On The Fringe

Quarterly Newsletter of

NATIVE PLANT SOCIETY OF NORTHEASTERN OHIO

Founding Chapter of

THE OHIO NATIVE PLANT SOCIETY

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PLEASE JOIN US!
ANNUAL DINNER, SATURDAY, NOVEMBER 20 CLEVELAND BOTANICAL GARDEN.

Frederick W. Case, Jr., co-author of *Trilliums* will make a presentation on North American *trillium* after our annual dinner. Mr. Case's presentation represents decades of first-hand experience with *trilliums* and will begin at 8:00 pm. Wine and cheese social hour begins at 5:30 pm followed by dinner at 6:30 pm. Dinner and presentation – $15.00. Presentation alone – $3.00. Guests are welcome.

THE COMPOSITAE - IMPRESSIVE VARIATION ON A COMMON THEME[1]

by Dr. George J. Wilder

Common features of the Compositae

The Compositae (also called Asteraceae) is among the largest families of angiosperms, with ca. 20,000 species worldwide. The family is cosmopolitan, and is the largest family in most parts of the temperate zone. In Ohio, in summer the Compositae includes a substantial proportion of the plant species present. Weishaupt (1971) indicated 67 genera of Compositae in Ohio. Certain species of Compositae are important, economically.

Flowers develop in a head (or) capitulum which simulates an ordinary flower. (Any inflorescence, including heads of the Compositae, which simulates an ordinary flower is called a pseudanthium [literal translation = false flower]). The receptacle is the distal portion of the peduncle (inflorescence stalk), which bears the flowers. The head bears bracts. Always present, is an involucre, i. e., a group of bracts situated peripheral to, and encircling all flowers of the head, collectively. Each bract of the involucre is called an involucral bract (or) phyllary (plural = phyllaries). Present, in only certain species are additional bracts situated among the flowers, to the inside of the involucre. Such bracts, collectively, are called chaff or pales (singular = pale).

Flowers are epigynous, i.e., the gynoecium exhibits one inferior ovary. The gynoecium is bicarpellate, a feature reflected by the typically two-cleft style; however, there is a unilocular ovary containing one ovule. The number of stamens equals the number of petals

(commonly five), and the anthers are usually syngenesious (i.e., connate [fused together]). Petals are also connate, basally. Depending on the species, a calyx (group of sepals) is present or absent. Where present the calyx is called a pappus (plural = pappi), and the pappus is atypical compared to calyxes of flowers of most other families (see below). Mainly two kinds of flowers exist within the Compositae: disc flowers and ray flowers. Disc flowers are actinomorphic (radially symmetrical); the corolla (petals) has a tubular base which culminates in typically five terminal lobes. Ray flowers are zygomorphic (bilaterally symmetrical); the corolla has a tubular base, but this base culminates upward in a flat, strap-shaped sector which is commonly bent sideways and which often terminates in short lobes. Such a corolla is a ligulate corolla.

The ovary matures into an achene. Normally (perhaps, always) the pappus remains attached for a time to the tip of the mature achene or, alternatively, to an extension from this tip, called a beak.

Variation within the Compositae

Growth habit and habitat.--All Ohio species are erect or prostrate herbs (albeit, tall and almost woody plants in some cases); however the Compositae also includes vines (*Mikania scandens*, native elsewhere in the U.S), woody shrubs (species of *Baccharis*, native elsewhere in the U. S.), and even trees (the genus *Espeletia*, which I observed many years ago in the Columbian Andes). Phyllotaxy is opposite or alternate (or mainly either of these conditions), sometimes varying even between species of one genus (*Helianthus*). Leaves are simple (*Rudbeckia hirta*, *Bidens cernua*) or compound (*Bidens frondosa*, *Coreopsis tripteris*), and may even be thrice compound (*Achillea millefolium*). In *Ambrosia trifida* and *Rudbeckia triloba* the leaves of one plant may, collectively, be one-lobed, two-lobed, and three-lobed (as, coincidently, is true in *Sassafras albidum* [*Lauraceae*]). Ohio species are terrestrial (*Carduus nutans*), semiaquatic (*Eclipta prostrata*), and aquatic (*Bidens [Megalodonta] beckii*).

