



<http://www.biodiversitylibrary.org/>

**Rhodora**

[Cambridge, Mass., etc.]New England Botanical Club [etc.]

<http://www.biodiversitylibrary.org/bibliography/721>

**v.90 (1988):** <http://www.biodiversitylibrary.org/item/24167>

Page(s): Text, Text, Text, Text, Text, Text, Text, Text, Text

Contributed by: Missouri Botanical Garden, Peter H. Raven Library

Sponsored by: Missouri Botanical Garden

Generated 22 April 2015 10:08 AM

<http://www.biodiversitylibrary.org/pdf4/038680700024167>

This page intentionally left blank.

DESCRIPTION AND DISTRIBUTION OF  
*EUPHRASIA STRICTA* IN NORTH AMERICA

STEPHEN R. DOWNIE<sup>1</sup> AND JOHN MCNEILL

ABSTRACT

The origin, subsequent migratory history and present-day distribution of *Euphrasia stricta* J. P. Wolff ex J. F. Lehm. is presented along with its taxonomic description. Introduced into eastern Maine during the 18th or 19th centuries, its range has expanded westward to southcentral Ontario and northward to the Gaspé Peninsula of Québec. In North America, the species is readily characterized by its erect, cuneate, narrowly ovate to ovate-lanceolate glabrous leaves and bracts possessing long aristate teeth.

Key Words: Scrophulariaceae, *Euphrasia stricta*, taxonomy, distribution, North America

In the course of preparing a manuscript on the status of *Euphrasia borealis* (Townsend) Wettst. and *E. nemorosa* (Pers.) Wallr. in relation to *E. stricta* J. P. Wolff ex J. F. Lehm. (Downie et al., 1987), it came to our attention that the precise circumscription of *E. stricta* is not well understood in North America. This misunderstanding was reflected in the many erroneously identified herbarium specimens we saw. Consequently, statements of its range in North America are inaccurate. Moreover, all herbarium collections examined from Ontario and most from Québec are of recent date, suggesting that these plants have recently migrated into these regions. The purpose of this paper is to provide a precise delineation of this taxon, and by mapping herbarium records and field collections at approximately 20 to 30 year intervals, to ascertain its origin, subsequent migratory history, and present-day distribution.

Many floras (e.g. Fernald, 1950; Gleason, 1952; Gleason and Cronquist, 1953; Marie-Victorin, 1964) have recognized *Euphrasia americana* Wettst. and *E. canadensis* Townsend as ubiquitous throughout the northeastern United States and adjacent Canada. In their revision of the North American species of *Euphrasia*, Sell and Yeo (1970) discovered that the plants to which these names were applied were similar to those found in Europe, and consequently rejected the names *E. americana* and *E. canadensis* in favour of the Euro-

---

<sup>1</sup>Present address: Dept. of Biology, Univ. of Michigan, Ann Arbor, MI 48109.

pean *E. nemorosa* and *E. borealis*. Recent evidence using multivariate techniques does not support the recognition of *E. nemorosa* and *E. borealis* as separate taxa (Downie et al., 1987). These plants should be treated as a single species, for which the correct name is *E. nemorosa*. *Euphrasia stricta* is, however, morphologically distinct from *E. nemorosa*.

The following names that have been used in North America are all synonyms of *Euphrasia stricta* J. P. Wolff ex J. F. Lehm.: *E. stricta* Host; *E. rigidula* Jord.; *E. condensata* Jord.; and, in part, *E. officinalis* L. *sensu* Gleason and Cronquist (1953). Although no type material of *E. stricta* has been traced (Sell and Yeo, 1970), application of the name can be determined with fair certainty from the original description.

In most of northwestern Europe, *Euphrasia stricta* is a variable species and many local and regional races (Karlsson, 1976; 1986; Yeo, 1978), and infraspecific taxa (Karlsson, 1984) have been described. In North America, however, it is generally unvarying and readily recognized by its erect, narrowly ovate to ovate-lanceolate glabrous leaves, and bracts with long-aristate teeth. The North American plants appear to resemble *E. stricta* var. *stricta* of European authors.

