon gerardi), Switchgrass (Panicum virgatum), Indian Grass (Sorghastrum avenaceum), and Dropseed (Sporobolus asper).

Gravelly Waste Areas

Recent quarrying operations, which have removed much of the top soil, have exposed gravel terraces of Tertiary origin. This area is dominated by weedy vegetation in various successional stages of development. Some factors involved in the variation from site to site are: exposure to sun, slope, soil richness, and proximity to water. One large portion on the east side, which was seeded to Tall Brome (Bromus inermis) several years ago, is still relatively free of invader species. Only a few such as: Giant Ragweed (Ambrosia trifida), Common Sunflower (Helianthus annuus), Common Milkweed (Asclepias syriaca), and Water Smartweed (Polygonum coccineum) have been able to move into

this area. The woody vegetation which is gradually establishing itself on better soils and wetter sites is dominated by Cottonwood (Populus deltoides), Poison Ivy (Toxicodendron radicans), and Grape (Vitis spp).

The spring flora here is dominated by such invaders as: Spiny-leaved Sow Thistle (Sonchus asper), Tansy Mustard (Descurainia pinnata), Pepper Grass (Lepidium virginicum), Yellow Cress (Rorippa sinuata), Cranesbill (Geranium carolinianum), White Sweet Clover (Melilotus albus), Yellow Sweet Clover (Melilotus officinalis), Wild Four-o'clock (Mirabilis nyctaginea), Hoary Plantain (Plantago virginica), Cleavers (Galium aparine), Mock Penneyroyal (Hedeoma hispida), and Japanese Brome (Bromus japonicus). In mid-summer a different assemblage of successional species occur; some common ones are Indian Hemp (Apocynum cannabinum), Mullein (Verbascum thapsus), Daisy Fleabane (Erigeron strigosus), Western Lettuce (Lactuca ludoviciana), Prairie Spurge (Euphorbia maculata), Spreading Spurge (Euphorbia serpens), Biennial Gaura (Gaura longiflora), Evening Primrose (Oenothera biennis), Barnyard Grass (Echinochloa sp.), Cottonweed (Froelichia gracilis), and Horse Nettle (Solanum carolinense). The late summer-fall period is dominated by members of the Sunflower Family. Some

of these are Broomweed (Gutierrezia dracunculoides), Short Ragweed (Ambrosia artemisiifolia), Giant Ragweed (Ambrosia trifida), Haplopappus (Haplopappus ciliatus), Common Sunflower (Helianthus annuus), Maximilian Sunflower (Helianthus maximiliani), Marsh Elder (Iva annua), Horse Weed (Conyza canadensis), and Ironweed (Vernonia baldwini). Other common taxa are: Knotweed (Polygonum arenastrum), Bushy Knotweed (Polygonum ramosissimum), Love Grass (Eragrostis pectinacea), Purple Love Grass (Eragrostis spectabilis), Prairie Cup Grass (Eriochloa contracta), Fall Panicum (Panicum dichotomiflorum), Green Foxtail (Setaria viridis), Dropseed (Sporobolus asper), and Poverty Grass (Sporobolus vaginiflorus).

Marshy Areas

The marshy areas, which are usually wet, are characterized by four types of aquatic vegetation. These are the submergent, free-floating, deep water rooted, and shallow water rooted.

The free-floating and submergent appear to be randomly distributed throughout the marsh. The submergent is dominated by Bladderwort (Utricularia vulgaris) and Coontail (Ceratophyllum echinatum), whereas the free-floating, which moves from time to time due to wind direction, is characterized by Water Lentil (Lemna minor), Duck-meat (Spirodela

polyrhiza), and Mosquito Fern (Azolla mexicana).

The deeper water areas of the marsh are generally characterized by tall emergent aquatics. Common plants here are Water Smartweed (Polygonum coccineum), Great Bulrush (Scirpus validis), Pickerel-weed (Pontederia cordata), Spike Rush (Eleocharis smallii), and American Lotus (Nelumbo lutea). In the area where the lotus is abundant few other species occur; this may be due to its continuous canopy which would reduce the light intensity.

The shallow areas comprise the largest portion of the marsh. River Bulrush (Scirpus fluvialis) is most abundant. Other common emergent species here are Floating Primrose Willow (Ludwigia peoloides), Smartweeds (Polygonum spp.), Caric-sedges (Carex spp.), Spike Rush (Eleocharis spp.), Great Bulrush (Scirpus validis), and Bur-reed (Sparganium eurycarpum), the latter often being abundant in the ecotone areas between the deep and shallow zones.

Temporary Pools

These low spring-flooded areas, which are usually dry by early summer, are dominated by herbaceous taxa. The pools that occur on gravelly disturbed soils are characterized by weedy species. Spring dominants here include Yellow-

cress (Rorippa sinuata). Rock Cress (Arabis virginica), Mouse Tail (Myosurus minimus),
 Caric Sedge (Carex molesta), (Carex brevior),
 (Carex gravida), and Spike Rush (Eleocharis obtusa). Dominants in the late summer-fall are
 Marsh Elder (Iva annua), Barnyard Grass (Echinochloa spp.), Fall Panicum (Panicum dichotomiflorum),
 Water Hemp (Amaranthus tamariscinus), and Tooth-cup (Ammannia coccinea).

The temporary pools and mud flats occurring on rich and less disturbed soils exhibit a greater diversity of species, many of which are perennial. Some common spring taxa are: Water Clover (Marsilea vestita), Bluntleaf Bedstraw (Galium obtusum), Caric sedges (Carex lanuginosa), (Carex emoryi), (Carex laeviconica), Spike Rush (Eleocharis compressa), (Eleocharis macrostachya), Reed Canary Grass (Phalaris arundinacea), and Rush (Juncus spp.). The summer and fall flora here is largely dominated by grasses. Common taxa at this time are Beggars Ticks (Bidens spp.), Tooth-cup (Ammannia coccinea), Smartweed (Polygonum spp.), Love Grass (Eragrostis reptans), Ricecut Grass (Leersia oryzoides), Water-Hemp (Amaranthus tamariscinus), Slough Grass (Spartina pectinata), Switch Grass (Panicum virgatum), and Umbrella Sedges (Cyperus spp.).

SUMMARY

The checklist of the vascular flora of McKinney Marsh contains 67 families, 187 genera, and 303 species (Table I). The number of species in the ten largest families are shown in Table II and those of the six largest genera in Table III.

An F-test analysis of the previously described ecological zones showed no significant difference among any of the terrestrial habitats. However, the ecological zones are distinguished by general species composition and abundance.

Table I. Number of families, genera, and species in each plant division

<u>Division</u>	<u>Species</u>	<u>Genera</u>	<u>Families</u>
Anthophyta			
Dicotyledoneae	203	134	51
Monocotyledoneae	97	50	13
Coniferophyta	1	1	1
Pterophyta	<u>2</u>	<u>2</u>	<u>2</u>
Total	303	187	67

Table II. Number of genera and species in the ten largest families.

Family	Genera	Species
Gramineae	27	44
Compositae	27	42
Cyperaceae	4	27
Leguminosae	12	18
Polygonaceae	2	11
Cruciferae	7	10
Euphorbiaceae	3	10
Labiatae	6	6
Rosaceae	4	6
Onagraceae	3	6

Table III. Number of species of the six largest genera.

Genus	Species
<u>Carex</u>	11
<u>Polygonum</u>	8
<u>Cyperus</u>	6
<u>Eleocharis</u>	6
<u>Euphorbia</u>	5
<u>Panicum</u>	5

Explanation of the Checklist

The checklist of the vascular flora of McKinney Marsh was supported mainly by collections made by the writer. Additional specimens from the study area, mostly by Garner in 1962, were examined and also included. All specimens are housed in the Emporia Kansas State College Herbarium. Information for each species is given in the following sequence: scientific name, common name, synonym in parenthesis when appropriate, growth type, habitats, frequency of occurrence, flower color, and flowering times. Nomenclature is based on The Checklist of Vascular Plants of the Great Plains (McGregor, et. al., 1975). Sequence is not in conventional checklist order but instead is based on strict alphabetical order, first by division, then by subdivision, family, genera and species.

Several manuals were used for specimen identification. These included Gray's Manual of Botany (Fernald, 1950), Manual of the Grasses of North America (Hitchcock, 1950), A Manual of the Flowering Plants of Kansas (Barkley, 1968), Keys to the Flora of Oklahoma (Waterfall, 1969), Woody Plants of the North Central Plains (Stevens, 1973), Manual

of the Vascular Plants of Texas (Correll and Johnston, 1970), and Flora of Missouri (Steyermark, 1964). In addition a monograph of The Genus Euphorbia of the High Plains and Prairie Plains of Kansas, Nebraska, South and North Dakota (Richardson, 1968) was used.

THE ANNOTATED CHECKLIST

Division ANTHOPHYTA

Dicotyledoneae

ACANTHACEAE (Acanthus Family)

Ruellia humilis Nutt. Wild Petunia. Perennial;
prairie areas; common; flowers lavender May-
October.

ACERACEAE (Maple Family)

Acer negundo L. Box Elder. Tree; pond banks;
infrequent; flowers green April-May.

Acer saccharinum L. Silver Maple. Tree; pond
banks; infrequent; flowers reddish February-
April.

AMARANTHACEAE (Amaranth Family)

Amaranthus tamariscinus Nutt. Water Hemp. Annual;
edge of ponds and gravelly waste areas;
common; flowers green June-October.

Froelichia gracilis (Hook.) Mog. Cottonweed.
Annual; old railroad embankment; common;
flowers white to pink May-September.

ANACARDIACEAE (Cashew Family)

Rhus glabra L. Smooth Sumac. Shrub; dioecious; old
railroad embankment; common; flowers yellowish
May-June.

Rhus radicans L. see Toxicodendron radicans (L.)
Kuntze ssp. negundo (Greene) Gillis

Toxicodendron radicans (L.) Kuntze ssp. negundo
(Greene) Gillis Poison Ivy. (Rhus radicans
L.) Perennial vine; dioecious; pond banks;
common; flowers green May-June.

APOCYNACEAE (Dogbane Family)

Apocynum cannabinum L. Indian Hemp. Perennial;
prairie areas, brome pastures, and gravelly
waste areas; common; flowers white May-August.

Apocynum sibiricum Jacq. Prairie Dogbane. Perennial;
prairie areas and gravelly waste areas; in-
frequent; flowers white to yellowish or green-
ish April-July.

ASCLEPIADACEAE (Milkweed Family)

Asclepias Sullivantii Engelm Milkweed. Perennial;
prairie areas; common; flowers lavender to
white June-July.

Asclepias syriaca L. Common Milkweed. Perennial;
prairie areas; common; flowers lavender May-
August.

Asclepias verticillata L. Whorled Milkweed.
Perennial; prairie areas; common; flowers
white May-September.

Asclepias viridis Walt. Spider Milkweed. Perennial;
prairie areas and gravelly waste areas; common;
flowers green May-June.

Cynanchum laeve (Michx.) Pers. Blue-vine. Vine;
climbing on trees; infrequent; flowers white
August-September.

CAMPANULACEAE (Bellflower Family)

Specularia leptocarpa (Nutt.) Nieuw. see [Triodanis
leptocarpa (Nutt.) Nieuw]

Specularia perfoliata (L.) A. DC. see [Triodanis
perfoliata (L.) Nieuw]

Triodanis leptocarpa (Nutt.) Nieuw. Western Venus'
Looking Glass. [Specularia leptocarpa (Nutt.)
Nieuw.] Annual; roadsides and old railroad
embankment; infrequent; flowers purple May-
August.

Triodanis perfoliata (L.) Nieuw. **Venus'** Looking
Glass. [Specularia perfoliata (L.) A. DC.]
Annual; old railroad embankment; common;
flowers purple April-August.

CAPPARIDACEAE (Caper Family)

Polanisia dodecandra (L.) DC. Clammy-weed [P.
graveolens Raf. (G, BB, P&S, Steyerm.)]
Annual or rarely perennial; old railroad
embankment; common; flowers white May-
October.

Polanisia graveolens Raf. (G, BB, P&S, Steyerm)
see [P. dodecandra (L.) DC.]

CAPRIFOLIACEAE (Honeysuckle Family)

Symphoricarpos orbiculatus Moench. Buckbrush. Shrub; old railroad embankment; common; flowers green July-August.

CARYOPHYLLACEAE (Pink Family)

Silene antirrhina L. Sleepy Catchfly. Annual or biennial; gravelly waste areas and old railroad embankment; common; flowers white May-September.

CERATOPHYLLACEAE (Hornwort Family)

Ceratophyllum echinatum Gray. Coon-tail. Submerged in marshes; abundant; flowers July-October.

CHENOPODIACEAE (Goosefoot Family)

Chenopodium album L. Lamb's Quarters. Annual; edge of cultivated field; infrequent; flowers green May-October.

Chenopodium standleyenun Aellen. Pigweed. Annual; edge of cultivated field and old railroad embankment; infrequent; flowers green July-October.

Kochia scoparia (L.) Schrad. Fire Bush. Annual; gravelly waste areas; infrequent; flowers green July-October.

COMPOSITAE (Sunflower Family)

Achillea millefolium L. Yarrow. Perennial; prairie areas; common; flowers white May-November.

Ambrosia artemisiifolia L. Short Ragweed. Annual; gravelly waste areas and old railroad embankment; common; flowers green July-November.

Ambrosia coronopifolia T. & G. see (Ambrosia psilostachya DC.)

Ambrosia psilostachya DC. Western Ragweed. (A. coronopifolia T. & G.) Perennial; gravelly waste areas; common; flowers green June-September.

Ambrosia trifida L. Giant Ragweed. Annual; gravelly waste areas and brome pasture; flowers June-September.

- Aster ericoides L. var. ericoides Wreath Aster.
Perennial; prairie areas; infrequent; flowers lavender (rays) and yellow (disk) July-October.
- Aster pilosus Willd. Heath Aster. Perennial;
prairie areas and gravelly waste areas;
common; flowers white (rays) and yellow (disk) August-November.
- Bidens comosa (Gray) Wieg. Beggars Tick. Annual;
edge of ponds; common; flowers yellow August-October.
- Bidens connata Muhl. var. petiolata (Nutt.) Farw.
Beggar Ticks. Annual or biennial; edge of ponds; infrequent; flowers yellow June-October.
- Bidens frondosa L. Beggars Tick. Annual; edge of ponds; infrequent; flowers yellow August-October.
- Bidens polylepis Blake. Tickseed Sunflower. Annual;
wet roadside ditches; infrequent; flowers yellow August-October.
- Boltonia asteroides (L.) L'Her. False Starwort.
Perennial; pond banks; infrequent; flowers pink (rays) and yellow (disk) July-October.
- Cacalia tuberosa Nutt. Indian Plantain. Perennial;
prairie areas; infrequent; flowers white May-August.
- Cirsium altissimum (L.) Spreng. Tall Thistle.
Biennial or perennial; old railroad embankment; common; flowers lavender July-October.
- Conyza canadensis (L.) Cronq. Horse Weed.
(Erigeron canadensis L.) Annual; gravelly waste areas; infrequent; flowers white (rays) and yellow (disk) June-November.
- Eclipta alba (L.) Hassk. Yerba de Tajo. Annual;
edge of ponds; infrequent; flowers white July-October.
- Erigeron annuus (L.) Pers. Daisy Fleabane. Annual or biennial; prairie areas; infrequent; flowers white (rays) and yellow (disk) July-October.

Erigeron canadensis L. see Conyza canadensis (L.) Cronq.

Erigeron philadelphicus L. Philadelphia Fleabane.
Perennial; cottonwood groves; infrequent;
flowers white (rays) and yellow (disk)
April-June.

Erigeron strigosus Muhl. Daisy Fleabane. Annual or
biennial; gravelly waste areas and prairie
areas; common; flowers white (rays) and
yellow (disk) May-September.

Gnaphalium obtusifolium L. Sweet Everlasting.
Annual; cottonwood groves; common-flowers
white July-November.

Gutierrezia dracunculoides (DG.) Blake. Broomweed.
Annual; gravelly waste areas; infrequent;
flowers yellow July-October.

Haplopappus ciliatus (Nutt.) DC. Annual; gravelly
waste areas; abundant; flowers yellow August-
September.

Helianthus annuus L. Common Sunflower. Annual;
gravelly waste areas; abundant; flowers
yellow (rays) and brown (disk) July-
November.

Helianthus maximiliani Schrad. Maximilian Sunflower.
Perennial; gravelly waste areas and old rail-
road embankment; abundant; flowers yellow
July-October.

Helianthus tuberosus L. Jerusalem Artichoke.
Perennial; gravelly mounds; rare; flowers
yellow August-October.

