

The Spread of *Vincetoxicum* Species (Asclepiadaceae) in Ontario¹

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Abstract. Two weedy species of *Vincetoxicum*, *V. medium* and *V. nigrum*, are being encountered with increasing frequency as naturalized species in Ontario. A third species, *V. album*, has not been reported in recent years.

The genus *Vincetoxicum* Moench includes three species which have become naturalized in North America: *V. album* (Mill.) Aschers., *V. medium* (R. Br.) Decne., and *V. nigrum* (L.) Moench. In most North American manuals, e.g., Fernald (1950) and Gleason & Cronquist (1963), these species are listed under *Cynanchum*. Studies of the Asclepiadaceae on a world-wide basis have convinced Bullock (1958) that *Vincetoxicum* should not be included in *Cynanchum*, but that the latter name should be restricted to a group of species in the Southern Hemisphere, none of which is naturalized in Canada. Bullock's (1958) studies have also established that the generic name *Vincetoxicum* is correctly applied to the species discussed in this paper, rather than to the angle-pods (correctly, *Gonolobus* Michx.), with which this name was once associated. The present use of the name *Vincetoxicum* is currently widely followed in Europe, and prevailed in North America throughout the nineteenth century. The treatment of *Vincetoxicum* as a genus separate from *Cynanchum* avoids the nomenclatural problem of the illegitimacy of the name *Cynanchum nigrum* (L.) Pers., noted by Monachino (1957).

Plants of these *Vincetoxicum* species are herbaceous perennials which, when the stems have attained sufficient height, become twining vines. The leaves range from ovate to cordate, and are smooth, glossy, and dark green, with entire margins. The flowers are borne in cymes termi-

nating axillary penduncles. The corollas are star-shaped, with five spreading lobes. The fruits and seeds are similar to those of *Asclepias* species. The two species now naturalized in Ontario, *V. medium* and *V. nigrum*, are illustrated in Figure 1, and have been contrasted in detail by Moore (1959). As *Cynanchum* species, they are also contrasted in Gleason & Cronquist's (1963) Manual. *Vincetoxicum album*, as *Cynanchum vincetoxicum*, is briefly described and distinguished from *V. (C.) nigrum* in the eighth edition of Gray's Manual (Fernald, 1950).

In the present study, it was found that some fruiting specimens could not be identified with certainty from traits of gross morphology alone. The identity of such specimens was checked through the use of cuticular imprints from the lower leaf surfaces. *Vincetoxicum nigrum*, which has twice the chromosome number of *V. medium* (Moore, 1959), has considerably larger guard cells than those of *V. medium*.

Only a relatively few colonies of *Vincetoxicum* species have thus far been reported in North America. This paper is designed to update information on the extent to which these species have spread in Ontario, and to provide a basis of comparison for future studies of the naturalization of these species. Notes on the local establishment and expansion of colonies, based on observations in the Hamilton area, have been included to demonstrate the weediness and potential nuisance value of these species.

Vincetoxicum nigrum was the first of these species reported to have become naturalized in North America. Its spread on this continent is chronicled in the successive editions of Gray's Manual of Botany, from the fifth (Gray, 1867), in which it was said to occur in "Cambridge,

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FIGURE 1. *Vincetoxicum* species. a-d, *V. medium*. a, portion of upper part of stem, bearing two cymes, with flower buds, open flowers, and young fruits. b, fruits in late autumn, after dehiscence. c, leaves on lower part of stem. d, flower. e, *V. nigrum*, flower.

Mass., &c.: a weed escaping from gardens", to the eighth (Fernald, 1950), in which its North American range was given as "Waste places, roadsides, thickets and fields, Me. to O., Pa. and Kans. (Natzd. from Eu.)." As Monachino (1957) later pointed out, the "*Cynanchum nigrum*" of Fernald (1950) consisted in part of the species now called *V. medium*, but examination of specimens in herbaria in the United States indicates that *V. nigrum* is the more widely distributed species there. When the

status of this genus in Canada was reviewed by Moore in 1959, the only locality in this country where *V. nigrum* was known to have escaped from cultivation was near the arboretum of Notre Dame College in Montreal, Quebec (1949).

Vincetoxicum nigrum had been collected at two Ontario localities, both in Northumberland County, prior to Moore's study, but at that time the specimens were still unidentified. The earliest Ontario collection of this species is from

Grafton, where it was found by Mrs. C. W. Dickson in 1952 (Dickson 418, OAC²). In 1956 *V. nigrum* was collected by Percy Gooding at Hilton, ca. 13 mi northeast of Grafton (Gooding 1859, DAO, OAC).

