

THE ILLINOIS SPECIES OF HALORAGACEAE AND HIPPURIDACEAE

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ABSTRACT.—Five species of *Myriophyllum*, one of *Proserpinaca*, and one of *Hippuris* are recorded. *Myriophyllum hippuroides* is reported from Illinois for the first time. Keys, descriptions, discussions, distribution maps, and line illustrations are provided for each species.

All three genera considered in this study were created by Linnaeus in 1753. There has never been difficulty on the part of botanists in separating the genera, and the names *Hippuris*, *Myriophyllum*, and *Proserpinaca* have been used by almost all workers. An exception to this was the employment of the name *Burshia* by Rafinesque (1808) for a species of *Myriophyllum*. Another misinterpretation was Walter's placing of a species of *Myriophyllum* within *Potamogeton*.

Although little confusion has existed on the generic level, varying opinions have been raised on the placement of these genera within families. Generally, two schools of thought have prevailed. One has been to consider all three genera to belong to the single family Haloragaceae (sometimes spelled Halorrhagaceae, Haloragidaceae, or Halorrhagidaceae). This has been adhered to by Petersen (1889), Hallier (1905), Hutchinson (1926), Fassett (1940), Jones (1945, 1950, 1964), and Jones and Fuller (1955).

The other trend has been to keep *Myriophyllum* and *Proserpinaca* in the Haloragaceae, and to segregate *Hippuris* into its own family, the Hippuridaceae, because of the linear, entire leaves in whorls of six or more, the sympodial branching of the stem, the bisexual flowers without a perianth, and the single stamen, ovule, and style of *Hippuris*. This has been followed by Schindler (1904, 1905), Bessey (1915), Rendle (1925), Wettstein (1935), Fernald (1950), and Gleason (1952). It is this latter view that is maintained in this study.

Mead was apparently the first botanist to record any of these taxa from Illinois when he listed *Myriophyllum heterophyllum*, *M. verticillatum*, and *Proserpinaca palustris* in 1846. By 1876, Patterson was able to record four species of *Myriophyllum* and one each of *Hippuris* and *Proserpinaca* from Illinois. No additions were made to these genera in Illinois for 89 years, or until a fifth species of *Myriophyllum* was discovered during this study. Several authors in the past have attributed still another species of *Myriophyllum* (*M. humile*) to Illinois, but this was not verified during our study.

The authors wish to thank the curators of the following herbaria for providing study material.

- F—Chicago Museum of Natural History
 ILL—University of Illinois
 ILLS—Illinois Natural History Survey
 ISM—Illinois State Museum
 MO—Missouri Botanical Garden
 SIU—Southern Illinois University

The senior author prepared the illustrations.

MORPHOLOGY OF THE GENERA

The species of *Myriophyllum* and *Hippuris* are usually submerged aquatics, rarely becoming terrestrial. *Proserpinaca* is amphibious, occurring both submerged in water and emergent onto land. The stems are simple or sparsely branched and glabrous. Submerged and usually emerged leaves occur. The submerged leaves, which range from 0.8-7.0 cm long, are shallowly incised or capillary-pinnate with 5-13 pairs of divisions. The emerged leaves in *Myriophyllum*, when developed, may resemble the floral bracts or the submerged leaves. In *Proserpinaca*, the emerged leaves are merely serrate. In *Hippuris*, the emerged leaves are entire and are borne in whorls of six to twelve.

The flowers are perfect in *Proserpinaca*, perfect or unisexual in the other genera. They are borne singly or in clusters of 2-5 in the axils of floral bracts. The bracts are whorled, linear to spatulate to obovate, entire, serrate, or pinnatisect. There are four petals in *Myriophyllum*, ranging from 1.5-3.0 mm long, three minute petals in *Proserpinaca*, and none in *Hippuris*.

The fruit, which provides some of the best diagnostic characters, is ovoid and 4-sulcate in *Myriophyllum* and 3-angled in *Proserpinaca*. In *Hippuris*, the fruit is 1-seeded, indehiscent, and nut-like.

ECOLOGICAL CONSIDERATIONS

The Haloragaceae and Hippuridaceae are aquatic families in Illinois with the individual species living either submerged, partially submerged in water, or rooted in the muddy banks of pools, streams, and lakes. The Illinois species of *Myriophyllum* occur in quiet waters of ponds and streams, sending fertile spikes containing bracts and flowers above the water level. *Proserpinaca* is an amphibious genus which may or may not develop the typical submerged dissected leaf of the family. *Hippuris*, when completely submerged, is sterile with scale-like leaves; the fertile forms grow only in shallow water.

GEOGRAPHICAL CONSIDERATIONS

The genus *Myriophyllum* is composed of about 40 species, 5 of which have been found in Illinois. In general these Illinois species range from Nova Scotia to Alaska, are greatly scattered throughout the United States and into Mexico, and are distributed widely in Europe.

The discovery of a specimen of *M. hippuroides* at F establishes a state record for this species. Previously the range for this plant extended from New York to Wisconsin and from Washington to California.

In Illinois, *M. pinnatum* is reported from many of the counties in the southern two-thirds of the state. *Myriophyllum verticillatum* and *M. heterophyllum* show a scattered distribution throughout the entire state but cannot be considered abundant. The remaining species, *M. exalbenscens*, is known from four northern counties and two in the central part of the state.

The irregular distribution of these five species leads the authors to believe that further collecting will be necessary to give a more complete and correct picture of the distribution of *Myriophyllum* in Illinois.

Fernald (1950) states that the genus *Proserpinaca* is composed of three species and two varieties. Only *P. palustris* is found in Illinois. This species ranges from Nova Scotia and Quebec, across the northern United States, and south to Florida, Louisiana, and down into Mexico, Central America, and the West Indies.

In Illinois, *Proserpinaca palustris* shows a limited distribution throughout the state but is found both in the northern- and southern-most counties. Again, more concentrated collecting may show this species to be a more common Illinois plant.

The genus *Hippuris* has two species, one of which is known from Illinois. The Illinois species, *H. vulgaris*, shows a wide distribution across southern Canada to Alaska, southeast to New Mexico and east across Nebraska and Illinois to New York. It is also found in Europe.

