

## Native Orchids of Oklahoma

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**As of the publication of this paper Oklahoma is known to have orchids of 33 species in 18 genera, which compares to 20 species and 11 genera reported by Waterfall (1969). Four of the 33 species are possibly extinct in the state based on current survey work. The greatest concentration of orchid species is in the southeastern corner of the state (Atoka, Bryan, Choctaw, LeFlore, McCurtain and Pushmataha Counties).**

### INTRODUCTION

The family Orchidaceae is the largest of the families of flowering plants with somewhere between 25,000 and 35,000 species, with new species continually being described. There are also numerous natural and artificial hybrids. The only place where orchids are not known to occur is Antarctica.

Orchids fascinate us because of the seemingly infinite combinations of colors and forms that are found in orchid flowers from the Arctic to the tropical rain forests. Many have incredibly complex pollination processes, most involving insects. Pollination complexity reaches a zenith with the development of "pseudo-copulation", a process where the orchid flower mimics the form, shape, movements and often the odor of a female wasp or bee. The flower in effect "seduces" the male wasp or bee into trying to copulate with it and in the process uses the male to transfer pollen from one flower to another. While pseudocopulation is highly efficient, it comes with a price -- if the pollinator becomes extinct, then the plant depending on it will probably become extinct, also.

"Orchids range vegetatively from Lilliputian plants a few millimeters long (some *Bulbophyllum* and *Platystele* species) to as tall as 13.4 meters (44 feet) (*Sobralia altissima* Bennett and Christenson, a recently described species from Peru)" (Romero-Gonzalez, Fernandez-Concha, Dressler & Magrath, in ed.) or gigantic clusters weighing several hundred kilograms (*Grammatophyllum*).

Orchids have been cultivated and used for over 2000 years. Lawler (1982) reported that orchids have long played a part in the life of the Chinese.

Since the time of Confucius (551-479 BCE) who mentioned *lan* in his writings, "acquaintance with good men was like entering a room full of *lan* or fragrant orchids" (Withner, 1959), orchids have been important in many facets of Chinese life including literature, painting, horticulture, and not least, medicine". They are mentioned in the *materia medica*, "Sheng nung pen ts'ao ching", tracing back to the legendary emperor Sheng Nung (ca. 28th century BCE). The term "*lan hua*" in early Chinese records refers to species of the genus *Cymbidium* (Withner, 1959), most likely *Cymbidium densifolium*, which is very pleasantly fragrant.

William Shakespeare in "Hamlet" Act IV, Scene VII has Queen Gertrude describing Ophelia's death to Laertes "There with fantastic garlands did she come of crow-flowers, nettles, daisies, and long purples, that liberal shepherds give a grosser name, but our cold maids do dead men's fingers call them." The "long purples/dead men's fingers" refer most likely to species in either the genus *Orchis* or *Dactylorhiza*. Economically, orchids are important as both cut flowers and as pot plants. And with modern propagation techniques, orchids have moved from being almost solely the province of the wealthy to flowering pot plants that nearly everyone can afford.

The earliest reference to orchids in the Americas is the Badianus Manuscript, which is an Aztec herbal of 1552 (Emmart, 1940). In it are references to the use of orchids for flavorings, perfume, a lotion against fatigue, and glue. The glue flower, *tzacohxochitl*, "has been associated with *Bletia campanulata*, and *Epidendrum pastoris*, or possibly *Catasetum maculatum*, from which an excellent glue for wood was obtained."

In Meso-America orchids were highly regarded by the Aztec and their predecessors to the southeast, the Maya. Both the Aztec ruler Montezuma II and Nezhuualcoyotl, King of Texcoco, a Toltec derived state, were noted for the orchids cultivated in their gardens. The Maya cultivated members of the genus *Vanilla* Miller (*sisbic* in Mayan) for their seedpods or "beans", which were a source of flavoring for foods and as perfume. The "beans" were fermented to produce vanilla. The Aztecs used *tlilxochitl* (literally "black flower" or "black pod") was used as a flavoring agent in *chocolatl* (chocolate).

In the Middle East from the time of the Assyrians to present day Turkey (Hanson, 2001), a food material called *salep*, a complex starch flour that is used in confections, has been made from the dry roots of several species of *Dactylorhiza* Necker ex Nevski, *Eulophia* R. Br., and *Orchis* L. The roots of these same plants have also been used as aphrodisiacs for both humans and animals.

The leaves of a few species of lady's-slipper orchids in the genus *Cypripedium* (*C. candidum*, *C. parviflorum*, *C. reginae* and *C. pubescens*) have been reported as causing contact dermatitis in some people (Lawler, 1982), and it has also been noted that the plants are avoided by cattle, presumably owing to irritation from the hairs.

#### ORCHID HABITATS IN OKLAHOMA:

Some of the more important orchid habitats in Oklahoma are: native prairies throughout the state, excluding the panhandle region; wet pimple mound prairies in the eastern third of the state; moist woodlands in the eastern half of the state; sphagnum bogs in the southeastern part of the state.

#### KEY TO GENERA OF OKLAHOMA ORCHIDS:

1. Leaves absent at flowering time or reduced to sheaths ..... 2
  2. Plants without chlorophyll (not green) ..... 3
    3. Rhizomes with annular scale scars, not coral-like. Lips 16-18 mm long ..... *Hexalectris*
    3. Rhizomes without annular scale scars, coral-like. Lips 4-7 mm long .....  
*Corallorhiza*
  2. Plants with chlorophyll (green) ..... 4
    4. Inflorescences racemes. Flowers with pedicels. Perianths with combinations of brown or maroon or green or greenish yellow ..... 5
      5. Mature flowers bilaterally asymmetrical. Lips 4-8 mm long; spurs present. Capsules 0.8-1.4 mm long; 0.4-0.5 mm in diameter ..... *Tipularia*
      5. Mature flowers bilaterally symmetrical. Lips 10-15 mm long; spurs absent. Capsules 1.7-2.2 mm long; 0.8-0.9 mm in diameter .....  
*Aplectrum*

#### TECHNICAL DESCRIPTION OF THE ORCHIDACEAE FAMILY IN OKLAHOMA:

**Plants** herbs; perennial; from rhizomes or tuberosids or corms or fleshy roots or pseudobulbs; autophytic or saprophytic or mycotrophic; caulescent or acaulescent. **Root Systems** absent or present; fibrous. **Leaves** basal or forming a basal rosette or cauline or tubular sheaths; simple; alternate or opposite or whorled; with basal sheaths; venation parallel or parallel-convergent; margins entire; stipules absent. **Inflorescences** solitary flowers or spikes or racemes; terminal or axillary; bracts present. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series; resupinate or not resupinate. **Calyces** bilaterally symmetrical or bilaterally asymmetrical. **Sepals** 3 (may appear to be two); free or fused; petaloid; green or white or brightly colored. **Corollas** bilaterally symmetrical or bilaterally asymmetrical; imbricate. **Petals** 3; of 2 forms; 1 larger, modified into a lip (labellum); 2 smaller, resembling the sepals; free or fused; of various colors. **Stamens** 1 or 2; fused to style and stigma forming a column (gynostegium); pollen in pollinia. **Pistils** 1; compound, carpels 3; stigmas 3, 3-lobed (all fertile), or 2 fertile and 1 sterile and enlarged (rostellum); styles 1; ovaries inferior; locules 1; placentation parietal. **Nectaries** present; 1; petaliferous; often modified into elongate spurs. **Fruits** capsules; usually dehiscent by 3 longitudinal slits but remaining closed at top and bottom. **Seeds** usually several thousand; minute. The family description is taken from "Keys and Descriptions for the Vascular Plants of Oklahoma" (Tyrrel et al, 2001)

- 4. Inflorescences spikes. Flowers sessile. Perianths white to creamy white ..... *Spiranthes*
- 1. Leaves present at flowering time ..... 6
- 6. Leaves one ..... 7
- 7. Leaves basal; linear to linear-lanceolate. Flowers not resupinate (column lowermost in flower) ..... *Calopogon*
- 7. Leaves cauline; lanceolate to ovate or elliptic. Flowers resupinate (column uppermost in flower) ..... 8
- 8. Perianths pink to rose or white ..... *Pogonia*
- 8. Perianths green ..... *Malaxis*
- 6. Leaves two or more ..... 9
- 9. Leaves basal ..... 10
- 10. Leaves 2. Inflorescences racemes. Perianths maroon or green ..... *Liparis*
- 10. Leaves 3 or more. Inflorescences spikes. Perianths white or creamy white...11
- 11. Leaves with white veins or markings. Lips saccate ..... *Goodyera*
- 11. Leaves without white veins or markings. Lips not saccate .....  
*Spiranthes*
- 9. Leaves cauline ..... 12
- 12. Leaves opposite or whorled ..... 13
- 13. Leaves 5-6; whorled. Sepals 35-60 mm long ..... *Isotria*
- 13. Leaves 2; opposite. Sepals 1.5-2 mm long ..... *Listera*
- 12. Leaves alternate ..... 14.
- 14. Lips saccate. Anthers 2 ..... *Cypripedium*
- 14. Lips not saccate. Anthers 1 ..... 15
- 15. Lips without spurs ..... 16
- 16. Perianths greenish maroon. Leaves plicate.....*Epipactis*
- 16. Perianths white or pink. Leaves not plicate ..... 17
- 17. Flowers 1-3 (-5); pedicellate .....  
*Triphora*
- 17. Flowers 6-numerous; sessile .....  
*Spiranthes*
- 15. Lips with spurs .....18.
- 18. Lips entire ..... 19
- 19. Flowers lavender and white .....  
*Galearis*
- 19. Flowers white or green or greenish yellow .... *Platanthera*
- 18. Lips 3 parted or fringed or both. ....20
- 20. Lips or lip parts fringed .....  
*Platanthera*
- 20. Lips or lip parts not fringed .....  
*Habenaria*

**ALPHABETIC LISTING OF  
GENERA:**

***Aplectrum*** Nuttall, Gen. 2:197. 1818. The genus name comes from the Greek *a* "without" and *plectron* "spur" in reference to the flower's lack of a spur. The species name is from the Latin *hiems*, *hiemalis/hyemalis* "of or belonging to the winter" in reference to the production of an over-wintering leaf in late fall. The genus is composed of two species; ***Aplectrum hyemale*** (Muhl. ex Willd.) Torr., occurring in eastern North America, and *A. unguiculatum* (Finet) Maekawa occurring in Japan. The latter species had previously been included in the closely related genus *Cremastra* (Luer, 1975).