#### DESCRIPTION OF *EUPHRASIA STRICTA*

STEM rigid and erect, up to 3 dm, usually dark purple with (0-) 1-5 pairs of erect branches from the middle and upper nodes. CAULINE INTERNODES (1-) 5-27 (-34) mm long, usually 1-3 times as long as the subtending leaves, rarely shorter, flowering beginning at node 4-12 (-15). FLORAL INTERNODES (2-) 5-18 mm long, 1-2 times as long as the subtending bracts. CAULINE LEAVES 4-10 mm long, 2-8 mm wide, erect, glabrous, narrowly ovate to ovate-lanceolate, cuneate, the margins serrate with 3-5 pairs of antrorse aristate teeth, (0.3-) 1-2 (-2.5) mm long, with an obtuse or acute terminal lobe. BRACTS 4.5-9.5 mm long, 3-6.5 mm wide, erect, glabrous, often appressed to the calyx and usually purple above, narrowly ovate to trullate, cuneate, the margins serrate with 4-5 pairs of antrorse, long-aristate teeth, 0.8-2.5 mm long, with an acute or acuminate terminal lobe. CALYX (4-) 5-7 mm long, glabrous or minutely scabrid with long, fine aristate teeth, the teeth (2-) 2.5-3.5 (-4) mm long, the veins sometimes flushed with purple and margins often black. COROLLA (4-) 6.5-9 mm long, exceeding the bracts, the tube

3–5 mm long; upper lip white and usually much suffused with lilac; lower lip 3–7 mm wide, white with deep-violet lines, and with wide-spreading lateral lobes, the lobes 1–2.5 mm deep. CAPSULE (2.5–) 4–6.5 mm long, (1–) 1.5–2.5 (–3) mm wide, glabrous, narrowly oblong, retuse to truncate, shorter than the calyx. SEEDS (11–) 16–30 per capsule, 1–1.6 mm long.

#### PAST MIGRATORY HISTORY AND PRESENT-DAY DISTRIBUTION

The following list of collection localities was compiled from our field work in Atlantic Canada and Maine, and from specimens we have seen and determined from the following herbaria: ACAD, CAN, DAO, GH, MT, MTMG, NEBC, NHA, OTT, and SFS. Mapping these localities according to date of collection (Figures 1, 2) gives some indication of the migratory history of *Euphrasia stricta* over this century.

#### 1901–1930

##### Maine

Cumberland Co., Brunswick 26 Aug. 1913 *K. Furbish s.n.* (NEBC). Hancock Co., Swans Island 12 Aug. 1918 *A. H. Norton 12440* (NHA); Swans Island Aug. 1910 *K. Furbish s.n.* (NEBC). Kennebec Co., Clinton 15 Aug. 1907 *R. C. Bean 2745* (NHA). Knox Co., Matinicus Island 16 Aug. 1916 *E. B. Chamberlain & A. H. Norton 11610* (NHA). Waldo Co., Islesboro 14 Aug. 1913 *M. L. Fernald 8195* (NHA). Johns Island 15 Aug. 1918 *A. H. Norton s.n.* (NHA).

##### New York

St. Lawrence Co., Waddington 24 July 1916 *O. P. Phelps 1624* (CAN).

#### 1931–1950

##### Maine

Hancock Co., Stonington, Deer Island 10 Sept. 1935 *A. R. & M. S. Hodgdon 2412* (NEBC, NHA). Washington Co., Lambert Lake 8 Aug. 1940 *C. H. Knowlton s.n.* (MT).

##### Pennsylvania

Pike Co., N. Notch Village, 7 mi. N. W. Porters Lake 20 Aug. 1940 *E. T. Wherry s.n.* (GH).