In Illinois, only three northern counties—Lake, McHenry, and Kane—have records of this species.

SYSTEMATIC TREATMENT

Key to the Families

- Haloragaceae and Hippuridaceae
1. Stem branching occasionally; leaves usually of two kinds: the submerged leaves deeply pinnatisect, the emerged leaves (as well as the bracts) serrate; fruit 3- to 4-locular.....Family Haloragaceae
1. Stem unbranched; leaves of one kind, whorled, simple, entire; fruit 1-locular.....Family Hippuridaceae

Haloragaceae—Water Milfoil Family

Key to the Illinois

Genera of Haloragaceae

1. Leaves whorled or scattered, crowded; flower 4-merous; fruit 4-angled 1. *Myriophyllum*
1. Leaves alternate, rather remote; flower 3-merous; fruit 3-angled 2. *Proserpinaca*
1. *Myriophyllum* L.—Water Milfoil
Myriophyllum L. Sp. Pl. 992. 1753.

Burshia Raf. Med. Rep. II. 5:357. 1808.
Aquatic or rarely terrestrial; stem usually branched; submerged leaves whorled or alternate, capillary-pinnate with 5-13 divisions; emerged leaves, if developed, serrate or pinnatifid; bracts whorled, entire, serrate, or pinnatifid; flowers axillary, perfect or unisexual, 4-merous; fruit 4-sulcate, anteriorly beaked.

Key to the Illinois

Species of *Myriophyllum*

1. Leaves verticillate and scattered; bracts entire to deeply toothed and exceeding the flower; stamens 4; fruit with 4 dorsal tuberculate or undulate ridges.
2. Bracts entire to pectinate; fruit 4-angled, with each section flattened, slightly papillose with a smooth dorsal ridge with undulate margins.....1. *M. hippuroides*
2. Bracts deeply toothed; fruit 4-angled, with each section rounded, smooth, with a tuberculate dorsal ridge.....2. *M. pinnatum*
1. Leaves all verticillate; bracts entire to pinnatifid, sometimes exceeding the flower; stamens 4 or 8; fruit without dorsal ridges or, if present, smooth.
3. Bracts deeply pinnatifid; stamens 8; fruit 4-angled, sections rounded, smooth....3. *M. verticillatum*
3. Bracts entire to serrate; stamens 4; fruit 4-angled, sections with dorsal ridges smooth, or slightly tuberculate without ridges.
4. Bracts entire to serrate, much exceeding flower; fruit with smooth dorsal ridges.....4. *M. heterophyllum*
4. Bracts entire to denticulate, not exceeding flower; fruit somewhat tuberculate, without dorsal ridges.....5. *M. exalbescent*
1. *Myriophyllum hippuroides* Nutt. ex Torr. & Gray, Fl. N. Am. 1:530. 1840. (Fig. 1).

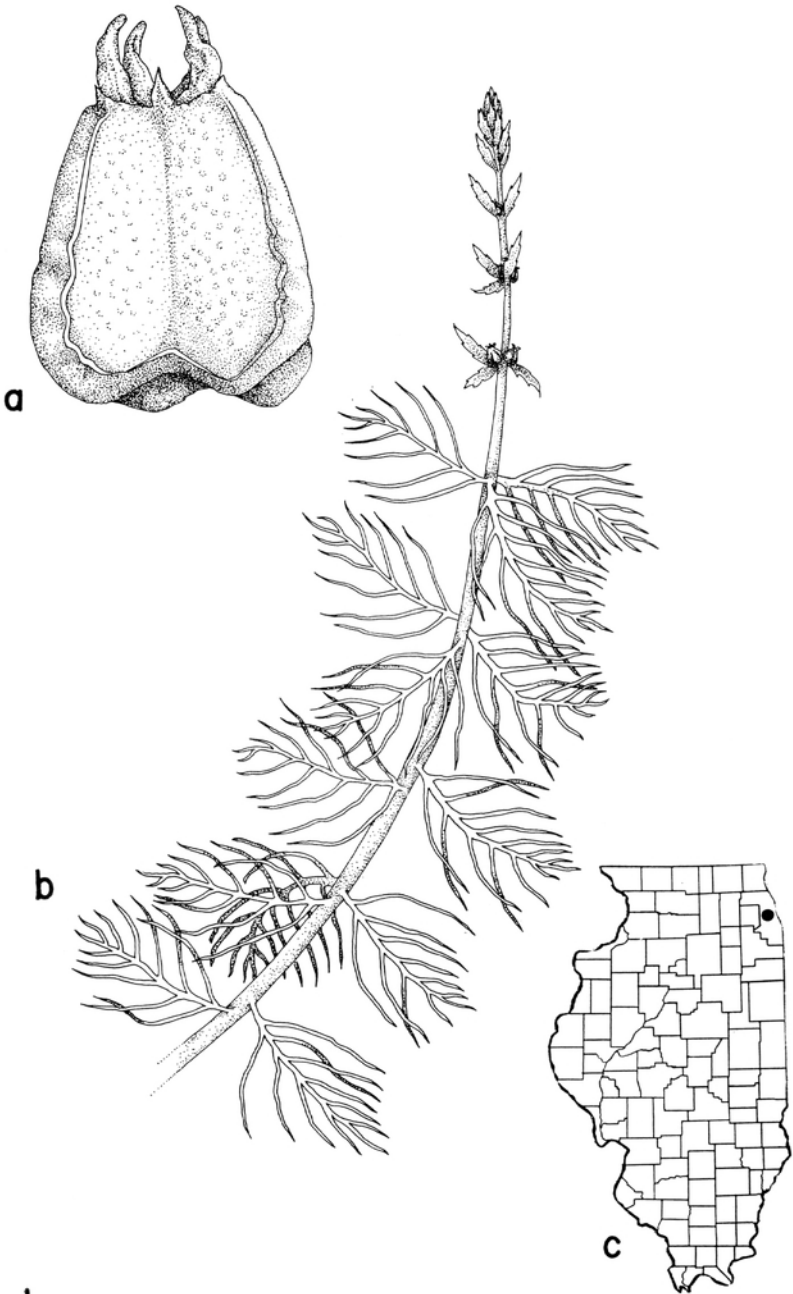


FIGURE 1.—*Myriophyllum hippuroides* Nutt. a. Fruit, X 00. b. Plant, X O. c. Illinois distribution.