Kinds of heads.--Three main kinds develop, and any species exhibits one of these three kinds. Kinds are listed. (1) Discoid head. - -This has solely disc flowers (*Antennaria, Carduus, Cirsium*). (2.) Ligulate head. - -This has solely ray flowers (*Hieracium, Leontodon, Sonchus*). (3) Radiate head. - -This has both disc flowers and ray flowers (*Echinacea purpurea*, species of *Rudbeckia* and *Solidago*). On radiate heads the ray flowers are always peripheral, mimicking the petals of ordinary flowers of other plant families. The disc flowers always develop centrally, i.e., to the inside of the ray flowers. In individual genera, heads may be consistently of the same kind, or not so (e.g., in *Bidens*, having different species with discoid heads and radiate heads). In particular species with either discoid or radiate heads, certain flowers within a head may differ morphologically from others, according to aspects not indicated above; for example, only specific flowers of a head may be fertile. In the Ohio flora, heads of each of the three kinds occur in many genera.

Colors of heads (excluding phyllaries).--Impressive variation exists. Heads may be blue (typical *Cichorium intybus*), yellow (many *Helianthus* species), orange (*Hieracium aurantiacum*), purple (many species *of Centaurea, Cirsium, and Vernonia*), or white (*Antennaria* species). Heads may also exhibit color combinations: (a) purple disc flowers and yellow ray flowers (certain *Helianthus* species), (b) yellow disc flowers and white ray flowers (an es-

pecially frequent combination; *Chrysanthemum leucanthemum*, *Bellis perennis*, various *Erigeron* species, *Galinsoga* species), and (c) purple-tipped disc flowers and yellow-and-purple or purple ray flowers (*Gaillardia pulchella*). In various species heads of atypical colors may be formed. In Cuyahoga County rare individuals of *Cichorium intybus* exhibit white or purple (rather than blue) heads, rare specimens of *Aster ericoides* and *Aster racemosus* exhibit blue (rather than white) heads, and rare plants of *Leontodon taraxacoides* exhibit cream-colored rather than yellow heads. In certain species (including one, aforementioned) color variants are named formas or varieties (e.g., *Eupatorium perfoliatum* forma *purpureum*, a pink- flowered forma of this typically white-flowered species; also *Aster pilosus* var. *pilosus* forma *pulchellus*, a roseate-flowered forma of the typically white-flowered species [both species found in Cuyahoga County]).

Numbers of heads per aerial shoot.--In certain species the heads are solitary on scapes which may be bracteate (*Tussilago farfara*) or ebracteate (*Taraxacum officinale*); however, in most Ohio species a plant bears a collection of heads called a capitulescence (or) synflorescence. This capitulescence may bear few heads (*Hypochaeris radicata*) or very many (all Ohio species of *Eupatorium* and *Solidago*). Various authors misleadingly call the capitulescence an inflorescence, but by definition heads are the inflorescence type within the Compositae. Within a capitulescence heads are loosely arranged (*Hieracium paniculatum*) or compactly arranged. The genus *Elephantopus* (which occurs in Ohio, but which I have only observed in Florida) is an extreme case of compact arrangement. Incredibly, in *Elephantopus* what superficially appears as one head is a capitulescence of

many heads.

Arrangements of heads on capitulescences. - - Arrangement is variable, sometimes even within a species. In *Solidago caesia* the capitulescence consists of a leafy main axis which bears either (a) heads solely within axillary glomerules (the stereotypical condition), (b) such glomerules plus many short, albeit, obvious glomerule-bearing branches, or (c) such glomerules plus fewer long glomerule-bearing branches. In certain species, varieties are recognized based on variations in capitulescence morphology. Two common varieties of *Solidago rugosa* in Cuyahoga County are var. *celtidifolia* (with long spreading capitulescence branches) and var. *aspera* (with a compact pyramidal capitulescence). In various *Liatris* species heads are attached raceme-like along one central axis. In many Compositae the heads develop on complex branching systems (e.g., in *Achillea millefolium* and species of *Eupatorium*).