Seed of *V. nigrum*, which had been received as seed of *Periploca graeca* L. (a woody asclepiadaceous vine not occurring as a wild plant in Canada), was planted at the Royal Botanical Gardens lath house, in West Flamborough Township, Wentworth County, in 1955. This species has subsequently spread throughout the lath house and into adjacent beds of ornamentals, becoming a weed. In 1969, it was discovered by James Spaxman in the R.B.G. nursery, ca. 0.5 mi from the lath house, where it had evidently been present at least since the previous year. Here *V. nigrum* was found along a lane and among dwarf conifers, with which it had probably been inadvertently transplanted from the lath house (Pringle 1126, HAM, LKHD, OS). Additional colonies were found in the nursery in 1970.

The earliest of several collections of *V. nigrum* from Kingston, Frontenac County, was made in 1961 by Marlene Forrester, who found this species "growing wild on a fence" along King Street (Forrester 1741, QUK). C. H. Zavitz collected *V. nigrum* in a hedge on Stuart Street in 1965 (Zavitz 1215, TRT). In 1966, he made additional collections on the Queen's University campus (Zavitz 1549, CAN) and on a fence at the junction of Union Street and Palace Road (Zavitz 1474, DAO). On the labels of these specimens, he suggested that *V. nigrum* might have escaped from the Botanic Garden which formerly existed at Queen's University. In 1964, W. G. Dore had noted on the label of a collection of *V. nigrum* from the junction of Stuart Street and University Avenue (Dore & Savile 20798, DAO): "It has probably been here for several years judging from its local dispersion, but not likely prior to 1937 when I taught 'Local Flora' at Queen's

Summer School." In 1967, however, Dore noted that George Lawson, who had established the Botanic Garden at Kingston, had listed (ms. quoted by Dore, 1967) among the plants in this garden: "*Periploca Graeca* — spontaneous; — perhaps brought in soil from the Bot. Gard., Cambridge, Mass." Since the Botanic Garden was founded in 1861, and Lawson left Kingston in 1863 (Dore, 1967), the appearance of "*Periploca Graeca*" must have occurred during the period 1861-1863. Dore then recorded his suspicion that Lawson's "*Periploca Graeca*" was actually "*Cynanchum nigrum*, . . . which now infests fence rows in the neighbourhood." In Lawson's time, *Vincetoxicum* (by any name) had not yet been listed in North American floras, but *Periploca graeca* was included. It would scarcely have been extraordinary, therefore, for *V. nigrum* to have been identified as *P. graeca* at that time. Moreover, it seems significant that shortly thereafter, *V. nigrum* was recorded by Gray (1867) as having escaped from cultivation in Cambridge, Massachusetts, while *P. graeca* was still known as a naturalized species only in New York State. It appears probable, therefore, that the present colonies of *V. nigrum* in Kingston are derived from an inadvertent introduction to the Botanic Garden, as Zavitz suspected, despite the absence of records for the period between 1863 and 1961.

Vincetoxicum nigrum has also become established as a wild plant in Glengarry County, where G. N. Gogo discovered "a large, dense patch" in a ditch and along a fence by Highway 2, 1 mi east of Glen Walter, in 1964 (Gogo 562A, 734, Dore & Gogo 21448, DAO). In 1969, a second colony was discovered in this county, in a brushy pasture $\frac{3}{8}$ mi east of the previously known population (Gogo in 1969, DAO).

Vincetoxicum album was listed by Fernald (1950) as having escaped from cultivation only in western New York and southern Ontario. The first report for Ontario was published by J. M. Macoun (1906) on the basis of a specimen of this species collected at Niagara Falls, by William Scott in 1904 (TRT). *Vincetoxicum album* has apparently not been collected subsequently in Ontario.

²Standardized herbarium designations follow Lanjouw & Stafleu (1964), with the addition of LKHD for the herbarium of Lakehead University, Thunder Bay, Ontario.

Previously, Cameron (1894) had listed *V. nigrum* among the plants occurring in Queen Victoria Park at Niagara Falls. In the absence of specimens, it is not certain whether *V. nigrum* had in fact become established at Niagara Falls in 1894, or whether this report was actually based on the colony of *V. album* which was later discovered by Scott, since *V. album* was not listed in North American manuals in Cameron's time. No species of *Vincetoxicum* have been encountered in more recent studies of the flora of the Niagara Falls area (Yaki, 1970, and references cited therein).