Myriophyllum verticillatum var. *che-neyi* Fassett, in *Rhodora* 41:524. 1939.

Submerged; stem sparsely branched; submerged leaves verticillate or subverticillate, to 4.5 cm long, capillary-pinnate with 5-10 pairs of divisions; emerged leaves deeply toothed; floral bracts whorled, linear to lanceolate, 0.5-2.0 cm long, entire or shallowly toothed; flowers axillary, perfect or unisexual; petals 1.5-3.0 mm long; stamens 4; fruit ovoid, 1.6-2.0 mm long, deeply 4-sulcate, each section somewhat papillose with a dorsal ridge with slightly undulate margins and an anterior beak.

Habitat.—Shallow water.

Range.—New York to Wisconsin; Illinois; Washington to California.

Myriophyllum hippuroides closely resembles *M. pinnatum* but may be distinguished by its bracts and fruit. The bracts of *M. hippuroides* are entire or slightly toothed and the 4-angled fruit has smooth to undulate ridges rather than conspicuously tuberculate ridges.

Myriophyllum hippuroides was described by Nuttall in 1840, but nearly one hundred years later, Fassett considered it a variety of *M. verticillatum*. The submerged leaves of *M. hippuroides* are whorled and scattered, in *M. verticillatum* only whorled. Floral bracts of *M. hippuroides* are entire or with 2-4 pairs of shallow teeth; floral bracts of *M. verticillatum* are deeply toothed. The flower of *M. hippuroides* has 4 stamens; that of *M. verticillatum* has 8 stamens. The fruits differ in several respects. *Myriophyllum hippuroides* has an ovoid, strongly 4-sulcate fruit with each section flattened and covered with minute papillae. On the dorsal edge of each segment is a smooth ridge with occasional undulations along the margins. The fruit of *M. verticillatum* is ovoid, plump, and not deeply divided. The individual sections are rounded, smooth, and without a dorsal ridge. It appears justifiable to recognize *M. hippuroides* as a valid species.

This is the first report of this species from Illinois.

Specimen Examined.—Cook: *A. Hall* 174 (F).

2. *Myriophyllum pinnatum* (Walt.) BSP. Prel. Cat. N.Y. 16. 1888. (Fig. 2). *Potamogeton pinnatum* Walt. Fl. Car. 90. 1788.

Myriophyllum scabratum Michx. Fl. Bor. Am. 2:190. 1803.

Either submerged or terrestrial; stem sparsely branched; submerged leaves verticillate, subverticillate, or scattered,

1-3 cm long, capillary-pinnate with about 5 pairs of divisions; emerged leaves developing occasionally and resembling bracts; floral bracts whorled, linear, 0.5-2.0 cm long, conspicuously toothed with 3-5 pairs of teeth; flowers axillary, perfect or unisexual; petals 1.5-2.0 mm long, rounded above; stamens 4; fruit ovoid, 1.3-2.0 mm long, deeply 4-sulcate, each section with a dorsal, tuberculate, slightly concave ridge and anterior beak.

Habitat.—Rooted in muddy shores or in shallow waters of ponds and lakes.

Range.—Massachusetts to North Dakota, south to Texas and Florida; Mexico.

Myriophyllum pinnatum may be distinguished in several respects. The submerged pinnatifid leaves are both whorled and scattered along the stem. The floral bracts, which are borne on an emerged spike, are linear, irregularly toothed, and much exceed the flower. Each lobe of the 4-sectioned fruit has a conspicuous dorsal tuberculate ridge terminated at the apex by a beak.

Specimens Examined.—Cass: *Reeroat* 3772 (ISM). Hancock: south of Warsaw, *Collector unknown*. Henderson: near Oquawka, *Patterson s.n.* (ILL). Mason: W of Saidora, *Reeroat* 4763 (ISM). Pike: W of Meredosia, *Reeroat* 6281 (ISM). Randolph: W of Sparta, *Swayne & Bailey* 1007 (SIU). St. Clair: S of French Village, *Winterringer* 10750 (ISM). Schuyler: without locality, *Reeroat* 1687 (ISM). Vermilion: Oakwood, *Tehon & Thompson s.n.* (ILLS). Williamson: near Herrin, *Abney & Dillard s.n.* (SIU).

