

Status of the Few-flowered Club-rush, *Scirpus verecundus* (Cyperaceae), in Canada*

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Crins, William J. 1989. Status of the Few-flowered Club-rush, *Scirpus verecundus* (Cyperaceae), in Canada. Canadian Field-Naturalist 103(1): 57-60.

The Few-flowered Club-rush, *Scirpus verecundus*, is restricted in Canada to two areas within the western Lake Ontario drainage basin in southern Ontario. It was first discovered in the Hamilton area in 1955 and in the Toronto area in 1976. It occurs on dry mesic slopes in hardwood-pine forests on neutral to slightly acidic coarse soils developed over calcareous bedrock. This species is rare in Canada, but its populations appear to be stable.

Key Words: *Scirpus verecundus*, Few-flowered Club-rush, Ontario, rare, distribution, population size.

The Few-flowered Club-rush, *Scirpus verecundus* Fernald, is one of very few true woodland members of this genus in Canada. It is most closely related to *S. clintonii* A. Gray, a species which is also considered to be rare in Ontario (Ball and White 1982a,b). Since it is a small, vernal herb with a superficial vegetative resemblance to other co-occurring woodland sedges such as *Carex pensylvanica* Lam., *S. verecundus* may be difficult to detect when it is not in flower.

Scirpus verecundus is a tufted perennial with culms 1-4 dm tall that arise from short rhizomes. The flat, dark green, shiny, narrow (1-2 mm) leaves often exceed the culm. The single, terminal spike contains four to eight flowers and is about 5 mm long. The spike is subtended and equalled or slightly exceeded by an erect, ovate bract which is prolonged into a short blunt awn 1-6 mm long. The midribs of the scales subtending the flowers also have short, sharp awns. Each achene is subtended by three to six bristles about as long as the achene (Figure 1).

Distribution

The range of *S. verecundus* encompasses much of the eastern United States north of the Carolinas from Virginia and eastern Missouri north to Maine, Pennsylvania and Ohio. It appears to be rare along the margins of its range in Maine (Ogden et al. 1948), Ontario (Ball and White 1982b), the Niagara frontier region of New York (Zander and Pierce 1979; Zenkert 1934), northern Ohio (Braun 1967), Illinois (Sheviak 1981), West Virginia (Clarkson et al. 1981), and Delaware (Tatnall 1946). However, it is common elsewhere in the Appalachian ranges and on the Coastal

Plain (Hitchcock and Standley 1919; Seymour 1969; Taylor 1915).

The first Canadian stations were found in the Royal Botanical Garden properties in the Hamilton area between 1955 and 1958 by A. Tamsalu. It was not discovered in the Toronto area until 1976 [relevant specimens in HAM, TRT; acronyms according to Holmgren et al. (1981)]. Both of these areas are contained within the Niagara Forest Section of the Deciduous Forest Region (Rowe 1972). Figures 2 and 3 present the distribution of the species in Ontario and North America, respectively.

Habitat

All of the populations of *S. verecundus* in Canada occur on relatively steep slopes under the cover of Red Oak, *Quercus rubra* L., in association with *Carex pensylvanica*. Eastern White Pine, *Pinus strobus* L., is often present in the overstory. *Scirpus verecundus* prefers sites in which the canopy is not continuous, but in which small gaps occur (the forest floor is subject to considerable sun-fleck activity). Some type of disturbance (selective cutting, fire, trail edges) is usually evident near populations of this species. At the Canadian sites, it prefers neutral to slightly acidic, coarse-textured soils (Table 1) developed over highly calcareous parent materials. Cation (K, Mg, Ca) and phosphorus contents at these sites vary considerably (Table 1), suggesting that *S. verecundus* is tolerant of a wide range of soil macronutrient conditions.

General Biology

Scirpus verecundus flowers in the spring (early to mid-May in the Ontario populations) before the

*Based on a COSEWIC status report by the author. Copies of the report are available at cost from the Canadian Nature Federation, Suite 203, 75 Albert Street, Ottawa K1P 6G1. Rare status was approved and assigned by COSEWIC on 8 April 1986.

