COSEWIC
Assessment and Status Report

on the

Crooked-stem Aster
Symphyotrichum prenanthoides

in Canada

THREATENED
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

COSEPAC
COMITÉ SUR LA SITUATION DES
ESPÈCES EN PÉRIL
AU CANADA

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COSEWIC 2002. COSEWIC assessment and status on report on the crooked-stem aster *Symphyotrichum prenanthoides* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 16 pp.

Zhang, J.J., D.E. Stephenson, J.C. Semple and M.J. Oldham. 1999. COSEWIC status report on the crooked-stem aster *Symphyotrichum prenanthoides* in Canada, *in* COSEWIC assessment and status on report on the crooked-stem aster *Symphyotrichum prenanthoides* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-16 pp.

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Également disponible en français sous le titre Rapport du COSEPAC sur la situation de l'aster fausse-prenanthe (*Symphyotrichum prenanthoides*) au Canada

Cover illustration:
Crooked-stem Aster — Reproduced with permission from Semple et al. 1996.

Catalogue No. CW69-14/292-2003E-IN
ISBN 0-662-34129-5

COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Crooked-stem aster

Scientific name
Symphyotrichum prenanthoides

Status
Threatened

Reason for designation
A species of restricted geographical range and small population size occupying few scattered forested edges of streams with potential risks of habitat disturbance and losses from roadside maintenance.

Occurrence
Ontario

Status history
Designated Special Concern in April 1999. Status re-examined and uplisted to Threatened in May 2002. May 2002 assessment based on new quantitative criteria applied to information from the existing 1999 status report.

COSEWIC
Executive Summary

Crooked-stem Aster
Symphyotrichum prenanthoides

Species information

Herbaceous perennials from elongated rhizomes. Stems ascending to erect, 2-9 dm, sharply bent at nodes especially above. Lower stem leaves oblanceolate, margins sharply serrate, deciduous by flowering; upper stem leaves similar but less constricted. Capitulescence paniculiform, few to many heads. Peduncles sparsely to densely hispid. Involucres turbinate, phyllaries somewhat foliaceous and usually reflexed. Rays 17-30, pale blue. Disc corollas 40-65, yellow becoming purple or brown. Achenes compressed obconic, 1 rib per side. Chromosome numbers: 2*n*=32.

Distribution

This species is rare in southwestern Ontario and is only known from Elgin County and one population each in Haldimand-Norfolk Regional Municipality and Oxford County. A Middlesex County population is apparently extirpated.

Habitat

Along the bank of streams and creeks; rich sandy soil; at edge of woods; usually in partial to full shade.

Biology

This is a perennial reproducing both by seed and asexual reproduction by means of its elongated rhizomes. It blooms in late August to early October in southwestern Ontario.

Population sizes and trends

A total of 22 extant populations are known. The sizes of most populations are small, averaging about 20 plants based on herbarium label data. The species is clonal and actual numbers may be much lower due to shoots (ramets) being counted as individuals. No trend information is available, although much potential suitable habitat has been lost in southwestern Ontario.

Limiting factors and threats

Most populations occur along the partially to fully shaded banks of streams and creeks that are unsuitable for agricultural use, but susceptible to chemical run-off. Some populations are along roadsides and near culverts and could easily be lost during road repairs, etc.

Special significance of the species

The biological significance, if any, is unknown at this time. In large populations, the species could be an important pollen source for local bees. This, however, is true for many wildflowers including most kinds of asters. The species has no known economic significance at this time.

Existing protection or other status designations

Populations occur in two provincial ANSI (Area of Natural and Scientific Interest) sites (Big Otter Creek and Talbot Creek) and several Elgin County KENAS (Kent Elgin Natural Areas Survey) sites, on private land.

Summary of status report

Crooked-stem Aster is a species of restricted geographical range in southwestern Ontario. Its few small populations are scattered within forested edges of streamside habitat and along roadsides, where there is continued risk from habitat disturbance and loss from road maintenance activities.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.
** Formerly described as “Not In Any Category”, or “No Designation Required.”
*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

Crooked-stem Aster
Symphyotrichum

in Canada

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1999

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SPECIES INFORMATION

Name and classification

Scientific name: *Symphyotrichum prenanthoides* (Muhl.) Nesom

Bibliographic citation: Phytologia 77: 290. 1994. TYPE: Schl. No. 15908 (Holotype: B !; seen by J.C.S.).