Iva annua L. Marsh Elder. (I. ciliata Willd)
Annual; gravelly waste areas and temporary
pools; abundant; flowers green July-October.

Iva ciliata Willd. see (I. annua L.)

Krigia biflora (Walt.) Blake. Dwarf Dandelion.
Perennial; prairie areas; infrequent; flowers
orange May-August.

Kuhnia eupatorioides L. False Boneset. Perennial;
prairie areas; infrequent; flowers white July-
October.

- Lactuca ludoviciana (Nutt.) DC. Western Lettuce.
Annual or biennial; gravelly waste areas;
common; flowers yellow July-August.
- Lactuca scariola L. f. scariola see (L. serriola
L.)
- Lactuca serriola L. Prickly Lettuce. (L. scariola
L. f. scariola) Annual or biennial; gravelly
waste areas; infrequent; flowers yellow June-
October.
- Pyrrhopappus carolinianus (Walt.) DC. False
Dandelion. Annual or biennial; gravelly
waste areas and mud flats; infrequent;
flowers yellow May-October.
- Senecio plattensis Nutt. Prairie Ragwort. Perennial;
prairie areas; infrequent; flowers yellow
May-June.
- Solidago altissima L. see S. canadensis L. var.
scabra (Muhl.) T. & G.
- Solidago canadensis L. var. scabra (Muhl.) T. & G.
Tall Goldenrod; (S. altissima L.) Perennial;
prairie areas and cottonwood groves; common;
flowers yellow August-November.
- Solidago graminifolia (L.) Salisb. Goldenrod. S.
gymnospermoides (Green) Fern. Perennial;
prairie areas and cottonwood groves; infre-
quent; flowers yellow August-October.
- Solidago gymnospermoides (Green) Fern. see S.
graminifolia (L.) Salisb.
- Solidago missouriensis Nutt. Missouri Goldenrod.
Perennial; prairie areas; infrequent; flowers
yellow July-September.
- Solidago rigida L. Stiff Goldenrod. Perennial;
prairie areas; infrequent; flowers yellow
August-October.
- Sonchus asper (L.) All. Spiny-leaved Sow Thistle.
Annual; gravelly waste areas; infrequent;
flowers yellow May-October.
- Taraxacum officinale Weber. Common Dandelion.
Biennial or perennial; gravelly mounds;
infrequent; flowers yellow March-October.

Tragopogon dubius Scop. Goat's Beard. Perennial;
prairie areas; infrequent; flowers yellow
May-July.

Vernonia baldwini Torr. Ironweed. Perennial;
gravelly mounds; infrequent; flowers purple
July-September.

Vernonia fasciculata Michx. Ironweed. Perennial;
cottonwood groves; infrequent; flowers purple
July-September.

Xanthium strumarium L. Cocklebur. Annual; gravelly
waste areas; infrequent to common; flowers
green August-October.

CONVOLVULACEAE (Morning Glory Family)

Convolvulus arvensis L. Field Bindweed. Perennial
vine; edge of cultivated field and beaver
dam; common; flowers white May-September.

Convolvulus sepium L. Hedge Bindweed. Perennial
vine; old railroad embankment and beaver
dam; common; flowers white May-September.

Cuscuta cuspidata Engelm. Love-vine. Annual
parasitic vine; mud flats and gravelly waste
areas; common; flowers straw-colored July-
October.

Cuscuta glomerata Choisy. Dodder. Annual parasitic
vine; mud flats and gravelly waste areas;
common; flowers straw-colored July-September.

Ipomea hederacea Jacq. Morning Glory. Annual or
perennial vine; rare; flowers lavender to
blue with white July-November.

CORNACEAE (Dogwood Family)

Cornus drummondii Meyer. Rough-leaved Dogwood.
Shrub; pond banks; common; flowers white
May-July.

CRUCIFERAE (Mustard Family)

Arabis virginica (L.) Poir. Rock Cress. Sibara
virginica (L.) Annual or biennial; open,
low flooded areas and mud flats; infrequent;
flowers white March-May.

Capsella bursa-pastoris (L.) Medic. Shepard's
Purse. Annual; gravelly waste areas; infre-
quent; flowers white March-May.

Descurainia pinnata (Walt.) Britt. Tansy Mustard.
Annual or biennial; gravelly waste areas;
infrequent; flowers yellow March-May.

Erysimum repandum L. Wall-flower. Biennial;
gravelly mounds; infrequent; flowers
yellow April-June.

Lepidium campestre (L.) R. Br. Field Cress.
Annual or biennial; old railroad embankment;
infrequent; flowers white April-June.

Lepidium densiflorum Schrad. Pepper Grass. Annual
or biennial; gravelly waste areas; common;
flowers white April-November.

Lepidium virginicum L. Pepper Grass. Annual or
biennial; gravelly waste areas; common;
flowers white February-November.

Rorippa sinuata (Nutt.) Hitchc. Yellow-cress.
Perennial; gravelly waste areas and mud
flats; infrequent; flowers Yellow April-
July.

Sibara virginica (L.) Rollins see Arabis virginica
(L.) Poir.

Thlaspi arvense L. Field Penny Cress. Annual;
edge of cultivated field and gravelly waste
areas; infrequent; flowers white April-July.

EUPHORBIACEAE (Spurge Family)

Acalypha gracilens Gray var. monococca Engelm.
A. monococca (Engelm.) Mill.

Acalypha monococca (Engelm.) Mill. Three-seeded
Mercury. (A. gracilens Gray var. monococca
Engelm.) Annual; prairie areas and gravelly
waste areas; common; flowers green May-
October.

Acalypha virginica L. Virginia Three-seeded
Mercury. Annual; prairie areas and gravelly
waste areas; infrequent; flowers green May-
July.

Croton capitatus Michx. Hogwort. Annual; old
railroad embankment; infrequent; flowers tan
June-October.

Croton monanthogynus Michx. Prairie Tea. Annual;
prairie areas and old railroad embankment;
common; flowers tan May-September.

Euphorbia corollata L. Flowering Spurge. Perennial;
prairie areas and old railroad embankment;
infrequent; flowers white May-October.

Euphorbia dentata Michx. Toothed Spurge. Annual;
prairie areas and old railroad embankment;
common; flowers green July-October.

Euphorbia maculata L. Prairie Spurge. (E. supina
Raf.) Annual; gravelly waste areas; common;
flowers green and white July-October.

Euphorbia marginata Pursh. Snow-on-the-mountain.
Annual; gravelly waste areas; common;
flowers green and white July-October.

Euphorbia serpens H. B. K. Spreading Spurge.
Annual; gravelly waste areas; common;
flowers green May-October.

Euphorbia supina Raf. see (E. maculata L.)

FUMARIACEAE (Fumitory Family)

Corydalis micrantha (Engelm.) Gray Corydalis.
Annual; old railroad embankment and gravelly
waste areas; infrequent; flowers yellow
April-June.

GERANIACEAE (Geranium Family)

Geranium carolinianum L. Cranesbill. Annual or
biennial; gravelly waste areas; common;
flowers white to lavender May-July.

HALORAGIDACEAE (Water-milfoil Family)

Myriophyllum pinnatum (Walt.) B. S. P. Green
Parrot's-feather. Perennial; mud flats and
shallow marshy areas; infrequent; flowers
purplish June-October.

LABIATAE (Mint Family)

Hedeoma hispida Pursh. Mock Pennyroyal. Annual;
mud flats; common; flowers blue May-July.

Lamium amplexicaule L. Henbit. Annual; edge of
cultivated field; infrequent; flowers
lavender February-November.

Lycopus americanus Muhl. Water Horehound. Annual;
edge of marshes and ponds; common; flowers
white June-October.

Salvia azurea Lam. var. grandiflora Benth. see
(S. pitcheri Torr.)

Salvia pitcheri Torr. Blue Sage. (S. azurea Lam.
var. grandiflora Benth.) Perennial; prairie
areas; common; flowers blue July-September.

Scutellaria parvula Michx. Skullcap. Perennial;
gravelly mounds and prairie areas; infre-
quent; flowers blue May-July.

Teucrium canadense L. Wood Sage. Perennial; edge
of ponds and cottonwood groves; common;
flowers lavender June-September.

LEGUMINOSAE (Legume Family)

Amorpha fruticosa L. False Indigo. Shrub; edge of
ponds; common; flowers purple May-July.

Baptisia australis (L.) Br. var. minor (Lehm.)
Fern. Wild Blue Indigo. Perennial; prairie
areas; common; flowers blue May-June.

Baptisia leucantha T. & G. White Wild Indigo.
Perennial; common; flowers white April-
June.

Baptisia leucophaea Nutt. Plains Wild Indigo.
Perennial; prairie areas; infrequent;
flowers white or yellow April-June.

Cassia fasciculata Michx. Partridge Pea. Annual;
prairie areas and sandy soils; infrequent;
flowers yellow June-October.

Desmanthus illinoensis (Michx.) MacM. Illinois
Bundle Flower. Shrub; prairie areas; common;
flowers white June-August.

Desmodium illinoense Gray. Tick Trefoil. Perennial
infrequent; flowers lavender June-September.

Gleditsia triacanthos L. Honey Locust. Tree;
gravelly mounds; infrequent; flowers green
May-June.

Glycyrrhiza lepidota Pursh. Licorice. Perennial;
common; flowers whitish April-June.

Lespedeza capitata Michx. Bush Clover. Perennial;
prairie areas; infrequent; flowers creamy
yellow July-September.

- Lespedeza cuneata (Dumont) G. Don. Sericea Lespedeza. Perennial; gravelly waste areas; common; flowers white-cream colored August-October.
- Melilotus albus Desr. White Sweet Clover. Annual or biennial; gravelly waste areas; common; flowers white May-October.
- Melilotus officinalis (L.) Lam. Yellow Sweet Clover. Annual or biennial; gravelly waste areas; common; flowers yellow May-October.
- Petalostemon candidum Michx. White Prairie Clover. Perennial; prairie areas; common; flowers white May-July.
- Petalostemon purpureum (Vent.) Rydb. Purple Prairie Clover. Perennial; prairie areas; common; flowers purple May-October.
- Psoralea tenuiflora Pursh. Scurfy Pea. Perennial; prairie areas and old railroad embankment; common; flowers purple May-September.
- Strophostyles leiosperma (T.G.) Piper. Wild Bean. Annual; pond dams; common; flowers white June-October.
- Trifolium pratense L. Red Clover. Perennial; roadsides; infrequent; flowers red May-September.

LENTIBULARIACEAE (Bladderwort Family)

- Utricularia vulgaris L. Bladderwort. Perennial; submerged in marshes; abundant; flowers yellow April-August.

LINACEAE (Flax Family)

- Linum sulcatum Ridd. Yellow Flax. Annual; prairie areas; infrequent; flowers yellow May-September.

LYTHRACEAE (Loosestrife Family)

- Ammannia coccinea Rottb. Tooth-cup. Annual; mud flats and open, low flooded areas; infrequent; flowers purple June-September.

- Lythrum alatum Pursh. see (L. californicum T. & G.)

- Lythrum californicum T. & G. Winged Loosestrife. (L. alatum Pursh.) Perennial; open, low flooded areas; infrequent; flowers purple June-September.

Peplis diandra Nutt. Water Purslane. Mud flats and shallow marshy areas; rare; flowers greenish May-October.

MALVACEAE (Mallow Family)

Abutilon theophrasti Medic. Velvet Leaf. Annual; edge of cultivated field; infrequent; flowers pale orange June-October.

Callirhoe alcaeoides (Michx.) Gray. Poppy Mallow. Perennial; prairie areas; common; flowers white to pink May-August.

Hibiscus militaris Cav. Rose Mallow. Perennial; edge of ponds and marshes; common; flowers pink and purple July-October.

Hibiscus trionum L. Flower-of-the-hour. Annual; edge of cultivated field; infrequent; flowers yellow and purple June-September.

MENISPERMACEAE (Moonseed Family)

Menispermum canadense L. Moonseed. Perennial vine; old railroad embankment; infrequent; flowers green May-June.

MORACEAE (Mulberry Family)

Maclura pomifera (Raf.) Schneid. Osage Orange. Tree; gravelly mounds; infrequent; flowers May-June.

Morus alba L. White Mulberry. Tree; gravelly mounds; common; flowers April-May.

Morus rubra L. Red Mulberry. Tree; beaver dam; rare; flowers April-May.

NYCTAGINACEAE (Four-o'clock Family)

Mirabilis nyctaginea (Michx.) MacM. Wild Four-o'clock. Perennial; gravelly waste areas; common; flowers violet May-October.

NYMPHAEACEAE (Water Lily Family)

Nelumbo lutea (Willd.) Pers. American Lotus. Perennial; marshy areas; common; flowers yellow June-September.

OLEACEAE (Olive Family)

Fraxinus pennsylvanica Marsh. var. subintegerrima
(Vahl.) Fern. Green Ash. Tree; gravelly
mounds; infrequent; flowers April-May.

ONAGRACEAE (Evening Primrose Family)

Gaura biennis L. var. pitcheri Pickering see
(G. longiflora Spach.)

Gaura longiflora Spach. Biennial Gaura (G. biennis
L. var. pitcheri Pickering) Biennial; old
railroad embankment and gravelly waste areas;
common; flowers pink June-October.

Gaura parviflora Dougl. Velvety Gaura. Biennial;
gravelly waste areas; infrequent; flowers
pink June-October.

Jussiaea repens L. see Ludwigia peoloides (H.B.K.)
Raven spp. glabrescens (L.) Ell.

Ludwigia palustris (L.) Ell. Marsh purslane. Mud
flats and shallow marshy areas; rare; flowers
late May-September.

Ludwigia peoloides (H.B.K.) Raven ssp. glabrescens
(D. Kintze.) Raven Floating Primrose Willow.
(Jussiaea repens L.) Perennial; shallow marshy
areas; abundant; flowers yellow May-October.

Oenothera biennis L. Evening Primrose. Perennial;
gravelly waste areas and old railroad embank-
ment; common; flowers yellow June-October.

Oenothera speciosa Nutt. White Evening Primrose.
Perennial; gravelly waste areas and roadsides;
common; flowers white May-July.

OXALIDACEAE (Wood Sorrel Family)

Oxalis dillenii Jacq. Yellow Wood Sorrel. Annual;
prairie areas and pond banks; infrequent;
flowers yellow May-November.

Oxalis stricta L. Sheep Sorrel. Perennial; pond
banks; infrequent; flowers yellow May-October.

PHYTOLACCACEAE (Pokeweed Family)

Phytolacca americana L. Pokeweed. Perennial; road-
sides; infrequent; flowers white to pink May-
October.

PLANTAGINACEAE (Plantain Family)

Plantago virginica L. Hoary Plantain. Annual;
gravelly waste areas; flowers green April-
June.

POLYGONACEAE (Buckwheat Family)

Polygonum arenastrum Jord. ex Bor. Knotweed.
(P. aviculare L.) Annual; gravelly waste
areas; infrequent; flowers white May-
November.

Polygonum aviculare L. see (P. arenastrum Jord.
ex Bor.)

Polygonum bicornne Raf. Pink Smartweed. (P. longi-
stylum Small) Annual; edge of ponds and open,
low flooded areas; flowers pink July-October.

Polygonum coccineum Muhl. Water Smartweed. Peren-
nial; marshes, open, low flooded areas; and
brome pasture; abundant; flowers rosy-pink
June-October.

Polygonum hydropiperoides Michx. Wild Water Pepper.
Annual or perennial; edge of ponds and shallow
marshy areas; common to abundant; flowers
white to pink June-November.

Polygonum lapathifolium L. Smartweed. Annual; edge
of ponds and marshes; common; flowers white
July-October.

Polygonum longistylum Small see (P. bicornne Raf.)

Polygonum prolificum (Small) Robins see (P. ramo-
sissimum) Michx.

Polygonum punctatum Ell. Water Smartweed. Perennial;
edge of marshes and ponds; common; flowers
white July-October.

Polygonum ramosissimum Michx. Bushy Knotweed.
Annual; gravelly waste areas and brome
pasture; common; flowers white July-
October.

Rumex altissimus Wood. Smooth Dock. Perennial;
prairie areas; common; flowers green April-
May.

Rumex crispus L. Curly Dock. Perennial; prairie
areas; common; flowers green April-May.

PORTULACACEAE (Purslane Family)

Claytonia virginica L. Spring Beauty. Perennial;
prairie areas; common; flowers pink and white
February-May.

PRIMULACEAE (Primrose Family)

Androsace occidentalis Pursh. Rock-Jasmine.
Annual; prairie areas, gravelly waste areas,
and mud flats; infrequent; flowers white
March-May.