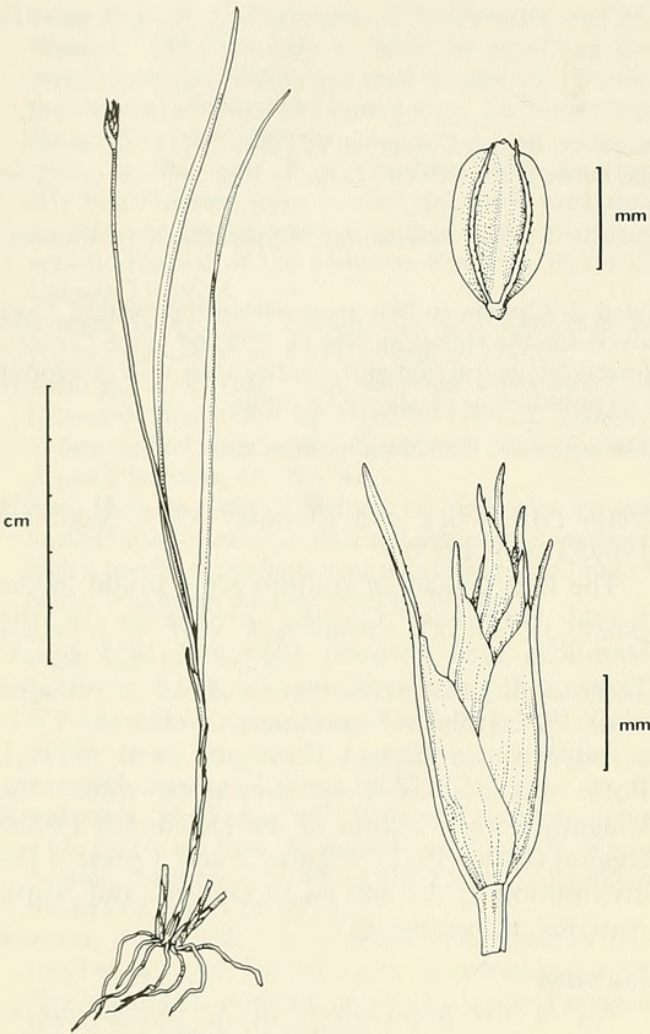


FIGURE 1. Habit, inflorescence and achene of *Scirpus verecundus*. Drawn from Crins 6286, Sutherland & Varga; Crins 6312 & Dyer; Crins 6475 (relevant specimens in TRTE) by Lesley Bolm.

forest canopy has developed. It shows the characteristic features of an anemophilous (wind-pollinated) plant, lacking showy perianth and nectaries and having relatively large, well exerted stamens and stigmas. Its flowers are protandrous (anthers emerging beyond scales before receptive stigmas), but the extent of outcrossing must be limited by the low stature of the plants and the irregular terrain in which the populations occur. Seed dispersal is well under way by late July and is virtually complete by early to mid-August. By late July, the leaves and culms become matted on the forest floor. This feature undoubtedly facilitates local dispersal and suggests a mechanism by which dense colonies of clumps could become established. If this mode of colony establishment is correct, then adjacent clumps must be closely related genetically. Seed set is extremely high, in spite of this presumed low genetic diversity within populations.

Population Size and Trends

Seven populations of *S. verecundus* are known in Canada. These occur in two areas separated by

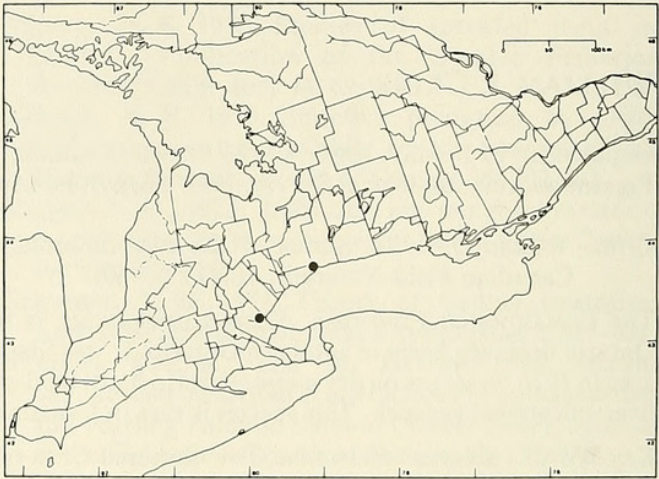


FIGURE 2. Distribution of *Scirpus verecundus* in Ontario.

approximately 90 km (east Toronto and west Hamilton). Within these areas, the populations are relatively close to one another. In the Rouge River valley of Toronto, the two populations are less than 1 km apart. The five populations in Cootes' Paradise (Royal Botanical Garden property), Hamilton, are all within 2 km of each other.

Due to the colonial nature of this plant, it is difficult to estimate the number of plants contained within each population. The clonal nature of the species, as well as its dispersal biology, contributes to this difficulty. All but one of the populations seen by the author in 1984 were composed of several hundred to thousands of fruiting culms. One of the Hamilton populations contained only eight small clumps with 5 to 30 flowering culms each.