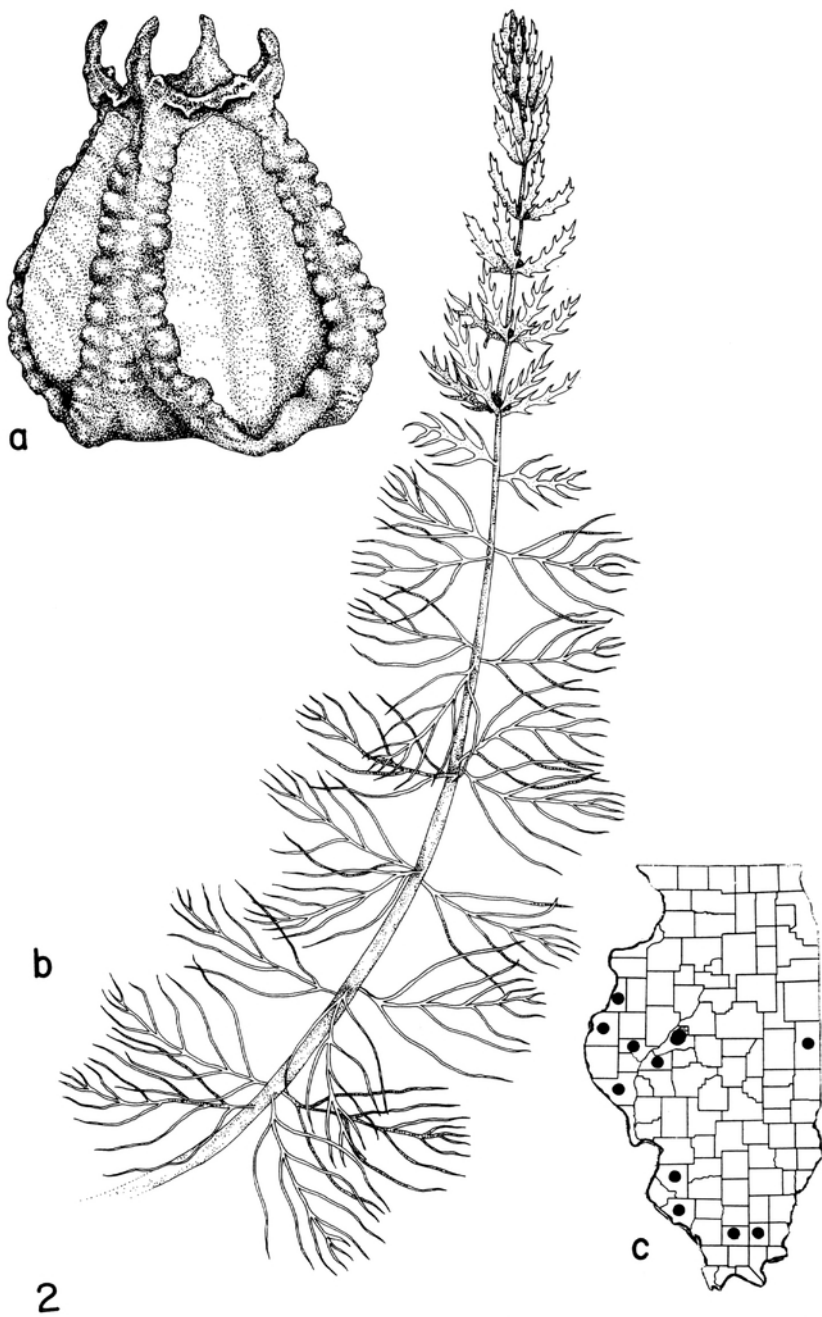
3. *Myriophyllum verticillatum* L. Sp. Pl. 992. 1753. (Fig. 3).

Submerged; stem branched occasionally; leaves in whorls of 4-5, 0.8-4.5 cm long, capillary-pinnate with 9-13 division pairs; emerged leaves, if developed, similar to the submerged; floral bracts whorled, linear, up to 1.5 cm long, deeply pinnatifid with 8-15 pairs of segments; flowers axillary, perfect or unisexual; petals 2.5 mm long, spatulate; stamens 8; fruit ovoid, 2.0-2.5 mm long, 4-sulcate, each section rounded with a shallow concavity on the dorsal surface and a conspicuous beak at the summit.

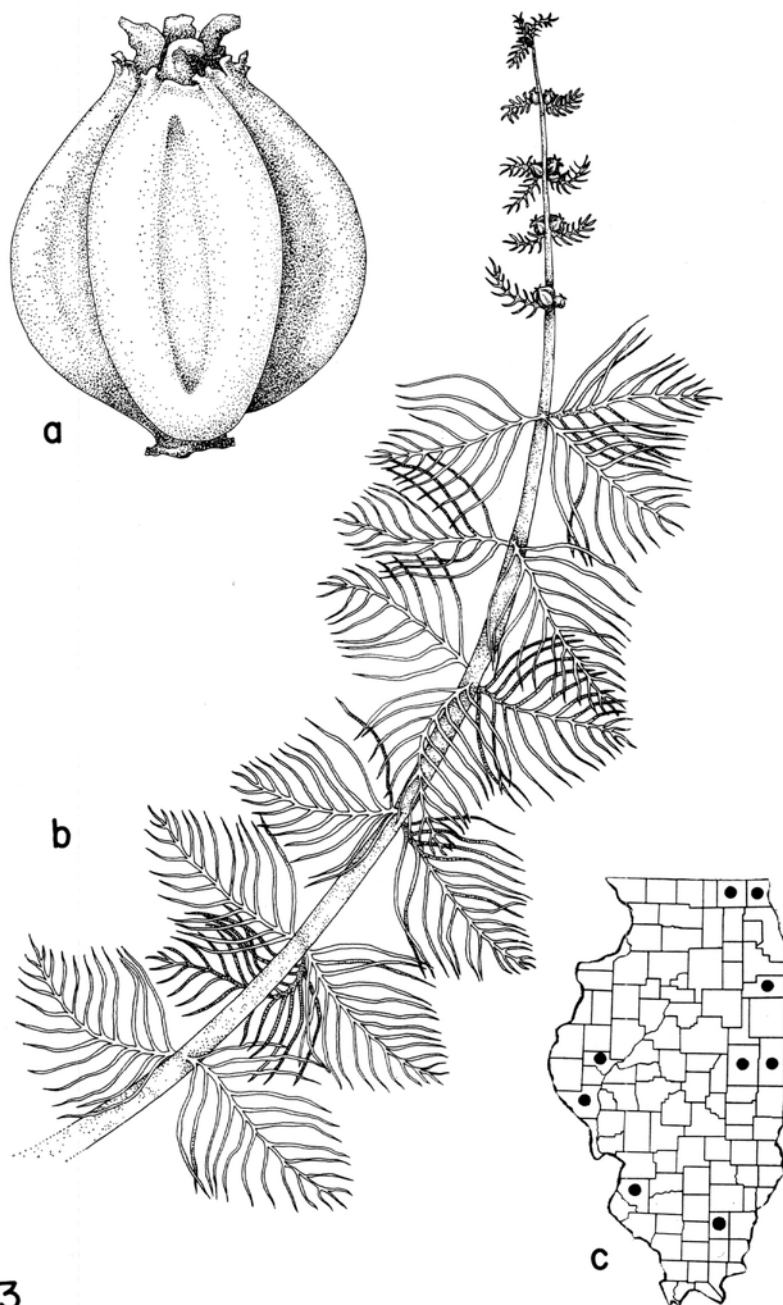
Habitat.—Shallow waters of ponds, streams, and lakes.

Range.—Nova Scotia to Wisconsin and Minnesota, west to Utah and Idaho, east to Illinois, Indiana, and New York; Eurasia.