Synonyms:
A. floribundus Nutt., Gen. Amer. 2: 158. 1818. non Willd. (1803). TYPE: (probable Holotype: BM !).
A. prenanthoides var. *longifolius* Porter, Bull. Torrey Bot. Club 17: 16. 1890. SYNTYPES: US.
A. prenanthoides porrectifolius Porter, Mem. Torrey Bot. Club 5: 326. 1894. Based on *A. prenanthoides* var. *longifolius* Porter (1890). nom. superfl.
A. prenanthoides Muhl. ex Willd. f. *milwaukeensis* Benke, Torreya 36: 122. 1936. TYPE: U.S.A. WISCONSIN. Milwaukee Co.: Lake Woods, 10 Sept. 1904, *Monroe 3908* (Holotype: MIL, not seen).
Aster prenanthoides Muhl. Species Plantarum 3: 2046. 1803 (Holotype: B! seen by J.C.S.)

Common name: Crooked-stem Aster

Family name: Asteraceae, Compositae

Common family name: Sunflower family, Aster family

Major plant group: Angiosperm (dicot flowering plant)

This species has traditionally been treated as *Aster prenanthoides* Muhl.

Description

Symphyotrichum prenanthoides is distinguished by its crooked stems and by its leaves that are strongly constricted above their flared clasping bases. The species typically has heads with outer phyllaries that are usually foliaceous and spreading to reflexed (Figure 1).

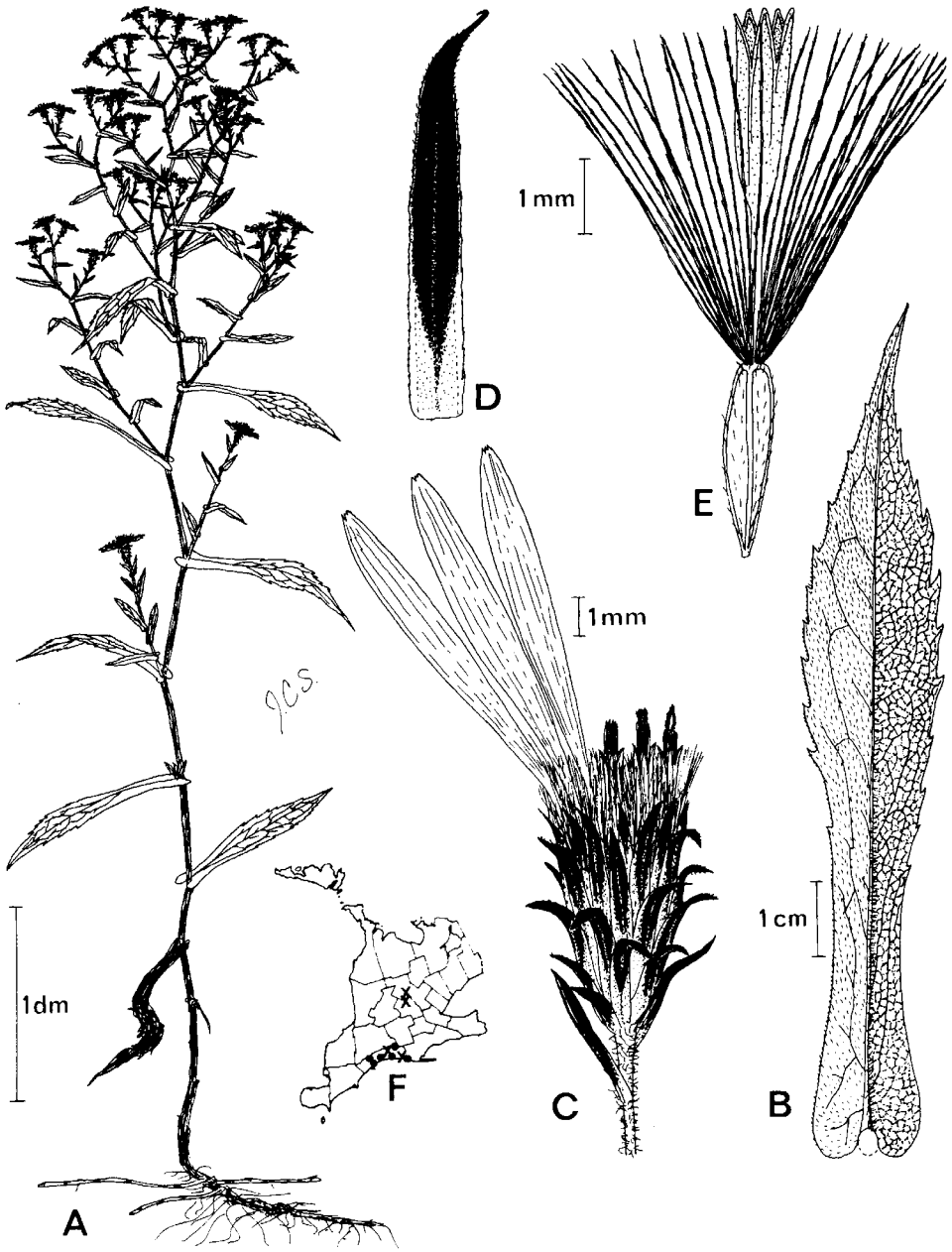

Figure 1. Illustrations of *Symphyotrichum prenanthoides* reproduced with permission from Semple et al. 1996. A, Habit; B, Mid stem leaf; C, Head of typical form with only a few florets drawn; D, Mid series phyllary with dark chlorophyllous zone; E, Mature disc floret achene with corolla attached.