Diameters of heads. - -Heads vary from narrow (e.g., ca. 3 mm wide in *Eupatorium fistulosum* [not including the spreading gynoecia]) to very broad (e.g., up to many centimeters wide in cultivated *Helianthus annuus*). Narrow heads generally have few flowers; for example, in *Xanthium* (a genus of monoecious species) the pistillate head has solely two flowers. *Pluchea* (known from Ohio, although I have only observed it in Florida) is an exceptional genus with narrow heads. I was incredulous when I first examined *Pluchea*. The head, which is discoid, bears (a) very many extremely narrow, needle-like flowers, peripherally and (b) much fewer, broader flowers, centrally. The broad heads of *Helianthus annuus* may have hundreds of flowers; in this species the many flowers define numerous conspicuous spirals within a head that describe

a precise mathematical pattern (Fabonacci Series).

Receptacles. - -Receptacle shape, a taxonomically important character, varies from conic or columnar (*Ratibida, Rudbeckia*) to flat or convex (*Helianthus*).

Phyllaries.- - Those surrounding one head may mostly be of uniform length (e..g., *Erechtites hieracifolia*) or may constitute conspicuous series of differing lengths. Species of *Bidens* and *Coreopsis* each exhibit extreme variation: (a) outer long, green, and leaf-like phyllaries, and (b) inner, often shorter and nongreen phyllaries. Lengths, shapes, and/or pubescences of phyllaries often serve as taxonomic characters, both for characterizing genera and for distinguishing between species within individual genera (e.g., *Helianthus*). The range in numbers of phyllaries per head serves for distinguishing particular species of *Bidens* and *Prenanthes*. In many individual species phyllary number varies between heads, but *Prenanthes altissima* consistently exhibits five phyllaries. Phyllaries are usually distinct; however, in *Xanthium* the phyllaries of pistillate heads are connate into a bilocular burr, each locule containing one pistillate flower. *Tagetes* also exhibit connate phyllaries, but no burr. Connate and non-connate phyllaries composing burrs facilitate dispersal by animals (species of *Arctium, Cirsium, and Xanthium*).

Pappi. - -It is curious that solely the word pappus signifies the calyx of the Compositae, because pappi are so variable. Differences between pappi (plus presence vs. absence of pappi) serve widely as taxonomic characters for distinguishing between species. The pappus may be capillary (i.e., composed of fine hairs or hairlike bristles) or consist of various numbers of rigid bristles, scales, teeth, or awns (the last three structures being relatively

similar). Depending on the species, within a capillary pappus the hairs are either unbranched (*Lactuca scariola, Sonchus uliginosus*) or branched. Branched pappus hairs are called plumose hairs (if the branch-hairs are long [*Cirsium vulgare, Tragapogon dubius*]) or barbellate hairs (if the branch-hairs are short [*Arctium minus, Carduus nutans*]). A value judgment may be necessary to determine whether or not pappus hairs with short lateral projections are barbellate or unbranched. *Helianthus* species and *Tagetes* species produce pappi of soft scales, whereas, in *Bidens* species pappi are rigid awns (stiff, pointed, very narrow objects). Species of *Bidens* are distinguished partly according to the number of awns per pappus and according to presence vs. absence of retrorse or antrorse barbs on these awns.

Certain Compositae exhibit a double (biseriate) pappus (e.g., *Krigia* species, in which there is an outer row of scales and an inner row of bristles). Also, different species of *Aster* are distinguished according to whether the pappus is single or double. In *Leontodon taraxacoides*, with ligulate heads, the pappus differs morphologically between the peripheral-most flowers and remaining flowers. For many taxa the pappus promotes fruit dispersal. Capillary pappi, especially plumose types, superbly facilitate wind dispersal and clear analogy exists between an achene situated beneath a capillary pappus and a human suspended beneath a parachute. The awned, barbed pappi of *Bidens* species promote dispersal by animals.