Vincetoxicum medium was first recorded as a naturalized species in North America in 1957, when Monachino (1957) reported that specimens from New York and Pennsylvania, dating back to 1929, actually represented this species, although they had hitherto been identified as *V.* (or *C.*) *nigrum*. Shortly thereafter, Moore (1959) reported that this species was also naturalized in Canada, and that here, too, it had been confused with *V. nigrum*.

Thus far, Ontario remains the only province from which *V. medium* has been recorded as a wild plant, assuming that a specimen collected in 1885 from "cultivated ground" in Victoria, British Columbia (Fletcher, *B. C. Geol. Survey 16054*, CAN), represents an intentional planting which did not persist (see Moore, 1959). The earliest collection in Ontario was made near Toronto Junction, by Mrs. J. E. White in 1899 or possibly 1889. The date appears as 1889 in Moore's (1959) article on this genus in Canada, and as 1899 in a letter from Moore quoted by Monachino (1959). The specimen in question could not be located during this study. Since other specimens of *V. medium* in DAO were collected at Toronto Junction by Mrs. White in 1902, the later date, 1899, seems more certainly to have been within the period of her collecting activity in the Toronto area.

Numerous additional collections of *V. medium* have been made within the Don River watershed in Metro Toronto. Dates on specimens in CAN, DAO, HAM, OAC, and TRT range from 1902 to 1971. Locality data include: York Mills; Wexford; along Don River near Lawrence Avenue; Wilket Creek; Sunnybrook

Park; Serena Gundy Park; Sherwood Park; Don Valley; Donlands; and near Radio Station CHUM. *Vincetoxicum medium* has become abundant over extensive portions of the Wilket Creek - - Sunnybrook - - Serena Gundy parks system, forming large, dense stands along the edges of thickets and on sunny hillsides, and occurring more sparsely in wooded areas.

Vincetoxicum medium has also been collected on White Road, Dunbarton, Ontario County, a short distance east of the Metro Toronto boundary, in 1952 and 1953 (Shumovich 1, OAC, and 345, DAO). Yet another collection from the Toronto area consists of presumably spontaneous plants from "Mr. Myall's garden, Thistle town" in what is now the northwestern part of Metro Toronto (Gravatt in 1957, TRT). In 1963, *V. medium* was collected on Snake Island in Lake Simcoe, in the northern part of York County (Dumais & Edmunds 187, TRT). Data on the extent of these populations are not available.

Vincetoxicum medium has been encountered as a naturalized species in Ottawa since 1931, when the first collections were made near the Chemistry Building (now an Animal Research Institute Building) on the Central Experimental Farm (Ritchie in 1931, DAO). In 1959, Moore reported that this species "now persists tenaciously in the Central Experimental Farm area on hedges and in ornamental beds within a radius of about half a mile from the Chemistry Building." In 1967, a colony of about 50 plants of *V. medium* was found by W. G. Dore and R. J. Moore in unkempt yards and along a fence at the end of Galt Street, Ottawa, 0.86 mi from the nearest plants on the Central Experimental Farm (Dore & Moore 22871, DAO). This colony was then estimated to be about 5 or 6 years old. Another Ottawa specimen, from the garden of Dr. A. E. Porslid, collected in 1962 (Porsild 23130, CAN), presumably represents cultivated plants.

A clue to the origin of the *V. medium* populations in Ottawa appears in W. T. Macoun's (1908) list of herbaceous perennials tested in the Aoretum and Botanic Garden at the Central Experimental Farm. Here it is recorded that "*Vincetoxicum nigrum*" was planted in 1905 for