Lysimachia ciliata L. Fringed Loosestrife. Perennial;
old railroad embankment; common; flowers
yellow May-July.

RANUNCULACEAE (Buttercup Family)

Clematis pitcheri T. & G. Leather Flower.
Perennial vine; old railroad embankment;
infrequent; flowers blue May-September.

Delphinium virescens Nutt. Prairie Larkspur.
Perennial; prairie areas; rare; flowers
white May-July.

Myosurus minumus L. Mouse Tail. Annual; mud flats;
infrequent; flowers yellowish-white March-
July.

ROSACEAE (Rose Family)

Crataegus mollis (T. & G.) Scheele. Hawthorne.
Tree; gravelly mounds; rare; flowers white
April.

Geum canadense Jacq. Avens. Perennial; gravelly
mounds; infrequent; flowers white May-
October.

Prunus americana Marsh. Wild Plum. Shrub;
gravelly mounds; infrequent; flowers white
April-May.

Rosa arkansana Porter var. suffulta (Greene)
Cockrell. Wild Rose. (R. suffulta Greene)
Shrub; prairie areas; infrequent; flowers
pink May-July.

Rosa carolina L. Pasture Rose. Shrub; prairie
areas; infrequent; flowers pink May-July.

Rosa multiflora Thunb. Japanese Rose. Shrub;
pond dams; rare; flowers white May-June.

Rosa suffulta Greene. see R. arkansana Porter
var. suffulta (Greene) Cockrell.

RUBIACEAE (Madder Family)

Cephalanthus occidentalis L. Buttonbush. Shrub;
edge of ponds and marshes; common; flowers
white June-August.

Galium aparine L. Cleavers. Annual; gravelly waste
areas and gravelly mounds; common; flowers
white May-July.

Galium obtusum Bigel. Bluntleaf Bedstraw. Perennial;
open, low flooded areas; common; flowers
white May-July.

SALICACEAE (Willow Family)

Populus deltoides Marsh. Cottonwood. Tree; edge of
ponds, gravelly mounds, and groves; abundant;
flowers March-May.

Salix exigua Nutt. ssp. interior (Rowlee) Cronq.
var. interior. Sandbar Willow. (S. interior
Rowlee) Tree; edge of ponds; common; flowers
May-June.

Salix interior Rowlee. see S. exigua Nutt. ssp.
interior (Rowlee).

Salix nigra Marsh. Black Willow. Tree; edge of
ponds; common; flowers April-May.

SAXIFRAGACEAE (Saxifrage Family)

Penthorum sedoides L. Ditch Stonecrop. Perennial;
shallow marshy areas; rare; flowers June-July.

SCROPHULARIACEAE (Figwort Family)

Bacopa rotundifolia (Michx.) Wettst. Disc Water
Hyssop. Perennial; mud flats and shallow
marshy areas; rare; flowers white with
yellow May-November.

Lindernia anagallidae (Michx.) Penn. False Pimper-
nel. Annual; mud flats and shallow marshy
areas; rare; flowers blue-violet April-
October.

Verbascum blattaria L. Moth Mullein. Biennial;
gravelly waste areas; infrequent; flowers
white to yellow.

Verbascum thaspsus L. Mullein. Biennial; old railroad embankment; infrequent; flowers yellow May-September.

Veronica peregrina L. var. xalopensis (H. B. K.) St. John & Warren Purslane Speedwell. Annual; gravelly mounds; common; flowers white April-August.

SOLANACEAE (Nightshade Family)

Physalis angulata L. var. pendula (Rydb.) Waterfall Ground Cherry. (P. pendula Rydb.) Annual; rare; flowers yellow May-August.

Physalis heterophylla Nees. Clammy Ground Cherry. Perennial; gravelly waste areas and roadsides; infrequent; flowers yellow May-August.

Physalis longifolia Nutt. see P. virginiana Mill var. sonorae (Torr.) Waterfall.

Physalis pendula Rydb. see P. angulata L. var. pendula (Rydb.)

Physalis pumila Nutt. Low Ground Cherry. Perennial; gravelly waste areas and roadsides; infrequent; flowers yellow and brown May-August.

Physalis virginiana Mill var. sonorae (Torr.) Waterfall. Virginia Ground Cherry. (P. longifolia Nutt.) Perennial; roadsides and prairie areas; infrequent; flowers yellow May-September.

Solanum carolinense L. Horse Nettle. Perennial; gravelly waste areas; infrequent; flowers white to lavender May-October.

TAMARICACEAE (Tamarisk Family)

Tamarix gallica L. see (T. ramosissima Ledeb.)

Tamarix ramosissima Ledeb. Salt Cedar. (T. gallica L.) Shrub or small tree; sandy soil; infrequent; flowers pink or white May-September.

UMBELLIFERAE (Parsley Family)

Cicuta maculata L. Water Hemlock. Biennial; open, low flooded areas and wet roadside ditches; infrequent; flowers white May-September.

Sanicula canadensis L. Black Snakeroot. Biennial; cottonwood groves; infrequent; flowers green May-July.

Torilis arvensis (Huds.) Link. Hedge Parsley.
T. japonica (Houtt.) DC. Annual; roadsides; infrequent; flowers white June-August.

Torillia japonica (Houtt.) DC. see T. arvensis (Huds.) Link.

ULMACEAE (Elm Family)

Celtis occidentalis L. Hackberry. Tree; gravelly mounds; infrequent; flowers April-May.

Ulmus americana L. American Elm. Tree; gravelly mounds; rare; flowers February-April.

Ulmus rubra Muhl. Slippery Elm. Tree; gravelly mounds; infrequent; flowers February-April.

URTICACEAE (Nettle Family)

Parietaria pensylvanica Muhl. Pellitory. Annual; gravelly mounds and cottonwood groves; infrequent; flowers green May-October.

VALERIANACEAE (Valerian Family)

Valerianella radiata (L.) Drfr. Corn Salad. Annual; wet roadside ditches; rare; flowers white April-May.

VERBENACEAE (Vervain Family)

Lippia lanceolata Michx. see Phyla lanceolata (Michx.) Greene.

Phyla lanceolata (Michx.) Greene. Fog Fruit.
 (Lippia lanceolata Michx.) Perennial; mud flats and shallow marshy areas; common; flowers whitish-pink May-September.

Verbena bracteata Lag. & Rodr. Prostrate Vervain. Annual or perennial; old railroad embankment; rare; flowers bluish-lavender April-October.

Verbena X moechina Moldenke. Vervain. Perennial; gravelly waste areas; rare; flowers blue-purple May-September.

Verbena stricta Vent. Hoary Vervain. Perennial; gravelly waste areas; infrequent; flowers blue to lavender May-September.

Verbena urticifolia L. White Vervain. Perennial;
cottonwood groves; infrequent; flowers white
June-October.

VIOLACEAE (Violet Family)

Viola papilionacea Pursh. (name mistakenly given to
a variety of common violets).

Viola pratensis Greene. Common Violet. Perennial;
prairie areas and gravelly mounds; infrequent;
flowers blue-violet March-June.

VITACEAE (Grape Family)

Parthenocissus quinquefolia (L.) Planch. Virginia
Creeper. Perennial vine; old railroad embank-
ment; infrequent; flowers green May-August.

Vitis cinerea Engelm. Grayback Grape. Perennial
vine; dioecious; old railroad embankment;
infrequent; flowers green June.

Vitis riparia Michx. Riverbank Grape. Perennial
vine; dioecious; gravelly waste areas and old
railroad embankment; infrequent; flowers green
May.

Vitis vulpina L. Winter Grape. Perennial vine;
dioecious; rare; flowers green May.

Monocotyledoneae

ALISMACEAE (Water Plantain Family)

Alisma subcordatum Raf. Water Plantain. Perennial;
wet roadside ditches and mud flats; rare;
flowers white or pinkish June-September.

Echinodorus cordifolius (L.) Griseb. Burhead.
Annual or short-lived perennial; mud flats
and shallow marshy areas; infrequent;
flowers white April-June.

Sagittaria graminea Michx. Arrowhead. Perennial;
mud flats and shallow marshy areas; infre-
quent; flowers white or rarely pinkish April-
November.

Sagittaria latifolia Willd. Common Arrowhead.
Perennial; mud flats and shallow marshy
areas; common; flowers white June-October.

COMMELINACEAE (Spiderwort Family)

Commelina communis L. Dayflower. Annual; gravelly mounds; infrequent; flowers blue and white May-October.

Tradescantia bracteata Small. Spiderwort. Perennial; prairie areas and roadsides; common; flowers blue May-July.

Tradescantia ohiensis Raf. Spiderwort. Perennial; roadsides and prairie areas; common; flowers blue May-July.

CYPERACEAE (Sedge Family)

Carex amphibola Steud. Caric-sedge. Perennial; cottonwood groves; infrequent; flowers late April-July.

Carex brevior (Dewey) Mackenz. Caric-sedge. Perennial; open low flooded areas; common flowers May-June.

Carex bushii Mackenz. Caric-sedge. Perennial; prairie areas; common; flowers May-June.

Carex emoryi Dew. Caric-sedge. Perennial; open low flooded areas; common; flowers April-May.

Carex gravida Bailey. Caric-sedge. Perennial; open low flooded areas; common; flowers May-June.

Carex laeviconica Dewey. Caric-sedge. Perennial; open low flooded areas and wet roadside ditches; infrequent; flowers late April-July.

Carex lanuginosa Michx. Caric-sedge. Perennial; open low flooded areas; common; flowers late spring-early summer.

Carex meadii Dew. Caric-sedge. Perennial; prairie areas; common; flowers March-June.

Carex muhlenbergii Schk. Caric-sedge. Perennial; open low flooded areas; common; flowers May-July.

Carex vulpinoidea Michx. Caric-sedge. Perennial; open low flooded areas; common; flowers June-August.

Cyperus acuminatus Torr. & Hook. Umbrella Sedge. Annual; mud flats; common; flowers late June-October.

- Cyperus erythrorhizos Muhl. Umbrella Sedge.
Annual or perennial; mud flats; abundant;
flowers July-December.
- Cyperus esculentus L. Yellow Nut Grass. Perennial;
open low flooded areas and mud flats; in-
frequent; flowers June-October.
- Cyperus ferruginescens Boeckl. Umbrella Sedge.
Annual; mud flats; abundant; flowers
August-October.
- Cyperus filiculmis Vahl. Umbrella Sedge. Perennial;
sandy soils and open, low flooded areas;
infrequent; flowers May-October.
- Cyperus setigerus Torr. & Hook. Umbrella Sedge.
Perennial; open, low flooded areas; common;
flowers June-September.
- Eleocharis acicularis (L.) R. & S. Spike Rush.
Perennial; mud flats and shallow marshy
areas; infrequent; flowers July-October.
- Eleocharis compressa Sulliv. Spike Rush. Perennial;
prairie areas; open, low flooded areas, and
mud flats; abundant; flowers May-July.
- Eleocharis lanceolata Fern. Spike Rush. Annual;
wet gravelly pond banks; rare; flowers
June-October.
- Eleocharis macrostachya Britt. Spike Rush.
Perennial; open, low flooded areas and mud
flats; abundant; flowers May-August.
- Eleocharis obtusa (Willd.) Schult. Spike Rush.
Annual; wet gravelly pond banks; infrequent;
flowers May-October.
- Eleocharis smallii Britt. Spike Rush. Perennial;
shallow marshy areas; common; flowers June-
September.
- Scirpus atrovirens Willd. Common Bulrush.
Perennial; cottonwood groves; rare; flowers
May-September.
- Scirpus fluviatilis (Torr.) Gray. River Bulrush.
Perennial; shallow marshy areas; abundant;
flowers May-September.
- Scirpus lineatus Michx. see (S. pendulus Muhl.)

Scirpus pendulus Muhl. Bulrush. (S. lineatus Michx.)
Perennial; open, low flooded areas and wet
roadside ditches; common; flowers May-August.

Scirpus validus Vahl. Great Bulrush. Perennial;
marshes; common; flowers May-September.

GRAMINEAE (Grass Family)

Agropyron smithii Rydb. Western Wheat Grass.
Perennial; gravelly mounds and brome pasture;
common; flowers May-August.

Agrostis hyemalis (Walt.) V. S. P. Hair Grass.
Annual; prairie areas; common; flowers June-
August.

Agrostis stolonifera L. Redtop. Perennial; prairie
areas; infrequent; flowers June-August.

Alopecurus carolinianus Walt. Meadow Foxtail.
Annual; prairie areas and open, low flooded
areas; common; flowers March-May.

Andropogon gerardi Vitman. Big Bluestem. Perennial;
prairie areas; common; flowers June-September.

Aristida oligantha Michx. Prairie Tree-awn Grass.
Annual; gravelly mounds and gravelly waste
areas; common; flowers August-October.

Bromus inermis Leyas. Smooth Brome. Perennial;
pasture and gravelly mounds; abundant;
flowers May-August.

Bromus japonicus Thunb. Japanese Brome. Annual;
gravelly waste areas; common; flowers June-
early August.

Buchloe dactyloides (Nutt.) Engelm. Buffalo Grass.
Perennial; prairie areas; infrequent; flowers
May-August.

Digitaria sanguinalis (L.) Scop. Common Crab Grass.
Annual; edges of cultivated field; infrequent;
flowers July-November.

Echinochloa crusgalli (L.) Beaub. Barnyard Grass.
Annual; open, low flooded areas, mud flats,
and gravelly waste areas; common; flowers
June-November.

Echinochloa muricata (P. Beauv.) Fern. Barnyard
Grass. Annual; open, low flooded areas, mud
flats, and gravelly waste areas; common;
flowers June-November.

- Elymus canadensis L. Canada Wild Rye. Perennial; cottonwood groves and prairie areas; infrequent; flowers June-October.
- Elymus virginicus L. Wild Rye. Perennial; prairie areas; infrequent; flowers May-September.
- Eragrostis capillaris (L.) Nees. Lace Grass. Annual; edge of cultivated field; infrequent; flowers July-October.
- Eragrostis pectinacea (Michx.) Nees. Love Grass. Annual; gravelly waste areas; infrequent; flowers July-October.
- Eragrostis reptans (Michx.) Nees. Love Grass. Annual; mud flats; common; flowers August-October.
- Eragrostis spectabilis (Pursh.) Steud. Purple Love Grass. Perennial; gravelly waste areas; infrequent; flowers July-October.
- Eriochloa contracta Hitchc. Prairie Cup Grass. Annual; gravelly waste areas and prairie areas; common; flowers July-October.
- Hordeum jubatum L. Foxtail Barley. Perennial; roadsides and open, low flooded areas; common; flowers May-October.
- Hordeum pusillum Nutt. Little Barley. Annual; roadsides; infrequent; flowers April-June.
- Leesia oryzoides (L.) Sw. Ricecut Grass. Perennial; shallow marshy areas; abundant; flowers June-October.
- Muhlenbergia frondosa (Poir.) Fern. Satin Grass. Perennial; old railroad embankment; common; flowers August-November.
- Panicum capillare L. Witch Grass. Annual; gravelly waste areas and edge of cultivated field; common; flowers July-October.
- Panicum lanuginosum Ell. Panic Grass. Perennial; prairie areas; infrequent; flowers May-September.
- Panicum oligosanthos Schultes var. scribnerianum (Nash.) Fern. Panic Grass. (P. scribnerianum Nash.) Perennial; prairie areas; common; flowers May-June (vernal), June-November (autumnal).

Panicum scribnerianum Nash. see P. oligosanthos
Schultes var. scribnerianum (Nash.) Fern.

Panicum virgatum L. Switch Grass. Perennial;
prairie areas and open, low flooded areas;
common; flowers July-September.

Phalaris arundinacea L. Reed Canary Grass.
Perennial; open, low flooded areas; common;
flowers late April-August.

Poa compressa L. Canada Blue Grass. Perennial;
prairie areas; infrequent; flowers May-
October.

Poa pratensis L. Kentucky Blue Grass. Perennial;
prairie areas; common; flowers May-July.

Schedonnardus paniculatus (Nutt.) Trel. Tumble
Grass. Perennial; old railroad embankments;
infrequent; flowers May-October.

Setaria faberii Herrm. Nodding Foxtail. Annual;
gravelly waste areas and edge of cultivated
field; common; flowers July-October.

Setaria glauca (L.) Beauv. Yellow Foxtail S.
lutescens (Wiegel) Hubb Annual; gravelly
waste areas and edge of cultivated fields;
common; flowers June-October.

Setaria viridis (L.) Beauv. Green Foxtail. Annual;
gravelly waste areas and edge of cultivated
field; common; flowers June-October.

Sorghastrum avenaceum (Michx.) Nash. Indian Grass.
S. nutans (L.) Nash Perennial; prairie
areas; common; flowers August-September.