Myriophyllum verticillatum may be distinguished readily from the other spe-



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FIGURE 2.—*Myriophyllum pinnatum* (Walt.) BSP. a. Fruit, X 00. b. Plant, X O. c. Illinois distribution.



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FIGURE 3.—*Myriophyllum verticillatum* L. a. Fruit, X 00. b. Plant, X O. c. Illinois distribution.

cies on the basis of leaves, bracts, and fruit. The submerged capillary-pinnate leaves are borne only in whorls, unlike the situation in *M. pinnatum*. The bracts are deeply pinnatifid and exceed the flower. The fruit is 4-angled with each section smooth and rounded with a slight vertical concavity on the dorsal margin. A small beak is found at the apex of each section.

Specimens Examined.—Champaign: Crystal Lake, *Clinton 30456* (ILL). Kankakee: Kankakee River, *Hill s.n.* (ILL). Lake: Fox Lake, *Richardson s.n.* (ISM). McHenry: without locality, *Vasey s.n.* (ILL). Pike: W of Hull, *Evers 33335* (ILLS). St. Clair: without locality, *Vasey s.n.* (ILL). Saline: SW of Carrier Mills, *Evers 2787* (ILLS). Schuyler: S of Frederick, *Reeroat 5635* (ISM). Vermilion: Oakwood, *Tehon & Thompson s.n.* (ISM).

4. *Myriophyllum heterophyllum* Michx. Fl. Bor. Am. 2:91. 1803. (Fig. 4).

Submerged; stem occasionally branched; submerged leaves in whorls of 4-6, 2-5 cm long, capillary-pinnate with 7-10 pairs of divisions; emerged leaves few, pinnatifid; floral bracts whorled, oblanceolate to spatulate, 0.4-2.0 cm long, entire to serrate; flowers axillary, perfect or unisexual; petals 1.5-3.0 mm long, acute; stamens 4; fruit subglobose, 1-2 mm long, deeply 4-sulcate, each section with slightly rounded sides and a dorsal flattened margin with a conspicuous anterior beak.

Habitat.—Ponds, lakes, and still waters of streams.

Range.—Quebec to Ontario and North Dakota, south to New Mexico and Texas, east to Florida; Mexico.

Myriophyllum heterophyllum is characterized chiefly by its floral bracts and fruit. The bracts are oblanceolate to spatulate and the margins entire to serrate. The fruit is distinctly 4-angled and each section has a flattened, smooth dorsal ridge.

Specimens Examined.—Cook: E of Richton Park, *Steyermack s.n.* (ILL). Jackson: N of Murphysboro, *Hardy s.n.* (SIU). Lake: Lake Nippissink, *Thompson & Tehon s.n.* (ILLS). Lee: Amboy, *Long 464* (ILL). McHenry: Ringwood, *Vasey s.n.* (ILL). Macoupin: Carlinville, *without collector* (ILLS). St. Clair: E of E. St. Louis, *Neill 170* (ISM). Vermilion: SE of Oakwood, *Evers 38625* (ILLS). Wabash: Mt. Carmel, *Schneck s.n.* (F). Whiteside: near Meredosia, *Pepoon s.n.* (ILLS).

5. *Myriophyllum exalbescens* Fern. in *Rhodora* 21:120. 1919. (Fig. 5).

Submerged; stem simple or sometimes branched; submerged leaves in whorls of 3-4, 1.2-3.0 cm long, capillary-pinnate with 6-11 pairs of divisions; emerged leaves, if present, similar to the submerged; floral bracts whorled, spatulate to obovate, up to 3 mm long, entire to denticulate; flowers axillary, perfect or unisexual; petals 2.5 mm long, obovate; stamens 8; fruit ovoid, 2.3-3.0 mm long, 4-sulcate, the sections rounded, smooth to slightly tuberculate and obscurely beaked.

Habitat.—Pools, quiet streams.

Range.—Laborador to Alaska, south to California, Arizona, Kansas, Illinois, West Virginia, and Maryland; Eurasia.

Many American authors have called this *M. spicatum*. Comparison of our material with authentic European material of *M. spicatum* leads us to believe that the two species are distinct.

Myriophyllum exalbescens is recognized by its floral bracts which are shorter than or equal to the length of the fruit. The bracts are spatulate to obovate, entire to slightly toothed. The fruit is 4-angled with a tuberculate surface and no dorsal ridges. The apex is obscurely beaked.

Specimens Examined.—Adams: E of Quincy, *Brinker 2914* (ISM). Boone: NE of Belvidere, *Fell F4541* (ISM). Cook: Des Plaines River, *Fuller 1192* (ISM). Lake: Waukegan Moorland, *Fuller 10549* (ISM). McHenry: Crystal Lake, *Pepoon 6660* (ILLS). McLean: without locality, *Fuller 304* (ISM).