Achenes. - -Among different species achenes vary in size, shape, and ornamentation. For *Bidens*, such features of achenes are important for distinguishing between certain species (e.g., *B. comosa vs. B. connata*). *Bidens bip-*

innata (Spanish Needles) has particularly narrow achenes. Presence vs. absence of a beak is a useful criterion for distinguishing between species of *Lactuca* and for separating *Sonchus* species from most *Lactuca* species.

Anatomy. - -Anatomical features are diagnostically valuable, especially features of pubescence and the presence vs. absence of laticifers (latex secreting structures) and other kinds of secretory cavities (e.g., resin cavities). The amounts and/or kinds of pubescence present are primary criteria for distinguishing between species of *Gnaphalium*, *Helianthus*, *Hieracium*, and *Senecio*. Frequently important, are the nature, distribution, and kinds of glandular hairs that may occur. Outwardly conspicuous nonlaticiferous secretory cavities and/or their characteristic fragrances may quickly clinch a species identification (*Dyssodia papposa*).

1. The present account was based mainly on information from Fernald (1950 - Gray's Manual of Botany), Fisher (1988 - The Dicotyledoneae of Ohio. Part III: Asteraceae), Gleason (1952 – The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada), Weishaupt (1971 - Vascular Plants of Ohio), and on personal observations of Compositae.

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SWAMP FOREST REMNANTS AT MENTOR MARSH

by Tom Sampliner

Prior to this field trip with the Northeast Ohio Naturalists (NEON) on September 2nd, I was unaware that high quality swamp forest remnants existed along portions of the perimeter of Mentor Marsh. Under the leadership of Jim Bissell, we entered the forest at two different points to survey the contents of these forests. Probably, most people have an image of the marsh similar to what I had; namely, a sea of *Phragmites*.

Our points of entry were from side streets off of Route 283. The elevation of these adjacent streets is higher than that of the marsh proper. Descent immediately puts the participant into a black muck substrate, not particularly wet at this time of year and a drought year at that. The forest canopy makes a dark environment occasionally penetrated with sunny openings. Immediately catching our attention were the tall colonies of ferns of several species. Standing tallest were the wide fronds of cinnamon fern, (*Osmunda cinnamomea*) which upon close inspection has beautiful tawny hairs at the base of mature sterile leaves. Genus mate, (*Osmunda regalis*) was also putting in a most regal appearance featuring bipinnate leaves with only upper pinnae bearing sporangia. We did not see the third member of the genus, the interrupted fern (*Osmunda claytoniana*). We did find at slightly lower growth elevation the dimorphic fronds of sensitive fern, (*Onoclea sensibilis*) many already turning from green to yellow. Walking in the dark shaded confines of these forests, it was quite easy to conjure up an image of say ET along with Elliot and the gang riding their

bicycles through the forest.

While not at their bloomtime showiness, lizard's tail (*Saururus cernuus*) was well represented complete with cordate blades zig zagging up the stem without the plume of white spiked florets on top. This may well be time for the mandatory mention for any NEON trip of ubiquitous poison ivy, (*Toxicodendron radicans*) everywhere underfoot. Here one also had to look carefully at what tree was being grabbed for support as the acidic swamp also had fellow itch causer, poison sumac (*Rhus vernix*). In fact, this species caused some confusion among a couple group members who mistook staghorn sumac (*Rhus typhina*) as the subject. While both have more than three leaflets as well as no wing along the leaf rachis, they differ as *R. vernix* has leaflets entire and panicles axillary as oppossed to *R. typhina* having leaflets serrate, panicles terminal and twigs and petioles are velvety-pubescent. Big deal, if anyone made a mistake, there was plenty of both jewelweeds (*Impatiens capensis* and *pallida)* around to rub on the exposed area for a purported remedy.