Sorghastrum nutans (L.) Nash. see S. avenaceum
(Michx.) Nash

Sorghum halepense (L.) Pers. Johnson Grass.
Perennial; cottonwood groves; infrequent;
flowers July-September.

Spartina pectinata Link. Slough Grass. Perennial;
open, low flooded areas; common; flowers
June-September.

Sphenopholis obtusata (Michx.) Scribn. Prairie
Wedgrass. Perennial; prairie areas and
old railroad embankment; common; flowers
May-July.

Sporobolus asper (Michx.) Kunth. Dropseed.

Perennial; gravelly mounds, prairies,
and gravelly waste areas; common;
flowers August-October.

Sporobolus drummondii (Trin.) Vasey. Dropseed.

[S. asper var. Hookeri (Trin.)] Perennial;
gravelly mounds, prairies, and gravelly
waste areas; common; flowers August-
October.

Sporobolus cryptandrus (Torr.) Gray. Sand

Dropseed. Perennial; sandy soils; in-
frequent; flowers June-October.

Sporobolus vaginiflorus (Torr.) Weed. Poverty

Grass. Annual; gravelly waste areas; common;
flowers August-November.

Tripsacum dactyloides L. Gama Grass. Perennial;

prairie areas, open, low flooded areas, and
old railroad embankment; common; flowers
May-September.

Triticum aestivum L. Wheat. Annual; cottonwood

groves; infrequent; flowers May-July.

IRIDACEAE (Iris Family)

Sisyrinchium campestre Bickn. Blue-eye Grass.

Perennial; prairie areas; common; flowers
blue April-June.

JUNACEAE (Rush Family)

Juncus dudleyi Weig. Bog-rush. Perennial; open,

low flooded areas; rare; flowers May-
September.

Juncus interior Wieg. Rush. Perennial; open, low

flooded areas; common; flowers May-August.

Juncus torreyi Coville. Rush. Perennial; sandy

soils; common; flowers July-October.

LEMNACEAE (Duckweed Family)

Lemna minor L. Water Lentil. Annual; free floating
in marsh; abundant.

Lemna perpusilla Torr. Duckweed. Free floating in

marsh; rare to infrequent.

Spirodela polyrhiza (L.) Schleid. Duck-meat.

Annual; free floating in marsh; abundant.

LILIACEAE (Lily Family)

Allium canadense L. var. canadense Wild Garlic.
(A. mutabile Michx.) Perennial; prairie
areas; common; flowers white May-July.

Allium candense L. var. lavendulare (Bates)
Ownbey & Aase. Wild Garlic. Perennial;
prairie areas and old railroad embankment;
common; flowers white May-July.

Allium mutabile Michx. see (A. canadense L. var.
canadense).

Nothoscordum bivalve (L.) Britt. False Garlic.
Perennial; prairie areas; common; flowers
white March-May.

Smilax hispida Muhl. Bristly Greenbrier. S.
tamnoides L. var. hispida (Muhl.) Fern.
Perennial vine; old railroad embankment;
infrequent; flowers green May-June.

Smilax tamnoides L. var. hispida (Muhl.) Fern.
see (S. hispida Muhl.)

ORCHIDACEAE (Orchid Family)

Spiranthes cernua (L.) Rich. Common Ladies'
Tresses. Perennial; prairie areas; infre-
quent; flowers white August-November.

PONTEDERIACEAE (Pickereel-weed Family)

Heteranthera limosa (Sw.) Willd. Mud Plantain.
Perennial; mud flats (Beaver dam); rare;
flowers white to purplish-blue June-
September.

Heteranthera reniformis R. & P. Mud Plantain.
Perennial; mud flats (beaver dam); rare;
flowers white to pale blue July-October.

Pontederia cordata L. Pickereel-weed. Perennial;
deeper marshy areas and mud flats (beaver
dam); common; flowers violet-blue June-
October.

POTAMOGETONACEAE (Pondweed Family)

Potamogeton diversifolius Raf. Pondweed. Annual;
ponds; common; flowers late May-October.

SPARGANIACEAE (Bur-reed Family)

Sparganium eurycarpum Engelm. Bur-reed. Perennial; shallow marshy areas; abundant; flowers May-August.

TYPHACEAE (Cat-tail Family)

Typha angustifolia L. Narrow-leaved Cat-tail. Perennial; edge of ponds; infrequent; flowers late May-July.

Typha latifolia L. Common Cat-tail. Perennial; wet roadside ditches; infrequent; flowers May-July.

Division CONIFEROPHYTA

PINACEAE (Pine Family)

Juniperus virginiana L. Red Cedar. Tree; dioecious; gravelly mounds; rare; flowers April-cones September.

Division PTEROPHYTA

MARSILEACEAE (Pepperwort Family)

Marsilea mucronata A. Br. see (M. vestita Hook & Grev.)

Marsilea vestita Hook & Grev. Water Clover. (M. mucronata A. Br.) Perennial; shallow marshy areas; infrequent; spores mature August-September.

SALVINIACEAE (Salvinia Family)

Azolla mexicana Presl. Mosquito Fern. Free floating in quiet waters of marsh; common; spores mature summer and fall.

Explanation of the Keys

The keys to the vascular flora of McKinney Marsh are based on specimens described in the checklist and some that could be expected in this area because of their presence in other wet habitats of the region (Table IV). No keys are provided for plants of the prairies and gravelly soils of the area.

Several manuals were used in constructing this key. Key characters were borrowed from the following: Flora of Missouri (Steyermark, 1964), Manual of the Vascular Plants of Texas (Correll and Johnston, 1970), Gray's Manual of Botany (Fernald, 1950), and Keys to the Flora of Oklahoma (Waterfall, 1969). In addition a monograph of The Genus Euphorbia of the High Plains and Prairie Plains of Kansas, Nebraska, South and North Dakota (Richardson, 1968) was used.

Table IV. Plants which may occur at McKinney Marsh

<u>Wolffia columbiana</u>	<u>Sagittaria ambigua</u>
<u>Marsilea quadrifolia</u>	<u>Sagittaria engelmanniana</u>
<u>Ranunculus abortivus</u>	<u>Juncus tenuis</u>
<u>Sparganium americanum</u>	<u>Leersia virginica</u>
<u>Potamogeton nodosus</u>	<u>Leptochloa filiformis</u>
<u>Callitriche terrestris</u>	<u>Leptochloa fascicularis</u>
<u>Callitriche heterophylla</u>	<u>Carex frankii</u>
<u>Justicia americana</u>	<u>Carex annectens</u> var. <u>xanthocarpa</u>
<u>Ludwigia alternifolia</u>	<u>Cyperus aristatus</u>
<u>Ceratophyllum demersum</u>	<u>Cyperus strigosus</u>
<u>Diodia teres</u>	<u>Scirpus americanus</u>
<u>Urtica dioica</u>	<u>Polygonum persicaria</u>
<u>Leucospora multifida</u>	<u>Polygonum hydropiper</u>
<u>Acorus calamus</u>	<u>Laportea canadensis</u>
<u>Echinodorus berteroi</u>	<u>Phleum pratense</u>
<u>Fimbristylis autumnalis</u>	<u>Polygonum pennsylvanicum</u>
<u>Sagittaria montevidensis</u>	

KEYS TO THE MAIN SECTIONS

1. Trees or shrubs, woody at least in the lower portion.....Section I, p. 44
1. Nonwoody plants, herbe (soft-stemmed plants) ... (2)
 - 2(1). Plants lacking green color (does not include plants which develop leaves of other colors in early spring or Fall).....
.....Section II, p. 45
 2. Plants with at least some green color... (3)
 - 3(2). Plants with floating or submerged leaf-blades.....Section III, p. 46
 3. Plants growing on dry soil or with leaf-blades and/or flowering stalk normally growing above the water... (4)
 - 4(3). Some or all of the leaves compound divided to its base or center into separate, distinct, smaller subdivisions (leaflets) which are not connected with one another by green leaf tissue
.....Section IV, p. 56
 4. All the leaves simple, if divided, then all divisions connected with each other by leaf tissue... (5)
 - 5(4). Leaves opposite (in pairs) or whorled (in circles)... (6)

5. Leaves alternate (only 1 at each node) or all arising from the base of the plant...(7)
- 6(5). Leaf-blades entire (without teeth).....
Section V, p. 58
6. Leaf-blades toothed or lobed.....
Section VI, p. 61
- 7(5). All leaves arising at base of plant.....
Section VII, p. 64
7. Leaves alternate on the stem (some may occur at base also)...(8)
- 8(7). All leaf blades entire.....
Section VIII, p. 70
8. Some or all leaf-blades toothed or lobed.....
Section IX, p. 95

Section I. TREES OR SHRUBS

1. Leaves alternate (2)
1. Leaves opposite (in pairs) or whorled (arranged in circles of 3) (5)
- 2(1). Leaves compound and entire; flowers purplish.....Amorpha fruticosa, p. 22
2. Leaves simple and toothed; flowers not purplish (3)
- 3(2). Buds with a single scale; mature leaves less than 3 cm wide (4)
3. Buds with several overlapping scales; mature leaves more than 4 cm wide.....
.....Populus deltoides, p. 28
- 4(3). Leaves with less than 5 teeth per cm.....
.....Salix exigua, p. 28
4. Leaves with more than 8 teeth per cm.....
.....Salix nigra, p. 28
- 5(1). Leaves opposite never whorled; twigs pubescent; flowers and fruits in flat-topped clusters (cymes)..Cornus drummondii, p. 19
5. Leaves opposite or in whorls of 3; twigs not pubescent; flowers and fruits in ball-shaped clusters, each cluster about 3 cm in diameter
.....Cephalanthus occidentalis,
p. 28

Section II. NONWOODY PLANTS LACKING GREEN COLOR

1. Stems twining on other plants; plants terrestrial...Cuscuta (2)
- 1(2). Stems not normally twining on other plants; plants growing under water.....
.....Utricularia vulgaris, p. 33
- 2(1). Flowers on stalks (pedicels) in loose inflorescences; seeds 1.4 mm long.....
.....Cuscuta cuspidata, p. 19
2. Flowers without stalks in thick, rope-like densely compact clusters; seeds 1.7-2.6 mm long.....Cuscuta glomerata, p. 19

Section III. WATER PLANTS

1. Complete plant not over 1.5 cm broad or long
...(2)
1. Complete plant, including stem and leaves,
always more than 2.5 cm broad or long...(6)
- 2(1). Plants with numerous, overlapping, lobed
leaf-like parts...Azolla mexicana, p. 39
2. Plants with 1 or few non-lobed, non-imbricated
leaf-like parts...LEMNACEAE (3)
- 3(2). Plants with no roots present.....
.....Wolffia columbiana, p. 41
3. Plants with 1 or more roots...(4)
- 4(3). Roots 2 to several to a plant; plant pur-
plish-red underneath.....
.....Spirodela polyrhiza, p. 37
4. Roots 1 to a plant; plant green underneath
...Lemna (5)
- 5(4). The green leaf-like joints of plants more or
less symmetrical; root sheaths without wings
or appendages.....Lemna minor, p. 37
5. The green leaf-like joints of plants not
symmetrical; root sheaths with wings or appen-
dages.....Lemna perpusilla, p. 37
- 6(1). Leaf-like part resembling a 4-leaved clover,
with 4 leaflets at the top of a stem.....
.....Marsilea (7)
6. Leaf-like parts not as above...(8)

- 7(6). Leaflets not hairy (glabrous); fruiting structures long-stalked.....
Marsilea quadrifolia, p.
7. Leaflets sparsely hairy, fruiting structures short-stalked, axillary at the base of the leaves.....Marsilea vestita, p. 39
- 8(6). Leaves or leaf-like parts all arising from the base of the plant, entire (smooth-edged), long and narrow, similar to grass...(9)
8. Leaves not grass-like, of long or slender, then tapering at base with a leaf-stalk (petiole)...(10)
- 9(8). Sheaths at base of stem (culm) closed at summit (united into a tube) not split down one side; flowers concealed by overlapping or spirally arranged scales; ovule and seed 1...CYPERACEAE (p. 79 L. 29)
9. Sheaths at base of stem split (open along one side) the edges of the sheath often overlapping, but not united into a tube; flowers not concealed, with 3 greenish or brownish sepals and 3 similar petals; ovules and seeds numerous...Juncus (p. 70 L. 4)
- 10(8). Leaf-stalk joining leaf-blade approximately in the middle (peltate leaves).....
Nelumbo lutea, p. 24
10. Leaves not peltate...(11)

- 11(10). Leaves entire...(12)
11. Leaves with teeth or cut into narrow segments or divisions...(13)
- 12(11). Leaves all arising from base of plant; flowers with 3 sepals and 3 petals
...ALISMACEAE (p. 66 L. 9)
12. Leaves not all arising from base of plant; flowers otherwise...(15)
- 13(11). Main flower-stem (peduncle) hair-like, extending above the water; leaves finely dissected into hair-like segments, often entangled and at least some bearing minute bladders (sacs); flowers with yellow fused petals (corolla).....
.....Utricularia vulgaris, p. 23
13. Without the above combination of characters
...(14)
- 14(13). Some of the leaves more than 1 cm wide; stems not creeping; flowers with a yellow corolla of 5 equal-sized petals separate to their base, 5 sepals and numerous stamens.....Ranunculus abortivus, p. 41
14. All leaves and leaf divisions less than 5 cm wide; stems usually creeping along wet, muddy places at the edge of water; flower parts in 4's.....Myriophyllum pinnatum, p. 21

- 15(12). Leaves of the stem alternate...(16)
15. Leaves of the stem opposite or in whorls of three or more...(26)
- 16(15). All the leaves linear, grass-, ribbon-, hair-, or thread-like, of about the same width above their base from one end to the other...(17)
16. Some of the floating leaves or all of the leaves broadened in one section more than in another the sides curved and not parallel their whole length, the leaves not linear nor thread- nor ribbon-like...(22)
- 17(16). A ligule present (prolonged or protruding thin appendage or hairy ring extending across the inner side of leaf at the junction of the leaf-blade and the leaf-sheath, surrounding the stem); leaves mainly blue- or silvery-green.....
GRAMINEAE, (p. 72 L. 8)
17. Ligule absent, but auricles (projecting lobes at sides of base of leaves or leaf-blades) may be present; leaves light green, grass- or yellow-green, or dark green...(18)
- 18(17). Stipules (thin or membranous, free or united outgrowths at base of leaf or leaf-sheath) present, either free from the rest of the leaf or the stem or

partially or wholly united with them.....