Common Names: Putty-root, Adam & Eve.

Flowering Time: mid-May to mid-June.

Description: This terrestrial orchid is one of two in Oklahoma that produces an evergreen over-wintering leaf in late fall which persists until late spring when it withers before producing a flower stalk. The leaf is elliptical in shape and may be up to 17-20cm (7-8 inches) long and 6-8.5 cm (2 1/2 to 3 1/2 inches) wide. It is dark green above, purple on the underside, and it is pleated with silver-white ribs. The flower stalk is a raceme with 6-20 white lipped, greenish-yellow and purple flowers, which are about 1.2 cm (1/2 inch) long. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. Both the leaf and later the flower stalk arise from a modified underground stem called a corm. The corms are connected by slender rhizomes and there may be several corms attached together. This orchid is

**Key to Species:**

1. Flowering stem and leaf about the same length; flowers opening simultaneously, (not having buds, flowers, and young fruits present at the same time), pale pink to magenta or occasionally white, the club shaped hairs closest to the tip of the lip pale pink, (hairs closer to the base of the lip yellow) ..... ***C. oklahomensis***
1. Flowering stem much longer than the leaf; flowers opening sequentially, (often having buds, flowers, and young fruits present simultaneously), magenta to rose-pink, the club shaped hairs closest to the tip of the lip golden yellow, (hairs closer to the base magenta to rose pink) ..... ***C. tuberosus***

***Calopogon oklahomensis*** D. H. Goldman; Lindleyana 37: 42. 1995.

Common Names: Oklahoma Grass-pink

Flowering Time: early May to early June.

Description: Plants consist of a single leaf and a flower stalk that is 20-30 cm [8-12 (-14) inches] tall that arise from an oblong or forked corm.

apparently rare in Oklahoma and has been collected only twice. Magrath and Lavalley collected it in fruiting condition in McCurtain County near Little River south of Broken Bow in October 1973. A small colony of 20-25 plants was found; unfortunately construction of a new 4-lane highway between Idabel and Broken Bow destroyed this particular colony. Hopefully it is still present in the immediate area. The second collection was by Paul Buck on a north-facing slope of Rich Mountain in LeFlore County just west of the Arkansas state line in December 1988. He observed 10-15 plants. It is to be hoped that this plant may actually be more common than our current records indicate.

Habitat: In Oklahoma the habitat is deciduous woodlands in decaying leaf litter and rich organic loam soil. One site was an alluvial flood plain, the other a mesic, north-facing slope near the top of Rich Mountain.

Distribution: southeastern Oklahoma (: Map 1).

***Calopogon*** R. Brown in Aiton, Hort. Kew. ed. 2:5:204. 1813, Nom. Cons. The genus name comes from the Greek *kalos* "beautiful" and *pogon* "beard" thus a "beautiful beard" in reference to the clusters of colorful hairs on the lip. According to Catling, Goldman & Magrath (2001) the genus is composed of 5 species, all native to eastern North America and Cuba. This is the only genus of orchids in Oklahoma that has non-resupinate flowers with the lip uppermost in the flower. Both species are in decline in Oklahoma due to changes in land use.

The leaves are linear to lanceolate 15-32 cm long and 0.3-1.1 cm wide. They are about the same height as the inflorescence. The inflorescence is a terminal raceme of 2-8 flowers, all of which open nearly simultaneously. Flowers are 2.5-4 cm (1-1/2 inches) in diameter and color ranges from deep pink to pure white in alba forms. The lip is uppermost

(non-resupinate) in the flower and has a tuft of white hairs with golden-yellow tips. The fruit is an erect capsule with the column persisting. This is one of the showiest of our native orchids, especially so if one happens to find a colony of several hundred to several thousand plants in bloom at the same time. *Calopogon oklahomensis* was reported by Waterfall (1969) as *C. pulchellus* (Salisb.) R. Br. and as *C. tuberosus* var. *tuberosus* by Magrath & Norman (1989).

Habitat: Moist to moderately dry sandy to loamy native prairies and in moist slightly acidic "pimple mound" prairies.

Distribution: eastern third of Oklahoma (Map 2).

*Calopogon tuberosus* (L.) Britton, Stern, and Poggenberg, Prel. Cat. Anth. Pterid. N.Y. 52. 1888.

Common Names: Grass-pink, Swamp-pink.

Flowering Time: mid-late June.

Description: Plants consist of a single leaf and a flower stalk that is 51- 94 cm (18-37 inches) tall that arise from a globose to elongate corm. The leaves are linear to lanceolate, 25-65 cm long and 0.5-2.2 cm wide. They are about one-half to two-thirds the height of the inflorescence. The inflorescence is a terminal raceme of 2-8 flowers, which open sequentially so that there may be buds, open flowers and young fruit on the same inflorescence at the same time. Flowers are 2.5-5 cm (1 1/2-2 inch) and color ranges from deep pink to magenta or rose. The lip is uppermost (non-resupinate) in the flower and has a tuft of white hairs

with golden-yellow tips. The fruit is an erect capsule 1-2 cm long and 0.5-1.0 cm in diameter, with the column persisting. This is one of the showiest of our native orchids, and also one of the rarer ones. Our populations are all *Calopogon tuberosus* (L.) BSP. var. *tuberosus*, previously reported as *C. pulchellus* (Salisb.) R. Br. by Waterfall (1969) and as *C. tuberosus* (L.) BSP. var. *simpsonii* (Chapman) Magrath (Magrath & Norman 1989).

Habitat: In Oklahoma this species is known only from three acidic sphagnum bogs: Harrison/Doshier Bog, Bennington Bog, and the Hugo/Speer/Railroad Bog, all of which are on sandy soil.

Distribution: southeastern Oklahoma (Map 3).

*Corallorhiza* Gagnebin, Acta Helv. Phys.-Math. 2:57. 1755. The genus name is from the Greek *korallion* "coral" and *rhiza* "root" in reference to the coral-like appearance of the branching underground rhizome.

Description of genus: plants terrestrial, mycotrophic, solitary or colonial herbs, consisting of underground coralloid rhizomes and racemose flowering stems with leaf sheaths, but not leaf blades. Plants lacking chlorophyll, stems yellow (alba forms) to reddish-purple to dark maroon. Flowers small, yellow with white lip (alba form) to purplish-green with white lip usually with magenta spots. Occasionally the previous year's inflorescence and fruit capsules will be present at the next year's flowering.

**Key to species**

1. Flowering in early-mid fall; lip 2.2-3.5 mm long; column 1.4-2.4 mm long; sepals 3.0-4.5 mm long ..... *C. odontorhiza*
1. Flowering in early spring; lip 4.0-7.5 mm long; column 2.4-5.0 mm long; sepals 4.5-10.0 mm long ..... *C. wisteriana*

*Corallorhiza odontorhiza* (Willd) Poirlet, Dict. Sci. Nat. X:375, 23 May 1818. The species name is from the Greek *odonto* "tooth" and *rhiza* "root" in reference to the tooth-like appearance of the swollen base of the stem.

Common Names: Autumn coral-root.

Flowering Time: September-October.

Description: Plants terrestrial, mycotrophic, lacking chlorophyll, racemose flower stems with leaves reduced to sheathing bracts, 7.6-28 cm (3-11 inches) tall. The stems are strongly thickened and bulbous at the base where they join the rhizomes.

Flowers 2-16 in loose racemes, purplish-brown with a white magenta spotted lip. In most of the Oklahoma specimens, the flowers do not appear to fully open and are probably cleistogamous. Capsules pendent, ellipsoidal, 6-8 mm long and 3-5 mm in diameter.

Habitat: Rich deciduous woods in decaying leaf litter. In the eastern part of Oklahoma this plant frequently blooms at the same time as the Indian (Ghost) Pipe, *Monotropa uniflora*. In both Oklahoma and Kansas any place where *Monotropa*

*uniflora* occurs, if you look carefully enough you will almost inevitably find *C. odontorhiza*.

Distribution: most frequent in the eastern part of the state, but also occurs in the "Caddo Canyons" of central Oklahoma (Widowmaker Canyon in Canadian County), (Map 4).

***Corallorhiza wisteriana*** Conrad, Jour. Acad. Phila. 6:145. 1829. The species was named in honor of Charles J. Wister, an American botanist who first collected the species in Pennsylvania.

Common Names: Wister's Coral-root; Early Coral-root.

Flowering Time: mid March - mid May.