##### Québec

Châteauguay Co., Saint Chrysostome 30 Aug. 1942 *Fr. Marie-Victorin, Fr. Rolland-Germain & M. Raymond 56035* (CAN, MT); Saint Chrysostome 14 Sept. 1933

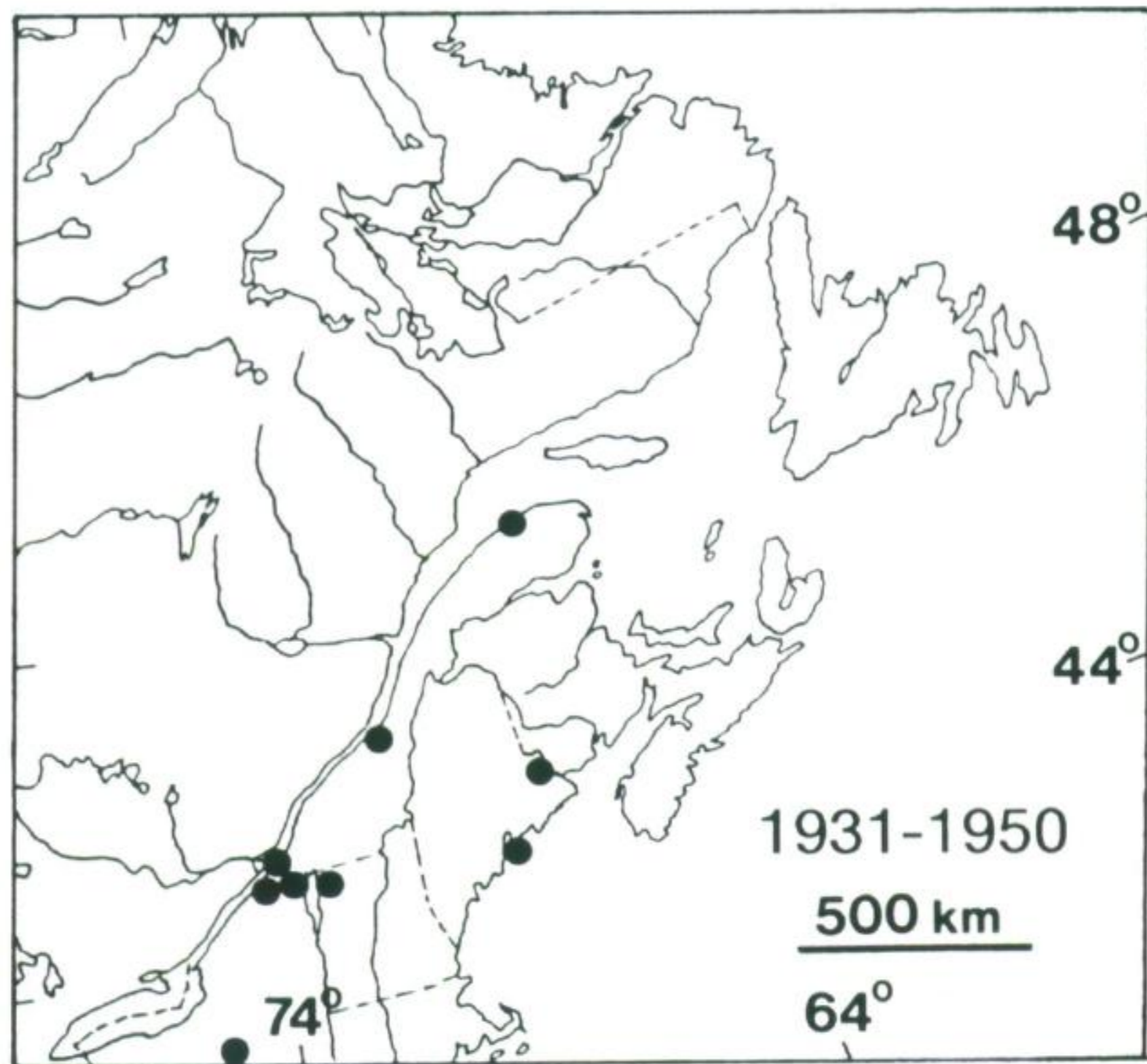