Potamogeton, (25)

18. Stipules absent...(19)

19(18). The clasping leaf-sheath surrounding the stem closed (margins of the sheath united, not split down one side)...Scirpus in CYPERACEAE (p. 86 L. 56)

19. Leaf-sheath open (margins not united)...(20)

20(19). Leaves pale or grass-green, rather soft and spongy, flattened 4-15 mm broad; flowers monoecious (stamens and pistils in separate flower clusters on the same plant); fruit 1-2 seeded, the fruiting portion of solid spherical bur-like heads 1.5-3.5 cm in diameter...Sparganium (21)

20. Leaves dark green, firm, at least the lowest ones quill-like or terete (rounded in cross-section), less than 4 mm broad; flowers perfect (stamens and pistils present in the same flower); fruits many-seeded; the fruiting portion of scattered small clusters .2-1 cm in diameter...Juncus (p. 70 L. 4)

21(20). Stigmas 2 to each female (pistillate) flower; fruits sessile, wedge-shaped and widest at summit or in the upper half; leaves conspicuously keeled.....
.....Sparganium eurycarpum,

21. Stigmas 1 per flower; fruits narrowed to a stalk-like base, and tapering above, widest around the middle, or at least non conspicuously broadened above; leaves flat or inconspicuously keeled.....
Sparganium americanum,
 p. 41
- 22(16). Stipules which form a sheath around stem at base of leaf are fringed with bristles or long hairs on the summit...Polygonum
 (p. 90 L. 70)
22. Stipules, if present, without bristles or long hairs at summit...(23)
- 23(22). Leaves expanded at base into a sheath or with stipules (small, thin outgrowths at base of leaf stalk); leaves with 3 or more parallel main nerves running from base to tip of leaf; flowers green, purple, or blue, rarely white, not yellow...(24)
23. Leaves not expanded at base into sheaths or stipules; leaves nerved like a feather with 1 main midnerve and few to several lateral (side) nerves arising at several levels from midrib; flowers yellow.....
Ludwigia peoloides, p. 25
- 24(23). Stipules free from part or all of the base of leaf, evident as loose appendages

or as projections from it; flowers green, without a tube and without sepals and petals (perianth) but with 4 stamens having sepal-like outgrowths; stems weak and flexible, supported by water
 ...Potamogeton (25)

24. Stipules completely fused with the leaf-stalk (petiole) to form a sheath, with no loose outgrowths or projections from Leaf-base; flowers purple or blue, rarely white, with a tube, 6-parted perianth, and 3 stamens; stems self-supporting out of water...Heteranthera (p. 66 L 8)
- 25(24). Submerged leaves with sides curved, not straight parallel, 4-20 mm wide.....
Potamogeton nodosus, p. 41
25. Submerged leaves thread-like or ribbon-like with straight or parallel sides, 0.5-1.5 mm wide.....Potamogeton diversifolius, p. 38
- 26(15). Leaves not dissected not subdivided...(27)
26. Leaves dissected or subdivided into narrow segments...(31)
- 27(26). Submerged leaves 0.2-5 mm broad, linear to linear-lanceolate...(28)
27. The submerged leaves mainly 8-25 mm broad (if 2 mm broad then leaves rounded)...(30)

- 28(27). Stems with ridges or wings extending down from the base of each leaf; calyx present; flowers perfect (stamens and pistils in the same flower); fruit many-seeded.....
Peplis diandra, p. 24
28. Stems without ridges running from the base of leaf; calyx absent; flowers monoecious, the male (staminate) and female (pistillate) occurring in separate flowers on the same plant; fruit 4-seeded...Callitriche (29)
- 29(28). Plants growing on land out of water; fruit on a short stalk (0.2-0.6) mm long, broader than high; flowers without bracts; leaves and stems without shield-shaped scales; leaves uniform throughout.....
Callitriche terrestris,
 p. 41
29. Plants growing in water, entirely submerged or with a rosette of floating leaves, or stranded on mud; fruit sessile, as high as broad or somewhat higher; flowers with 2 bracts at base; leaves and stems with shield-shaped scales; leaves of different shapes on the same plant.....Callitriche heterophylla,
 p. 41
- 30(27). Leaves with several main nerves starting from the base of the leaf-blade, less than $1\frac{1}{2}$ as long as broad, broadly rounded

- at summit.....Bacopa rotundifolia, p. 28
30. Leaves with 1 main midnerve and few to several lateral (side) nerves on each side, 2 or more times as long as broad, not broadly rounded at summit...(31)
- 31(30). Leaves 7 or more times as long as broad, mostly 7-20 (rarely 4 cm) long.....
.....Justicia americana, p. 41
31. Leaves 2-4 (rarely 6) times as long as broad, 1-8 (rarely 10 cm) long.....
.....Ludwigia palustris, p. 25
32. Leaves alternate; petals conspicuous, 7-8 mm long.....Ludwigia alternifolia, p. 41
- 33(26). Leaves and stems rough to the touch, coarse, with a musty odor; plants never producing flowers or fruits.....
.....Chara in CHAROPHYTA (a division of higher algae, not included in this work)
33. Leaves and stems without a particularly coarse texture and musty odor; plants producing flowers and fruits...(34)
- 34(33). Plants with roots; stems creeping along wet mud flats; petals purple, about 2 mm long.....Myriophyllum pinnatum, p. 21

34. Plants rootless; entire plant submerged;
flowers without sepals and petals (perianth)
...Ceratophyllum (35)
- 35(34). Leaves usually forked 1 or 2 times; the
divisions conspicuously serrate on one
side; fruits without lateral spines.....
.....Ceratophyllum demersum,
p. 41
35. Leaves usually forked 2 to 4 times, the
divisions entire or only obscurely serrate;
fruits with 3 or 5 lateral spines.....
.....Ceratophyllum echinatum,
p. 15

Section IV. NONWOODY PLANTS WITH SOME OR ALL
LEAVES COMPOUND

1. What appears to be one flower is actually a dense mass of small flowers surrounded by green scales (bracts of the involucre); anthers united into a tube; petals united into a tube; ovary inferior; ovule and seed 1 in each of the individual flowers...Bidens
(2)
1. Without the above combination of characters
...(4)
- 2(1). Rays (petal-like appendages) of the flower-head showy, 10-25 mm long, much longer than the outer bracts of the involucre.....
.....Bidens polylepis, p. 16
2. Rays of the flower-head absent, or at most less than 5 mm long...(3)
- 3(2). Main leaves of the stem divided more than once, each larger principal leaflet or division further divided once or twice again into smaller segments (2-3 times pinnately divided), the ultimate segments tending to be rounded or with curved margins; outer bracts of involucre shorter than the inner ones, not leaf-like, usually 8; achenes somewhat 4-sided and 4-angled, linear, the mature inner ones of the head

- 12-18 mm long, about 1 mm broad; stem
 4-angled (square in cross-section).....
Bidens bipinnata, p. 41
3. All the leaves or at least the main lower and
 middle leaves of the stem divided only once
 into 3 or 5 merely toothed leaflets with
 triangular or conical pointed teeth; outer
 bracts of the involucre 5-8, usually much
 longer than the inner ones and leaf-like;
 achenes flattened, the mature inner ones of
 the head 7-10 mm long and 2.2-3.8 mm broad;
 stem more or less cylindrical, not square.....
Bidens frondosa, p. 16
- 4(1). Leaves once pinnately compound; stamens 6,
 2 of them shorter than the other 4.....
Arabis virginica, p. 19
4. Leaves twice pinnately compound or palmately
 compound; stamens 5 or many, but not 6...(5)
- 5(4). Base of petiole enlarged into a sheath
 which envelopes the stem; leaflets serrated
 with many small teeth, not lobed.....
Cicuta maculata, p. 29
5. Base of petiole not enlarged into a sheath;
 leaflets not serrated, but may be lobed.....
Ranunculus abortivus, p. 41

Section V. NONWOODY PLANTS WITH OPPOSITE OR
WHORLED, SIMPLE LEAVES WITHOUT TEETH
OR LOBES

1. Bruised stem, leaf, or leaf-stalk not producing a milky sap...(3)
1. Bruised stem, leaf, or leaf-stalk producing a milky sap...(2)
 - 2(1). Leaves of the main stem with a stalk (petiole) 4-10 mm long; mature fruits (follicles) 12-20 cm long.....
.....Apocynum cannabinum, p. 13
 2. Leaves of the main stem without a stalk (sessile) or with an inconspicuous stalk rarely up to 4 mm long; mature fruits (follicles) 4-10 cm long.....
.....Apocynum sibiricum, p. 13
 - 3(1). Leaves in whorls of 4 or more.....
.....Galium obtusum, p. 28
 3. Some or all of the leaves opposite...(4)
 - 4(3). Both calyx and corolla absent at flowering time; dwarf plants up to 3.5 cm tall growing on damp soil; leaves 2-4 mm long.....
.....Callitriche terrestris,
p. 41
 4. At least calyx present at flowering time; short or tall plants with longer leaves...(5)
 - 5(4). Leaves with transparent dots (hold leaf to light to note); petioles fringed with hairs

-Lysimachia ciliata, p. 27
5. Leaves lacking transparent dots; petioles not fringed with hairs...(6)
- 6(5). Ovary inferior, the calyx-tube fused to the wall of the ovary...(9)
6. Ovary superior, the calyx-tube wholly or partly free from the ovary...(7)
- 7(6). Leaves nearly round to round-obovate, the main nerves all arising from the base of the blade.....Bacopa rotundifolia, p. 28
7. Leaves much longer than wide, not rounded in outline; nerves of the leaf pinnately arranged (the side nerves arising from various levels of the midrib)...(8)
- 8(7). Flowers clustered in a head-like spike at the tip of the flower-stem (peduncle); peduncle more than 3 cm long.....
.....Justicia americana, p. 41
8. Flowers solitary at the tip of each peduncle; peduncles less than 3 cm long.....
.....Lindernia anagallidea, p. 28
- 9(6). Flowers without a corolla (petals) at flowering time but with a small calyx 1-6 mm long
.....Ludwigia palustris, p. 25
9. Flowers with a corolla at flowering time...(10)
- 10(9). Corolla of separate petals distinct to

base...LYTHRACEAE (11)

10. Corolla of united petals joined into a tube...
Diodia teres, p. 41
- 11(10). At least some of the upper leaves alter-
 nate.....Lythrum californicum,
 p. 27
11. All leaves opposite.Ammannia coccinea, p. 23

Section VI. NONWOODY PLANTS WITH OPPOSITE OR
WHORLED, SIMPLE TOOTHED OR LOBED
LEAVES

1. What appears to be one flower is actually a dense mass of small flowers surrounded by green or colored scales (bracts of the involucre); anthers united into a tube or rarely scarcely united; petals united into a tube; ovary inferior; ovule and seed 1 in each of the individual flowers...COMPOSITAE (2)
1. Without the above combination of characters ... (6)
- 2(1). Flowers green or greenish; flower-heads small, arranged one above the other in elongated spike-like or raceme-like inflorescences... (3)
2. Flowers yellowish or white... (4)
- 3(2). Leaves toothed; all the flower-heads the same, the 3-5 pistillate (female) flowers situated along the outer margin of the head surrounding the more numerous central sterile staminate (male) flowers; no projections or tubercles appearing on any of the involucre... Iva annua, p. 17
3. Leaves lobed; flower-heads not the same, separated into numerous pistillate (female) heads situated in the axils of leaves or

- bracts at the base of the staminate (male) inflorescences; projections or tubercles appearing on some part of the involucre of the pistillate flower-head.....
Ambrosia psilostachya,
 p. 15
- 4(2). Flowers whitish...Eclipta alba, p. 16
4. Flowers yellowish....Bidens (5)
- 5(4). Outer bracts of involucre 2-6; mature inner achenes toward center strongly 4-angled with a prominent midrib, 5-8 mm long, 1.6-2.6 mm broad..Bidens connata, p. 16
5. Outer bracts of involucre 6-10; mature inner achenes toward center of head flat or nearly so with slender or faint midrib, not strongly 4-angled, 8.5-11 mm long, 2.5-3 mm broad.....
Bidens comosa, p. 16
- 6(1). At least some of the leaves in whorls (circles) of 3 or more.....
Myriophyllum pinnatum,
 p. 21
6. Leaves opposite...(7)
- 7(6). Flowers greenish, without a corolla at flowering time, the stamens and pistils in separate flowers on the same (monoecious) or different (dioecious) plants; plants may have stinging hairs.....

-Urtica dioica, p. 41
7. Flowers not green, with a corolla, stamens and pistils in the same flower (flowers perfect); plants without stinging hairs
...(8)
- 8(7). Leaves toothed...(9)
8. At least some of the leaves with lobes which are cleft more than halfway to the midrib
...(10)
- 9(8). Ovary 4-lobed; leaves with a minty odor; stems not procumbent and rooting at the nodes; flowers in spike-like racemes.....
.....Teucrium canadense, p. 22
9. Ovary not 4-lobed; leaves without a minty odor; stems often procumbent and rooting at the nodes; flowers in terminal clusters (heads)....
.....Phyla lanceolata, p. 30
- 10(8). Plants more than 3 cm tall; leaves without a dense covering of hairs on both surfaces; flowers in dense axillary clusters; pedicels lacking or nearly so.....
.....Lycopus americanus, p. 21
10. Plants about 2 cm tall; leaves with more or less dense covering of hair on both surfaces; flowers not in dense axillary clusters; pedicels 5-10 mm long.....
.....Leucospora multifida,
p. 41

Section VII. NONWOODY PLANTS WITH ALL LEAVES
SIMPLE AND ARISING ONLY AT THE
BASE OF THE PLANT

1. Bruised rootstock and leaves sweet-smelling or spicy-fragrant; flowers greenish-yellow; crowded on a thick finger-like column (spadix) arising from the side of the long, green leaf-like spathe.....
.....Acorus calamus, p. 41
1. Bruised rootstock and leaves not sweet-smelling; flowers other than described above...(2)
- 2(1). Flowers of tones of brown, buff, greenish, or straw color, or, if of other colors, the perianth (corolla and calyx) dry and scale-like or thin and transparent, or perianth absent or reduced to bristles or scales, with the flowers then occurring in the axils of imbricated (overlapping) dry scales forming spikes or spikelets...(3)
2. Flowers purple, blue, lavender, rose, pink, white, or yellow, but the color produced in a conspicuous or developed perianth or corolla ... (6)
- 3(2). Flowers greenish-yellow, each with numerous pistils arranged up and down the length of an elongated, tail-like receptacle, at the base of which are 10-18 stamens, 5 petals,

- and 5 sepals.....Myosurus minimus, p. 27
3. Flowers of other colors or without the above combination of characters...(4)
- 4(3). Perianth consisting of 3 sepals and 3 similar petals.....Juncus (p. 70 L. 4)
4. Perianth absent or reduced to bristles or scales...(5)
- 5(4). Leaf-sheaths split lengthwise on the side opposite the blade; leaves usually 2-ranked; stems rounded or flat, never triangular in cross-section, usually hollow...
GRAMINEAE (p. 72 L. 8)
5. Leaf-sheath continuous around the stem or becoming ruptured only in age; leaves usually 3-ranked, or reduced to sheathing scales only; stems often triangular in cross-section, usually with a pith...CYPERACEAE (p. 79 L. 29)
- 6(2). Leaves with the petiole joining the blade near its center (peltate).....
.....Nelumbo lutea, p. 24
6. Leaves not peltate, the petiole joining directly to the lower end or base of the blade...(7)
- 7(6). Carpels (pistils) more than 8, distinct (not united with each other); stamens 9-20 or more; inflorescence often with 2 or more whorls of branches, sometimes with

only 1 whorl...ALISMACEAE (9)

7. Carpels (pistils) 2-3, rarely 4-6, usually united into a 2-3-celled ovary, rarely the carpels only slightly united; stamens 3; inflorescence various, sometimes composed of a single whorl...Heteranthera (8)
- 8(7). Leaf-blades longer than broad, narrowed to an acute, obtuse, or slightly heart-shaped base; flowers only 1 in each inflorescence, its tube 20-35 mm long.....
.....Heteranthera limosa, p. 38
8. Leaf-blades about as broad as long with a deeply heart-shaped base; flowers 2-16 in the inflorescence; tube of flower 6-10 mm long
.....Heteranthera reniformis,
p. 38
- 9(7). Each flower with 6 stamens; pistils in one ring on a small flat receptacle.....
.....Alisma subcordatum, p. 31
9. Some of the flowers with 6-20 or more stamens; pistils in several series in a head on enlarged greenish-white receptacle...(10)
- 10(9). All flowers perfect (with both stamens and pistils in the same flower); individual mature seed-like fruits (achenes) plump with ribs or ridges, not flattened or winged; in addition to the 3 minute or

leaf-like bracts at each joint where the flower-stalks originate, there are additional papery or minute outgrowths (bracteoles)...Echinodorus (11)

10. Some flowers with either stamens or pistils, but not both on the same flower; individual mature seed-like fruits (achenes) flattened or winged; only the 3 papery or leaf-like bracts present at each joint where the flower-stalks originate...Sagittaria (12)

11(10). Main flower-stem (scape) upright, mostly branched; sepals with smooth veins; fruits with beaks 0.5-0.8 (-1) mm long; transparent lines on leaves (use lens) mostly less than 1 mm apart and often several mm long.....Echinodorus berteroi, p. 41

11. Main flower-stem (scape) eventually lying on or touching the ground (prostrate or procumbent); sepals with tiny ridges covered by projections (papillae); fruits with beaks 0.2-0.8 mm long; transparent lines on leaves mostly 1 mm or more apart and rarely more than 1 mm long.....Echinodorus cordifolius, p. 31

12(10). Sepals large and conspicuous, appressed to and surrounding the mature fruit,

nearly orbicular; lower flowers perfect
 (with both stamens and pistils in the
 same flower); fruiting pedicels thick,
 mostly 2-5 cm long.....
Sagittaria montevidensis,
 p. 41

12. Sepals not large and conspicuous, spreading
 or reflexed (turned down), not orbicular;
 lower whorls (circles) of flowers either all
 pistillate (female) or all staminate (male);
 fruiting pedicels not conspicuously thick.....
 (13)

13(12). Leaves not arrowhead-shaped nor with
 tail-like lobes at base...(14)

13. Leaves arrowhead-shaped or with tail-like
 lobes at base...(15)

14(13). Filaments glabrous (without hairs or
 scales); leaf-blades pinnately-nerved
 (main side nerves joining the midrib at
 points one above the other, feather-like);
 the papery or leaf-like bracts (at base
 of each whorl of flower-stalks) nearly
 separate, long-pointed, 9-15 mm long.....
Sagittaria ambigua, p. 41

14. Filaments minutely hairy or roughened (use
 lens); leaf-blades palmately-nerved (main
 nerves arising from the base); the 3 papery

bracts (at base of each whorl of flowers),
 united at their base, ovate, 3-8 mm long.....

