

Note

Reversed Clover, *Trifolium resupinatum* L. (Fabaceae), Confirmed in Canada

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We report two populations of *Trifolium resupinatum* (Reversed Clover, trèfle résupiné) from southern Ontario, confirming it as established in Canada. This Eurasian and north African species was reported in the late 1800s in New Brunswick and Quebec, where it apparently did not persist. Its distribution across the United States is sporadic.

Key Words: *Trifolium resupinatum*; Reversed Clover; Persian Clover; Fabaceae; new record; Ontario; Canada

With this report of two populations in southern Ontario, *Trifolium resupinatum* L. (Reversed or Persian Clover) is confirmed as established within the flora of Canada.

Twelve species in the genus *Trifolium* are reported in the flora of Ontario (Oldham 2016). The first Ontario record of *T. resupinatum* is based on a specimen collected by Michael Oldham, K. McIntyre, J. Labrecque, R. Gould, N. Cavallin, and N. Lavoie on 25 August 2005, at the St. Clair Region Conservation Authority's McAlpine Tract in Middlesex County. *Trifolium resupinatum* was subsequently collected by Colin Chapman on 17 June 2016, in Desjardins Canal Park, in the City of Hamilton, Ontario.

Among known Ontario *Trifolium* species, *T. resupinatum* is most similar to *T. fragiferum* L. (Strawberry

Clover, trèfle fraisier), which is also rare in the province. It is distinguished from *T. fragiferum*, the only other Ontario species with inflated calices, by its resupinate flowers and the absence of stolons. Because of their similarly coloured flowers, there is also a superficial resemblance between *T. resupinatum* and the common *T. pratense* L. (Red Clover, trèfle rouge). However, *T. resupinatum* is distinguished from *T. pratense* by its smaller inflorescence (10–20 mm in diameter), the presence of floral bracteoles, and resupinate flowers. The resupinate flowers (Figure 1A), floral bracteoles, and inflated calices (Figure 1B) in fruit readily distinguish *T. resupinatum* from the other *Trifolium* species of Ontario (Haines 2011).

Trifolium resupinatum is an annual species native to Mediterranean Europe and northern Africa east to



FIGURE 1. Distinguishing features of Reversed Clover (*Trifolium resupinatum*): (A) resupinate corollas and (B) inflated calices in fruit. Photos: Colin Chapman.

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Afghanistan and central Asia, where it occurs in fields, streambanks, roadsides, and waste places. It has been introduced elsewhere in Europe as well as in Australia, North America, tropical and southern Africa, and South America (Davis 1970; Zohary 1972; Townsend and Guest 1974; Meikle 1977; Zohary and Heller 1984).

In North America, *Trifolium resupinatum* has been used for silage, hay, pasture, and occasionally in lawn seed mixtures (Magness *et al.* 1971; Gillett and Cochran 1973). The species has a scattered distribution throughout the United States; it was first found in Louisiana in 1928 and is now locally established from Texas to New England (Magness *et al.* 1971; Haines 2011). It is not known from Michigan, adjacent to Ontario (Voss and Reznicek 2012).

Trifolium resupinatum was first reported in Canada in Saint John, Saint John County, New Brunswick, in 1879, on ballast waste “with *T. ornithopodioides* L. and a few other foreign species” (Fowler 1879). Hinds *et al.* (2000) knew of no subsequent New Brunswick records and did not expect it to have persisted in the province. With no supporting herbarium specimen known for *T. resupinatum*, its provincial status is “Reported but unconfirmed” (Stephen Clayden and Sean Blaney, personal communications).

Macoun (1883–1890) reported it from “near Quebec City”, Quebec, but again, no herbarium specimen exists. Brouillet *et al.* (2010+) list it as “excluded”, with the comment “old report, not established” for both New Brunswick and Quebec.

Magness *et al.* (1971) reported that *Trifolium resupinatum* used for agricultural purposes naturally reseeds, but does not tolerate low winter temperatures. However, the species has been shown to persist in western North Dakota, producing over 200 seedlings/m² in plots that had been seeded in the previous year (Carr *et al.* 2005). Most of the state of North Dakota is within plant hardiness zones 4a and 3b (USDA 2012). Much of Atlantic Canada and the southern portions of the remaining Canadian provinces are within plant hardiness zones equal to or warmer than North Dakota; Middlesex County is in plant hardiness zone 6b (Natural Resources Canada 2016). The warmer average annual extreme minimum temperature suggests that *T. resupinatum* is likely able to persist in southern Canada and may reseed from agricultural sites.

The McAlpine Tract population was found on a roadside in a rural, agricultural area, presumably introduced through use as a pasture plant. It is not clear how long the population has been established at that site. The Desjardins Canal Park population arose from soil salvaged (in 2014) from a development site in Oakville, Ontario (A. Bell, personal communication) for site restoration purposes. The Desjardins Canal Park population, then, may have persisted here for as long as two years.

Trifolium resupinatum remains a rarely reported introduction in Canada. However, its discovery in two

widely separated southern Ontario sites in different habitats suggests that it may be found elsewhere in agricultural regions of southern Canada.

Voucher specimens

Canada, Ontario: Middlesex County, McAlpine Tract, St. Clair Region Conservation Authority property, weedy roadside, flowers small and pink, rare, mixed with *T. hybridum*, 42.7953°N, 81.8296°W, 25 August 2005, M. J. Oldham, K. McIntyre, J. Labrecque, R. Gould, N. Cavallin, and N. Lavoie, Collection Number 31945 (NHIC, MICH); City of Hamilton, Desjardins Canal Park, Hamilton Conservation Authority property, roughly 50 plants scattered on disturbed ground, with *Lolium perenne*, *Lotus corniculatus*, *Trifolium repens*, *Melilotus officinalis*, *Medicago sativa*, *Bromus hordeaceus*, *Vicia cracca*, 43.26699°N, 79.94208°W, 17 June 2016, C. J. Chapman, Collection number 2016-135 (HAM, DAO, NHIC).

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