The following comprehensive technical description is taken from Semple et al. (1996):

> Herbaceous perennials from elongated herbaceous rhizomes. Stems ascending to erect, 2-9 dm tall, sharply bent at nodes especially above, glabrate to moderately pubescent in lines in capitulescence, often anthocyanotic. Lower stem leaves oblanceolate, greatly constricted above the auriculate clasping base, margins sharply serrate, deciduous by flowering. Upper stem leaves similar but less constricted, upper surface moderately very short-hispid, under surface sometimes hispid along the veins, otherwise glabrous; branch leaves similar, reduced. Capitulescence paniculiform, few to many heads. Peduncles sparsely to densely hispid; bracts linear to narrowly lanceolate, pubescence like branch leaves. Involucres turbinate, 5-6 mm high. Phyllaries in 4-6 graduated to subequal series, sometimes foliaceous, appressed or spreading-reflexed, glabrous to sparsely hispid in the diamond-shaped chlorophyllous zone. Rays 17-30, 7.5-12 mm long, 1-2 mm wide, pale blue. Disc corollas 40-65, 3.5-5 mm long, yellow becoming purple or brown, somewhat ampliate, lobes 0.5-1.0 mm long. Achenes compressed obconic, 1 rib per side, sparsely to moderately strigose; single pappus whorl about equal in length to disc corolla. Chromosome numbers: 2*n*=32.

DISTRIBUTION

Global range

The species' North American range is given in Figure 2. *Symphyotrichum prenanthoides* has been reported for the following states by NatureServe (2002): Connecticut (SH), Delaware (S1), Florida (SE), Illinois (SU), Indiana (SR), Iowa (S3), Kentucky (S?), Maryland (SR), Massachusetts (S2), Michigan (S?), Minnesota (SU), Mississippi (SR), New Jersey (S2), New York (SR), North Carolina (S3?), Ohio (SR), Pennsylvania (S?), Tennessee (SR), Virginia (SR), West Virginia (S?), Wisconsin (SR); in Ontario it is listed as S2. Based on information provided by Semple there are no verified records of this species in Michigan.

Canadian range

In Canada, this species is rare in southwestern Ontario and is now only known from Elgin County and one population each in Haldimand-Norfolk Regional Municipality and Oxford County. A Middlesex County population is apparently extirpated (Figure 3).