.....Sagittaria graminea, p. 31

15(13). The 3 papery or thin bracts at base of
 each whorl of pistillate (female)
 flower- or fruit-stalks rounded, blunt,
 or slightly pointed at tip, 1 cm or less
 long; main flower-stem (scape) rounded
 in cross-section, scarcely angled; beak
 of mature fruits horizontal.....

.....Sagittaria latifolia, p.

31

15. The 3 papery or firm leaf-like bracts at base
 of each whorl of pistillate (female) flower-
 or fruit-stalks long-pointed at tip, 1.5-4 cm
 long; main flower-stem (scape) angled; beak
 of mature fruit erect to ascending.....

.....Sagittaria engelmanniana,

p. 41

Section VIII. NONWOODY PLANTS WITH ALTERNATE,
SIMPLE LEAVES WITHOUT TEETH OR
LOBES

1. Ray flowers 8-15 mm long, lilac or white;
disk flowers yellow..Boltonia asteroides,
p. 16
1. Without the above combination of characters
...(2)
- 2(1). Flowers of brown, buff, greenish, or straw-
color, or, if other colors, the perianth
(corolla and calyx) dry and scale-like or
thin and transparent, or perianth absent
or reduced to bristles or scales, with the
flowers then occurring in the axils of
imbricate (overlapping) dry scales forming
spikes or spikelets...(3)
2. Flowers of mainly other colors, white, purple,
lavender, blue, or greenish, but the color
produced in a perianth or corolla...(60)
- 3(2). Perianth consisting of 3 sepals, 3 similar
petals, and 3 or 6 stamens...Juncus (4)
3. Perianth absent, or reduced to bristles or
scales...(7)
- 4(3). Leaves with cross partitions which show up
as darker or harder places at regular inter-
vals; underground root-stock bearing tuber-
ous enlargements..Juncus torreyi, p. 37

4. Leaves without any cross partitions which show up as darker or harder places at regular intervals; underground root-stock not bearing tuberous enlargements...(5)
- 5(4). Auricles at summit of leaf-sheath white and very thin, 1-3.5 mm long, loose, like a tiny flap protruding at the summit of the sheath.....Juncus tenuis, p. 41
5. Auricles at summit of leaf-sheath short and rounded, not loose or protruding as a tiny flap...(6)
- 6(5). Auricles yellow and glossy, rigid, like cartilage; perianth 4-6 mm long, spreading-ascending, overtopping the capsule.....
.....Juncus dudleyi, p. 37
6. Auricles brownish or greenish, firm but not rigid or glossy; perianth 3-4 mm long about equaling the capsule.....
.....Juncus interior, p. 37
- 7(3). Leaf-sheaths split lengthwise on the side opposite the blade; leaves usually 2-ranked; stems rounded or flat, never triangular in cross-section, usually hollow
...GRAMINEAE (8)
7. Leaf-sheaths continuous around the stem or becoming ruptured only in age; leaves usually 3-ranked, or reduced to sheathing

scales only; stems often triangular in cross-section, usually with a pith...CYPERACEAE (29)

- 8(7). Inflorescence consisting of 1 (or presenting the appearance of 1) dense or closely flowered spike (shaped like a pencil, tail, broom, brush, finger, shaft, hook, curve, or match stick), the spikelets surrounding all sides of the main axis, or with only their sides or edges next to the main axis (rachis) of the inflorescence...(9)
8. Inflorescence not appearing as 1 dense or closely-flowered spike, but as other types of arrangements which have 2 or more separate units of branches...(15)
- 9(8). Bristles or awns (stiff or delicate, 2 mm or more long, extensions or outgrowths, usually from midrib of lemma or glume) on some part of the spikelet or at the base of the spikelets (hairs attached to or covering parts of spikelets should not be judged as bristles or awns...(10)
9. Bristles or awns absent.....
Phalaris arundinacea, p. 36
- 10(9). Slender bristles on the outside and at the base of each spikelet, but no awns arise

- from the glumes, lemma, or palea of the spikelet.....Setaria faberii, p. 36
10. Awns attached to some part of the spikelet, but no bristles are on the outside or at the base of a spikelet (do not confuse bristle-like glumes of Hordeum)...(11)
- 11(10). Long awns present on both glumes and lemmas...Hordeum (12)
11. Long awns, when present, only on glumes or lemma, not on both...(13)
- 12(11). Inflorescence nodding or curving down; awns curving outward or spreading at maturity; spikelets 30-70 mm long (measured from the base to the tip of awn); all glumes bristle-like throughout.....Hordeum jubatum, p. 35
12. Inflorescence erect; awns erect or ascending, straight at maturity; spikelets 12-20 mm long (measured from base to tip of awn); at least some of the glumes broadened above bases.....Hordeum pusillum, p. 35
- 13(11). Awns on glumes only, not on lemmas.....
.....Phleum pratense, p. 41
13. Awns on lemmas only, not on glumes...(14)
- 14(13). Awns arising from the back, but not the tip of the lemma, 3-5 mm long; both glumes about 2-2.5 mm long.....

.....Alopecurus carolinianus,
p. 34

14. Awns arising from the tip of the lemma, 1 mm long; one glume reduced to .01 mm long; the other about as long as the rest of the spikelet.....Eriochloa contracta, p. 35

15(8). Plants 1-3 mm tall, averaging close to the height of a man; leaf blades 1-3.5 cm wide; inflorescence all at the top of the culm (stem), consisting of 2-4 spikes which are pistillate (female) in the lower portion and staminate (male) in the upper portion; no awns present on any part of the spikelet.....Tripsacum dactyloides, p. 37

15. Without the above combination of characters
...(16)

16(15). Some part of the spikelet prominently nerved; some of the hairs on the spikelet often with a blister-like or swollen base (papillose-hispid) or rather stiff; ligule absent; (sheaths compressed)...Echinochloa (17)

16. Without the above combination of characters
...(18)

17(16). Swollen- or blister-based stiff hairs present on all or most nerves in addition to those on marginal nerves of 2nd glume and sterile lemma; use a magnification of 15X or more to observe that the summit of the smooth shining fertile lemma tapers into a long rather firm acuminate (well-pointed) or nearly acuminate tip lacking a ring of microscopic hairs; conspicuous long and bristle-like hairs few or sometimes absent at the nodes (joints) and along the rachis of the branches of the inflorescence.....Echinochloa muricata, p. 34

17. Hairs, when present on 2nd glume and sterile lemma, fine and slender from base to tip, the swollen- or blister-based hairs, if present at all, occurring only on marginal nerves; use a magnification of 15X or more to observe that the summit of the smooth shining fertile lemma tapers into a short, soft, easily bent, or wrinkled obtuse (blunt) tip with a ring of microscopic hairs present where the summit grades into the softer dull tip; conspicuous long and bristle-like hairs frequent at the nodes

and sometimes along the rachis of the inflorescence.....Echinochloa crusgalli, p.

34.

18(16). Awns present on some part of the spikelet
...(19)

18. Awns absent on all parts of the spikelet...
(21)

19(18). Plants usually more than 1 mm tall with stout scaly rhizomes forming colonies; leaf-blades with sharp edges, their surfaces rough; spikelets more than 10 mm long.....
.....Spartina pectinata, p. 36

19. Annual plants less than 1 mm tall, and without rhizomes; leaf-blades not sharp; spikelets less than 10 mm long...(20)

20(19). Glumes longer than and enclosing the lemmas; inflorescence a panicle with the spikelets on the tips of the branches; spikelets less than 3 mm long; leaves 1-2 mm broad.....
.....Agrostis hyemalis, p. 34

20. Glumes shorter than the lemmas; inflorescence a raceme; spikelets 5-10 mm long; leaves 2-10 mm broad.....Leptochloa fascicularis,
p. 41

21(18). Flowers with only one sex developed on a single plant, either staminate (male) or pistillate (female); lemmas more or less

pubescent (with hairs), 2-4 mm long.....
Eragrostis reptans, p. 35

21. Flowers with both sexes on the same plant;
 lemmas pubescent or without hairs...(22)

22(21). Spikelets with bristles on edges (glumes
 absent)...Leersia (23)

22. Glumes present...(24)

23(22). Spikelets 2.5-3.5 mm long; leaves at most
 finely scabrous (rough with minute hairs)
 on margins, and this not obvious; culms
 compressed (flattened); lower branches
 of inflorescence solitary.....
Leersia virginica, p. 41

23. Spikelets 4.5-6 mm long; leaves with bristle-
 cilliate or scabrous-hispid margins (with
 longer stiffer hairs) and this obvious; culms
 terete (circular in cross-section); lower
 branches of inflorescence whorled.....
Leersia oryzoides, p. 35

24(22). Glumes overlapping and enclosing the en-
 tire floret; ligule conspicuous; 9-10 mm
 long; perennial from creeping rhizomes....
Phlaris arundinacea, p. 36

24. Ligule less than 9 mm long or absent...(25)

25(24). Spikelets 1-flowered; inflorescence a
 panicle with pinnate branching...(27)

25. Spikelets 2-10 flowered; inflorescence a raceme-like panicle with 2 rows of spikelets sessile on the branches of the inflorescence...Leptochloa (26)
- 26(25). Lemmas 1-1.5 mm long; spikelets 3- or 4-flowered, 1.4-2.6 mm long.....
.....Leptochloa filiformis,
p. 41
26. Lemmas 2.5-4 mm long; spikelets 6- to 12-flowered, 5-10 mm long.....
.....Leptochloa fascicularis,
p. 41
- 27(24). Annual, with delicate roots (easily pulled from the ground); ligule a dense ring of white hairs 1-2 mm long.....
.....Panicum dichotomiflorum,
p. 35
27. Plants perennial (not easily pulled from the ground); ligule a membranous scale...(28)
- 28(27). Plants with strong branching scaly rhizomes; stems tough 1-2 mm tall; spikelets scattered uniformly on all parts of the inflorescence, not crowded at the ends of the branchlets; branches of the inflorescence not capillary; spikelets over 3 mm long with only the 2nd glume longer than the fertile lemma...
.....Panicum virgatum, p. 36

28. Plants without strong branching scaly rhizomes; stems not tough, only 1-6 mm long; spikelets crowded at the ends of the branchlets; branches of the inflorescence capillary; spikelets less than 3 mm long; both glumes longer than the fertile lemma.....
Agrostis hyemalis, p. 34
- 29(7). Ordinary leaves apparently not present on plant, only the culms (stems) evident...
 (30)
29. Ordinary leaves present, either occurring at base of plant, on culm, or both...(36)
- 30(29). Inflorescence of 1 spikelet at top of stem (culm); achenes crowned with a tubercle...Eleocharis (31)
30. Inflorescence of 2 or more spikelets, or, of only 1 spikelet, this not at very tip of stem; achenes lacking a tubercle...Scirpus
 (56)
- 31(30). Stems capillary, usually angular, less than 0.5 mm thick; spikelets flattened; scales 2-3 ranked.....
Eleocharis acicularis,
 p. 33
31. Without the above combination of characters
 ...(32)
- 32(31). Plants tufted, annuals without firm elongate rhizomes and stolons...(34)

32. Plants perennial, with firm reddish, purple,
or black strong rhizomes or stolons...(34)
- 33(32). Spikelets broadly ovoid to cylindric,
usually obtuse; scales obtuse.....
.....Eleocharis obtusa, p. 33
33. Spikelets lance-acuminate; scales acute.....
.....Eleocharis lanceolata,
p. 33
- 34(32). Achenes biconvex; bristles often present
...(35)
34. Achenes trigonous; bristles absent.....
.....Eleocharis compressa, p.
33
- 35(34). Culms firm or wiry, subterete (almost
rounded); fertile scales loosely ascend-
ing.....Eleocharis smallii, p. 33
35. Culms soft, flat or compressed; fertile scales
compressed.....Eleocharis macrostachya,
p. 33
- 36(29). Spikelets not all alike, because the
staminate (male) and pistillate (female)
flowers are in separate parts of the same
inflorescence or in completely separate
inflorescence; each achene surrounded by
a sac (perigynium)...Carex (37)

36. The spikelets appearing to be all the same or essentially so, some or all of the flowers with stamens and pistil in the same flower (perfect), none of the pistillate flowers surrounded by a sac...(47)
- 37(36). Surface of perigynia hairy or with a minute rough puberulence (rough-toothed or serrulate beaks of glabrous perigynia not included here).....
Carex lanuginosa, p. 32
37. Perigynia glabrous or nearly so (roughened, toothed, or serrulate margins of beaks are included here)...(38)
- 38(37). Styles 3; achenes (inside perigynia) 3-sided...(39)
38. Styles 2; achenes 2-sided...(41)
- 39(38). Perigynium ends in a prominent 2-toothed or 2-pronged beak, the teeth of beak 0.2-2.2 mm long...(40)
39. Tip of perigynium ends abruptly and cut off straight across or at an angle (obliquely), either without teeth or with only a slight notch without conspicuous projections.....
Carex amphibola, p. 32
- 40(39). Main body of perigynium (excluding its beak) broadest in the upper half; all scales of pistillate spike with a long

- awn much longer than the length of the perigynium; perigynium 3.5-5 mm long.....
Carex frankii, p. 41
40. Main body of perigynum broadest in the lower half; scales of pistillate spike shorter than or equalling the length of the perigynia; perigynia mainly 5-9 mm long.....
Carex laeviconica, p. 32
- 41(38). Uppermost spike completely staminate (male); lowermost spikes completely pistillate (female).....Carex emoryi, p. 32
41. All spikes alike or nearly so, with both staminate and pistillate flowers in the same spike (where stamens have fallen or disappeared from mature or old spikes, the locations of staminate flowers may be detected by empty scales at base or tip of spike)...(42)
- 42(41). Staminate (male) flowers located at tip of some or all of the spikes...(43)
42. Staminate flowers at base of some or all spikes...(46)
- 43(42). Spikes 2-12, mostly in simple interrupted or close heads...(44)
43. Spikes numerous, in paniculate spiciform heads, usually 2-several on each lateral branch...(45)

- 44(43). Leaf-sheaths close or tight, not prominently septate on the back; blades 2-4 mm broad; perigynia 3-3.5 mm long.....
.....Carex muhlenbergii, p. 32
44. Leaf-sheaths loose and prominently septate on the back; blades 3.5-8 mm borad; perigynia 3.5-5.5 mm long.....Carex gravida, p. 32
- 45(43). Beak of perigynium about equaling main body of perigynium; perigynium 1-1.8 mm wide.....Carex vulpinoidea, p. 32
45. Beak of perigynium much shorter than main body of perigynium; perigynium 1.5-2.4 mm wide.....Carex annectens var. xanthocarpa, p. 41
- 46(42). Spikes conical to slightly rounded at summit; scales acuminate, nearly equaling beak of perigynium; perigynium 2.5-3.5 mm broad....Carex brevior, p. 32
46. Spikes broadly rounded at summit; scales blunter, reaching only to base of beak of perigynium; perigynium 2-3 mm broad.....
.....Carex molesta, p. 41
- 47(36). Scales of spikelets in 2 ranks, alternating on 2 sides of the raches giving the spikelet a flattened appearance...Cyperus
(48)

47. Scales of spikelets spirally arranged, presenting a more rounded or cone-like appearance...(55)
- 48(47). Annuals or short-lived perennials with soft bases and tufted fibrous roots, without stolons or hardened rhizomes or tubers...(49)
48. Perennials with hardened rhizomes or tubers or producing tuber-bearing stolons...(53)
- 49(48). Tips of loosely spreading scales very slender and recurved; dwarf plants, rarely up to 1.6 dm tall.....
Cyperus aristatus, p. 41
49. Tips of scales not strongly recurved; if slightly so, the plants larger than 1.6 dm tall...(50)
- 50(49). Inflorescence spherical with radiating spikelets.....Cyperus acuminatus, p. 32
50. Inflorescence more elongated along the rachis, not spherical...(51)
- 51(50). Scales 1-1.5 mm long; rachilla continuous, not disarticulating at maturity, wingless or very narrowly winged.....
Cyperus erythrorhizos,
 p. 33
51. Scales 1.8-4.5 mm long; rachilla winged, jointed and disarticulating at base or

breaking into segments...(52)

