THE STATUS OF ASTER SCHREBERI NEES (SCHREBER'S ASTER) IN ILLINOIS

INTRODUCTION

Aster schreberi Nees (Asteraceae) is a relatively common species in dense woods and thickets, particularly in the piedmont and mountains of the eastern and southeastern United States, extending from Maine, west through southeastern Ontario to southeastern Wisconsin, south through Illinois, Pennsylvania, West Virginia and southeastern Ohio to Virginia, eastern Kentucky and Tennessee, and northern Alabama. The populations of this species in Illinois are disjunct by about 450 km from the nearest populations to the east (Jones 1989). Due to this disjunct distribution, and the few extant population in the state, schreber's aster is presently listed as state threatened (Sheviak and Thom, 1981). In the past, these disjunct midwestern populations have been referred to Aster chasei G. N. Jones, but Jones (1989) has found no consistent characters whereby the midwest populations can be distinguished from those to the east.

Aster schreberi is a relatively uncommon species in Illinois, being restricted to the northern one-third of the state. It is most common along the central part of the Illinois River valley, being reported from Bureau, Marshall, Peoria, Putnam, and Tazewell Counties. From here it extends westward through Henry, Knox, and Rock Island Counties, and has also been reported from Cook and Will Counties in northeastern Illinois. Most populations of this species occur on mesic, well-drained loamy to slightly gravelly soils in relatively mature wooded areas. Most are also on north-facing hillsides or in mesic ravines, and most are associated with hillsides that show evidence of past soil slumping.

Not only is Aster schreberi relatively uncommon in Illinois but flowering individuals are relatively rare in most populations. This species has a strongly creeping horizontal rhizome system from which sterile shoots are commonly produced. These commonly form large sterile colonies in which these basal rosettes from a dense ground cover. The present study was undertaken to determine how common Aster schreberi is in Illinois, to determine the size and structure of the populations, and to characterize the habitat in which these populations occur.

MATERIALS AND METHODS

Site data from all known populations of Aster schreberi in Illinois were obtained from Illinois herbaria. Attempts were made to relocate each population, and to find previously unrecorded populations, by visiting all known sites as well as similar areas where the species could possibly occur. At each site where Aster schreberi populations were found, general site and population data were obtained. At selected sites a detailed site evaluation was undertaken. At these sites the woody overstory density (#/ha), basal area (m^2/ha), relative values, importance values, and average diameters were determined, as was the density (#/ha) of the woody seedlings and saplings. The woody overstory composition was determined by using two quadrats 25 m on a side centered over the Aster schreberi population. In these quadrats all trees larger than 10 cm dbh were identified and their diameters recorded. The density of the woody seedlings (greater than 40 cm tall, but less than 2.5 cm dbh), and saplings (2.5-9.9 cm dbh) was determined using nested circular plots 1/1000 ha (for seedlings) and 1/100 ha (for saplings) randomly located throughout the area.

RESULTS AND DISCUSSION

Listed below are the Aster schreberi populations examined in the Illinois River Valley in Bureau, Marshall, and Peoria Counties. Other sites will be added as soon as the data are analyzed.

Site 1. Miller-Anderson Nature Preserve: (SW1/4 Sec 35 T15N R9E, Bureau Co., Illinois)

Site characteristics: North-facing hillside, deep loam soil, 18-20 degree slope, soil slumping in parts of area.

Vegetation: Mesic, second growth, relatively immature forest dominated by Acer saccharum Marsh (sugar maple) (Table 1). Other common overstory species are Quercus alba L. (white oak), and Quercus rubra L. (red oak). Trees average 232 stems per ha in the study area with a basal area of 13.88 m^2/ha. The woody understory is dominated by sugar maple, and Ostrya virginiana (Mill.) K. Koch (iron wood), with 2400 woody seedlings and 1350 saplings per ha (Table 1).

Aster schreberi population: The colony extends for about 110m along the slope and from near the ridge to about 45m down slope. In this area are six large colonies that vary from 5 to more than 18m in diameter, as well as scattered individuals and smaller colonies throughout the area. Only three flowering individuals were observed.

Table 1. Woody vegetation associated with the Aster schreberi colony located in the Miller-Anderson Nature Preserve, Bureau County, Illinois.

	Seed-lings #/ha	Sapl-ings #/ha	Den-sity #/ha	Basal Area m^2/ha	Av. Diam. cm	Rel. Den.	Rel. Dom.	I. V.
Acer saccharum Marsh.	1600	440	128	6.38	23.3	55.2	45.9	101.1
Quercus alba L.	--	--	40	4.00	34.8	17.2	28.8	46.0
Quercus rubra L.	100	--	32	3.01	34.4	13.8	21.7	35.5
Tilia americana L.	--	180	16	.31	15.3	6.9	2.3	9.2
Ostrya virginiana K. Koch.	200	680	16	.18	12.1	6.9	1.3	8.2
Others	500	50	--	--	--	--	--	--
Totals	2400	1350	232	13.88		100.0	100.0	200.0

Site 2. Marshall State Fish and Wildlife Area, Spring Branch Unit: (SW1/4 Sec 23 T12N R9E, Marshall Co., Illinois).