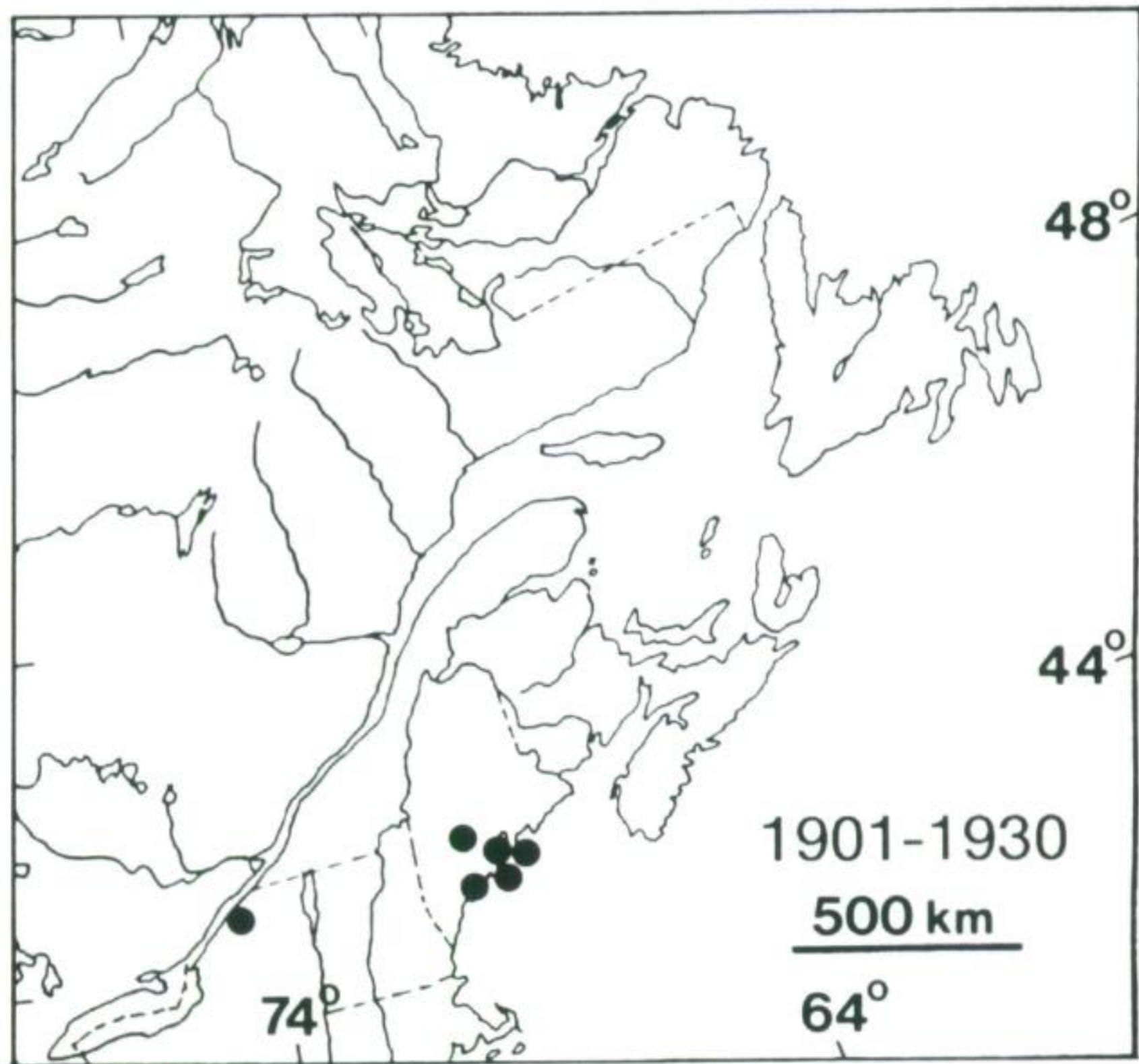


Figure 1. Collection localities of *Euphrasia stricta*: A. from 1901 to 1930; B. from 1931 to 1950. Each dot may represent more than one locality.