- 52(51). Scales 3-4.5 mm long, yellow or yellow-tinged; rachilla not breaking into short segments, the narrow somewhat confluent wings not embracing the achenes.....
Cyperus strigosus, p. 41
52. Scales 1.5-2.3 mm long, reddish-brown; rachilla breaking into short segments with the achenes embraced by broad clasping wings..
Cyperus ferruginescens,
 p. 33
- 53(48). Scales of spikelet mainly 3-4.5 mm long, conspicuously keeled; base of culm either with a hardened enlargement or sending out thick underground stolons...
 (54)
53. Scales of spikelet mainly 2-2.9 mm long, faintly keeled; base of culm sending out slender underground scaly stolons, sometimes bearing a tuber at the end.....
Cyperus esculentus, p. 33
- 54(53). Base of culm not forming hardened rhizomes or sessile tubers, mostly stoloniferous; mature scales reddish-brown.....Cyperus setigerus, p. 33
54. Base of culm with hard knotty rhizomes or series of tubers; mature scales golden with

- a green midrib.....Cyperus strigosus, p. 41
- 55(47). Base of style larger than rest of style...
Fimbristylis autumnalis,
 p. 41
55. Base of style slender, not larger than rest
 of style...Scirpus (56)
- 56(55). The culm ends in 1 erect bract (which
 resembles a continuation of the culm),
 the inflorescence thus appearing to
 originate from the side of the stem;
 stems without leaves or leaves inconspic-
 uous...(57)
56. The culm ends in 2 or more leaf-like spread-
 ing bracts, the inflorescence thus terminat-
 ing the culm; culms with several or many well-
 developed leaves...(58)
- 57(56). Spikelets without or nearly without a
 stalk, appearing to come directly from
 the culm; culms 3-angled.....
Scirpus americanus, p. 41
57. Spikelets with a stalk, culms terete (rounded)
Scirpus validus, p. 34
- 58(56). Culms sharply 3-angled; spikelets 20-40 mm
 long, 5-11 mm thick; achenes 4-5 mm long..
Scirpus fluviatilis, p. 33
58. Culms obtusely (bluntly) angled; spikelets
 2-10 mm long, 1-4 mm thick (excluding bris-

- ... tles); achenes 0.7-1.3 mm long...(59)
- 59_58). Bristles in flower and fruit with tiny barbs directed downward (retrosely) (do not confuse with the smooth filaments which may remain attached at first); stems either solitary or few in a clump from scaly stolons.....
Scirpus atrovirens, p. 33
59. Bristles in flower and fruit smooth, or, if barbed, the barbs few and upwardly ascending; stems growing usually from large clumps, not producing stolons...Scirpus pendulus, p. 34
- 60(2). Only 1 leaf present on the stem (there may be more at the base); flowers blue-purple; stamens 6; ovary superior.....
Pontederia cordata, p. 38
60. Without the above combination of characters ... (61)
- 61(60). Petals absent at flowering time, only a calyx or sepal-like parts present, the latter sometimes reduced to small scales ... (62)
61. Petals present at flowering time... (82)
- 62(61). Flowers on a thick, fleshy, finger-like axis 4-9 cm long becoming 0.7-2 mm thick in fruit; bruised leaves (stems); root-stock fragrant and sweet-tasting.....

-Acorus calamus, p. 41
62. Without the above combination of characters
 ...(63)
- 63(62). Flowers in dense masses in an upright,
 long narrow, cylindrical, constricted
 or divided spike, 10-35 mm long, the
 lower half (pistillate) chocolate or
 reddish-brown, the upper half (staminate)
 mustard- or brownish-yellow; fruiting
 spikes with dense masses of down; leaves
 very long and strap-shaped; stem 0.75-
 2.7 m tall...Typha (64)
63. Without the above combination of characters
 ...(65)
- 64(63). Flowering spikes continuous, the male
 part not separated from the female part
 ...Typha latifolia, p. 39
64. Flowering spikes with the male parts
 separated from the female part by a naked
 axis.....Typha angustifolia, p. 39
- 65(63). Flowers in more or less spherical heads,
 the stamen-bearing heads above, the pis-
 tillate heads below.....
-Sparganium, (66)
65. Flowers not in spherical heads...(67)

- 66(65). Stigmas 2 to each pistillate flower,
 fruits sessile, wedge-shaped and widest
 at summit or in the upper half.....
Sparganium eurycarpum,
 p. 39
66. Stigmas 1 per flower; fruits narrowed to a
 stalk-like base, and tapering above, widest
 around the middle, or at least not conspic-
 uously broadened above.....
Sparganium americanum,
 p. 41
- 67(65). Nodes of stem covered or surrounded by a
 thin tube-like sheath (ocrea) formed
 from united stipules...POLYGONACEAE (68)
67. Stipules, if present, not forming a tube-like
 sheath around the nodes of the stem...(81)
- 68(67). Sepals 6, the inner 3 sepals longer and
 enlarged in fruit; usually a cluster of
 leaves present at base of plant...Rumex
 (69)
68. Sepals usually 4 or 5, but, if 6, then the
 flowers not occurring in many-flowered in-
 florescences; the sepals nearly equal in
 length in fruit or the inner sepals smaller;
 usually no cluster of leaves present at base
 of plant...Polygonum, (70)

- 69(68). Leaves conspicuously wavy or wrinkled on margins, stems usually lacking side branches; grain-like tubercle of the fruit about $2/3$ as wide as long.....
.....Rumex crispus, p. 26
69. Leaves flat and smooth, without wrinkled or wavy margins; stems usually with side branches; grain-like tubercle of the fruit $1/2$ as wide or narrower.....Rumex altissimus, p. 26
- 70(68). Flowers not in terminal spike-like or raceme-like inflorescence.....
.....Polygonum ramosissimum,
p. 26
70. Flowers in terminal spike-like or narrowly raceme-like inflorescences...(71)
- 71(70). Peduncles with numerous stalked glands
...(72)
71. Peduncles without stalked glands (sessile ones may occur)...(74)
- 72(71). Styles and stamens of the same length (or nearly so), not exerted from calyx; achene lenticular, flat or nearly so on both surfaces; annual.....
.....Polygonum pennsylvanicum,
p. 26
72. Styles or stamens exerted; achene lenticular and with at least one side convex or ridged
...(73)

- 73(72). Racemes 1 or 2, terminal; achene plump, strongly biconvex; leaves and sheaths obviously pubescent (at least when young); fruiting sepals more than 4 mm long, strongly veined; flowers pinkish-red; stems green; perennial.....
Polygonum coccineum, p. 26
73. Racemes numerous, lateral and terminal; achenes ridged or with only one strongly convex face; leaves and sheaths glabrous or nearly so; fruiting sepals usually less than 4 mm long; flowers white or pink; stems usually cherry-red (at least at nodes); annual.....
Polygonum bicorne, p. 26
- 74(71). Racemes usually nodding; sepals with prominent anchor-shaped veins near apex; achene lenticular, flat, about 2 mm long; annual.....Polygonum lapathifolium, p. 26
74. Racemes erect; sepals without anchor-shaped veins; achenes biconvex, oval in cross-section; annual or perennial...(75)
- 75(74). Ocrea (stipular sheath) with marginal cilia less than 1 mm long.....
Polygonum coccineum, p. 26
75. Ocrea with marginal cilia 1.5 mm long or more ... (76)

- 76(75). Calyx with glands...(77)
76. Calyx without glands...(78)
- 77(76). Achenes black, lustrous, smooth; young
flower buds white or green-tipped; in-
florescence erect.....
.....Polygonum punctatum, p. 26
77. Achenes black, dull, minutely pitted; young
buds pinkish; inflorescence usually nodding
.....Polygonum hydropiper, p.
41
- 78(76). Achenes trigonous; styles 3...(79)
78. Achenes lenticular; styles 2...(80)
- 79(78). Racemes usually less than 4 cm long,
mostly rounded at the apex; marginal
cilia of ocrea usually less than 3 mm
long; achenes ovoid, longer than wide,
lenticular or trigonous (if trigonous,
the faces slightly concave).....
.....Polygonum persicaria,
p. 41
79. Racemes usually more than 4 cm long, tapering
to the apex; marginal cilia of ocrea usually
3 mm or more long; achenes trigonous.....
.....Polygonum hydropiperiodes,
p. 26
- 80(78). Racemes usually less than 4 cm long,
mostly rounded at the apex; marginal

- cilia of ocrea usually less than 3 mm long; achene lenticular or trigonous (if trigonous, the faces slightly concave); annual...Polygonum persicaria, p. 41
80. Racemes usually more than 4 cm long, tapering to the apex; marginal cilia of ocrea usually 3 mm or more long; achene biconvex; perennial.....Polygonum coccineum, p. 26
- 81(67). Perianth 6 parted; plants with a grass-like appearance...Juncus (4)
81. Perianth 5 parted; plants not grass-like.....Amaranthus tamariscinus, p. 13
- 82(61). Petals 4...Ludwigia (83)
82. Petals 5 or 6...(84)
- 83(82). Stamens 4; fruit less than 10 mm long, mostly as broad as long or slightly longer.....Ludwigia alternifolia, p. 41
83. Stamens 8-12; fruit 10-50 mm long, conspicuously longer than broad.....Ludwigia peoloides, p. 25
- 84(82). Petals yellow, calyx about 10 mm long.....Lysimachia ciliata, p. 27

84. Petals bright-purple, calyx 5-7 mm long.....
.....Lythrum californicum, p.

Section IX. NONWOODY PLANTS WITH ALTERNATE,
SIMPLE TOOTHED OR LOBED LEAVES
(MARGINS OF LEAVES NOT COMPLETELY
ENTIRE)

1. Stems 3-6 (10 or more) dm tall with short hairs; leaves sessile, rough hairy; hairs with pustulate bases.....Ambrosia psilostachya, p. 15
1. Without the above combination of characters ... (2)
 - 2(1). At least some of the leaves bearing small green or black bladders; stems not self-supporting out of water and often found lying on wet ground; calyx with 2 lobes fused at the base.Utricularia vulgaris, p. 23
2. Without the above combination of characters ... (3)
 - 3(2). Flowers with the stamens and pistils separated in different flowers on the same plant (monoecious) or different plants (dioecious)... (4)
3. Flowers perfect (with the stamens and pistils in the same flower)... (5)
 - 4(3). Stipules present at base of leaf-stalk in the form of a very small, narrow, scale- or hair-like appendages or outgrowths; plants usually with stinging hairs; leaves more

than 5 mm wide, usually in shaded areas
under trees.....Laportea canadensis,
p. 41

4. Stipules absent; plants without stinging hairs;
leaves less than 5 mm wide.....
.....Myriophyllum pinnatum,
p. 21

5(3). Stamens many (more than 12), inserted
directly on the receptacle together with
the sepals, the sepals not united into a
tube but separate to their base; petals
5, 2.5-3.5 mm long.....
.....Ranunculus abortivus, p.
41

5. Without the above combination of characters
...(6)

6(5). Stamens 16-24 or more, inserted on the style
(monadelphous); petals 6-8 cm long.....
.....Hibiscus militaris, p. 24

6. Stamens 4-10, not monadelphous; petals less
than 5 cm long...(7)

7(6). Petals absent or rarely present, the flowers
yellowish-green, turning orange-red in
fruit; calyx deeply parted, but the seg-
ments connected at base.....
.....Penthorum sedoides, p. 28

7. Without the above combination of characters
...(8)

- 8(7). Stamens 6, 4 long ones and 2 short; petals
4, not fused at their base; stems and
leaves sparsely if at all hairy...CRUCI-
FERAE (9)
8. Stamens 4; petals 5, fused at their base;
stems and leaves with an obvious covering of
hairs.....Leucospora multifida,
p. 41
- 9(8). Petals yellow or orangish, leaves of the
stem with auricles (ear like extensions
around the stem at the base of the leaf)....
.....Rorippa sinuata, p. 20
9. Petals white, leaves of the stem without
auricles.....Arabis virginica, p. 19

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Glossary

- Achene. A dry indehiscent one-seeded fruit.
- Acuminate. Tapering at the end to a gradual point. (Fig. II)
- Acute. Sharp, ending in a point, the sides of the apex essentially straight or slightly convex.
- Alternate. Placed singly at different heights on the axis or stem. (Fig. III)
- Annual. Of only one growing season.
- Anthesis. The expansion or the time of expansion of a flower.
- Apical. Relating to the apex or tip.
- Appendage. An attached extra or secondary part, as a projecting or a hanging part or supplement.
- Appressed. Lying close and flat against.
- Aquatic. Living in water.
- Ascending. Rising somewhat obliquely, or curving upward.
- Auricle. An ear-shaped appendage or lobe. (Fig. IV)
- Awn. A bristle-shaped appendage. (Fig. V)
- Axillary. In or related to the axis.
- Axis. The central part of a longitudinal support on which organs or parts are arranged.
- Barbed. Bristles or awns provided with terminal or lateral spinelike hooks that are bent backwards sharply. (Fig. VI)



Fig. II

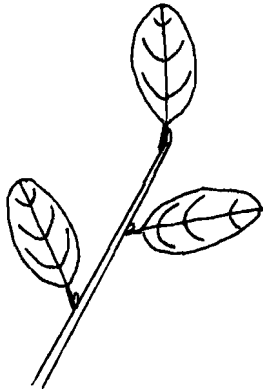


Fig. III

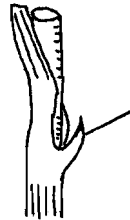


Fig. IV



Fig. V



Fig. VI

Beak. A long prominent and firm point. (Fig. VII)

Biconvex. Convex on both sides as in a lens.
(Fig. VIII)

Biennial. Of two years' duration.

Bifid. Two-cleft. (Fig. XIX)

Bipinnate. Doubly or twice pinnate. (Fig. X)

Blade. The expanded part of a leaf or petal.

Bloom. A whitish powdery and glaucous covering
of the surface.

Bract. A more or less modified or reduced leaf
subtending a flower or belonging to an in-
florescence, or sometimes on the stem. (Fig.
XI)

Bristle. A stiff hair, or any slender body which
may be likened to a hog's bristle. (Fig. XII)

Bush. A low thick shrub, without distinct trunk.

Calcareous. Limey.

Calyx. The outer circle of floral envelopes con-
sisting of the sepals.

Calyx-tube. The tube of a gamosepalous calyx.
(Fig. XIII)

Capillary. Hairlike.

Capitate. Shaped like a head; collected into a
head or dense cluster.

Capsule. A dry dehiscent fruit composed of more
than one carpel.

Carpel. A simple pistil.

Cilia. Marginal hairs.

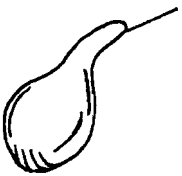


Fig. VII



Fig. VIII



Fig. IX

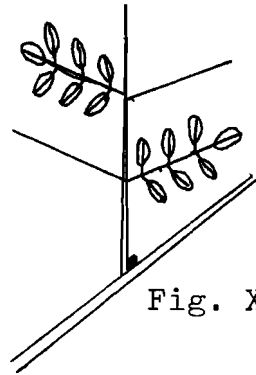


Fig. X

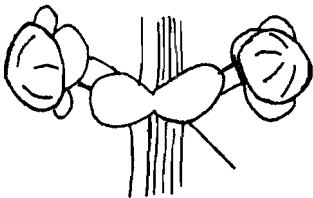


Fig. XI



Fig. XII



Fig. XIII

- Clasping. Leaf partly or wholly surrounding stem.
(Fig. XIV)
- Cleft. Divided to or about the middle into divisions.
- Compound leaf. A leaf of two or more leaflets.
(Fig. XV)
- Cordate. Heart-shaped with the point at the apex. (Fig. XVI)
- Corolla. Inner circle of floral envelopes of distinct or united petals.
- Creeping. Running along at or near the surface of the ground and rooting.
- Culm. The stem of grasses and sedges, usually hollow in the grasses except at the swollen nodes.
- Cyme. A broad more or less flat-topped flower-cluster with the central flowers opening first. (Fig. XVII)
- Dioecious. Staminate and pistillate flowers on different plants.
- Disk-flowers. In Compositae, the tubular flowers of the head as distinguished from the ray flowers. (Fig. XVIII)
- Distinct. Separate; not united with parts in the same series.
- Divided. Separated to the base.
- Entire. Without tothing, lobing, or division.
(Fig. XIX)
- Exserted. Projecting beyond, as stamens from a corolla.
- Feather-veined. With veins all arising from the sides of a midrib. (Fig. XX)



Fig. XIV

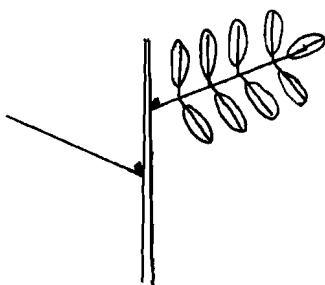


Fig. XV

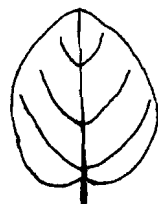


Fig. XVI



Fig. XVII

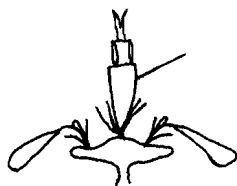


Fig. XVIII

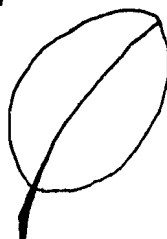


Fig. XIX



Fig. XX

Fertile. Said of pollen-bearing stamens and seed-bearing fruits.