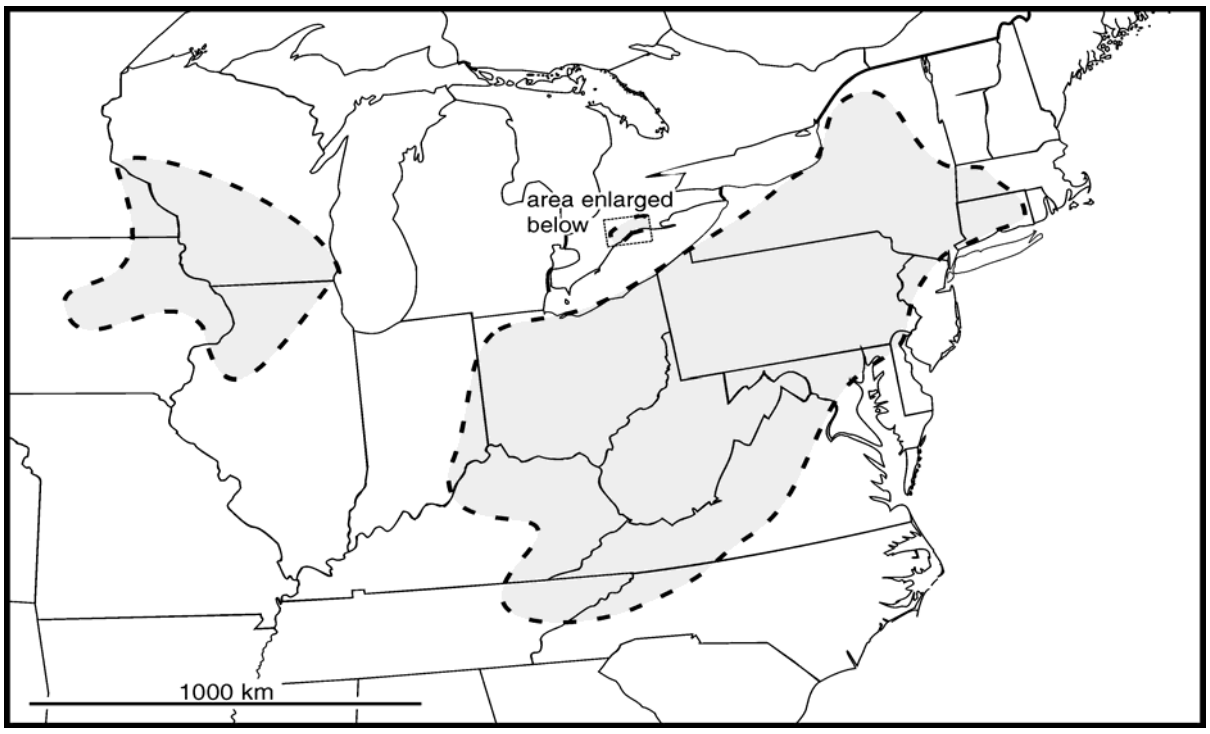

Figure 2. Native North American distribution of *Symphyotrichum prenanthoides.*

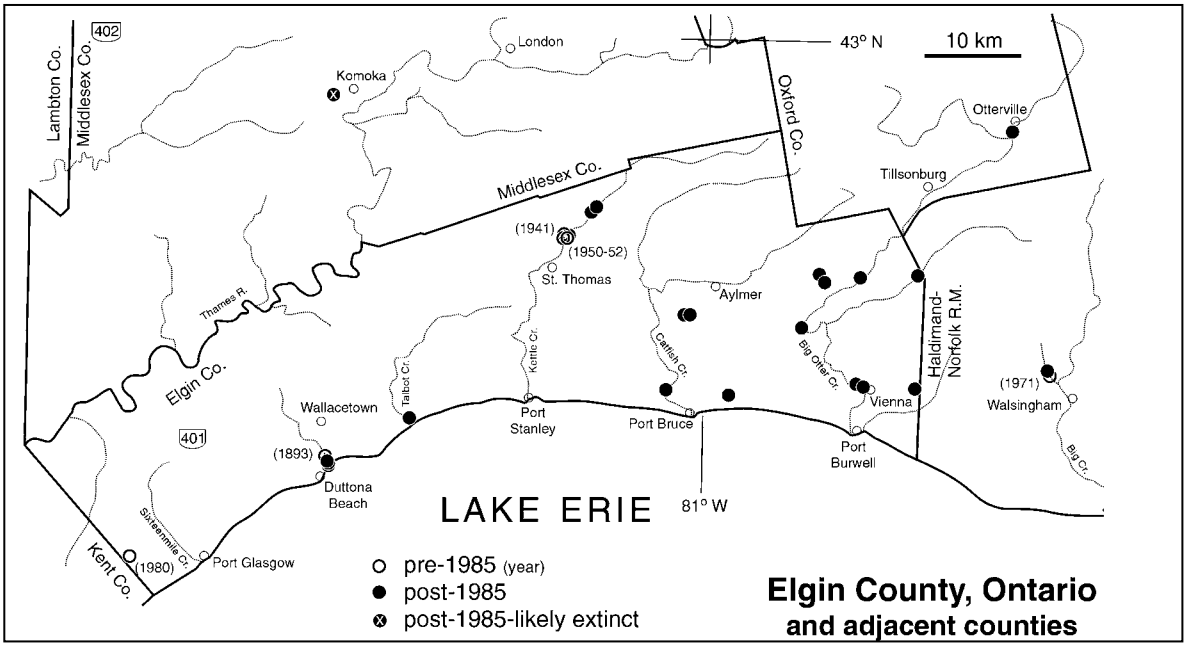

Figure 3. Distribution of *Symphyotrichum prenanthoides* in Canada (area enlarged from Figure 2).

HABITAT

The species is found along the banks of streams and creeks draining into the north shore of Lake Erie. It tends to occur in rich sandy loamy soil, commonly at the edge of woods and usually in partial to full shade. Figures 4 and 5 show the typical habitat of *Symphyotrichum prenanthoides* in Ontario.

Figure 4. Habitat of *Symphyotrichum prenanthoides* at Springwater Conservation Area, Elgin Co., Ontario.

Figure 5. Habitat of *Symphyotrichum prenanthoides* at Little Jerry Creek, Elgin Co., Ontario.