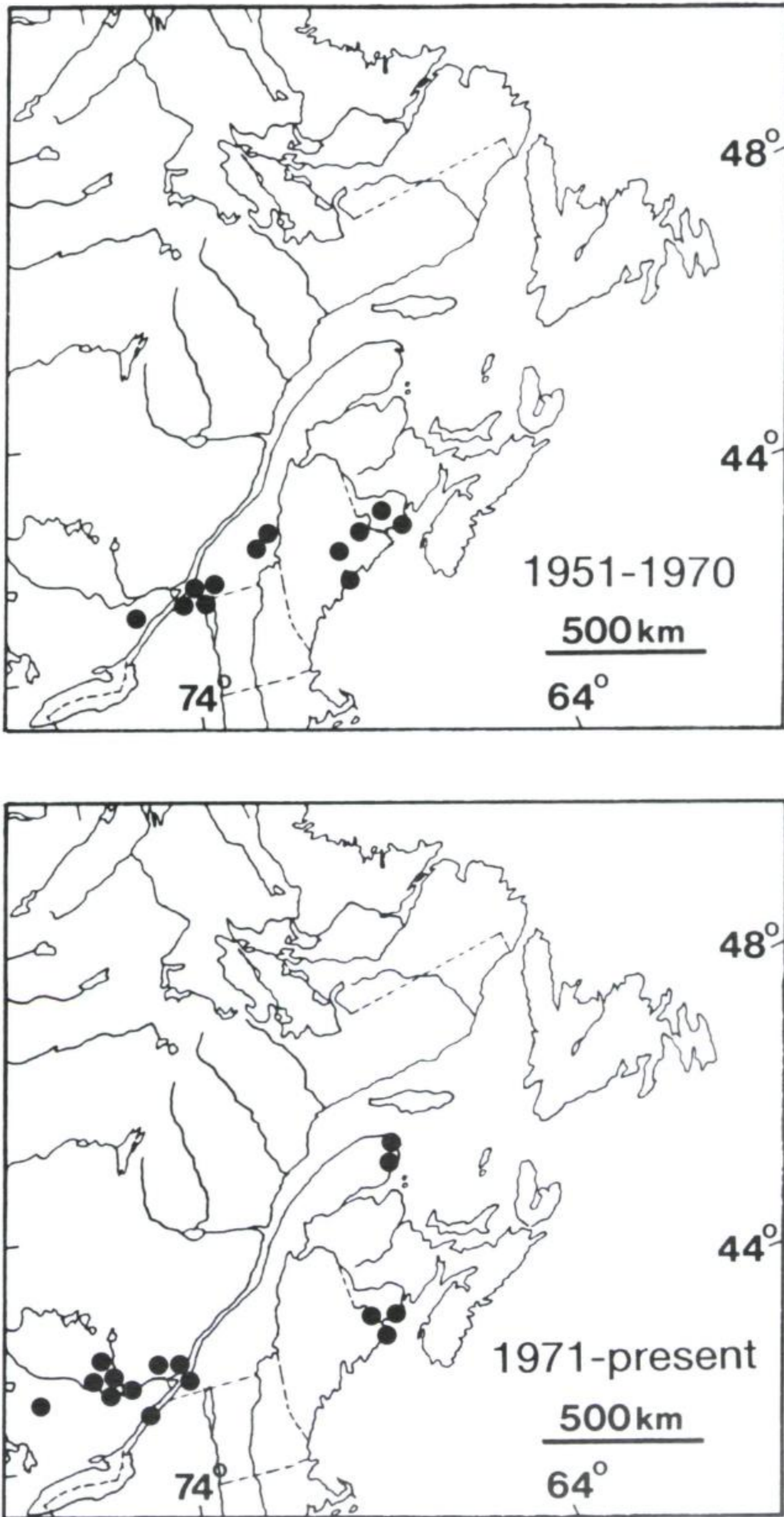


Figure 2. Collection localities of *Euphrasia stricta*: A. from 1951 to 1970; B. from 1971 to present. Manitoulin District not shown. Each dot may represent more than one locality.