Filament. The part of a stamen which supports the anther.

Florets. Individual flowers included within a very dense form of inflorescence.

Free. Not joined to other organs.

Funnelform. With the tube gradually widening upward and passing into the limb. (Fig. XXI)

Gamopetalous. Having the petals more or less united.

Gamosepalous. Having the sepals united.

Glabrous. Not hairy.

Glandular. Having or bearing secreting organs, or glands.

Glaucous. Covered with a 'bloom' or a whitish substance that rubs off.

Glume. A small chafflike bract usually applied to one of the two empty bracts at the base of the spikelet of the grasses. (Fig. XXII)

Head. A dense cluster of sessile flowers or fruits on a very short axis or receptacle.

Herbaceous. Having the characters of an herb; leaflike in color and texture.

Imbricate. Overlapping, as shingles on a roof.

Immersed. Growing wholly under water.

Incised. Cut sharply, irregularly, and more or less deeply.

Inferior. Lower or below; as an inferior ovary, one that is below the calyx or corolla.

Inflorescence. The flowering part of a plant, but especially the type of its arrangement.

Inserted. Attached to or arising from.

Internode. The portion of a stem or other structure between two nodes.

Involucral. Pertaining to an involucre.

Involucre. A circle or collection of small leaves or bracts surrounding a flower-cluster or head or a simple flower, sometimes reduced to one encircling bract. (Fig. XXIII)



Fig. XXI

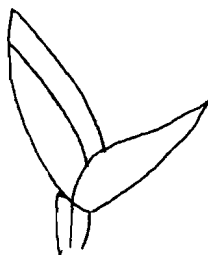


Fig. XXII

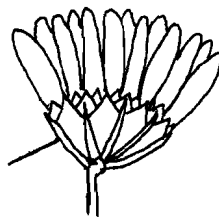


Fig. XXIII

Keeled. Ridged like the bottom of a boat.
 Lanceolate. Shaped like a lancehead, several times longer than wide, broadest toward the base and narrowed to the apex. (Fig. XXIV)

Lateral. Located on or at the side.

Latex. Milky sap.

Leaf-blade. The expanded or broader portion of a leaf.

Leaflet. One part of a compound leaf. (Fig. XXV)

Lemma. The lower of the two bracts immediately inclosing the flower in the grasses.

Lenticular. Having the shape of a biconvex lens. (Fig. XXVI)

Ligule. The flattened strap-shaped body of the ray flowers of Compositae or also applied to a projection from the top of the sheath in grasses and sedges. (Fig. XXVII)

Linear. Long and narrow, with parallel sides or nearly so.

Lobe. Any segment or part of an organ usually indicated by a division to about the middle.

Midrib. The central or main rib of a leaf or leaflike part.

Monadelphous. Stamens united by their filaments into a tube or column. (Fig. XXVIII)

Monecious. Having stamens and pistils in separate flowers on the same plant.

Node. A joint where one or more leaves are borne or a knot- or knob-enlargement. (Fig. XXIX)

Oblique. Unequal-sided or slanting.



Fig. XXIV

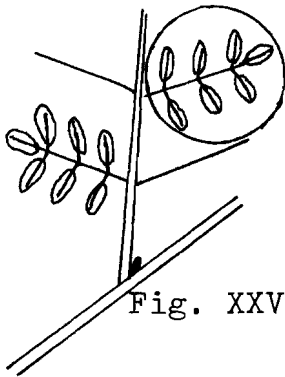


Fig. XXV



Fig. XXVI

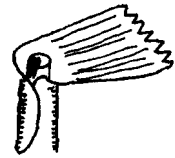


Fig. XXVII

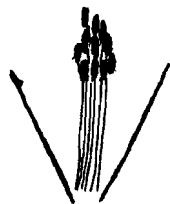


Fig. XXVIII

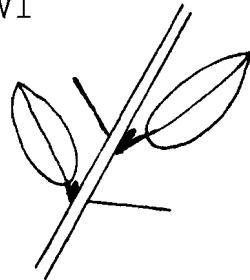
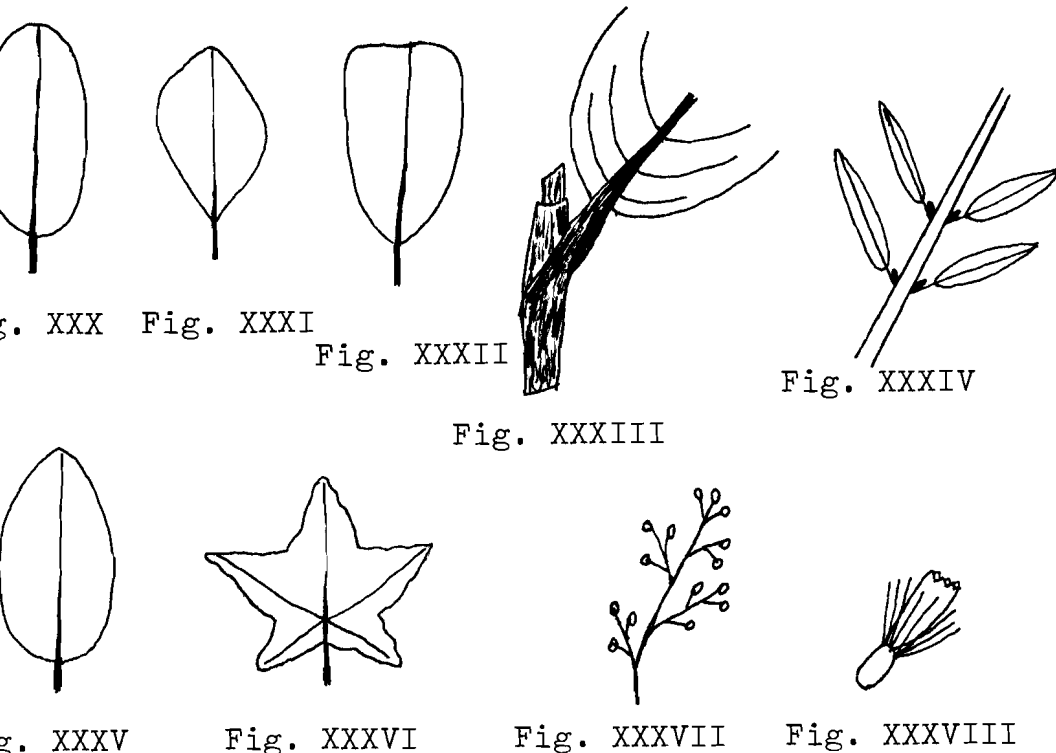


Fig. XXIX

- Oblong. Two or three times longer than broad and with nearly parallel sides. (Fig. XXX)
- Obovate. Inversely ovate. (Fig. XXXI)
- Obtuse. Blunt or rounded at the end. (Fig. XXXII)
- Ocrea. A tubular sheath formed by a fusion of two stipules. (Fig. XXXIII)
- Opposite. Two at a node, on opposing sides of a stem or branch. (Fig. XXXIV)
- Ovary. The part of the pistil which contains the ovules.
- Ovate. Having an outline like that of an egg, with the broader end at the base. (Fig. XXXV)
- Ovoid. A solid with an ovate outline.
- Palea. The upper one of the two bracts which, with the lemma, incloses the flower in grasses.
- Palmate. Lobed or divided in a handlike fashion. (Fig. XXXVI)
- Panicle. A loose irregularly compound inflorescence with pedicellate flowers, such as a branched raceme or corymb. (Fig. XXXVII)
- Panicled, Paniculate. Borne in a panicle; resembling a panicle.
- Papillose. Bearing minute pimple-like projections.
- Pappus. The modified calyx-limb in Compositae, etc., forming a plumose, bristle-, scale-like, or other type of crown at the summit of the achene. (Fig. XXXVIII)



- Parted. Cleft nearly but not quite to the base.
- Pedicel. The stem of an individual flower.
- Peduncle. Stem of a flower-cluster or of a solitary flower when that flower is the only member of the inflorescence.
- Peltate. Attached to the support by the lower surface away from the margins. (Fig. XXXIX)
- Perennial. Of three or more years' duration.
- Perfect. Having both functional pistil and stamens.
- Perianth. The two outer floral envelopes consisting of the calyx and corolla (when present), but not the stamens and pistils.
- Perigynium. The inflated sac which incloses the ovary in Carex.
- Persistent. Remaining attached or continuous.
- Petal. A division of the corolla, usually colored or showy.
- Petaloid. Colored and resembling a petal.
- Petiole. Leaf-stalk. (Fig. XL)
- Phyllary. Involucral bract in the Compositae.
- Pinnate. Compound and feather-like with the leaflets of a compound leaf on either side of the axis. (Fig. XLI)
- Pistil. The seed-bearing portion of the flower, consisting of the ovary, style, and stigma, or the style sometimes absent. (Fig. XLII)
- Pistillate. Provided with pistils, and without stamens or without functional stamens; the pistil may be simple, consisting of one carpel, or compound, consisting of two or more united carpels.

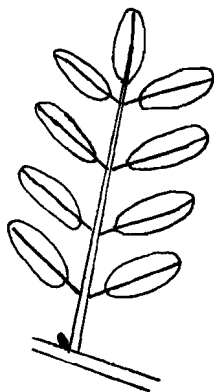


Fig. XXXIX

Fig. XL

Fig. XLI

Fig. XLII

- Pith. The soft spongy center of the stem of most seed plants.
- Prostrate. Lying flat upon the ground.
- Pubescent. Covered with hairs, especially if short and soft.
- Raceme. A simple inflorescence of stalked flowers arising from a more or less elongated common axis. (Fig. XLIII)
- Racemose. In racemes; or resembling a raceme.
- Rachilla. A secondary axis, as in the grasses and sedges for the floral axis. (Fig. XLIV)
- Rachis. The axis of an inflorescence or of a compound leaf.
- Ray. The branch of an umbel or similar inflorescence or the straplike marginal flower of many Compositae, when differentiated from the disk flower. (Fig. XLV)
- Receptacle. The more or less enlarged or elongated end of the stem or flower axis on which some or all of the flower parts are borne. (Fig. XLVI)
- Rhizome. An underground or prostrate usually horizontal stem, usually rooting at the nodes and becoming curved at the apex. (Fig. XLVII)
- Rib. A primary or prominent vein of a leaf.
- Rootstock. Same as rhizome, sometimes used for elongate, unmodified rooting underground offshoots.
- Runner. A slender trailing shoot which roots at the nodes.



Fig. XLIII



Fig. XLIV

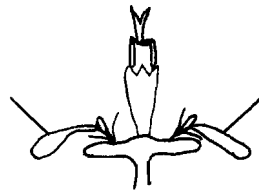


Fig. XLV

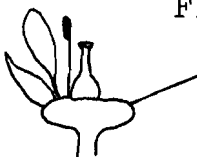


Fig. XLVI

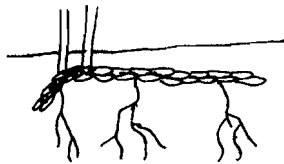


Fig. XLVII

Sagittate. Shaped like an arrow-head, the basal lobes pointing downward or backward. (Fig. XLVIII)

Scale. Mostly dry, thin, scarious leaves or bracts.

Seed. The ripened ovule, consisting of the embryo and its proper coats.

Sepal. A division of a calyx.

Serrate. Having sharp teeth pointing forward. (Fig. XLVIX)

Sessile. Without stalk of any kind. (Fig. L)

Sheath. A tubular envelope surrounding an organ or part. (Fig. LI)

Shrub. A woody perennial; smaller than a tree, usually with several stems or trunks from the base.

Spathe. A large leaflike or colored bract surrounding an inflorescence. (Fig. LII)

Spicate. Arranged in or resembling a spike.

Spike. An unbranched simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis. (Fig. LIII)

Stamen. Pollen-bearing organ of the flower.

Sterile. A flower without pistil or a stamen without an anther.

Stigma. The part of a pistil or style which receives the pollen.

Stipulate. Having stipules.

Stipule. An appendage at the base of a petiole or leaf or on each side of its insertion. (Fig. LIV)

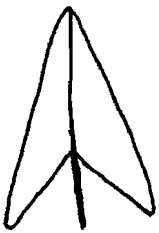


Fig. XLVIII

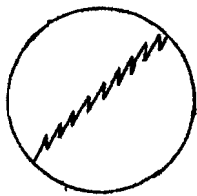


Fig. XLVIX



Fig. L

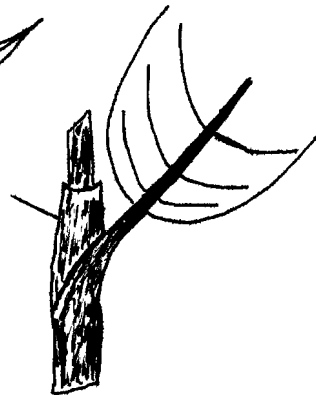


Fig. LI

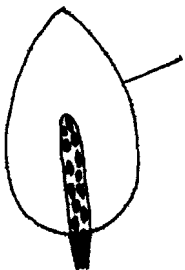


Fig. LII



Fig. LIII

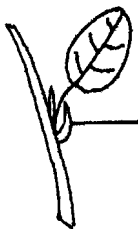
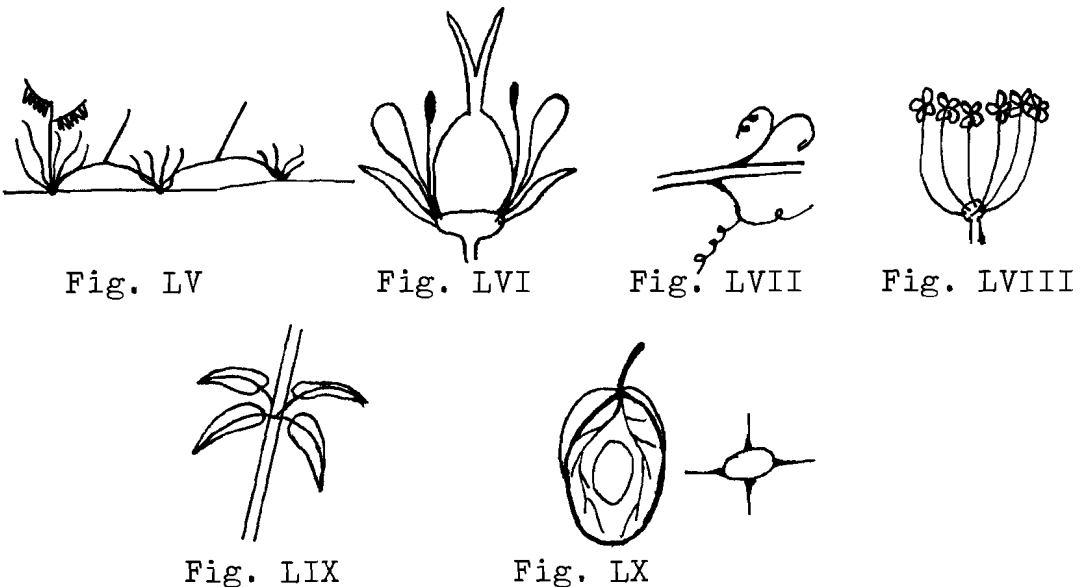


Fig. LIV

- Stolon. A runner, or any basal branch that takes root. (Fig. LV)
- Style. The usually elongated part of the pistil connecting the stigma and ovary.
- Subtend. To be situated below and close to, as a bract underneath a flower.
- Superior ovary. An ovary that is free from the calyx or perianth and with the perianth inserted below it on the receptacle. (Fig. LVI)
- Tendril. A slender clasping or twining process or extension of the stem or leaf. (Fig. LVII)
- Terete. Circular in transverse cross-section.
- Terminal. At the tip or distal end.
- Tree. A woody plant that produces one main trunk.
- Tuber. A thickened, short underground branch with numerous buds or eyes.
- Tuberous. Tuber-like in appearance or character.
- Umbel. An inflorescence in which the peduncles or pedicels of a cluster arise from a common point. (Fig. LVIII)
- Versatile. Referring to an anther which is attached near its middle and capable of turning on its support.
- Whorl. An arrangement of leaves or other organs in a circle around the stem. (Fig. LIX)
- Wing. Any membranous or thin expansion bordering or surrounding an organ. (Fig. LX)
- Zygomorphic. Irregular, with a corolla divisible into equal halves in one plane only, usually along an anterior-posterior line.



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