Description: Plants terrestrial, mycotrophic, lacking chlorophyll, racemose flower stems with leaves reduced to sheathing bracts, 12.7-38 cm (5-15 inches) tall. The stems are thickened at the base where they join the rhizomes. Flowers 5-16 in loose racemes, purplish-brown with a white magenta spotted lip. Capsules are pendent, ellipsoidal, 6-10 mm long and 3-5 mm in diameter. Reports of *C. trifida* for Oklahoma in the literature have apparently been based on *alba* forms that are known to occur in Pontotoc County (Byrd's Mill near Fittstown).

#### Key to species:

1. Lip 5.0-6.3 cm long, pale yellow to ivory; dorsal sepal 7.0-9.3 cm long; capsules 3.5-5.5 cm long ..... ***C. kentuckiense***
1. Lip 2.0-3.0 cm long, bright yellow or white; dorsal sepal 3.5-4.7 cm long; capsules 2.5-3.3 cm long ... 2
  2. Lip bright yellow ..... ***C. parviflorum f. parviflorum***
  2. Lip white or white with light pink veining ... ***C. parviflorum f. albolabium***

***Cypripedium kentuckiense*** C.F. Reed, Phytologia 48:426. 1981. The species is named after the state where it was originally collected. It was reported by Waterfall (1969) as *C. calceolus* L. var. *pubescens* (L.) Correll.

Common Names: Kentucky Lady's-slipper.

Flowering Time: late April - mid May.

Description: Plants terrestrial, pubescent with 3-6 elliptical to ovate to nearly sub orbicular leaves. Flowers typically solitary, rarely two. Petals and sepals greenish to yellowish with reddish-brown spots, reticulations or nearly solid markings; lip pale yellow, obovoid, 5-6.3 cm (2-2 1/2 inches) long. Capsules erect, ellipsoidal, 3-5 cm (1 1/5-2 inches) long and 1-1.5 cm (2/5-3/5 inches) in diameter.

Habitat: Rich mesic deciduous forests on river flood plains and bases of slopes and wet seep areas. This plant is in decline in Oklahoma due mainly to changes in land use. The Mountain Fork

Habitat: Rich deciduous woods in decaying leaf litter.

Distribution: central and eastern Oklahoma (Map 5).

***Cypripedium*** Linnaeus, Species Plantarum 2:951. 1753. The genus name comes from the Greek *Kypris* "goddess of love and beauty," who was supposed to have been born on Cyprus, and *podion* "little foot."

Description of genus: Plants terrestrial, from a short rhizome with fibrous roots, caulescent (Oklahoma plants), pubescent, stems 25-71 cm (-97) [10-28 (-38)] inches tall with 3-6 alternating, lanceolate to elliptical (rarely nearly orbicular) leaves. Flowers showy, 1-3 in a racemose inflorescence. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. According to Cribb (1997) the center of diversity of the genus is China where 30 of the 45 known species have been reported, North America is the second richest area with 11 species. The genus is represented in Oklahoma by 2 species.

colony, which in 1989 numbered over 214 plants, has been completely destroyed, as has another on the Arkansas/Oklahoma border on the southern slope of Rich Mountain. Additionally because of the showy flowers it is vulnerable to flower lovers who may pick the flowers (preventing seed production for the year) or try to dig the plant up and transplant it into their gardens.

Distribution: southeastern Oklahoma (Map 6).

***Cypripedium parviflorum*** Salisb., Trans. Linn. Soc. I: 77. Pl. 2, Fig. 2. 1791.

Common Names: Southern Small Yellow Lady's-slipper.

Flowering Time: late April - mid May.

Description: Plants terrestrial, pubescent with 3-5 lanceolate to elliptical to ovate leaves. Flowers solitary, to typically two or rarely 3. Petals and sepals greenish to yellowish with reddish-brown spots usually appearing uniformly dark solid

markings, or rarely with dark reticulations; lip bright yellow or white with pink veins, oblanceolate-ovoid, 2-3.2 cm (1/2 - 1 1/3 inches) long. Capsules erect, ellipsoidal, 2-3.5 cm (4/5 - 1 2/5 inches) long and 0.6-1 cm (1/5-2/5 inches) in diameter. All of our plants in Oklahoma are var. *parviflorum*.

Habitat: Rich mesic deciduous forests on gravelly soil covered by decaying leaf litter, most commonly on north facing slopes of mountain ridges. This plant is in decline in Oklahoma due mainly to changes in land use. Additionally because of the showy flowers it is vulnerable to flower lovers who may pick the flowers (preventing seed production for the year) or try to dig the plant up and transplant it into their gardens.

A white-lipped form has been found at the Tate Ranch site in Adair County among the more typical bright yellow-lipped plants. This plant was described as *C. parviflorum* Salisb. var. *parviflorum* f. *albolabium* Magrath & Norman (1989).

Distribution: northeastern and eastern Oklahoma as far south as Rich Mountain (Map 6).

***Epipactis*** Swartz, Kongl. Svensk. Vetensk. Acad. Nya Handl. 21:231. 1800, in part; emend. L.C. Richard, De Orch. Europ. Annot. 29. 1817; Mem. Mus. Hist. Nat. Par. 4:51. 1818. nom. con. The genus name comes from the Greek *epipactis* a name used by Theophrastus, ca 350 BCE to describe a plant used to curdle milk. The genus is composed of about 20 species in Eurasia, with only one native to North America.

***Epipactis gigantea*** Dougl. ex Hook, Fl. Bor.-Am. 2:202. pl. 202. 1839. The genus name is from the Latin *giganteus* "gigantic" relating to the large size of both plants and flowers in this species.

Common Names: Stream Orchid, Chatterbox, Giant Helleborine.

Flowering Time: mid May - mid June.

Description: Plants terrestrial, glabrous, caulescent, stems 40-79 (-100) cm [16-31 (-39) inches] tall, with 4-11 alternating, ovate-lanceolate leaves. The inflorescence is a raceme of 3-15 relatively showy flowers. The sepals are greenish-yellow with purple veins, petals greenish becoming rose apically with purple veins, the lip is yellowish to rosy apically, with purple to brown veins. The lip is divided into two parts, an hypochile and an apical epichile which articulates with the hypochile and is easily moved by the faintest of air movements; hence the common name "chatterbox" because the flowers look as if they are talking to each other. The capsules are pendent and ellipsoidal, 2.3 cm (9/10-1

1/5 inches) long and 0.6-0.9 cm (1.5-2/5 inches) in diameter. This species varies from uncommon to locally common and is most easily found in the Turner Falls area in the Arbuckle Mountains.

Habitat: Occurs in cracks in limestone bedrock in spring fed streams in Arbuckle Mountains.

Distribution: south central Oklahoma in Arbuckle Mountains (Map 8).

***Galearis*** Rafinesque, Herb. Raf. 71. 1833, Fl. Tellur. 2:39. 1836. The genus name is from the Latin *galea* "helmet" in reference to the hood formed by the connivent sepals and petals over the column. The genus is composed of two species *Galearis spectabilis* (L.) Raf. and *G. cyclochila* (Fr. & Sav.) Maxim. in Japan and Korea.

***Galearis spectabilis*** (L.) Raf., Herb. Raf. 71. 1833. The species name is from the Latin *spectabilis* "notable" or "remarkable" in reference to the showy lavender and white flowers.

Common Names: Showy Orchis.

Flowering Time: late April - mid May.

Description: Plants terrestrial, glabrous, with slender fleshy roots from a short rootstock, two basal fleshy dark green elliptical to sub orbicular leaves, a third leaf rarely present on the stem; stems slightly 4-5 angled (fluted), fleshy, 17-25.5 cm (7-10 inches) long. The 3-6 (-15) flowers are born in a lax raceme. They are showy with the sepals and petals lavender and the lip white with a blunt club-shaped down-turned spur that is as long as the lip. Capsules are erect, ellipsoidal and 1.5-2 cm (1/2-7/8 inches) long and 0.5-0.7 cm (1/5-1/4 inches) in diameter. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. This species has been collected once at Battiest in McCurtain County and reported and photographed by Jim Norman on Polecat Peak in LeFlore County

Habitat: Rich mesic deciduous woods in decaying leaf mold.

Distribution: southeastern Oklahoma (Map 9).

***Goodyera*** R. Brown in Aiton, Hort. Kew. ed. 2. 5:197. 1813. The genus is named for John Goodyer, a seventeenth century English botanist. There are about 25 species in this worldwide genus, with 4 in North America and 1 in Oklahoma. ***Goodyera pubescens*** (Willd.) R. Brown in Aiton, Hort. Kew. ed. 2. 5:198. 1813.

Common Names: Downy Rattlesnake Orchis.

Flowering Time: August.

Description: Plants terrestrial, densely pubescent, stems 15-35 (-46) cm [6-14 (-18) inches] long; from fleshy creeping rhizomes which may produce small to fairly extensive colonies. The 3-8 petiolate leaves form a basal rosette. Leaves oblong-elliptic, dark green to blue-green with a prominent network of white veins. The inflorescence is a densely flowered cylindrical spike, the sessile flowers are spirally arranged. Flowers are white, the sepals have a green central vein, the lip is a pouch with a strongly recurved apex like the spout on a pitcher. The capsules are sub-erect and globose and about 5-6 mm (1/4 inch) in diameter. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. This species has been found at two locations -- once in McCurtain County about 3 miles southeast of Smithville, and on Polecat Peak in LeFlore County. The Polecat Peak population is quite extensive.

Habitat: Rich mesic deciduous woods in decaying leaf mold.

Distribution: eastern Oklahoma in the Ouachita Mountains.

