

Slender False Brome (*Brachypodium sylvaticum*, Poaceae), an Invasive Grass New to Ontario, Canada

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Brachypodium sylvaticum, Slender False Brome, an invasive Eurasian grass, is reported for the first time in Ontario and eastern Canada from Grey County, southern Ontario. The only previous Canadian record is from Vancouver Island, British Columbia. The species is widespread in the U.S. Pacific Northwest, where it is spreading aggressively throughout much of western Oregon. In the eastern U.S.A., known populations are few and localized, although the species will likely spread.

Key Words: *Brachypodium sylvaticum*, Slender False Brome, Poaceae, invasive, new record, Grey County, Ontario, Canada.

The invasive Eurasian grass species *Brachypodium sylvaticum* (Huds.) P. Beauv. (Slender False Brome) was recently discovered in Ontario, and is here reported as new to the flora of the province and eastern Canada. On 5 and 19 August 2011, Brian Miller and Robert Aitken encountered an unfamiliar grass species while conducting a volunteer vascular plant inventory of the Nordin Nature Reserve, a 13.5 ha parcel of land owned by the Escarpment Biosphere Conservancy in Grey County, Ontario. A specimen was collected and photographs were taken (Figure 1). Photographs were emailed to Michael Oldham of the Ontario Natural Heritage Information Centre, who was also unfamiliar with the grass. Oldham forwarded the photographs to Anton Reznicek of the University of Michigan. Reznicek provided a tentative identification of *Brachypodium sylvaticum*, a species previously unreported in Ontario. Miller, Aitken, and Oldham visited the site on 18 October 2011 and confirmed that the unknown grass was *B. sylvaticum*. Additional specimens were collected by Oldham at this time and have been deposited in regional herbaria (herbarium acronyms follow Thiers 2011*) (see voucher specimens below). The general location of *Brachypodium sylvaticum* collected in Grey County, southern Ontario, is plotted on the map in Figure 2.

Brachypodium sylvaticum (Huds.) P. Beauv. is a perennial grass native to Europe, Asia, and North Africa (Piep 2007). Only subspecies *sylvaticum* is known to be present in North America (Piep 2007). The species was first found in North America near Eugene, Lane County, Oregon, in 1939 (Kaye 2001*), and by 1966 it was thoroughly naturalized and formed at least two large colonies in the Corvallis-Albany area of Benton County, Oregon (Chambers 1966). In western North

America, it was subsequently discovered in San Mateo County, California, in 2003 (Johnson 2004) and near Cowichan Lake, Vancouver Island, British Columbia, in 2008 (Fenneman 2010*). It is now also known from the state of Washington (Daniel and Werier 2010). Unconfirmed reports exist for Colorado and Utah (Kaye 2001*; Piep 2007). *Brachypodium sylvaticum* is highly invasive in the Pacific Northwest. It currently covers an estimated 10 000 ha of forested and open habitats in Oregon (Kaye 2003*). By examining nuclear microsatellites and chloroplast haplotype variation in 23 introduced populations of *B. sylvaticum* in western North America and 25 native populations of *B. sylvaticum* in western Europe, Rosenthal et al. (2008) suggested that there were two independent historical introductions of the species in Oregon and a separate introduction in California.

Brachypodium sylvaticum is rare in eastern North America. There are no previous reports of *B. sylvaticum* from Ontario (Dore and McNeill 1980; Morton and Venn 1990; Newmaster et al. 1998) or elsewhere in Canada east of Vancouver Island (Scoggan 1978-1979; Kartesz 1999; Brouillet et al. 2011*). In the eastern U.S.A., *B. sylvaticum* is currently highly localized. It was first reported in Virginia (Piep 2007) and has recently been reported from Genesee County and Tompkins County in New York State (Daniel and Werier 2009, 2010). It is well established at Bergen Swamp in Genesee County, where it has been present since at least the mid-1990s (Daniel and Werier 2010). In Michigan, *B. sylvaticum* is known from Benzie County, where it was first collected in 1984 (Reznicek et al. 2011*).

The Ontario population of *Brachypodium sylvaticum* is located between Priceville and Flesherton in Grey



FIGURE 1. Spikelets of *Brachypodium sylvaticum* in Grey County, Ontario, 19 August 2011. Photo: Brian Miller.