Colonies generally occupy discrete areas. One population in Hamilton occupied an area approximately 10 x 10 m, with clumps evenly and closely spaced within this area. Another popula-

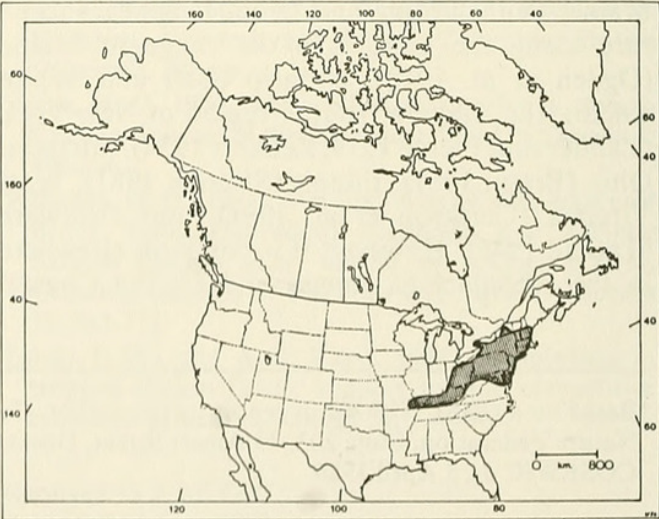


FIGURE 3. Distribution of *Scirpus verecundus* in North America.

TABLE 1. Soil sample data for five Canadian populations of *Scirpus verecundus*.

Site*	Date	pH	P	K (ppm in soil)	Mg	Ca	Texture
1a	10 May 1984	6.9	53	104	88	1880	coarse
2a	21 May 1984	4.9	29	28	59	204	coarse
2b	21 May 1984	5.3	7	27	100	602	coarse
2c	21 July 1984	5.6	8	68	97	380	coarse
2d	11 August 1984	6.8	3	32	141	1286	coarse

*Site 1a is one of the Metropolitan Toronto Populations; sites 2a-d are Hamilton area populations.

tion occupied an area of approximately 10 x 1 m along a steep, narrow ridge. A third Hamilton population comprised a nearly continuous series of clumps covering about 8 x 5 m on both sides of a nature trail. Plants in all of these populations flowered and/or fruited profusely during 1984. Each clump contained several flowering culms, and the populations visited during July and August 1984 showed successful fruiting and seed dispersal (mature achenes and bare rachises).

No information is available regarding changes in population size. It is not possible to determine whether a given clump is of recent origin or whether it is declining. The Toronto populations were only recently discovered (the first in 1976), and they have not been closely monitored. The Hamilton populations, discovered between 1955 and 1958, appear to be healthy and contain large numbers of flowering culms. Thus, it is at least holding its own in this area.

Limiting Factors

On the basis of the sites which are occupied by *S. verecundus* in Canada, it would appear that light levels on the forest floor may be a limiting factor in the successful establishment of new clumps. Competition for space with *Carex pensylvanica*, a common, clonal associate, may also limit the establishment or spread of *S. verecundus*. Slightly acidic soils developed over calcareous bedrock are probably also required by this species.

Special Significance of the Species

Scirpus verecundus is one of very few simple-spiked, vernal, woodland species in the genus. Its highly reduced inflorescence makes it potentially useful in studies of the phylogeny of this large genus. Reduction generally represents evolutionary advancement, so that *S. verecundus* could yield valuable information in this regard.

Since *S. verecundus* can occur in fairly large populations on relatively steep banks under forest cover, it may play a minor role in local bank stabilization, along with other forest herbs.

Protection

Scirpus verecundus receives no formal legal protection in Canada. It has been listed as

endangered in Illinois (Sheviak 1981) and rare in West Virginia (Clarkson et al. 1981). It has also been listed as nationally rare in Canada (L. Kershaw, J. K. Morton, and J. M. Venn. 1976. A list of rare or endangered species in the Canadian flora — vascular plants. Unpublished computerized list, Department of Biology, University of Waterloo, Waterloo, Ontario) and provincially rare in Ontario (Ball and White 1982b), but these listings do not afford any protection.

Evaluation of Status

Scirpus verecundus is considered to be rare in Canada. Although it is only known from two areas in southern Ontario, most of its seven populations are relatively large, apparently stable, and produce and disperse ample amounts of seed. There is no evidence of population reduction. There is no serious threat to its habitat at present, and it is quite possible that the species could be found in other suitable sites in the Niagara Peninsula or in the western Lake Ontario region.

Acknowledgments

I thank Erich Haber, National Museum of Natural Sciences, Ottawa, for useful suggestions during the early stages of this study. Peter Ball of the Erindale Campus, University of Toronto, deserves special thanks for his support and encouragement during this study, particularly for allowing my use of his files on the rare sedges of Ontario. I am also grateful to Lesley Bohm of Vancouver, British Columbia, for preparing the excellent illustrations of *Scirpus verecundus*. Mary Gartshore, Donald Sutherland, and Steven Varga assisted me on various field trips. The curators of several herbaria (CAN, DAO, HAM, MICH, TRT and TRTE) provided access to their collections. I also thank the staff of the Agri-Food Laboratories, Inc., of Guelph, Ontario, for conducting the soil analyses. The COSEWIC study was supported in part by a financial contribution from the World Wildlife Fund, Canada.

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Received 22 July 1987

Accepted 15 July 1988



Crins, William J. 1989. "Status of the Few-flowered Club-rush, *Scirpus verecundus* (Cyperaceae), in Canada." *The Canadian field-naturalist* 103(1), 57–60. <https://doi.org/10.5962/p.356052>.

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