**Habenaria** Willdenow, Sp. Pl. 4:44. 1805. The genus name comes from the Latin *habena* "strap," "thong," or "rein" in reference to the rein-like spur and appendages of the petals and lip that are characteristic of the genus. The genus consists of about 600 species (Pridgeon, Crib, Chase & Rasmussen, 2001) that are mainly tropical or subtropical and worldwide in distribution. Correll (1950) recognized 39 species and varieties of *Habenaria* (*sensu lato*), however Luer (1975; *sensu stricto*) recognized 4 species in North America, with 1 occurring in Oklahoma.

**Habenaria repens** Nuttall, Gen. N. Am. Pl. 2:190. 1818. The species name is from the Latin *repto* "to creep," hence *repens* "creeping."

Common Names: Water Spider Orchid.

Flowering Time: September – October.

Description: Plants terrestrial to aquatic, glabrous, the leafy stems 40-66 cm (16-26 inches) tall. The 5-9 alternating leaves sessile with linear-lanceolate shape. The 10-50 plus flowers are born in a spicate raceme. The flowers are light green to greenish-white with a greenish-white to greenish-yellow lip. The flowers are relatively inconspicuous and have the appearance of a spider, hence the name "water spider" orchid. It forms small colonies by sending out rhizomes, which produce new plants. This plant was first located by John Taylor in 1974

at the Boehler Seeps area where the colony persisted for many years and grew to consist of several thousand plants. However a series of several early freezes a few years ago appears to have caused this plant to become extirpated in Oklahoma at the present time.

Habitat: Known only from two spring fed acidic sphagnum bogs over sandy soil (Boehler Seeps in Atoka County and the Speer Bog in Choctaw County).

Distribution: southeastern Oklahoma (Map 11).

**Hexalectris** Rafinesque, Neogenyton 4. 1825. The genus name is from the Greek *hex* "six" and *alectryon* "cock" in reference to the six fleshy lamellae resembling a cock's-comb, which occur on the lip. In actuality the lip usually has either 5 or 7 lamellae. The genus as treated by Catling & Magrath (2001) consists of 7 species, mainly Mexican, with 5 occurring in the United States and 1 in Oklahoma.

**Hexalectris spicata** (Walt.) Barnh., Torrey 4:121. 1904. The species name is from the Latin *spicatus* "spiked" in reference to the spicate inflorescence.

Common Names: Crested Coralroot.

Flowering Time: late June – July.

Description: Plants terrestrial, mycotrophic, lacking chlorophyll, flowering stems 22-56 (-80 cm) [9-22 (-32)] inches tall, produced from stout, branching, annulate, jointed rhizomes; the leaves reduced to a few tubular sheaths on the stems. The 5-25 pedicellate flowers produced on scapose racemes. Flowers large, showy, sepals yellow-brown with brownish-purple veins, petals yellow with purple veins, the lip white to light yellow with purple veins and lamellae. Capsule pendent, ellipsoidal, 5/8-1 inches (2-2.5 cm) long and 1/5-3/5 inches (1.2-1.5 cm) in diameter. All Oklahoma specimens seen to date are var. *spicata*, however var. *arizonica* occurs in north central Texas (Liggio & Liggio 1999)

Habitat: Ranges from leaf mold in deep shade of mixed hardwoods and conifers on well-drained knolls and stream banks, sometimes on rotting logs, tends to prefer limestone soil. In Oklahoma populations growing in decaying juniper needle litter over sandstone at William's Wilderness near Cyril in Caddo County are far more robust than those growing in regular leaf mold.

Distribution: eastern Oklahoma in the Ouachita Mountains.

**Key to varieties:**

1. Flowers pale yellow to pinkish, usually closed, cleistogamous; column without a rostellar flap separating the pollen masses from the stigmatic surface; the 5 central veins of lip with lamellae 0.2-0.7 mm above lip surface.....*Hexalectris spicata* var. *arizonica*
1. Flowers yellowish- or purplish-brown, usually open, chasmogamous; column with a rostellar flap separating the pollen masses from the stigmatic surface; the 5 central veins of lip with lamellae 0.7-1 mm above lip surface.....*Hexalectris spicata* var. *spicata*

Variety *arizonica* (S. Watson) Catling & Engel. Lindleyana 8 (3): 122. 1993, is called the Arizona Crested Coral-Root.

Habitat: Ranges from leaf mold in deep shade of mixed hardwoods and conifers on well-drained knolls and stream banks, sometimes on rotting logs, tends to prefer limestone soil. In Oklahoma, populations growing in decaying juniper needle litter over sandstone (e.g. William's Wilderness near Cyril in Caddo County) are far more robust than those growing in leaf mold that originates from deciduous tree leaves and/or pine needles.

Distribution: central and eastern Oklahoma (Map 12).

*Isotria* Rafinesque, Med. Repos. 2(5):357. 1808. The genus name is from the Greek *isos* "equal" and *treis, tria* "three" in reference to the three sepals, which are equal size and shape. The genus consists of two species both North American, with 1 species occurring in Oklahoma.

*Isotria verticillata* (Muhlenberg ex Willdenow) Rafinesque, Med. Repos. 2(5):357. 1808. The species name is from the Latin *verticillatus* "whorled" in reference to the whorl of leaves at the top of the stem.

Common Names: Large Whorled Pogonia; Whorled Pogonia.

Flowering Time: mid April - early May.

Description: Plants terrestrial, glabrous, long hollow stems 5-13 inches (12-33 cm) tall, topped by a whorl/verticil of 5-6 lanceolate to ovate to nearly rhombic-ovate green leaves. The inflorescence is terminal with a solitary flower or rarely two. The sepals are purplish brown, the petals are yellow-green and the lip is yellow with purple edges and a white mid-lobe. The capsule is erect and ellipsoidal, 1/2-1 inch (1.4-2.5 cm) long and 1/45-16 inch (0.6-0.9 cm) in diameter. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. This species was first found by Albert Lavalley on an

Oklahoma Orchid Society field trip in 1976 at the McKinney Creek site near Tom in McCurtain County. It is presently known from 5 locations in McCurtain and LeFlore Counties. This seems to be a relatively rare plant, but populations of up to 200 plants have been found. It is potentially vulnerable to changes in land use.

Habitat: Rich mesic mixed deciduous and pine woodlands in the Ouachita Mountains and the Gulf Coastal Plain in the Ouachita National Forest.

Distribution: southeastern Oklahoma (Map 13).

*Liparis* L.C.Richard, Mem. Mus. Paris 4:43, 52. 1818. The genus name is from the Greek *liparos* "fat," "greasy," or "shining" in reference to the almost oily feel and lustre of the leaves in this genus. The genus is nearly worldwide in distribution and has about 250 species. Magrath (2001) recognized 3 occurring in North America, with 1 in Oklahoma.

*Liparis liliifolia* (L.) L. C. Richard ex Lindley, Bot. Reg. 11:pl.882. 1825. The species name is from the Latin *lilium* "a lily" and *folius* "leaved" referring to the lily-like foliage of this species.

Common Names: Lily-leaved Twayblade.

Flowering Time: late May – June.

Description: Plants terrestrial, glabrous, fleshy, with two elliptic-ovate shiny green leaves subtending a scapose raceme arising from a small ovoid pseudobulb. The stem is 3 1/2-10 inches ((9-) 15 (-25) cm) tall. The 5 (-31) flowers with pale green sepals, purple filiform petals and a translucent pale purple to maroon lip are in an open raceme. The obovate lip is the showy part of the flower. The capsules are ellipsoid, and about 5/8 inches (1.5 cm) long and 3/16 inches (0.5 cm) in diameter. This species has only been collected once, at the McKinney Creek site near Tom in McCurtain County in 1975.

Habitat: Rich mesic mixed deciduous and pine woodlands in the Gulf Coastal Plain area in the Ouachita National Forest.

Distribution: southeastern Oklahoma (Map 14).

**Listera** R. Brown in Aiton, Hort. Kew. ed 2. 5:201. 1813. nom. cons. The genus name is in honor of Martin Lister, a noted English physician and naturalist. The genus consists of 25 species; Coleman & Magrath (2001) recognized 8 in North America with 1 in Oklahoma, occurring in cool temperate regions of both the northern and southern hemispheres.

**Listera australis** Lindl., Gen. Sp. Orchid. 456. 1840. The genus name is from the Latin *australis* "southern" in reference to the more southern distribution of the species.

Common Names: Southern Twayblade.

Flowering Time: late April - mid May.

Description: Plants terrestrial, arising from a minute rhizome with a few long slender fibrous roots, the stem is glabrous with a pair of terminal leaves, stem and inflorescence 4-9 inches (9-23 cm) tall. The 6-25 pedicellate flowers are born in an open terminal raceme that is pubescent. The flowers are marcescent maroon-purple with the showy linear lip deeply divided into two filamentous lobes. The capsules are globose to ovoid 1/16-3/16 inches (2-4 mm) long and 1/16-2/16 inches (2-3 mm) in diameter, and are born in a horizontal position. This species was originally collected by Magrath at the McKinney Creek site near Tom in McCurtain County in 1979 during an Oklahoma Academy of Science Spring Field Meeting while on a field trip.

Habitat: Plants occur in "hanging" sphagnum bogs in mixed deciduous and pine wooded areas. In Oklahoma they are usually associated with the rhizomes of cinnamon fern.

Distribution: southeastern Oklahoma. It is presently known from Bryan, Choctaw and McCurtain Counties (Map 15).

**Malaxis** Solander ex Swartz, Nov. Ge. Sp. Pl. Prodr. 119. 1788. The name is from the Greek *malaxis* "a softening" in reference to the soft, succulent consistency of the leaves of the plants in this genus. The genus is composed of about 250 species. Catling & Magrath (2001) recognized 9 species in North America with 1 in Oklahoma. It is widespread mostly in Asia and the East Indies.