Protection/ownership

Populations occur in two provincial ANSI (Area of Natural and Scientific Interest) sites.

BIOLOGY

Population size varies from a few individuals to dozens of scattered individuals. In Ontario, the species flowers from late August to early October. It reproduces primarily by seed, but also asexually by its elongated rhizomes.

The species is a semi-obligate out-breeding species, as are nearly all asters (Jones, 1978). This means that populations usually must have several genetically different individuals present in order for fruit and seed production. Asters can self-pollinate, when stimulated by the presence of pollen from other species or by chance. Normal pollen transfer between individuals is accomplished by insects, primarily bees and Lepidoptera. Other insects may also serve as occasional pollen vectors.

Achene dispersal is presumed to be by wind.

POPULATION SIZES AND TRENDS

Currently, about 22 extant populations are known. The sizes of most populations are small, averaging about 20 plants (flowering stems) based on herbarium label data and field observations. The species is clonal and actual numbers may be much lower due to shoots (ramets) being counted as individuals. No trend information is available, although much potential habitat has been lost in southwestern Ontario with the presumed loss of populations of this species.

All known records based on plant collections and field surveys are recorded in Table 1. Those assumed or known to be extirpated are so indicated in the table.

The following record represents an erroneous report:

> Waterloo R.M.: Wellesley Rd; 5 Aug. 1982; *J. Chmielewski 1279* (WAT). The specimen, on which this report in Semple and Heard (1987) was based was re-examined for this status report. It appears not to be *A. prenanthoides*, and may be a hybrid between *A. cordifolius* and another species of *Aster*. Semple and Heard (1987) noted that it was one of several collections that might be included in *A. prenanthoides*, pending further study. All Ontario populations of the species seen in conjunction with the preparation of this status report included individuals typical for the species as it occurs in New York and elsewhere and not like *J. Chmielewski 1279.*

Table 1. Locations and status of populations of *Symphyotrichum prenanthoides.*			
Collection site	**Date**	**Collector or observer**	**Notes**
Elgin Co.: Aldborough Twp.; Site 1	6 Sep. 1980	*W.G. Stewart 2933* (UWO).	Gravelly soil of waste ground; MAP: 40I/12 STATUS UNKNOWN
Elgin Co.: Bayham Twp.; Site 2	16 Oct. 1985	*D. McLeod 8520*.	One population, several flowering plants but toward end of flowering period; ligules, blue-purple; damp, sandy loam of open thicket on slope.
Elgin Co.: Bayham Twp.; Otter Creek Complex, Site 3	12 Sep. 1986 14/15 Sept. 1997	*Bill Lamond 2659* (TRTE) Semple & Zhang	Along sandy road next to woodlot edge in wet-mesic soil; no abundance information available.none seen
Elgin Co.: Bayham Twp.; valley of Big Otter Creek. Site 4	16 Sep. 1986 14/15 Sept.1997	*Ian D. MacDonald 17973* *Semple & Zhang*	Sand plain river valley seepage slope wet mesic successional grove of *Thuja occidentalis*. 6 clones, 50 shoots in area about 10 m^2
Elgin Co.: Bayham Twp.; Site 5	26 Sep. 1986	*Ian D. MacDonald 18051*	Sand plain moist seepage of road cut and ditch
Elgin Co.: Bayham Twp.; Little Jerry and Big Otter Creek complex; Site 6	4 Oct. 1986 14/15 Sept. 1997	*Ian D. MacDonald 18136* *Semple & Zhang*	Thicket of *Physocarpus opulifolius, Salix eriocephala, Carex stricta, Solidago patula, Equisetum hyemale*; sand plain valley slope seepage, wet mesic thicket. 8 clones about 132 shoots in area of <10m^2
Elgin Co.: Bayham Twp.; Big Otter Creek, Site 7	23 Aug. 1987	*M.J. Oldham et al. 7811 (DAO 588727, NHIC)*	
Elgin Co.: Dunwich Twp.; Lake Erie shore and mouth of small creek, Site 8	7 Oct. 1993	*M.J. Oldham 15932* (WAT)	Rare, along small creek; flowering
Elgin Co.: Malahide Twp.; Site 9	7 Sept. 1941	*K. Young 193 (DAO 159664, TRT 84477)*	
Elgin Co.: Malahide Twp.; Site 10	25 Sept. 1989	*M.J. Oldham & Dave Mcleod 10378* (WAT)	
Elgin Co.: Malahide Twp.; Site 11	7 Aug. 1991	*M.J. Oldham sight record*	Roadside bank at edge of woods; early flowering
Elgin Co.: Malahide Twp.; Site 12	10 Sept. 1952 7 Sept. 1950 5 Oct. 1950	*Lorne E. James 1895* (DAO 159662, UWO) *Lorne E. James s.n.* (DAO 159663) *Lorne E. James s.n.* (DAO 159661)	Sandy, moist soil, part shade; flowers pale blue; sparse-scarce. LIKELY EXTIRPATED
Elgin Co.:Malahide Twp.; Site 13	x.x, 1986 14/15 Sept. 1997	*Wendy Laberee 3590* (TRTE) Semple & Zhang	Near Lake Erie shore, side of creek, quite frequent, with *Impatiens capensis.* 2 clones with 56 shoots