*Fr. Bernard-Louis s.n.* (GH, MT); Saint Chrysostome 14 Sept. 1933 *E. Rouleau 811* (DAO, GH, MT); Saint Chrysostome 14 Sept. 1933 *M. Racine s.n.* (MT); Saint Chrysostome 7 Sept. 1942 *Fr. Marie-Victorin, Fr. Rolland-Germain & M. Raymond 56015* (MT). Gaspé-Ouest Co., Cap-Chat 5 Aug. 1953 *Fr. Samuel 3019* (MT). Huntingdon Co., Covey Hill 10 Sept. 1949 *L. M. Terrill 6082* (DAO). Laprairie Co., Laprairie 11 Sept. 1940 *Fr. Marie-Victorin, Fr. Rolland-Germain & B. Boivin 4232* (GH, MT). Lévis Co., Saint Jean Chrysostome 14 Sept. 1933 *Fr. Bernard-Louis 224* (SFS). Missisquoi Co., Missisquoi (Bay) 5 Sept. 1942 *Fr. Marie-Victorin, Fr. Rolland-Germain & M. Raymond 56192* (GH, MT).

### Vermont

Grand Isle Co., E. Alburg 14 Sept. 1935 *A. S. Pease 25348* (NEBC).

### 1951–1970

### Maine

Penobscot Co., Bradley 23 Sept. 1959 *A. E. Brower s.n.* (NEBC). Waldo Co., Islesboro, Keller (Hermit) Point 13 Aug. 1966 *G. B. Rossbach 6526* (ACAD). Washington Co., N. Lubec 26 Aug. 1964 *R. B. Pike & R. Burns s.n.* (NHA); Topsfield (in part) 7 Sept. 1957 *W. G. Dore 16992* (DAO).

### New Brunswick

Charlotte Co., Anderson settlement 29 Sept. 1963 *W. A. Squires s.n.* (DAO). Sunbury Co., Blissville 11 Aug. 1962 *D. S. Christie 507* (DAO).

### Ontario

Grenville Co., Kemptonville 30 Aug. 1969 *C. & E. Frankton 2140* (DAO).

### Québec

Châteauguay Co., Saint Chrysostome 20 Sept. 1954 *E. Rouleau 5476* (MT). Frontenac Co., St. Gédéon 9 Sept. 1959 *M. Raymond 59010* (MT). Huntingdon Co., Covey Hill 19 July 1951 *L. M. Terrill 6552* (MTMG); Hemmingford 9 Aug. 1951 *L. Cinq-Mars & A. Dion s.n.* (DAO, MT); Hemmingford 20 Aug. 1952 *I. Bassett & A. Hamel 2650* (DAO). Missisquoi Co., Missisquoi Bay, Pickle Point 19 Aug. 1953 *Fr. Louis-Alphonse 3973* (MT). Napierville Co., Sherrington 28 July 1951 *L. Cinq-Mars s.n.* (DAO, MT). Saint Jean Co., Lacolle 2 Sept. 1951 *M. Raymond & L. Cinq-Mars 1524* (DAO, MT); Lacolle 23 Aug. 1951 *L. Cinq-Mars s.n.* (DAO, MT); Lacolle 12 Aug. 1952 *I. Bassett & A. Hamel 2472* (DAO); Saint Valentin 29 Aug. 1963 *L. Cinq-Mars 63-1358* (DAO); Saint Valentin 8 Aug. 1952 *P. Louis-Marie 52666* (CAN, DAO, SFS). Wolfe Co., Lac Aylmer, W. Batoche 1 Sept. 1967 *S. Brisson & C. Hamel 13172* (MT).