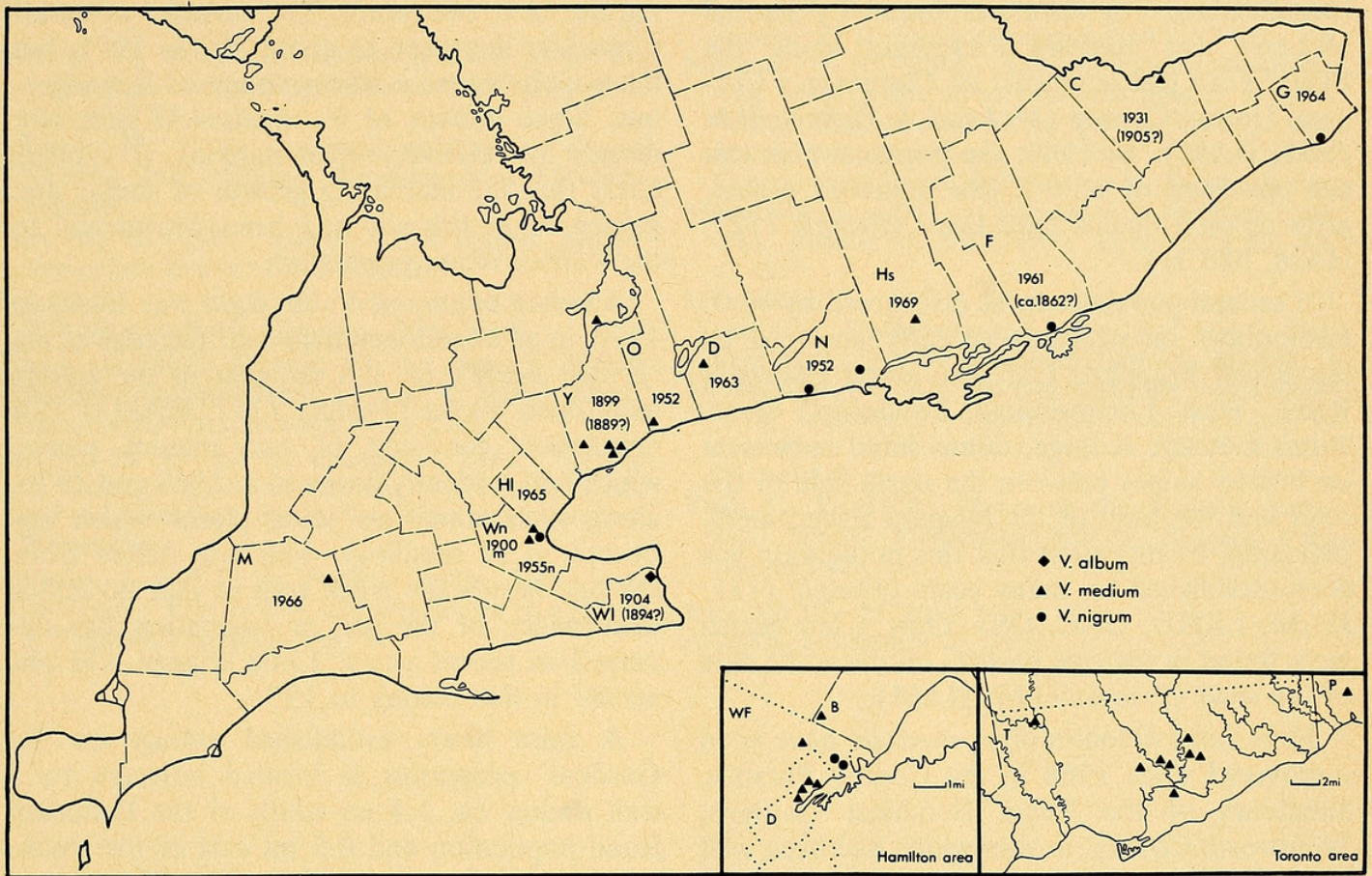


FIGURE 2. Distribution records of *Vincetoxicum* species naturalized in Ontario. Dates indicate earliest records of the species in each county, regardless of status. Counties, main map: C, Carleton; D, Durham; F, Frontenac; G, Glengarry; HI, Halton; Hs, Hastings; M, Middlesex; N, Northumberland; O, Ontario; WI, Welland; Wn, Wentworth. Municipalities, inset maps: B, Burlington; D, Dundas; P, Pickering Township; T, Metropolitan Toronto; WF, West Flamborough Township.

evaluation as an ornamental perennial. It seems quite possible that it was actually *V. medium* which was planted, and that the populations of *V. medium* later found in Ottawa spread from this introduction.

Vincetoxicum medium was found in Cartwright Township (near Burketon), Durham County, in 1963 (Kirk 6834, CAN, TRT). This population, when visited by the author in 1971, consisted of a large colony in a moist opening among white cedars, with a smaller colony on a hilltop a short distance away (Pringle 1287, HAM, OAC). The density of *V. medium* in the less heavily shaded parts of the main colony was sufficient to exclude almost all other vegetation, except for a few raspberry canes. In more densely shaded sites, the stems of *V. medium* were less crowded but still numerous, climbing to a height of 2 m on the cedars.