Site characteristics: North-facing slope and terrace, deep loam soil on terrace, very shallow loam soil on hillside, slope varies from nearly level on the terrace to 20-27 degrees on the hillside, extensive soil slumping throughout the area with most of the terrace the result of slumping.

Vegetation: Mesic, second growth, immature forest dominated by Ulmus americana L. (American elm) and Populus deltoides Marsh (Cottonwood) (Table 2). Trees average 512 stems per ha in the study area with a basal area of 27.33 m^2/ha. The woody seedling layer is relatively dense with 7250 stems/ha, while saplings average 665 stems/ha. The seedling layer is dominated by Celtis occidentalis L. (hackberry), Carya cordiformis (Wang.) K. Koch. (bitternut hickory), Corylus americana Walt. (hazelnut), Staphylea trifolia L. (bladdernut), and Fraxinus spp. (ash).

Aster schreberi population: The colony extends for about 85m along the terrace, to near the ridge top. A few large colonies to 8 m in diameter occur in the area with numerous smaller colonies and scattered individuals. No flowering individuals were observed.

Table 2. Woody vegetation associated with the Aster schreberi colony located in the Marshall State Fish and Wildlife Area, Spring Branch Unit, Marshall County, Illinois.

	Seed-lings #/ha	Sapl-ings #/ha	Den-sity #/ha	Basal Area m^2/ha	Av. Diam. cm	Rel. Den.	Rel. Dom.	I. V.
Ulmus americana L	--	25	264	7.70	18.1	51.6	28.2	79.8
Populus deltoides Marsh.	--	--	64	13.27	50.8	12.5	48.6	61.1
Tilia americana L.	--	100	56	2.23	19.9	10.9	8.2	19.1
Fraxinus spp.	875	63	32	1.40	21.9	6.3	5.1	11.4
Quercus rubra L.	--	--	24	1.25	25.5	4.6	4.6	9.2
Acer saccharum Marsh.	125	263	32	.49	13.8	6.3	1.8	8.1
Ulmus rubra Muhl.	--	--	24	.80	20.5	4.6	2.9	7.5
Prunus serotina Ehrh.	--	13	8	.09	11.6	1.6	.3	1.9
Cercis canadensis L.	--	13	8	.10	12.8	1.6	.3	1.9
Ostrya virginiana K. Koch.	--	138	--	--	--	--	--	--
Others*	6250	50	--	--	--	--	--	--
Totals	7250	665	512	27.33		100.0	100.0	200.0

* Includes Celtis occidentalis L., Carya cordiformis (Wang.) K. Koch., Corylus americana Walt, and Staphylea trifolia L.

Site 3. About 1 km north of the Marshall/Peoria County line, to the west of route # 29. (NE1/4 Sec 34 T12N R9E, Marshall Co., Illinois).

Site characteristics: North-facing hillside, relatively shallow loam soil, 20-26 degree slope, soil slumping common.

Vegetation: Mesic, second growth, relatively immature forest dominated by Acer saccharum. Quercus rubra and Fraxinus spp.. are also relatively common forest components. Trees average 368 stems per ha in the study area with a basal area of 26.82 m^2/ha (Table 3). The woody understory is dominated by sugar maple, bitternut hickory Ulmus rubra Muhl. (slippery elm), and ash, with 5000 seedlings and 464 saplings per ha (Table 3).

Aster schreberi population: The population extends for about 75m along the slope, and from near the base to the ridge-top, a distance of 45m. Two colonies average 6 and 12m in diameter respectively, while numerous scattered individuals and small colonies are also present. Ten flowering individuals were observed.

Table 3. Woody vegetation associated with the Aster schreberi colony located about 1 km north of the Marshall/Peoria County line, to the west of route # 29, Marshall County, Illinois.

	Seed-lings #/ha	Sapl-ings #/ha	Den-sity #/ha	Basal Area m^2/ha	Av. Diam. cm	Rel. Den.	Rel. Dom.	I. V.
Acer saccharum Marsh.	2500	388	192	9.38	23.5	52.3	35.0	87.3
Fraxinus spp.	625	--	40	5.15	40.0	10.9	19.2	30.1
Quercus rubra L.	--	--	32	4.70	40.6	8.7	17.5	26.2
Juglans nigra L.	--	--	16	1.82	33.9	4.3	6.8	11.1
Ulmus americana L.	--	13	24	.77	19.6	6.5	2.9	9.4
Carya cordiformis K. Koch.	1000	13	16	1.16	29.3	4.3	4.3	8.6
Ulmus rubra Muhl.	500	--	16	.96	26.4	4.3	3.6	7.9
Prunus serotina Ehrh.	--	--	8	1.24	44.4	2.2	4.6	6.8
Quercus alba L.	--	--	8	1.18	43.2	2.2	4.4	6.6
Celtis occidentalis L.	--	--	16	.46	18.8	4.3	1.7	6.0
Others	375	50	--	--	--	--	--	--
Totals	5000	464	368	26.82		100.0	100.0	200.0

Site 4. Forest Park Nature Center, south edge of preserve near the Pimiteoui Trail, Peoria Heights, Peroria Co., Illinois.