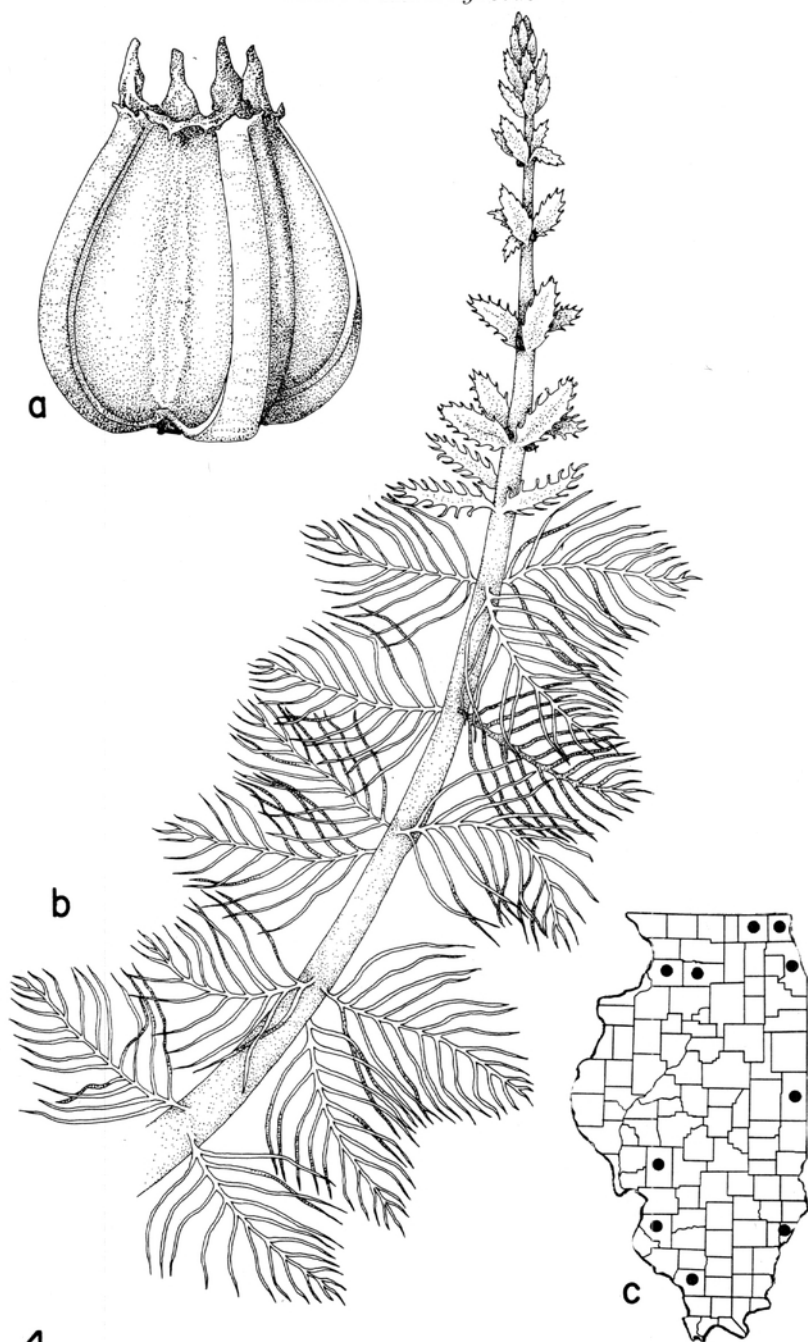
2. *Proserpinaca* L.—Mermaid-weed
Proserpinaca L. Sp. Pl. 88. 1753.

Only the following species is known from Illinois.

1. *Proserpinaca palustris* L. Sp. Pl. 88. 1753. (Fig. 6).

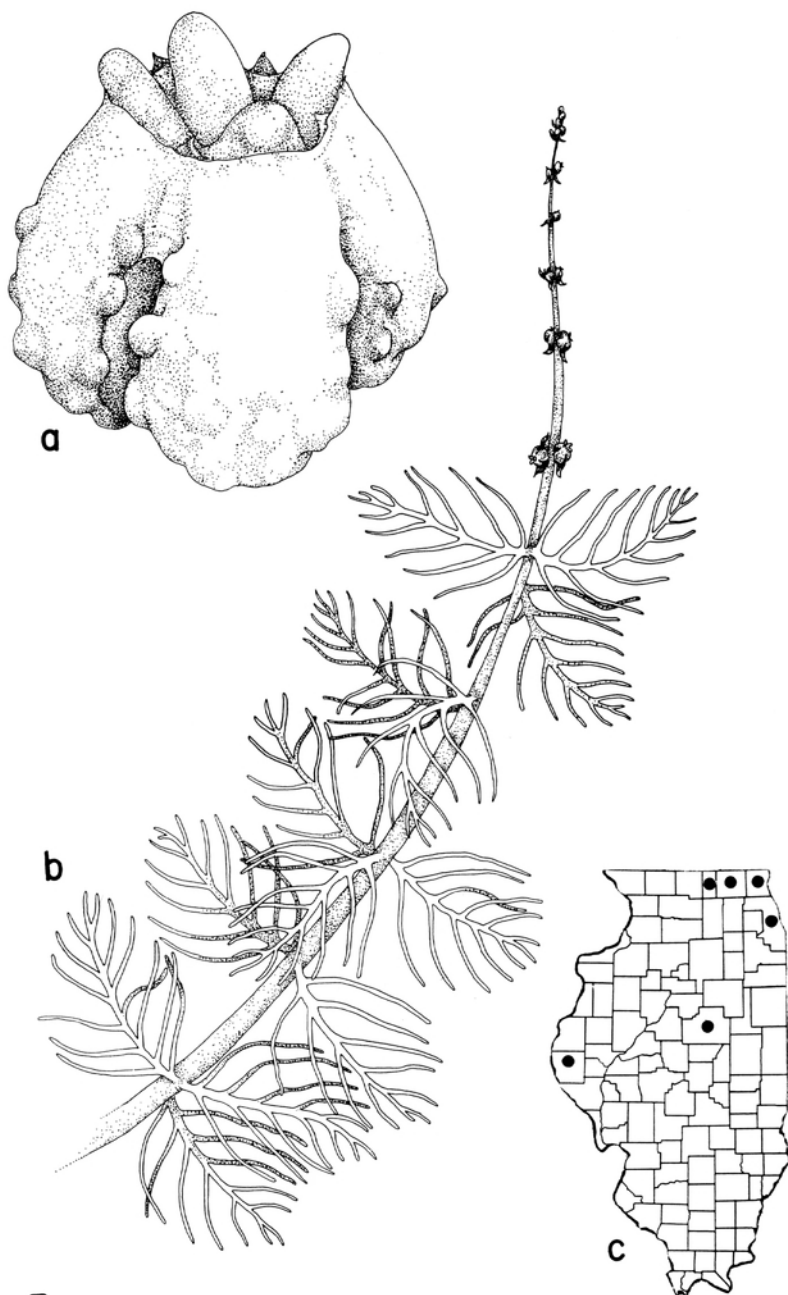
Submerged or terrestrial; stems prostrate, the branches erect; submerged leaves, if present, alternate, 1-7 cm long, capillary-pinnate to shallowly incised; emerged leaves lanceolate to oblanceolate, 1.5-8.5 cm long, serrate; flowers axillary, solitary or in groups of 2-5, perfect; calyx 3-sided, trilobed; petals 3, minute; stamens 3; fruit pyramidal-ovoid, 3-angled, 3-6 mm long, the surface of each section smooth to tuberculate, the margin slightly winged.