Collection site	Date	Collector or observer	Notes
Elgin Co.:Malahide Twp.; Site 14	14 Sept. 1997	*Semple & Zhang* (WAT 10588)	3 clones with total of 62 shoots in total area of perhaps 15 m^2
Elgin Co.: Yarmouth Twp.; Lake Erie shore at mouth of small creek, Site 15	5 Sept. 1893 7 Oct. 1993 14 Sep. 1997 14 Oct. 1997 14 Oct 1997	*Keith s.n.* (DAO 159665) *M.J. Oldham 15926* (MICH, NHIC, WAT) *J.C. Semple & J.J. Zhang10590* (WAT) Semple & Zhang Semple & Zhang	 3 subpop. 168 shoots (8 m^2) 3 clones with 62 shoots (likely not the same as seen on 14 Sept. 3 clones with 80 shoots (7 m^2)
Elgin Co.: Yarmouth Twp.; Kettle Creek, Site 16	14 Jun. 1994 13 Jun. 1994	*J.M. Bowles v.v.* *Bill Lamond 158*	
Elgin Co.: SW of Straffordville, Site 17	19 Aug. 1986	*Bill Lamond 2548* (TRTE)	In semi-open area under *Acer saccharum, Tsuga canadensis, Fagus grandifolia, with Aster lateriflorus, Solidago canadensis, Erigeron annuus* and *Aster macrophyllus.*
Elgin Co.: NW of Port Bruce, Site 18	10 Sep. 1986	*Bill Lamond 2630* (TRTE)	About 100 plants growing in open spot of *Acer nigrum*; floodplain with *Equisetum arvense*, *Heliopsis helianthoides* and *Smilacina stellata*;
Elgin Co.: NW of Straffordville, Site 19	9 Sep. 1986	*Bill Lamond 2616* (TRTE)	Along roadside in wet-mesic soil.
Elgin Co.: Catfish Creek Slope and Floodplain Forest, exact collection location not known. Site 20	10 Sep. 1986	*Bill Lamond KE862630*.	Probably rare at site since not reported by Kaiser in 1988; specimen collected from Black Maple floodplain with Sycamore, Black Walnut.
Haldimand-Norfolk R.M.: Deer Creek, Site 21	18 Jul. 1971 16 Sep. 1985	*L. Hume & J.C. Day 480* (UWO) *D. Bradley v.v.*	Distance from river edge 36-38 m; elevation 620 ft.
Middlesex Co.: Caradoc Twp.; WSW of Komoka Post Office, Site 22	2 Sep. 1992 14.15 Sept. 1997	*M.J. Oldham 14322* (WAT) Semple & Zhang	LIKELY EXTIRPATED none seen
Oxford Co.: Norwich Twp.: Site 23	x.x. 1992	*D. McLeod s.n.*	Recorded during a wetland evaluation along Big Otter Creek, south of Otterville in 1992.

LIMITING FACTORS AND THREATS

Most populations of *Aster prenanthoides* occur along the shaded banks of streams and creeks in wooded areas. Such locations are unsuitable for agriculture and thus not directly threatened by farming, but potentially vulnerable when such woodlots are selectively or clear-cut for wood. Populations along roadsides are at greater risk due to habitat modification and loss resulting from road maintenance and construction, or agricultural activities on adjacent property.

SPECIAL SIGNIFICANCE OF THE SPECIES

The biological significance, if any, is unknown at this time. In large populations, the species could be an important pollen source for local bees. This, however, is true for many wildflowers including most kinds of asters. The species has no known economic significance at this time.

EXISTING PROTECTION OR OTHER STATUS

Aster prenanthoides presently has no legal status or formal protection in Canada. It was listed as rare by Semple and Chmielewski (1983), and listed tentatively as threatened due to the low number of known populations by Semple et al. (1996).

International status: None. This species has a global ranking of G4G5 (Argus & Pryer, 1990; Oldham, 1996; NatureServe, 2002) indicating that it is “apparently secure, or abundant and demonstrably secure with many occurrences” globally.