### 1971–present

### New Brunswick

Charlotte Co., Campobello Island 15 Aug. 1973 *P. Yeo, A. R. Hodgdon & R. B. Pike 20231* (NHA); New River Beach between Saint George and Saint John 5 Sept. 1976 *J. McNeill 5202* (OTT); Saint Croix River, Milltown hydrodam 26 Aug. 1985 *H. R. Hinds & M. Lulham 7938* (CAN).



**Ontario**

Carleton Co., Nepean 30 Sept. 1981 *D. F. Brunton & C. Frankton 3418A* (CAN); Nepean 30 Sept. 1981 *D. F. Brunton 3462* (CAN); Baxter Conservation Centre 1 Oct. 1980 *J. M. Gillett 18640* (CAN); Baxter Conservation Centre 12 Aug. 1979 *C. & E. Frankton 2508* (DAO); Grenville Co., Cardinal 6 Aug. 1986 *M. J. Shchepanek & A. W. Dugal 7228* (CAN). Manitoulin District, Manitoulin Island, Carrol Wood Bay 16 July 1976 *J. K. Morton & J. M. Venn NA9265* (SFS); Manitoulin Island, 1 km N. Hwy. 40 on road E. of Maple Lake 18 Aug. 1981 *D. F. Brunton 3305* (CAN). Nipissing District, Algonquin Prov. Park 8 Sept. 1985 *D. F. Brunton 6488* (DAO). Ottawa-Carleton Reg. Municip., S. W. Malakoff 8 Sept. 1976 *A. Hanes & J. Reddoch s.n.* (CAN); S. W. Malakoff 22 Aug. 1976 *A. & J. Reddoch s.n.* (CAN); S. Bell's Corners 20 Aug. 1977 *J. & A. Reddoch s.n.* (CAN); Bell's Corners 18 Aug. 1977 *C. & E. Frankton 2452* (DAO); Bell's Corners 23 Aug. 1977 *C. & E. Frankton 2453* (DAO); Bridlewood 3 Sept. 1977 *A. & J. Reddoch s.n.* (CAN); S. W. Bell's Corners 8 Sept. 1979 *D. R. Brunton, C. & E. Frankton 1983* (CAN); S. Cedar Grove picnic site 29 Aug. 1982 *S. J. Darbyshire & S. O'Donnell 1723* (CAN); Bell's Corners, Stoney Swamp 17 Sept. 1986 *J. McNeill s.n.* (OTT).

**Québec**

Gaspé-Est. Co., York Centre 14 Aug. 1972 *L. Cinq-Mars L197* (CAN, SFS); Forillon National Park, Cap-des-Rosiers 1 Sept. 1972 *M. M. Grandtner G1672* (CAN). Gatineau Co., Gatineau Park between Kelly and Glynn Lakes 12 Sept. 1976 *J. M. Gillett 17194* (CAN); Gatineau Park, S. Old Chelsea 4 Sept. 1980 *J. & A. Reddoch 238* (CAN); Gatineau Park, McKlosky Road Trail at Meach Lake 5 Aug. 1985 *D. S. Katz 318* (OTT). Île de Montréal, Outremont 8 Sept. 1982 *M. St. Pierre 11* (MTMG). Pontiac Co., N. Danford Lake 9 Sept. 1975 *M. J. Shchepanek & A. Dugal 1421* (CAN); Otter Lake, Yate's Uranium Mine 4 Sept. 1983 *A. Vogg 336* (CAN); Kent Lake 3 Sept. 1971 *W. G. Dore, M. Camfield & R. F. Dore 24910* (DAO). Terrebonne Co., Saint Sauveur-des-Monts 17 Aug. 1976 *Y. Pérusse 76388* (SFS); Sainte Thérèse 23 Sept. 1983 *B. Landry s.n.* (MT).