The shrub layer contained some old friends as well as some not so common species. Spicebush (*Lindera benzoin*) lends both fragrance and color, green when young and red berries when mature. Maple-leaved viburnum (*Viburnum acerifolium*) contributed some dark blue berries. Occasionally, the aforementioned poison ivy would climb a tree to be joined by the five leaflet whorls of Virginia creeper, (*Parthenocissus quinquefolia*). Not so commonly seen was nannyberry, (*Viburnum lentago*). In the afternoon, we added highbush blueberry (*Vaccinium corymbosum*) to the diversity mix. We paid most attention though to the herbal layer. Arrow arum (*Peltandra*

virginica) waved wide, arrow shaped leaves at least knee high. A most handsome sedge (*Carex crinita*), exhibited tightly packed spikes which resembled a diver bent over having just touched toes. Jim informed us this species is a typical swamp forest indicator. To compare with something more of us are already familiar with, there is a resemblance in the tightly packed drooping spikes to those of the wild rye in the *Elymus* genus.

Some discussion took place over the umbelliferous pattern of water parsnip, (*Sium suave*). Several of the parsley family can be quite confusing. Not that any of this group is ever confused, yeah, sure. The zig zag stems of fairy bells (*Disporum lanuginosum*) were mostly without the beautiful bright orange colored fruits. Football shaped, they may well be adopted as a symbol for a local sports team.

Running across the ground and often at the tree bases were some colorful specimens of running strawberry also called hearts a bursting (*Euonymous obovatus*). Bright orange berries seem to be exploding from their tough outer casings. Along the embankments some of the group stopped to examine and maybe taste an alien called Indian strawberry, (*Duchesnea indica*) which does, indeed, produce a strawberry look-alike fruit with not nearly the native's taste. However, when these are alternated with horsetail (*Equisetum arvense*) the combination of textures is pleasing to the eye.

The best plant finding of the trip was a member of the buckwheat family, (*Polygonum robustius)* which still carries a state listing of threatened. This species vividly brought to my attention a current equipment deficiency. We were told to look at punctate sepals (in this context the dotting being glands). With a 20-power hand lens bor-

rowed from another member, I could finally see the trait while views with my 10 power were worthless. Now I wonder what else I've been missing all these years. No wonder grass and sedge spikelets often remain a mystery.

Some rough-leaf goldenrod (*Solidago patula*) was in this acidic wetland where one would expect it enabling the members to feel it's sandpaper-like leaf texture. Water-horehound (*Lycopus uniflorus*) still had a few of those tiny white flowers available for view.

The afternoon session gave us a couple more fern species. We had a few rather tiny specimens of the ladder-like pattern of (*Dryopteris cristata*). Light green, gradually tapered, marsh ferns (*Theylpteris palustris*) and a few others may also have been seen. We searched for but did not find either log fern (*Dryopteris celsa*) nor a rare sedge, (*Carex limosa*).

A rich diversity of trees provides the canopy. We saw both red and silver maples (*Acer rubrum* and *saccharinum*), black, red and pumpkin ash, (*Fraxinus pennsylvanica*, *nigra* and *tomentosa*), beech (*Fagus grandifolia*), wild black cherry (*Prunus serotina*), American elm (*Ulmus americana*), Shagbark hickory (*Carya ovata*), Tupelo (*Nyssa sylvatica*), red and pin oaks (*Quercus borealis* and *palustris*) and yellow birch (*Betula lutea*) just to name the most prominent. In conclusion, a rich diversity worthy of protection awaits your visit.

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A SHORT FLOWER STALK IN THE DEEP DARK FOREST: ONLY THE SHADOW KNOWS

by Tom Sampliner

HACK-OTIS STATE NATURE PRESERVE is a mature upland forest just over the Cuyahoga County line into the southeastern corner of Lake County. Public access is during daylight hours.

It is typical northeastern Ohio forest abutting the western escarpment of the Chagrin River. At all times of the year I have found it to offer dramatic overlooks of the river as well as a rich diversity of trees, shrubs and flowering plants.