National status: Listed as rare by Semple and Chmielewski (1983) and with a National Rank of N2 indicating “imperiled because of rarity (5 to 20 occurrences)” by Argus and Pryer (1990).

Provincial or state status: Ranked as S2 (very rare in Ontario; usually between 5 to 20 occurrences in the province) by Argus and Pryer (1990) and Oldham (1994, 1996). Considered rare in the following states (NatureServe 2002): Connecticut (SH; historic), Delaware (S1; critically imperilled, usually fewer than 5 occurrences), Iowa (S3; rare or uncommon, 21 to 100 occurrences), Massachusetts (S2; imperilled, usually 6 to 20 occurrences), North Carolina (S3?), and New Jersey (S2; imperilled, usually 6 to 20 occurrences).

SUMMARY OF STATUS REPORT

The species is known from about 22 extant sites occupying small fragmented woodland habitats along streams within a restricted geographical area; at least 2 historic populations are extirpated. No precise information on the total population size or

trends is available but current data indicates that there are likely fewer than 1000 shoots in very small patches within habitats that likely occupy an area of <<20 km^2. Most populations are on private land and occur in a region where most of the original forests have been cleared for agricultural purposes. The species is at risk from roadside maintenance, possibly from habitat disturbance due to selective logging of the streamside woodlands and impacts of agricultural activities.

TECHNICAL SUMMARY

Symphyotrichum prenanthoides
Crooked-stem Aster Aster fausse-prenanthe
Occurrence: Ontario

Extent and Area information	
• *extent of occurrence (EO)(km²)*	<2000
• *specify trend (decline, stable, increasing, unknown)*	unknown
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	no
• *area of occupancy (AO) (km²)*	<<20
• *specify trend (decline, stable, increasing, unknown)*	likely declining
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	no
• *number of extant locations*	about 22
• *specify trend in # locations (decline, stable, increasing, unknown)*	unknown
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	no
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	likely declining
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	perhaps 2-3 years
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	<1000
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	unknown
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	
• *are there extreme fluctuations in number of mature individuals (>1 order of magnitude)?*	no
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤1 successful migrant / year)?*	yes
• *list each population and the number of mature individuals in each*	
• *specify trend in number of populations (decline, stable, increasing, unknown)*	2 historic sites lost
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	no
Threats (actual or imminent threats to populations or habitats)	
- roadside maintenance; selective logging; possible impact from nearby agricultural activities	
Rescue Effect (immigration from an outside source)	High / Moderate / Low
• *does species exist elsewhere (in Canada or outside)?*	USA
• *status of the outside population(s)?*	see text
• *is immigration known or possible?*	unlikely
• *would immigrants be adapted to survive here?*	probably
• *is there sufficient habitat for immigrants here?*	not much
Quantitative Analysis	

ACKNOWLEDGEMENTS

Jennifer Line, Natural Heritage Information Centre, assisted with location data entry and checking. Funding provided by the Canadian Wildlife Service and the Canadian Council for Human Resources in the Environment Industry.

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Zhang, Jay J. Knowledgeable about the classification of asters and goldenrods of Ontario.

Stephenson, David E. Field biologist; knowledgeable about Ontario flora.

Semple, John C. Dr. Semple is an expert on evolution and classification of members of the Tribe Astereae of Asteraceae particularly asters, goldenasters, and goldenrods.

Oldham, Michael J. Experienced field botanist and botanist/herpetologist with the Natural Heritage Information Centre, Peterborough, ON.

COLLECTIONS EXAMINED

Herbaria at the following institutions were consulted for possible collections of *Aster prenanthoides* from Canada.

CAN	Canadian Museum of Nature
DAO	Vascular Plant Herbarium, Agriculture Canada
HAM	Royal Botanical Garden, Hamilton, Ontario
NHIC	Natural Heritage Information Centre, Peterborough, Ontario
OAC	Botany Department, University of Guelph
TRT	Vascular Plant Herbarium, Botany Department, Royal Ontario Museum
TRTE	Botany Department, University of Toronto – Erindale
UWO	Plant Science Department, University of Western Ontario
WAT	Department of Biology, University of Waterloo
WLU	Biology Department, Wilfrid Laurier University

*Abbreviations as listed in P.K. Holmgren, N.H. Holmgren, and L.C. Barnett, 1990. *Index Herbarium. Part I. The Herbaria of the World*. Eighth Edition. New York Botanical Garden, New York, USA.

FIELDWORK

Field surveys were conducted on 14 and 15 September 1997 by Drs. John C. Semple and Jay J. Zhang.