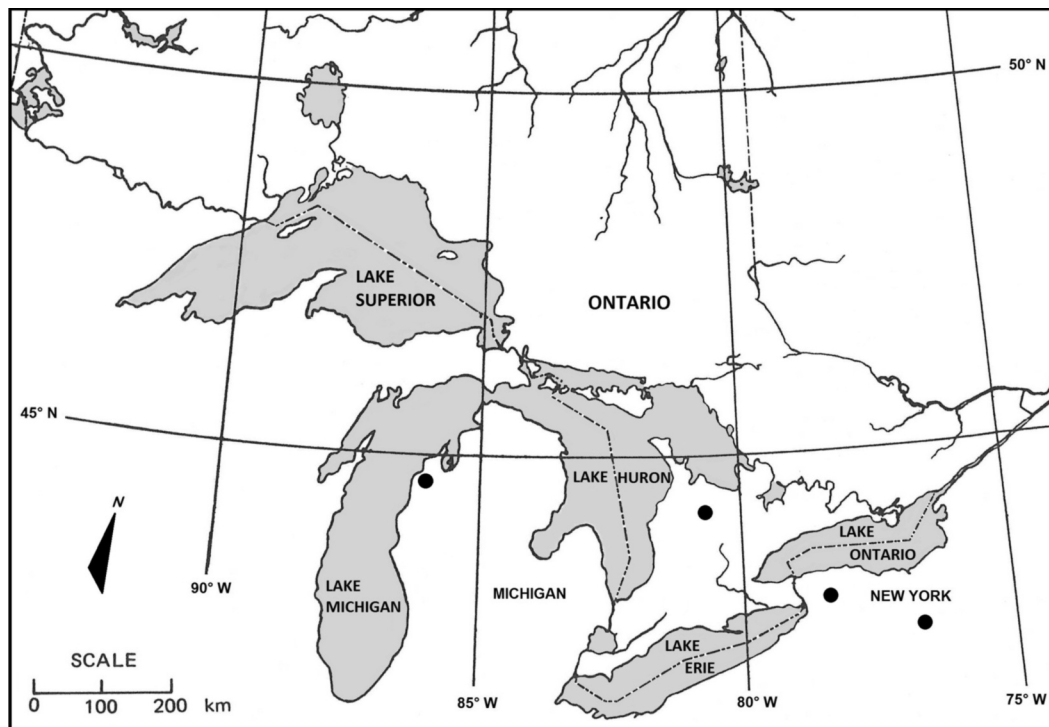


FIGURE 2. General locations of *Brachypodium sylvaticum* in Grey County (Ontario), Benzie County (Michigan) and Genee and Tompkins Counties (New York). Base map source: Dore and McNeill (1980).

County south of Grey Road 4 (44.217°N, 80.597°W). In the Nordin Nature Reserve, the population occurs on a small wooded upland knoll dominated by an understory of Eastern White Cedar (*Thuja occidentalis*) and Balsam Fir (*Abies balsamea*) and a semi-open canopy of Sugar Maple (*Acer saccharum*), Paper Birch (*Betula papyrifera*), Yellow Birch (*B. alleghaniensis*) and Eastern Hop-Hornbeam (*Ostrya virginiana*). The knoll

is surrounded by a large swamp dominated by Eastern White Cedar, Black Ash (*Fraxinus nigra*), and Red Maple (*Acer rubrum*). Several thousand plants of *Brachypodium sylvaticum* were estimated to occur on the upland knoll; none were observed growing in the surrounding wetland (Figure 3). All vascular flora observed growing on the knoll with *B. sylvaticum* is listed in Table 1.

TABLE 1. Plant species observed growing with *Brachypodium sylvaticum* in Grey County, Ontario, in 2011.

Scientific name (common name)	Scientific name (common name)
<i>Abies balsamea</i> (Balsam Fir)	<i>Fraxinus</i> sp. (ash species)
<i>Acer saccharum</i> (Sugar Maple)	<i>Leucanthemum vulgare</i> * (Oxeye Daisy)
<i>Actaea pachypoda</i> (White Baneberry)	<i>Ostrya virginiana</i> (Hop Hornbeam)
<i>Agrimonia gryposepala</i> (Tall Agrimony)	<i>Polygala paucifolia</i> (Gaywings)
<i>Betula alleghaniensis</i> (Yellow Birch)	<i>Polygonatum pubescens</i> (Hairy Solomon's-seal)
<i>Betula papyrifera</i> (Paper Birch)	<i>Prunella vulgaris</i> (Heal-all)
<i>Brachyelytrum</i> sp. (Shorthusk)	<i>Pteridium aquilinum</i> (Bracken Fern)
<i>Carex arctata</i> (Drooping Woodland Sedge)	<i>Schizachne purpurascens</i> (False Melic Grass)
<i>Carex gracillima</i> (Graceful Sedge)	<i>Solidago canadensis</i> (Canada Goldenrod)
<i>Carex pedunculata</i> (Long-stalked Sedge)	<i>Solidago rugosa</i> (Rough-stemmed Goldenrod)
<i>Clinopodium vulgare</i> (Wild-basil)	<i>Symphotrichum urophyllum</i> (Arrow-leaved Aster)
<i>Danthonia spicata</i> (Poverty Oat Grass)	<i>Thuja occidentalis</i> (Eastern White Cedar)
<i>Diervilla lonicera</i> (Northern Bush-honeysuckle)	<i>Viola</i> cf. <i>labradorica</i> (Violet)
<i>Epipactis helleborine</i> * (Helleborine)	

* Non-native (exotic) species



FIGURE 3. *Brachypodium sylvaticum* (Slender False Brome) population in Grey County, Ontario, 18 October 2011. The graminoid vegetation in the foreground and right side of the photo is almost entirely *Brachypodium sylvaticum*. Photo: Michael Oldham.