Habitat.—Shallow waters and shores of ponds and lakes.



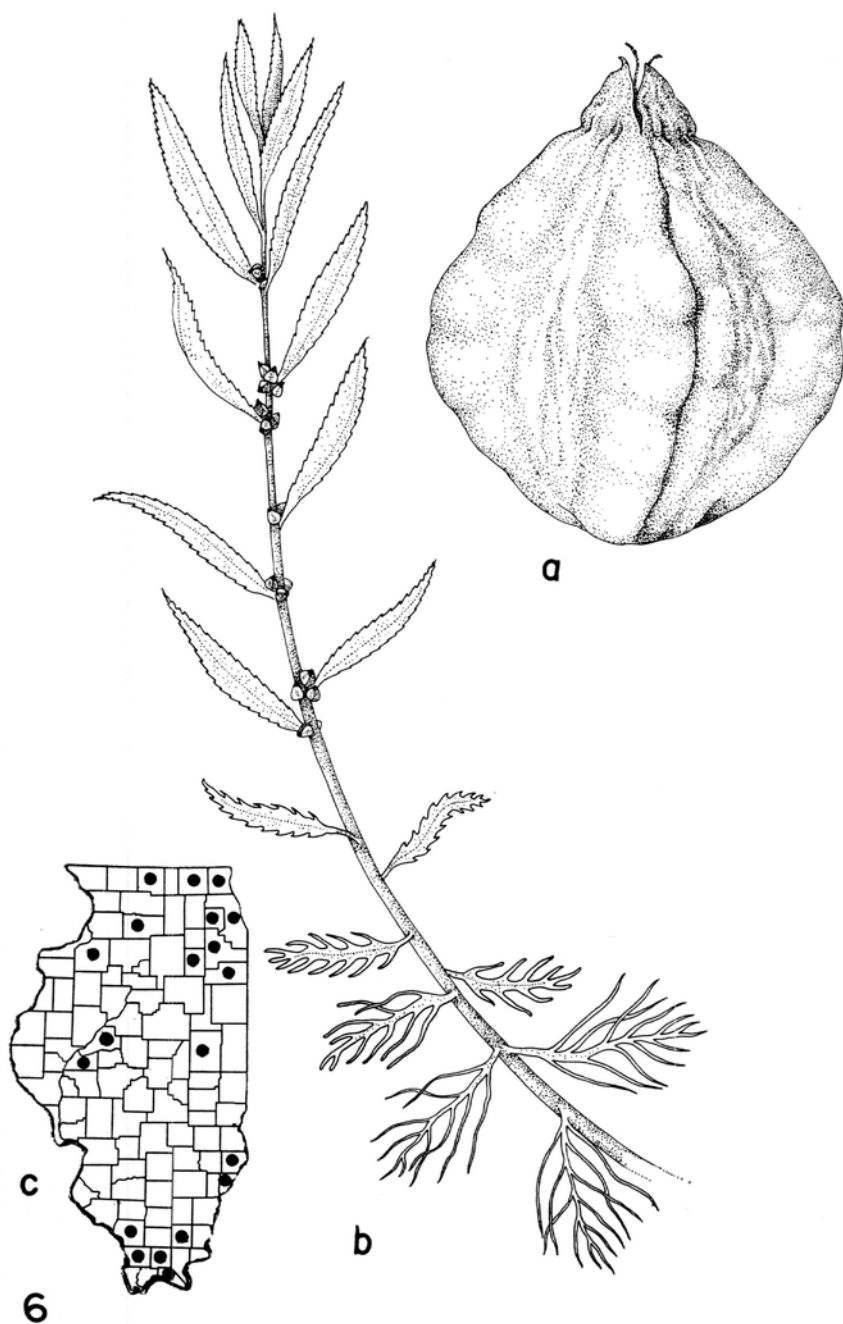
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FIGURE 4.—*Myriophyllum heterophyllum* Michx. a. Fruit, X 00. b. Plant, X O. c. Illinois distribution.



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FIGURE 5.—*Myriophyllum exalbescens* Fern. a. Fruit, X 00. b. Plant, X O. c. Illinois distribution.



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FIGURE 6.—*Proserpinaca palustris* L. a. Fruit, X OO. b. Plant, X O. c. Illinois distribution.

Range.—Nova Scotia and Quebec to Ontario and Minnesota, south to Louisiana and Florida; Mexico; Central America; West Indies.

Proserpinaca palustris commonly has alternate leaves which are variable: the submerged leaves are pinnatifid, the amphibious leaves, which are found at water level, are deeply toothed, and the emersed, lanceolate leaves are serrate. The flowers are axillary, occurring singly or in clusters of 2-5. The fruit is sharply 3-angled, with each angle slightly winged.

In addition to typical material, Fernald recognizes two varieties with wingless fruits with flat or rounded sides. Neither variety appears to be present in Illinois, although the ranges of each should include Illinois.

Specimens Examined.—Cass: SW of Beardstown, *Winterringer 5219* (ISM). Campaign: Clover Station, *Ahles 2914* (SIU). Cook: Des Plaines River, *Pearsall 7317* (ISM). DuPage: Wheaton, *Blount 56* (ISM). Grundy: NE of Gardner, *Evers 3234* (ILLS). Henry: W of Sedgely Crossing, *Dobbs s.n.* (ILL). Jackson: E of Elkville, *Bailey & Swayne 3103* (SIU). Johnson: E of Vienna, *Hall & Winterringer 25* (ILL). Kankakee: SW of Custer Park, *Steyermark s.n.* (ILL). Lake: N of Waukegan, *Fuller 9049* (ISM). Lawrence: SE of Lawrenceville, *Sibert s.n.* (ILL). Lee: S of Amboy, *Chase 13113* (ILL). McHenry: Ringwood, *Vasey s.n.* (F). Mason: W of Saidora, *Rezroat 6088* (ISM). Massac: E of Brookport, *Bailey & Swayne 2721* (SIU). Saline: Cottonwood Pond, *Bailey & Swayne 2841* (SIU). Union: Wolf Lake, *without collector* (SIU). Wabash: Mt. Carmel, *Schneck s.n.* (F.). Will: SW of Braidwood, *Evers 30851* (ILLS). Winnebago: N of Shirland, *Fell & Fell 46541* (ISM).