Elgin Co.: Yarmouth Twp.; (site 15, Table 1, 14 Sept. 1997) embankment of creek, within woods; three subpopulations found (1 m² with 18 shoots; 3 m² with about 100 shoots and 4 m² with about 50 shoots over 1 m tall); in bloom; surrounding plants are: *Aster lateriflorus, A. puniceus, A. novae-angliae, A. urophyllus, Solidago gigantea, S. canadensis, S. flexicaulis, S. caesia, Erigeron strigosus, Bidens spp., Eupatorium spp., Rudbeckia triloba, Rubus spp., Fraxinus spp., Lobelia spp., Smilacina racemosa, Cornus alternifolia, Geum spp., Rhus typhina, Betula papyrifera, Acer saccharum, Prenanthes spp.* (picture taken).

Middlesex Co.: (site 22) M.J. Oldham had collection in this woodlot on Sept. 2, 1992; we surveyed the whole woodlot, no plants seen; owner of woodlot contacted.

Elgin Co.: Malahide Twp.; (site 15) a little creek close to Bradley's Creek, roadside, at edge of woodlot, bank of creek, scattered plants seen; 3 clones along the edge of woods; in blooming; in the shade of woods, no direct light; not seen in woods; clone 1 with 30 shoots, 4 m²; clone 2 with 10 shoots, 2 m²; clone 3 with 40 shoots, 3 m². Surrounding plant species are: *Aster lanceolatus, A. urophyllus, A. puniceus, Solidago canadensis, Daucus carota, Sambucus spp., Betula spp., Fraxinus spp., Acer saccharum, A. rubrum, Pinus strobus* (picture taken).

Elgin Co.: Malahide Twp.; (site 15) roadside, one clone found with 37 shoots, 1-1.5 m wide and 10 m long; 20 m away another clone found with 11 shoots; 50 m away another clone with 14 shoots found; all sites on the south bank, and in the shade. Surrounding plants are: *Aster lanceolatus, A. cordifolius, A. urophyllus, Solidago canadensis, Plantago lanceolata, Ambrosia artemisiifolia, Acer negundo, Impatiens capensis, Rubus spp., Asclepias syriaca, Geranium spp., Erigeron strigosus, Tussilago farfara, Populus tremuloides* (picture taken). We checked Van Patter Rd., First Concession Rd., S of Elgin along Highway 3, no crooked-stem aster seen.

Elgin Co.: Bayham Twp.; (site 6) on the N side of road, about 100 m from Highway; E bank of creek, edge of woods, under indirect light, one clone with 6 shoots found, plants small, about 30–50 dm high, very rare locally; surrounding plants: *Solidago flexicaulis, S. canadensis, S. caesia, Cornus spp., Fraxinus spp*. (picture taken).

Elgin Co.: Bayham Twp.; (site 6) S side of road, E bank of creek, edge of woods, under indirect light, 8 clones found, all scattered, in bloom. Clone 1 with 2 shoots; clone 2 with 3 shoots; clone 3 with 25 shoots; clone 4 with 28 shoots; clone 5 with 25 shoots; clone 6 with 8 shoots, 1 m²; clone 7 with 20-25 shoots, 8 m²; clone 8 with 10 shoots right in a small ditch mixed up with horsetail (*Equisetum spp.*) (picture taken).

Elgin Co.: Bayham Twp.; (site 6) we checked S of road, E bank of creek, no plants seen.

Elgin Co.: Bayham Twp.; (site 6) E bank of creek, sandy soil; 6 clones found in bloom, scattered along the edge of woods. Clone 1 with 5 shoots, 1 m²; clone 2 with 20+ shoots, 2 m²; clone 3 with 4 shoots, 1 m²; clone 4 with 2 shoots, 1 m²; clone 5 with 11 shoots, 3 m²; clone 6 with 8 shoots, 2 m². Surrounding plants: *Solidago canadensis, Salix spp., Populus spp., Acer negundo, Oenothera spp., Asclepias syriaca, Daucus carota* (picture taken).

Elgin Co.: Bayham Twp.; (site 6) Scattered clones in sandy enbankment, in blooming, under trees of ash (*Fraxinus spp*.), elm (*Ulmus spp*.), willow (*Salix spp*.) and poplar (*Populus spp*.). 6 clones found (picture taken).Bank of Big Otter Creek in Vienna area has been checked, such as Water Street, did not find any Crooked-stem Aster.

Elgin Co.: Malahide Twp.; (site 13), on the E bank of a creek, rich sandy soil, edge of woods, 2 clones found. Clone 1 with 50 shoots, scattered for 20 m, in bloom; clone 2 with 6 shoots, 2 in bloom, under *Populus tremuloides*. The forest on this private property is being managed by the Ministry of Natural Resources under the Woodlands Improvement Act.