I always enjoy a walk there if for no other reason than to observe the various fern species; rather diverse for a preserve of such modest size. Common species you would expect to find will include: Christmas fern (Polystichum acrosticoides), dark green and clumped in vase-like clusters, New York fern (*Thelypteris noveboracensis*), light green tapered at both ends, cinnamon fern (*Osmunda cinnamomea*) and several of the wood fern genus: spinulose, evergreen, and intermediate, respectively (*Dryopteris carthusiana*, *intermedia*, and *marginalis*). However, it is not a given that you will find the beech ferns. Broad beech fern (*Phegopteris hexagonoptera*) has connective tissue completely lining the stipe from lowermost pinnae to the uppermost. Were there to be a lack of this between the lowermost pair and the second pair, you would have one major trait to distinguish the more rare in our area, long beech fern (*Phegopteris connectilis*). The latter would also generally feature the lowermost pair of pinnae sharply angled downward. The first species, the

broad, is found at Hack-Otis. The wetter areas will show off the expected dimorphic fronds of sensitive fern, (*Onoclea sensibilis*). One caution, don't look too casually at the fernlike greenery of sweet cicely (*Osmorhiza longistylis*) or your eyes may convert this ephemeral into a non-existant species of fern.

Following a period of wet weather, the preserve is also a fine location to search for fungi; another of my pasttimes. I have often seen attractive fruitings of the chicken mushroom (*Laetiporus sulphureus*), a polypore-type of fungi that when young and fresh is bright orange and yellow in overlapping brackets. As the name implies, it is one of the edibles. Keeping with the orange color scheme, you should find (*Mycena leaiana*) the orange mycena, clustered on deciduous woods and often very tiny. Among the little guys and in the same genus, you can find a dark grouping called bleeding mycena (*Mycena haematopus*) which will indeed exude a blood look-alike fluid when broken or squeezed.

Bracketed to the trees are plentiful brown top polypores with white edges and completely solid white pores underneath; this is the artist's conch, (*Ganoderma applanatum*) which craft people use to etch designs on the white parts and sell. Clustered at the bases of trees in more of a gray than brown color is the radish mushroom (*Collybia radicata*) which when dug out would exhibit a long tap root. Better off red than dead are the various species of red russula, all of which have stout white stalks and gills, the latter so brittle that when stroked flake away. Several of these are edible but several also taste bad. Before I have any more fung than I already have I'd better return to the discovery I made on Friday, September 13, 1999.

Dappled afternoon light in a canopied forest can play tricks on the eye. One is even more apt to be mislead when you start observing a rather commonplace species of plant and carelessly proceed to conclude that everything similar must just be more of the same. The "commoner" would be beechdrops (*Epifagus virginiana*). In mature beech maple forest the ubiquitious distribution is certainly no surprise at this time of year. Depending upon variables of soil, light, etc. their color, heights and appearance are similar but can vary enough to make you look twice at some of the specimens. Perhaps this day I was not lulled into an observational complacency. Something was not right about that tiny lonesome specimen. Yeah, there was creamy color and madder; but these florets seem to have, yes, they do have lips. What's more, they are not the tubular florets of the beechdrops because they have lateral petals and sepals and they flare out away from the opening into the flower. Upon closer look, hey, that's a column; I've got an orchid and a coral root at that. Let me take a closer look at this little guy. The central portion of the bright white floret lip has a rectangular madder line running lengthwise. The lip is tripartate with the smaller lateral basal lobes also having madder in dots. Each lateral sepal and petal as well as the dorsal sepal, especially when hit by light, took on a warm orangish-brown color. The flower stalk was red and the bottom sheathing bract was also of that warm orange color. As I observed, various small insects would come for a visit. I wish I had the knowledge to identify more of them and know what all their activities meant. By now most of you have concluded as did I that the subject was spotted coralroot orchid (*Corallhoriza maculata*), a state potentially

threatened species. Especially at this time of year, it is easy to see why they can be overlooked.

Out came the photography gear. Snap, snap. I looked all around the area for more specimens but did not find any. I also returned several times over the next week to 10 days to further examine and take another picture or two. You can be sure that each time I return to this very pleasant preserve just for a casual walk, I am keeping sharp watch low to the ground in the hope of finding more of my new friend. Who can say, perhaps there will be some of the other fall species of orchids waiting for discovery in the strange light of the forest. Wouldn't it be nice to add another species like say autumn coral root, (*Corallhoriza odontorhiza*)? Who knows, I guess only the shadows.

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