**Malaxis unifolia** Michx., Fl. Bor.-Am. 2:157. 1803. The species name is from the Latin *unifolium* "one leaf" in reference to the solitary leaf of this species.

Common Names: Green Adder's Mouth.

Flowering Time: late April - mid June.

Description: Plants terrestrial, glabrous, inflorescence and solitary leaf (rarely 2) arises from a pseudobulb, roots are few and fibrous. The leaf is narrowly to broadly ovate and encloses the base of the inflorescence in a sheath. The stem is 4-9 1/2 inches (10-24 cm) tall. The 25-100 green flowers are born in an open raceme, which appears umbellate before elongation of the rachis. The capsules are ellipsoid 1/8-1/4 inches (3-6 cm) long and 1/16-1/8 inches (2-3.5 cm) in diameter are held on filiform pedicels in a horizontal to sub-horizontal position. It is not uncommon to find a previous year's inflorescence and seeds pods persisting through the current flowering period and frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. This orchid, once thought to be rare in the state, can become locally abundant in an appropriate habitat.

Habitat: Plants occur in pine and mixed deciduous woods, growing in the layer of decomposing leaf and needle litter, also in shaded "hanging" sphagnum bogs.

Distribution: eastern and southeastern Oklahoma (Map 16).

**Platanthera** L. C. Richard, Mem. Mus. Paris 4:48. 1818. The genus name is from the Greek *platys* "wide, broad" and *anthera* "anther" in reference to the unusually wide anther. According to the Flora North America treatment by Sheviak (2001) there are about 200 species (mainly north temperate), with 32 species in North America, and 6 in Oklahoma.

Description: Plants terrestrial, glabrous, rather succulent, erect. The roots are fasciculate, fleshy and often enlarged into lance-fusiform tuberosities. The stems leafy or leafless with the leaves either basal or gradually reduced to bracts toward the inflorescence. The inflorescences solitary, terminal, lax to dense spikes, some spikes appear to be racemose due to the elongated slender ovary. Flowers often showy, colors include green or white or yellow or orange in our species. The lips have a spur at the base and may be entire, fringed, lobed or parted. Occasionally the previous year's inflorescence and fruit capsules will be present at the next year's flowering.

**Key to species:**

1. Lip fringed or lacerate ..... 2
  2. Lip not in 3 divisions; flowers golden-yellow to apricot orange ..... *P. ciliaris*
  2. Lip in 3 divisions; flowers white to creamy white or light green to greenish white or yellowish green ..... 3
    3. Flowers light green to greenish white or yellowish green ..... *P. lacera*
    3. Flowers white to creamy white ..... 4
      4. Rostellum lobes spreading, viscidia separated by 6-7.5 mm, angular in lateral view .... *P. praeclara*
      4. Rostellum lobes parallel, viscidia separated by 1-3.5 mm, rounded in lateral view ..... *P. leucophaea*
1. Lip not fringed or lacerate ..... 5
  5. Flowers greenish white to white; leaf 1 (rarely 2), cauline; lip 6 mm long, basal lobes absent, apex obscurely 3-lobed ..... *P. clavellata*
  5. Flowers greenish yellow; leaves 2 to 6, cauline; lip 4 mm long, basal lobes present, apex entire ..... *P. flava*

*Platanthera ciliaris* (L.) Lindl., Gen. Sp. Orchid. 292. 1835. The species name is from the Latin *cilium* "eyelashes" in reference to the finely fringed lip. This species was reported by Waterfall (1969) as *Habenaria ciliaris*

Common Names: Golden Plume; Orange Fringed Orchis; Yellow Fringed Orchid.

Flowering Time: August - early September.

Description: Plants 15-37 inches (38-94 (-100) cm) tall, usually with 3-5 glossy green lanceolate leaves. The 30-60 flowers in a racemose appearing spike. Flowers are typically an apricot orange and are very showy; the lip has a copiously fringed margin and a long slender spur. The capsules are ellipsoidal, 1/2-5/8 inches (13-15 mm) long and 2/16-3/16 inches (3-4 mm) in diameter, and are semi-erect at maturity. This is one of the showiest native orchids. It may occur as a few isolated plants or in colonies of up to 2000 plants.

Habitat: This species grows in shaded sphagnum bogs or "hanging" sphagnum bogs in mixed deciduous and pine woodlands. It sometimes occurs in full sunlight, but usually in more shaded habitats.

Distribution: southeastern Oklahoma (Map 17).

*Platanthera clavellata* (Michx.) Luer, Nat. Orchids Fla., 148. 1972. The species name is from the Latin *clavellatus* "club shaped" in reference to the small club-shaped spur. It was reported by Waterfall (1969) as *Habenaria clavellata*.

Common Names: Little Club-spur Orchis; Small Green Wood Orchid.

Flowering Time: late May - early July.

Description: Plants 8-17 inches (20-43 cm) tall, usually with one large oblanceolate leaf and one

or two small bracts. The 3-17 flowers are produced in a relatively dense spike. Flowers are typically white or greenish white or light yellow green. The lip is oblong and obscurely lobed at the apex, the spur is about twice the length of the lip and club-shaped. The capsules are ellipsoidal, 5/16-6/16 inches (7-10 mm) long, not counting the persistent perianth, and 1/8-1/4 inches (3-5 mm) in diameter and are semi-erect to horizontal at maturity. This is one of the less showy orchids in the state. It usually occurs as scattered plants but may form sizeable colonies. It is strictly a "shade" plant. This particular orchid seems to have an extremely high capsule set, frequently with 80-90% of the flowers producing a capsule.

Habitat: This species grows in shaded sphagnum bogs or "hanging" sphagnum bogs in mixed deciduous and pine woodlands.

Distribution: southeastern Oklahoma (Map 18).

*Platanthera flava* (L.) Lindl., Gen. Sp. Orchid. 293. 1835. var. *flava*. The species name is from the Latin *flavus* "yellow" in reference to yellowish-green flowers. Reported by Waterfall (1969) as *Habenaria flava*.

Common Names: Southern Tubercled Orchis.

Flowering Time: mid May – August.

Description: Plants 8-22 inches (20-56 cm) tall, usually with one or two large lanceolate leaves and one or two small bracts. The 5-44 flowers are produced in a relatively dense spike. The flowers are typically green with a greenish-yellow lip. The lip is ovate with two side lobes near the base, the mid-lobe is strongly recurved, the spur is about twice the length of the lip and club-shaped. The capsules are ellipsoidal, 4/16-7/16 inches (5-9 mm)

long, not counting the persistent perianth, and 1/16-1/4 inches (2-4 mm) in diameter and are semi-erect to nearly erect at maturity. This is one of the least attractive orchids in the state, but the flower is none-the-less interesting and is apparently pollinated by mosquitoes. It usually occurs as scattered plants but may form sizeable colonies. It is strictly a "shade" plant. This particular orchid seems to have a relatively high capsule set, frequently with 30-70% of the flowers producing a capsule. In shallow spring fed springs, such as occur at the Battiest site in McCurtain County, extensive colonies sometimes form as a result of vegetative propagation by underground rhizomes that will periodically produce new plants every 2-6 inches (5-15 cm) apart. At this location in 1982 over a thousand plants were observed. Also at this location this orchid shares its habitat with quillworts, *Isoetes melanospora*, which are also rather uncommon plants. Variety *flava* has the lower floral bracts equal to or shorter than the flowers and a suborbicular lip, which differs from variety *herbiola* which has the lower floral bracts longer than the flowers and the lip longer than wide.

**Habitat:** This species grows in shaded sphagnum bogs or "hanging" sphagnum bogs in mixed deciduous and pine woodlands or in shallow spring fed streams.

**Distribution:** southeastern Oklahoma (Map 19).

***Platanthera lacera*** (Michx.) G. Don. in Sweet, Hort. Brit. ed 3, 650. 1839. The species name is from Latin *lacer* "torn" or *lacerere* "to tear" in reference to the deeply fringed lip. It was reported by Waterfall (1969) as *Habenaria lacera*.

**Common Names:** Green Fringed Orchis.

**Flowering Time:** mid May - mid June.

**Description:** Plants 12-34 inches (30-86 cm) tall, usually with two large lanceolate leaves and one or two smaller bracts. The 9-33 pale green to greenish-white flowers are produced in a lax to dense racemose appearing spike. The lip is deeply three parted with each of these divisions parted one to 3 times to create a lacerate appearance, the spur is slightly longer than the length of the lip and either slender to club-shaped. The capsules are ellipsoidal, 1/2-3/4 inches (12-20 mm) long, not counting the persistent style, and 2/16-3/16 inches (2-5 mm) in diameter, and are erect at maturity.

**Habitat:** This species has the most diverse set of habitats of any orchid in the state. It occurs in open sunlit sphagnum bogs, moist "pimple mound" prairies, occasionally in relatively dry prairies, in deep mixed deciduous and pine woodlands either in

"hanging" sphagnum bogs or growing through the decaying leaf litter.

**Distribution:** eastern Oklahoma (Map 20).

***Platanthera leucophaea*** (Nutt.) Lindl., Gen. Sp. Orchid. 294. 1835. The species name is from the Greek *leucon* "white" and *phaios* "gray or dusky" implying an off-white colour, usually a creamy or greenish white. This species was reported as *Habenaria leucophaea* by Waterfall (1969). It is known in Oklahoma only from the type specimen.