One plant of *V. medium* was found by Clarence Frankton in a low field near the Thames River north of Thorndale, Middlesex County, in 1966 (Frankton 1941, DAO).

At Latta, in Hastings County, R. Hainault and I. D. Macdonald found *V. medium* present in "large colonies on both sides of the road" (Hainault & Macdonald 4979, CAN). The extent of this population indicates that it must have been established for several years prior to its discovery.

The earliest record of *V. medium* in the Hamilton area is a specimen in TRT collected by William Scott in 1900. The locality is given merely as "Hamilton", with no indication as to whether the specimen represents a wild or cultivated plant. No further collections of *V. medium* were made in this area until 1965, when two specimens were brought to the author for

identification. The first was found by Rachel McLeod and Barbara Pickersgill along the Bruce Trail just southeast of Clappison's Corners, Halton County (*McLeod & Pickersgill in 1965*, HAM). In 1969, the population at this site consisted of only a few scattered plants, growing on a shaded talus slope (*Pringle 1125*, HAM, MICH).

A second population was discovered by W. J. Lamoureux on property recently acquired by the Royal Botanical Gardens, along Patterson Road, West Flamborough Township, Wentworth County. A large, dense stand is present on brushy slopes between the north side of the road and the base of the Niagara Escarpment, indicating by its extent that this population has been established for many years (*Pringle 1111*, HAM, LKHD, OAC, OS). Only a few plants were found in the cow pasture on the south side of the road (*Pringle 1119*, HAM).

Four small colonies of *V. medium* have been discovered since 1968 in the Coote's Paradise Sanctuary of the Royal Botanical Gardens, Wentworth County, in sites which had been well known to the author for several years. Because these colonies had not been observed on previous visits to these sites, and had not been reported in any of the earlier floristic surveys of the Gardens' natural areas, it seems highly probable that they are of recent origin. During the last several years, a number of new truck and foot trails have been constructed in the northwestern part of Coote's Paradise Sanctuary, and it seems likely that the increased pedestrian traffic and use of equipment in this area has contributed to the spread of *V. medium*. These new colonies have been observed at frequent intervals in order to determine their rates of expansion.

The first of these colonies was discovered in the winter of 1968-1969, in a disturbed area along a truck trail constructed in 1967, ca. 2.0 mi southwest of the large population on Patterson Road. At that time there were seven aerial stems in this colony. The following summer, over 100 aerial stems were present (*Pringle 1127*, DAO, HAM, KE). Only slight increases in the extent of this population were noted dur-

ing the next two years. The number of aerial stems had increased to about 200 in 1971, but the population as a whole appeared less vigorous. Since growth of *V. medium* is generally densest in relatively open habitats, it appears likely that the increasing growth of sumac and goldenrod at this site had been detrimental to the *Vincetoxicum* population.

Another colony of *V. medium* was found in 1970, in an abandoned field near the edge of the "Hydro Pond", ca. 0.5 mi west of the colony mentioned above (*Pringle 1257*, HAM). This population consisted of two mature plants, which had evidently flowered in 1969 and 1970, along with numerous small plants which appeared to be seedlings. This site differs from the one beside the truck trail in that no major disturbance of the soil or vegetation has occurred in recent years. Little change was observed in this colony in 1971.

A third newly established colony on the Gardens' properties is located adjacent to a trail shelter ca. 1.4 mi south of the Patterson Road population and 0.5 mi east of the truck-trail colony (*Pringle 1258*, HAM). This colony consisted of two plants, which appeared to be in their second or third year, in 1970. Four plants were present in 1971. Most recently, a solitary, vigorous plant of *V. medium* was found in 1971 in a grassy opening in the Reforestation Area, about midway between the truck-trail and Hydro Pond colonies.

Although *V. medium* and *V. nigrum* were slow in becoming established in Ontario, and are still uncommon species in this province, the above data indicate that their rate of establishment in new localities has been increasing in recent years. It seems highly probable that more populations of *V. medium* and *V. nigrum* will continue to be found in Ontario, and that these species will be reported from additional provinces and states. From herbarium labels, published reports and the author's observations, it is also apparent that these species, once established in a locality, are likely to form large, dense populations and to spread to additional sites nearby, and should therefore be regarded as potentially troublesome weeds.

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