In the flora of Ontario, *Brachypodium sylvaticum* most closely resembles species in the genus *Bromus*, particularly *Bromus pubescens* (Hairy Woodland Brome), due to its hairy leaves and spikelets. However, *Brachypodium* can be distinguished from *Bromus* by its open leaf sheaths (closed in *Bromus*) and spikelets arising singly from the rachis on short pedicels (branched inflorescences in *Bromus*). The only other *Brachypodium* species in eastern North America, *Brachypodium pinnatum* (Heath False Brome), is rare in disturbed ground and waste areas in Massachusetts (Haines 2011). It can be distinguished from *Brachypodium sylvaticum* by its rhizomes, usually hairless culms and leaf sheaths, stiffer racemes, and short or absent lemma awns (Piep 2007; Paszco 2008).

In its native range in Eurasia, *Brachypodium sylvaticum* is a forest understory plant, but it also occurs in open grassland (Shouliang and Phillips 2006; Stace 2010). *B. sylvaticum* is considered highly invasive in the U.S. Pacific Northwest, where it has rapidly expanded its range, thrives in a variety of ecological conditions, and often forms dense monospecific stands (Kaye 2001*, 2003*; Johnson 2004). Preliminary observations suggest this plant is quite invasive in New

York State as well (Daniel and Werier 2010). Observations of the Ontario population, where *B. sylvaticum* forms a dense, monospecific stand on the east side of the knoll and appears to be spreading to other areas of the knoll, support this suggestion. Although new aliens appear regularly in the flora of eastern Canada, many are highly localized and do not pose a threat to native biodiversity. *Brachypodium sylvaticum* is a potentially serious invader of natural communities in Ontario. A variety of control methods are being researched and used in the U.S. Pacific Northwest to try to control the species (see the web page of the False-brome Working Group: <http://www.appliedeco.org/invasive-species-resources/FBWG>).

The origin of the Grey County, Ontario, population of *Brachypodium sylvaticum* is unknown. Invasion via an abandoned railway line (now a walking trail) that runs approximately 100 m south of the population is possible; however, no sign of *B. sylvaticum* was observed along the former railway or along Grey County Road 4, located approximately 350 m to the northeast. Additionally, recreational activities (e.g., hiking) do not appear to have initiated this population—the vegetation surrounding the knoll is thick and undis-

turbed, and there are no formal or informal footpaths. Seeds may have been dispersed to the site from an undiscovered population in the general area. In the U.S. Pacific Northwest, long-distance seed dispersal of *B. sylvaticum* is usually associated with logging activities, roadside maintenance, and recreational activities (e.g., hiking), with short-distance dispersal occurring via wildlife, particularly ungulates (Fenneman 2010*). White-tailed Deer (*Odocoileus virginianus*) are common in the vicinity of the Grey County population, and they may be responsible for local dispersal.

Brachypodium sylvaticum should be watched for elsewhere in southern Ontario and eastern Canada. Populations should be controlled wherever possible in order to prevent the widespread invasion of the species in eastern North America, as has occurred in Oregon and other areas of the Pacific Northwest.

Voucher specimens

Poaceae

Brachypodium sylvaticum (Huds.) P. Beauv. (Slender False Brome)—ONTARIO: Grey County, Municipality of Grey Highlands (former Township of Artemesia), Nordin Nature Reserve (Escarpment Biosphere Conservancy), ~2.5 km northeast of Priceville (or 6 km southwest of Flesherton) south of Grey Road 4 and north of Durham Road, patches of this grass in the bottom to mid-slope section of a distinct wooded knoll surrounded by *Thuja occidentalis* swamp and *Fraxinus nigra* swamp, associated species observed at this location were *Pteridium aquilinum*, *Carex gracillima*, *Carex arctata*, *Actaea pachypoda*, *Polygonatum pubescens*, and *Polygala paucifolia*, 44.217°N, 80.597°W, 19 August 2011, *B. Miller* (OAC); ONTARIO: Grey County, Municipality of Grey Highlands (former Township of Artemesia), Nordin Nature Reserve (Escarpment Biosphere Conservancy), ~2.5 km northeast of Priceville (or 6 km southwest of Flesherton) south of Grey Road 4 and north of Durham Road, locally common, several thousand plants estimated on wooded knoll dominated by Eastern White Cedar and Balsam Fir, with *Pteridium aquilinum*, *Brachelytrum* sp., *Schizachne purpurascens*, *Epipactis helleborine*, *Solidago rugosa*, *Prunella vulgaris*, 44.217°N, 80.597°W, 18 October 2011, *M. J. Oldham*, *B. M. Miller*, and *R. J. Aitken 39441* (CAN, DAO, MICH, NHIC, TRT, UWO).

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