**Common Names:** Eastern Prairie Fringed Orchis.

**Flowering Time:** June.

**Description:** Plants up to nearly 3 feet (ca 91 cm) tall with 2-5 elliptic to lanceolate leaves. The 15-25 flowers are produced in a lax racemose appearing spike. The lip is deeply three parted and each of these parts is deeply fringed, the spur is about twice as long as the lip and is slender and club-shaped. The capsules are ellipsoidal and about 7 inches (18 mm) long and 3 1/2 inches (9 mm) in diameter, and semi-erect at maturity. According to Nuttall (1837) the type location seems to be in Choctaw County along the Red River at the junction of the Kiamichi River. Marlin Bowles and I looked for the original location that was supposed to be a place called the "Running Horse Prairie" and never could satisfactorily find this location.

**Habitat:** This plant appears to prefer moist to wet limestone based prairies or marshy areas.

**Distribution:** southeastern Oklahoma (Map 21).

***Platanthera praeclara*** Sheviak & Bowles, Rhodora 88:278. 1986. The species name is from the Latin *prae* "before" or "in front" and *clarus* "clear, brilliant, shining" in reference to the series of translations: very bright, beautiful, splendid, glorious, distinguished, noble. Originally reported as *Habenaria leucophaea* by Magrath & Taylor (1978).

**Common Names:** Western Prairie Fringed Orchis.

**Flowering Time:** June.

**Description:** Plants 11-20 inches (28-51 cm) tall, usually with three to five large lanceolate leaves and several smaller bracts. The 6-10 flowers are produced in a relatively open racemose appearing spike. The flowers are creamy white. The lip is deeply three parted and each of the parts deeply lobed and fringed, the spur is about two to three times the length of the lip and slender club-shaped and curved. The capsules are ellipsoidal, 3/4- 1 inch (20-25 mm) long, not counting the persistent perianth, and 3/16-1/4 inches (5-8 mm) in

diameter and are semi-erect to erect at maturity. The flowers of this species are about 25-30% larger than those of *P. leucophaea* (Sheviak & Bowles 1986). This species was collected in two different prairies in northeastern Oklahoma by Magrath in 1975. Since that time one of the prairies has come under Nature Conservancy protection, and the other has been essentially destroyed by changes in land use.

Habitat: Rich loamy relatively moist prairies.

Distribution: northeastern Oklahoma (Map 22).

**Pogonia** Jussieu, Gen. Pl. 65. 1789. The genus name is from the Greek *pogon* "beard" in reference to the bearded crest of the lip. There are apparently 5 species in this genus *P. japonica* Reichenb. f. and *P. minor* (Makino) Makino in Japan and *P. japonica* Reichb. f. and *P. yunnanensis* Finet in China and *P. ophioglossoides* in North America.

*Pogonia ophioglossoides* (L.) Ker-Gawl., Bot. Reg. 2: t. 148. 1816. The species name is from the Greek *ophis* "snake" and *glossa* "tongue" and *eidos* "like" or "resembling" in reference to the plant's resemblance to the adder's-tongue fern (*Ophioglossum*) and its solitary leaf.

Common Names: Rose Pogonia.

Flowering Time: mid May - mid June.

Description: Plants terrestrial, arising from a minute rhizome with a few long slender fibrous roots. The stem is glabrous with a single lanceolate to elliptic to ovate leaf. The stem and inflorescence is 9-19 inches (23-48 cm) tall. The pedicellate flowers are usually solitary, occasionally a second flower occurs in an open terminal raceme. The flowers are pink to rose (rarely white). The lip is spatulate, pink to nearly red, the disc with three rows of tightly packed greenish-yellow hairs

becoming three deeply reddish crests towards the apex. The capsules are ellipsoidal, 3/4-1 inches (20-25 mm) long and 1/8-1/4 inches (4-7 mm) in diameter, and are born in an erect position. This species was originally collected at the Hugo/Speer Bog and the Harrison/Doshier Bog in 1977 by John and Connie Taylor. This species can form quite extensive colonies by producing slender stoloniferous rhizomes which will produce new plants at about 4 inch (10 cm) intervals.

Habitat: Found only in three different (Bennington Bog, Harrison/Doshier Bog, and Speer/Hugo/Railroad Bog)sphagnum bogs, growing in sphagnum moss.

Distribution: southeastern Oklahoma. It is presently known from Bryan, Choctaw and Pushmataha Counties. (Map 23).

**Spiranthes** L. C. Richard, Mem. Mus. Paris 4:50. 1818. Nom. Cons. The genus name is from the Greek *speira* "coil" or "spiral" and *anthos* "flower" in reference to the coiled or twisted spike of flowers. The genus as presently recognized by Sheviak & Brown (2001) consists of 45 species, 23 in North America with 8 in Oklahoma, occurring in North America, South America, Eurasia and Australia.

Description of genus: Plants terrestrial, glabrous to pubescent and often glandular, with fleshy, fasciculate, slender to tuberoidal roots, stems with foliaceous sheaths. The inflorescences are terminal spikes, with the flowers laxly to densely crowded, secund (on one side) or in a spiral. The sessile flowers are relatively small, but usually showy and in one or two species quite pleasantly fragrant. Capsules ellipsoidal and semi-erect to erect at maturity, the perianth parts usually persisting on the mature capsule.

#### Key to species:

1. Lip with green markings ..... 2
  2. Lip with central green spot; flowering September-October ..... *S. lacera* var. *gracilis*
  2. Lip with green veins; flowering late April-May ..... *S. praecox*
1. Lip without green markings
  3. Flowers pure white; glabrous; sepals 2.5-3 mm long ..... *S. tuberosa*
  3. Flowers creamy white, or if white with cream to creamy yellow area on lip; pubescent with pointed, knobby or capitate hairs; sepals 3.5-12 (-14) mm long ..... 4
    4. Hairs pointed; flowering late May to early July ..... *S. vernalis*
    4. Hairs capitate, knobby or slightly clavate; flowering late August to early November ... 5
      5. Sepals 3.5-4.5 (-5) mm long ..... *S. ovalis* var. *erostellata*
      5. Sepals 6.5-14 mm long ..... 6

6. Basal leaves present, cauline leaves present or reduced to sheathing bracts at flowering ..... 7
  7. Lip ovate oblong, slightly constricted near middle, dilated at apex ..... *S. cernua*
  7. Lip broadly rhombic-ovate, basal half dilated, tapering to obtuse or subacute apex ..... *S. odorata*
6. Basal leaves absent, cauline leaves reduced to sheathing bracts at flowering ..... 8
  8. Lip ovate-oblong, slightly constricted near middle, dilated at apex; lateral sepals appressed, not arching over the dorsal sepal and petals; basal callosities longer than wide ..... *S. cernua*
  8. Lip oblong-ovate, without a slight constriction near middle, apex subacute; lateral sepals free, spreading with incurved tips, often arching over the dorsal sepal and petals (not always obvious in pressed specimens); basal callosities short, conical, as wide as high ..... *S. magnicamporum*

*Spiranthes cernua* (L.) L. C. Richard, Orch. Eur. Annot., 37. 1817. The species name is from the Latin *cernuus* "faced to the ground" or "inclined forward" in reference to the nodding position of the flowers.

Common Names: Nodding Ladies'-tresses

Flowering Time: late September-mid November

Description: Plants are 4-21 inches (10-53 cm) tall, the prairie form usually lacking basal leaves at flowering, the woodland/bog form usually has 2-4 linear-lanceolate to obovate leaves at flowering. The 5-50(-60) flowers, white to creamy white, are produced in very tight spirals (prairie form) to loose spirals (woodland/bog form). The lip usually cream to creamy-yellow centrally. The rachis is moderately to densely pubescent with some hairs capitate. The capsules are ellipsoidal, 3/16-6/16 inches (5-9 mm) long, not counting the persistent perianths, and 1/8-1/4 inches (2-6 mm) in diameter and semi-erect to erect at maturity. The prairie form vegetatively reproduces by means of basal off-shoots near the stem, while the woodland/bog form often produces long stoloniferous rhizomes up to at least 6 inches (16 cm) long that produce new plants at their tips, as well as basal off-shoots. This is one of the most wide spread orchid species in Oklahoma and has both a woodland/bog form with long oblanceolate leaves at flowering and a more compact prairie form which may or may not have leaves present at flowering. The prairie form is very similar to *S. magnicamporum* and is often confused with it.

Habitat: This species occurs in native prairies and pastures throughout most of the state. It also occurs in sphagnum bogs, marshy areas and densely wooded areas in the southeast part of the state.

Distribution: eastern half of Oklahoma with a few scattered records in western and northwestern part of the state (Map 24).

*Spiranthes lacera* (Rafinesque) Rafinesque, Herb. Raf., 44. 1833. The species name is from the Latin *lacer* "torn" or *lacere* "to tear" in reference the fringed lip. It was reported by Waterfall (1969) as *Spiranthes gracilis*. This is one of our most common native orchids and can occur in populations of several thousand plants.

Common Names: Northern Slender Ladies'-tresses (var. *lacera*); Southern Slender Ladies'-tresses (var. *gracilis*).

Flowering Time: September – October.

Description: Plants 5-23 inches (12-58 cm) tall, basal rosette of leaves withered or absent at flowering, sheathing leaves present on stem, stem glabrous, rachis glabrous to sparsely pubescent with capitate to clavate hairs. The 14-60 white flowers are produced on second to laxly spiraled to densely tightly spiraled spikes. The lip is white with a central green spot. The capsules are ellipsoidal to sub-globose, 1/8-1/4 inches (3-5 mm) long, not counting the persistent perianth, and 2/16-3/16 inches (3-4 mm) in diameter and sub-erect at maturity. There are two varieties that have been segregated out in this species, var. *lacera* and var. *gracilis*.