Site characteristics: Terrace and north- to northeast-facing hillside, thick loam soil, slope varies from nearly level on the terrace to 15-20 degrees on the hillside, some soil slumping on the hillside.

Vegetation: Mesic, second growth, relatively immature forest dominated by sugar maple and white oak. Other common associated trees include Tilia americana L. (basswood), slippery elm, and ironwood (Table 4). Trees average 248 stems per ha in the study area with a basal area of 14.53 m^2/ha. The woody understory is dominated by sugar maple, slippery elm, ash, and bitternut hickory, with 2100 seedlings and 750 saplings per ha (Table 4).

Aster schreberi population: The population extends for about 45 m along the terrace, and about 35m up the slope. It consists of one colony about 10m in diameter located on the flat terrace. Scattered individuals are also encountered on the terrace as well as the hillside. About 15 flowering individuals were observed.

Table 4. Woody vegetation associated with the Aster schreberi colony located in the southern part of the Forest Park Nature Center, Peoria County, Illinois.

	Seed-lings #/ha	Sapl-ings #/ha	Den-sity #/ha	Basal Area m^2/ha	Av. Diam. cm	Rel. Den.	Rel. Dom.	I. V.
Acer saccharum Marsh.	600	510	128	2.52	15.3	51.6	17.3	68.9
Quercus alba L.	--	--	16	6.62	72.3	6.5	45.6	52.1
Tilia americana L.	--	100	40	1.73	22.5	16.1	11.9	28.0
Ulmus rubra Muhl.	500	30	16	2.30	42.7	6.5	15.9	22.4
Ostrya virginiana K. Koch.	--	40	24	.36	13.6	9.7	2.5	12.2
Quercus rubra L.	--	--	8	.57	30.0	3.2	3.9	7.1
Carya cordiformis K. Koch.	200	40	8	.28	21.1	3.2	1.9	5.1
Fraxinus spp.	700	20	8	.15	15.7	3.2	1.0	4.2
Others	100	10	--	--	--	--	--	--
Totals	2100	750	248	14.53		100.0	100.0	200.0

Site 5. Forest Park Nature Center, south side of Valley Trail near the junction with the Wilderness Trail, Peoria Heights, Peoria Co., Illinois.

Site characteristics: North-facing hillside, relatively shallow loam soil, 15-20 degree slope, soil slumping common.

Vegetation: Mesic, second growth, immature forest dominated by red oak and sugar maple. Trees average 264 stems per ha in the study area with a basal area of 25.21 m^2/ha (Table 5). The woody understory is dominated by sugar maple and ash, with 26875 seedlings and 1000 saplings per ha (Table 5).

Aster schreberi population: The population extends for about 65m along the slope and from near the base to the ridge top, a distance of 35m. Four scattered colonies varying from 2 to 6m in diameter are found near the base to middle of the slope along with scattered individuals and a few very small colonies. Thirty-three flowering individuals were observed.

LITERATURE CITED

Jones, A. G. 1989. Aster and Brachyactis in Illinois. Ill. Nat. Hist. Surv. Bull. 34:139-194.

Sheviak, C. J. and R. H. Thom. 1981. Endangered and threatened species of Illinois. Status and distribution. Natural Land Institute.

Table 5. Woody vegetation associated with the Aster schreberi colony located along the south side of Valley Trail near the junction with the Wilderness Trail at the Forest Park Nature Center, Peoria County, Illinois.

	Seed-lings #/ha	Sapl-ings #/ha	Den-sity #/ha	Basal Area m^2/ha	Av. Diam. cm	Rel. Den.	Rel. Dom.	I. V.
Quercus rubra L.	--	13	96	13.31	39.1	36.4	52.8	89.2
Acer saccharum Marsh.	1625	912	104	7.73	26.2	39.4	30.7	70.1
Quercus alba L.	--		8	2.46	62.5	3.0	9.7	12.7
Ulmus rubra Muhl.	--	--	16	.80	25.1	6.1	3.2	9.3
Tilia americana L.	--	--	16	.49	19.6	6.1	1.9	8.0
Carya cordiformis K. Koch.	--	--	8	.22	18.5	3.0	.9	3.9
Fraxinus spp.	1000	--	8	.13	14.4	3.0	.5	3.5
Ostrya virginiana K. Koch.	--	75	8	.07	10.8	3.0	.3	3.3
Others	250	--	--	--	--	--	--	--
Totals	2875	1000	264	25.21		100.0	100.0	200.0