## DISCUSSION

*Euphrasia* seems to have attracted little notice in American botany until the beginning of the 20th century when Wettstein (1896) wrote his monograph of the genus. Prior to this time, the few specimens which were available were treated as *E. officinalis* L. or varieties of it. Distributed throughout most of continental Europe (Yeo, 1978), *E. stricta* has been reported to have been introduced into New England near the turn of the century from whence it acted as a colonizing weed and spread rapidly (Fernald and Wiegand, 1915; Gleason, 1952). *Euphrasia stricta* has been repeatedly reported as "a recent introduction" or "possibly introduced" and as "following the progress of civilization." It is typically found in fields and lawns, by roadsides, and in other somewhat artificial habitats

associated with civilization, and has every appearance of an introduced plant. The earliest record of collection was in 1890 when plants were collected in Maine (Fernald and Wiegand, 1915). *Euphrasia stricta* was probably introduced into eastern Maine and eastern Canada by early European colonists during the 18th or 19th centuries, and has subsequently migrated northward and westward. It now appears to be well-established in eastern Ontario, particularly in the Regional Municipality of Ottawa-Carleton and vicinity. Recent collections from Manitoulin Island and Algonquin Provincial Park further attest to its rapid expansion westward.

#### ACKNOWLEDGMENTS

We gratefully acknowledge financial support from the Natural Sciences and Engineering Research Council of Canada, and thank the curators of the herbaria who lent us specimens. We also thank Deborah S. Katz-Downie and Andrée Quintin for assistance in the field, and Martin Dubé, Alison Dibble, Charles D. Richards and Sally C. Rooney for supplying additional plant material.

#### LITERATURE CITED

- DOWNIE, S. R., A. QUINTIN AND J. MCNEILL. 1987. Le statut d'*Euphrasia borealis*, *E. nemorosa* et *E. stricta* dans l'est de l'Amérique du Nord: une analyse numérique. *Canad. J. Bot.* (in press).
- FERNALD, M. L. 1950. *Gray's Manual of Botany*, 8th ed. (reprinted by D. Van Nostrand Co., New York 1970).
- FERNALD, M. L. AND K. M. WIEGAND. 1915. The genus *Euphrasia* in North America. *Rhodora* 17: 181-201.
- GLEASON, H. A. 1952. *Euphrasia*, In: *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, Vol. 3., pp. 246-248. (reprinted by Hafner Publishing Co. Inc., New York 1968).
- AND A. CRONQUIST. 1953. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. Willard Grant Press, Boston.
- KARLSSON, T. 1976. *Euphrasia* in Sweden: hybridization, parallelism, and species concept. *Bot. Not.* 129: 49-60.
- . 1984. Early-flowering taxa of *Euphrasia* (Scrophulariaceae) on Gotland, Sweden. *Nord. J. Bot.* 4: 303-326.
- . 1986. The evolutionary situation of *Euphrasia* in Sweden. In: *Biosystematics of the Nordic flora*. B. & J. Jonsell, Eds., *Acta Univ. Ups., Symb. Bot. Ups.* XXVII: 2, 61-71. Uppsala.
- MARIE-VICTORIN, FRÈRE. 1964. *Flore Laurentienne*, 2nd ed. Revised by E. Rouleau. University of Montreal Press, Montreal.
- SELL, P. D. AND P. F. YEO. 1970. A revision of the North American species of *Euphrasia* L. (Scrophulariaceae). *J. Linn. Soc., Bot.* 63: 189-233.

- WETTSTEIN, R. VON. 1896. Monographie der Gattung *Euphrasia*. Leipzig.  
YEO, P. F. 1978. A taxonomic review of *Euphrasia* in Europe. *J. Linn. Soc., Bot.*  
77: 223–334.

S. R. D.

DEPARTMENT OF BIOLOGY  
UNIVERSITY OF OTTAWA  
OTTAWA, ONTARIO K1N 6N5  
CANADA

J. M.

REGIUS KEEPER  
ROYAL BOTANIC GARDEN  
EDINBURGH, SCOTLAND EH3 5LR  
UNITED KINGDOM