**Key to the varieties:**

1. Flowers laxly arranged on spike, lower flowers distantly spaced; inflorescence capitate-pubescent; leaves usually persisting through anthesis ..... *Spiranthes lacera* var. *lacera*
1. Flowers densely arranged on spike, lower flowers closely spaced; entire plant essentially glabrous, leaves usually absent at anthesis ..... *Spiranthes lacera* var. *gracilis*

Variety *lacera* is called the Northern Slender Ladies'-tresses, and var. *gracilis* (Bigel.) Luer, Nat. Orchid. US & Can., 112. 1975 is called the Southern Slender Ladies'-tresses. The variety name is from the Latin *gracilis* "thin" or "slender" in reference to slender stem.

Habitat: Open prairies and mixed deciduous woods in either loamy or sandy soil.

Distribution: eastern two-thirds of Oklahoma (Map 25).

*Spiranthes magnicamporum* Sheviak, Bot. Mus. Leaflet. Harvard, 23:287. 1973. The species name is from the Latin *magnus* "large" and *campus* "plain" thus "great plain" and *magnicamporum* "of the Great Plains," in reference the prairies of the Mid-west and Central Plains region where this species occurs.

Common Names: Great Plains Ladies'-tresses.

Flowering Time: mid September – October.

Description: Plants 6-15 1/5 inches (15-40 cm) tall, leaves normally absent at flowering. The 13-50 white to ivory to creamy-white flowers in dense spikes in 3-4 ranks (3-4 flowers per cycle of spiral). The rachis is moderately pubescent with some capitate hairs. The lip is centrally yellow to creamy yellow. In fresh material the lateral sepals are wide spreading and ascend above the rest of the flower, while in *S. cernua* they usually are not spreading and are parallel to the other flower parts. The capsules are ellipsoidal, 1/4-3/8 inches (5-9 mm) long, not counting the persistent perianth, and 1/8-1/4 inches (3-5 mm) in diameter, sub-erect at maturity. This species can be scattered to locally abundant, and occasionally occurs in mixed populations with *S. cernua* (prairie form).

Habitat: Occurs in dry to wet prairies with loamy or sandy soil.

Distribution: central and south central Oklahoma (Map 26).

*Spiranthes odorata* (Nutt.) Lindl., Gen. Sp. Orchid. 467. 1840. The species name is from the Latin *odoratus* "with an odor," in reference to the strong pleasant fragrance of this flower.

Common Names: Fragrant Ladies'-tresses.

Flowering Time: October.

Description: Plants 12-27 inches (30-69 cm) tall, the lanceolate leaves present at flowering, up to 14 inches (35.5 cm) long. The 21-62 white to creamy-white flowers in a dense spike in 3-4 ranks (3-4 flowers per cycle of spiral). The rachis is moderately pubescent with some capitate hairs. The lip is centrally yellow to creamy yellow. The flowers are highly fragrant with a fragrance that has been compared to vanilla, cumarin or jasmine. The capsules are ellipsoidal, 1/4-3/8 inches (6-10 mm) long, not counting the persistent perianth, and 3/16-1/4 inches (4-6 mm) in diameter and sub-erect at maturity. This species is extremely rare and is known only from the Speer Bog.

Habitat: sphagnum bog over sand near Speer.

Distribution: southeastern Oklahoma (Map 27).

*Spiranthes ovalis* Lindley, Gen. Sp. Orchid. 466. 1840. The species name is from the Latin *ovalis* "shaped like an egg," in reference to the inflorescence, which tends to taper at both ends.

Common Names: Oval Ladies'-tresses.

Flowering Time: mid September – October.

Description: Plants 4 1/2-10 inches (11-25.4 cm) tall, 1-3 oblanceolate leaves present at flowering, stem glabrate to pubescent, rachis pubescent with some hairs clavate to capitate. The 7-23 white tubular flowers tightly spiraled (usually 3 flowers per cycle of spiral) in the spike. The capsules are ellipsoidal, 3/16-5/16 inches (4-7 mm) long, not counting the persistent perianth, and 2/16-3/16 inches (3-4 mm) in diameter, and sub-erect at maturity. This species appears to be relatively rare, but this may be due to the fact that this small plant can be easily overlooked. There are two varieties recognized for this species, var. *ovalis* and var. *erostellata*. Most of the Oklahoma material seems to best fit in var. *erostellata*, however at least one specimen may be better treated as var. *ovalis*.

**Key to the varieties:**

1. Flowers fully open, sepals and petals not connivent; rostellum and viscidium present; ovaries swell progressively ..... *Spiranthes ovalis* var. *ovalis*
1. Flowers never fully open, sepals and petals connivent; rostellum and viscidium absent; ovaries swell simultaneously.....*Spiranthes ovalis* var. *erostellata*

Variety *erostellata* P. M. Catling, Brittonia 35:120-125. 1983; derives its name from the Latin *ex* "out" or "beyond" and *rostellum* "beaked, hooked" hence "lacking a beak" in reference to the absent rostellum.

Habitat: Occurs in mixed deciduous and pine woods in loam, sandy or gravelly soil.

Distribution: southeastern Oklahoma (Map 28).

*Spiranthes praecox* (Walter) S. Watson in A. Gray, Man. Bot. North. U.S. ed. 6, 503. 1890. The species name is from the Latin *praecox* "precocious" in reference to its flowering early in the season.

Common Names: Giant Ladies'-tresses.

Flowering Time: mid April – May.

Description: Plants 14-21 inches (36-91 cm) tall, the linear lanceolate leaves mostly reduced to sheathing bracts. The 17-41 white to creamy white flowers occur in nearly secund to laxly to tightly spiraled spikes with 4-7 flowers per cycle of spiral. The rachis is sparsely pubescent with some capitate hairs. The lip is white with several green veins. The central part of the lip is white to creamy yellow. The capsules are ellipsoidal, 5/16-6/16 inches (7-8 mm) long (not including the persistent perianth) and 3/16-4/16 inches (5-6 mm) in diameter, sub-erect at maturity. This species has been collected only at the McKinney Creek site near Tom in McCurtain County by Magrath and at the Schooler Bog in Choctaw County by Sidney Carpenter. It should probably be considered as rare at this point in time.

Habitat: Growing at edge of mixed deciduous and pinewoods in sandy soil and also near edges of sphagnum bogs in sunlit areas.

Distribution: southeastern Oklahoma (Map 29).

*Spiranthes tuberosa* Rafinesque, Herb. Raf. 45. 1833. The species name is from the Latin *tuberosus* "with or swollen into tubers" (actually tuberoids) in reference to the solitary swollen fusiform tuberoidal root. It was reported by Waterfall (1969) as *Spiranthes grayi*.

Common Names: Little Ladies'-tresses, Little Pearl-twist.

Flowering Time: mid August – October.

Description: Plants 5-17 inches (12.7-43 cm) tall, glabrous, arising from a single fusiform tuberoid, occasionally the previous years tuberoid will persist, the basal leaves absent at flowering. The 5-35 minute pure white flowers in secund to laxly to rarely tightly spiraled spikes with 4-7 flowers per cycle of spiral. The capsules are ellipsoidal, 1/8-1/4 inches (3-5 mm) long, not counting the persistent perianth and 1/16-1/8 inches (2-3 mm) in diameter, sub-erect at maturity. This is a truly beautiful flower; under 5-10X magnification it appears crystalline. It is frequently rather scattered in local distribution, but occasionally substantial populations occur.

Habitat: In Oklahoma it typically occurs in mixed deciduous and pine woods in sandy or loam soils, occasionally it occurs in meadows in full sunlight.

Distribution: eastern half of Oklahoma (Map 30).

*Spiranthes vernalis* Engelmann & Gray, Bost. J. Nat. His. 5:236. 1845. The species name is from the Latin *vernalis* "of or belonging to spring" in reference to the early time of the year when it flowers.

Common Names: Grass-leaved Ladies'-tresses, Spring Flowering Ladies'-tresses.

Flowering Time: June - late July.

Description: Plants 14-37 inches (35.5-94 cm) tall, pubescent with articulate pointed hairs and no capitate hairs, arising from numerous stout roots, 2-5 leaves and 5-7 sheathing bracts present at flowering. The 7-50 creamy white flowers in secund to laxly to tightly spiraled spikes with 3-7 flowers per cycle of spiral. The capsules are ellipsoidal, 1/4-3/8 inches (6-8 mm) long, not counting the persistent perianth, and 1/8-1/4 inches (3-5 mm) in diameter, sub-erect at maturity. This species often occurs in populations in the thousands in one year and the next have only a very few scattered blooming plants, this is in part due to weather conditions. It also means that population samples taken in any one season may not really be representative of the actual frequency of occurrence in a given location.

Habitat: Native prairies, roadside ditches, disturbed areas in sandy to clay loam. In the Kiamichi Mountains they are often abundant in the roadside ditches growing in gravelly soil.

Distribution: eastern two-thirds of Oklahoma (Map 31).

**Tipularia Nuttall**, Gen. N. Am. Pl. 2:195. 1818. The genus name is from *Tipula* the genus of insects to which the crane flies belong in reference to the resemblance of the flowers to crippled crane flies in flight. *Tipula* from the Latin *tippula* "water-spider." There are three species in the genus, *T. josephi* in the Himalaya Mountains, *T. japonica* in Japan and *T. discolor* in the eastern United States.

**Tipularia discolor** (Pursh) Nuttall, Gen. N. Am. Pl. 2:195. 1818. The species name from the Latin *discolor* "of different colors" or "faded" in reference to the dull colors of the flowers.

Common Names: Crane-fly Orchid.