Hippuridaceae—Mare's-tail Family

1. *Hippuris* L.—Mare's tail

Hippuris L. Sp. Pl. 4. 1753.

Only the following species occurs in Illinois.

1. *Hippuris vulgaris* L. Sp. Pl. 4. 1753. (Fig. 7).

Submerged; stem erect, unbranched; submerged leaves verticillate, linear to filiform, often reduced to scales; emersed leaves in whorls of 6-12, linear to oblong, 0.4-3.5 cm long, entire; flowers axillary, perfect or unisexual; sepals and petals none; hypanthium enclosing ovary in

the perfect flowers; stamen 1; style 1; fruit indehiscent, ellipsoid, nut-like, 1-seeded.

Habitat.—Shores of streams and lakes or in shallow water.

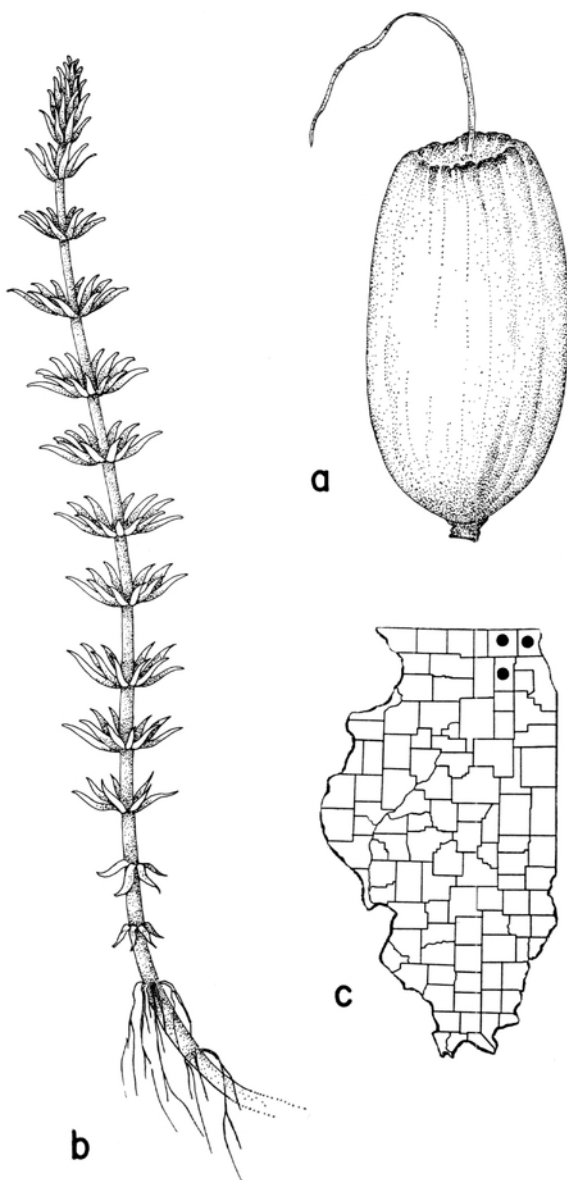
Range.—Greenland to Alaska south to New Mexico, Nebraska, Illinois, Indiana, and New York; Eurasia.

Hippuris vulgaris is characterized by having its entire, linear leaves arranged in whorls of 6-12 on unbranched erect stems. The tiny flowers are axillary in the leaves of the middle and upper portion of the plant. The ellipsoid fruit is smooth.

Specimens Examined.—Kane: South Elgin, *Sherff s.n.* (F). Lake: Grass Lake, *Gleason & Shobe 260* (ILL). McHenry: without locality, *Vasey s.n.* (ILL).

LITERATURE CITED

- BESSEY, C. E. 1915. The phylogenetic taxonomy of flowering plants. *Ann. Mo. Bot. Gard.* 2:109-164.
- FASSETT, N. C. 1940. *A Manual of Aquatic Plants*. McGraw-Hill Book Company, New York.
- FERNALD, M. L. 1950. *Gray's Manual of Botany*. 8th ed. American Book Company, New York.
- GLEASON, H. A. 1952. *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*. Vol. 2. New York Botanical Garden, New York.
- HALLIER, H. 1905. Provisional scheme of the natural (phylogenetic) system of flowering plants. *New Phytologist* 4:151-162.
- HUTCHINSON, J. 1926. *The families of flowering plants. I. Dicotyledons*. London. 328 pp.
- JONES, G. N. 1945. *Flora of Illinois*. 1st ed. University of Notre Dame Press, Notre Dame, Indiana.
- . 1950. *Flora of Illinois*. 2nd ed. University of Notre Dame Press, Notre Dame, Indiana.
- . 1964. *Flora of Illinois*. 3rd ed. University of Notre Dame Press, Notre Dame, Indiana.
- , and G. D. FULLER. 1955. *Vascular Plants of Illinois*. The University of Illinois Press, Urbana, and the Illinois State Museum, Springfield.
- PETERSEN, O. G. 1889. Halorrhagidaceae. In Engler and Prantl, *Die Natürlichen Pflanzenfamilien* III (7):226-237.



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FIGURE 7.—*Hippuris vulgaris* L. a. Fruit, X OO. b. Plant, X O. c. Illinois distribution.

- RENDLE, A. B. 1925. The classification of flowering plants. Vol. 2. Cambridge. 636 pp.
- SCHINDLER, A. K. 1904. Die Abtrennung der Hippuridaceen von den Halorrhagaceen. Engler's Bot. Jahrb. 34. Beibl. 77.
- _____. 1905. Halorrhagaceae. In Engler, Das Pflanzenreich 23:1-133.
- WETTSTEIN, R. 1935. Handbuch der systematischen Botanik. 4th ed. Leipzig and Wien. 1152 pp.
- WINTERRINGER, G. S., and R. A. EVERS. 1960. New Records for Illinois Vascular Plants. Illinois State Museum, Springfield.

Manuscript received December 1, 1965.