Flowering Time: August - early September.

Description: This terrestrial orchid is one of two in Oklahoma that produces an evergreen over-wintering leaf in late fall which persists until spring when it withers. Flowering is in late summer. Plants scapose, glabrous, 9-25 inches (23-64 cm) tall, the solitary leaf is long-petiolate and ovate, dark green above and purple underneath. The leaf and flower stock arise from an oval corm 5/8-1 3/16 inches (15-30 mm) long and 3/8-3/4 inches (10-20 mm) wide, the corms develop at the ends of slender rhizomes and it is not uncommon to find 3-7 or 8 corms attached together. The 17-41 greenish to greenish-yellow to greenish-maroon flowers born in an open raceme. The spur is 3-4 times the length of the lip. As the flower first opens it is essentially bilaterally symmetrical, however as the flower matures it twists so that it becomes bilaterally asymmetrical. The capsules are ellipsoidal, 5/16-1/2 inches (8-13 mm) long (not counting the persistent perianth) and 3/16-1/4 inches (4-5 mm) in diameter, pendant on slender pedicels. Capsule set in this species is fairly high with some plants having over 90% of the flowers being pollinated by noctuid moths. Frequently the previous year's inflorescence and fruit capsules will be present at the next year's flowering. This plant was first collected in Oklahoma by Steve Stephens from the University of Kansas in August 1968. He found one plant 2 miles south of Honobia. A revisit of this site by Magrath

and Albert Lavalley revealed a population of several hundred plants.

Habitat: Occurs in mixed deciduous and pine woodlands, growing in the layer of decaying leaf litter.

Distribution: southeastern Oklahoma (Map 32).

**Triphora Nuttall**, Gen. N. Amer. Pl. 2:192. 1818. The genus name from the Greek *tri* "three" and *phoros* "bearing," in reference to the small number of flowers, often three or perhaps to the three crests on a three-lobed lip. There are about 25 species in North America, West Indies, Central and South America. Medley (2001) recognized 5 species in North America, with 1 in Oklahoma.

**Triphora trianthophora** (Swartz) Rydberg in Britton, Man. Fl. N. States, 298. 1901.

Common Names: Three Birds' Orchid, Nodding Pogonia.

Flowering Time: mid August -mid October.

Description: Plants 1 1/2 - 10 inches (4-25 cm) tall, stems glabrous, fleshy and green to purple, with 2-6 ovate green leaves. Plants arising from fleshy roots which produce spheroidal to ovoid to cylindrical tuberoids. The 1-6 white fading to pale pink flowers in an open raceme. Flowering tends to be synchronous and ephemeral, with individual flowers usually lasting only one day, very rarely 2-3 days. The lip is obovate and white with 3 bright green papillose crests. The pollinia are magenta. The capsules are ellipsoidal, 3/8-5/8 inches (9-15 mm) long and 1/8-5/16 inches (4-7 mm) in diameter. The capsules are held erect when they first begin to develop but normally become pendant as the capsule matures and opens. Plants may occur as scattered individuals or form crowded colonies well over 4 feet (1.2 meters) in diameter, such as the one at the Battiest site.

Habitat: Occurs in mixed deciduous and pine woodlands and shaded sphagnum bogs, usually growing in the layer of decaying leaf litter, sometimes penetrating into the soil underneath.

Distribution: central and southeastern Oklahoma. There is a population in the Caddo Canyons (Widowmaker Canyon) in Canadian County. The late Dr. George Goodman told me that he had seen it in one of the moist canyons near Turner Falls in the Arbuckle Mountains in Murray County (Map 33).

## Number of Orchid Taxa Recognized for Oklahoma:

Year	Genera	Species	Varieties	Forms	Total Taxa
1972	11	20	0	0	20
2001	18	33	2	1	36
New taxa since 1972	7 (38%)	15 (43%)			
Possibly extinct in Oklahoma	4 (22%)	6 (18.2%)			

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1. *Aplecturnum hyemale* (over wintering leaves)  
Photographer: Carlyle Luer



2. *Aplecturnum hyemale*  
Photographer: Carlyle Luer



3. *Calopogon oklahomensis*  
Photographer: Charles S. Lewallen



4. *Calopogon tuberosa*  
Photographer: Carlyle Luer



5. *Corallorhiza odontorhiza*  
Photographer: Carlyle Luer



6. *Cypripedium kentuckiense*  
Photographer: Larry Magrath



7. *Cypripedium kentuckiense*  
Photographer: Charles S. Lewallen



8. *Cypripedium parviflorum*  
Photographer: Jim Norman



9. *Cypripedium parviflorum*  
Photographer: Jim Norman



10. *Cypripedium parviflorum*  
*f. albolabium*  
Photographer: Jim Norman



11. *Cypripedium parviflorum*  
*f. albolabium*  
Photographer: Jim Norman



12. *Cypripedium parviflorum*  
*f. albolabium*  
Photographer: Larry Magrath



13. *Epipactis gigantea*  
Photographer: Carlyle Luer



16. *Habenaria repens*  
Photographer: Charles M. Mather



19. *Isotria verticillata*  
Photographer: Carlyle Luer



22. *Malaxis unifolia*  
Photographer: Larry Magrath



14. *Galearis spectabilis*  
Photographer: Larry Magrath



17. *Hexalectris spicata*  
Photographer: Larry Magrath



20. *Liparis lillifolia*  
Photographer: Carlyle Luer



23. *Platanthera ciliaris*  
Photographer: Larry Magrath



15. *Goodyera pubescens*  
Photographer: Charles M. Mather



18. *Isotria verticillata* (early fruit)  
Photographer: Larry Magrath



21. *Liparis lillifolia*  
Photographer: Carlyle Luer



24. *Platanthera ciliaris*  
Photographer: Larry Magrath



25. *Platanthera clavellata*  
Photographer: Larry Magrath



26. *Platanthera flava* v. *flava*  
Photographer: Larry Magrath



27. *Platanthera flava* v. *flava*  
Photographer: Charles M. Mather



28. *Platanthera lacera*  
Photographer: Larry Magrath



29. *Platanthera leucophaea*  
Photographer: Carlyle Luer



30. *Platanthera praeclara*  
Photographer: Carlyle Luer



31. *Pogonia ophioglossoides*  
Photographer: Charles S. Lewallen



32. *Spiranthes lacera*  
Photographer: Charles S. Lewallen



33. *Spiranthes cernua*  
Photographer: Charles M. Mather



34. *Spiranthes magnicamporum*  
Photographer: Carlyle Luer



35. *Spiranthes cernua*  
Photographer: Charles M. Mather



36. *Spiranthes magnicamporum*  
Photographer: Albert Lavalley



*37. Spiranthes odorata*  
Photographer: Carlyle Luer



*38. Spiranthes ovalis v. erostellata*  
Photographer: Larry Magrath



*39. Spiranthes praecox*  
Photographer: Carlyle Luer



*40. Spiranthes tuberosa*  
Photographer: Larry Magrath



*41. Spiranthes vernalis*  
Photographer: Carlyle Luer



*42. Tipularia discolor (in fruit)*  
Photographer: Larry Magrath



*43. Triphoria trianthrophoria*  
Photographer: Charles S . Lewallen



Map 1. *Aplectrum hyemale*



Map 2. *Calopogon oklahomensis*



Map 3. *Calopogon tuberosus v. tuberosus*



Map 4. *Corallorhiza odontorhiza*



Map 5. *Corallorhiza wisteriana*



Map 6. *Cypripedium kentuckiense*



Map 7. *Cyripedium parviflorum v. parviflorum*



[Type location]

Map 7a. *Cyripedium parviflorum v. parviflorum v. f.albolabium*



Map 8. *Epipactis gigantea*



Map 9. *Galearis spectabilis*



Map 10. *Goodyera pubescens*



Map 11. *Habenaria repens*



Map 12. *Hexalectris spicata v. spicata*



Map 13. *Isotria verticillata*



Map 14. *Liparis liliifolia*



Map 15. *Listera australis*



Map 16. *Malaxis unifolia*



Map 17. *Platanthera ciliaris*



Map 18. *Platanthera clavellata*



Map 19. *Platanthera flava* v. *flava*



Map 20. *Platanthera lacera*



Map 21. *Platanthera leucophaea*



Map 22. *Platanthera praeclara*



Map 23. *Pogonia ophioglossoides*



Map 24. *Spiranthes cernua*



Map 25. *Spiranthes lacera v. gracilis & v. lacera*



Map 26. *Spiranthes magnicamporum*



Map 27. *Spiranthes odorata*



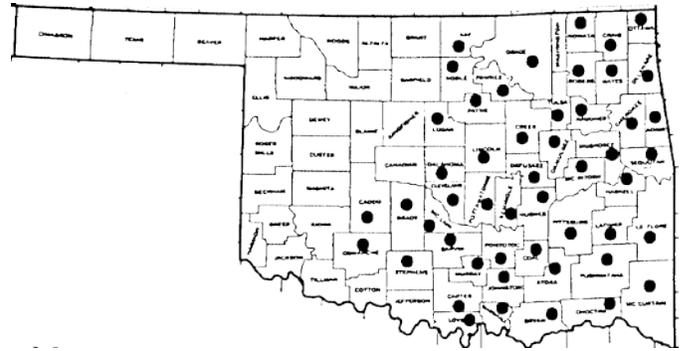
Map 28. *Spiranthes ovalis v erostellata*



Map 29. *Spiranthes praecox*



Map 30. *Spiranthes tuberosa*



Map 31. *Spiranthes vernalis*



Map 32. *Tipularia discolor*



Map 33. *Triphora trianthophora*