WATERCRESS IN THE NEW WORLD

PETER S. GREEN

Fifteen years ago Howard and Manton (1946) put on record the existence of both a diploid and tetraploid species of watercress and distinguished them under the names *Nasturtium officinale* R. Br. (diploid, 2n = 32) and *N. uniseriatum* Howard & Manton (allotetraploid, 2n = 64). The following year, Airy Shaw (1948) elucidated the nomenclature and showed that the name *N. microphyllum* Boenn. ex Reichb. should be used for the tetraploid on grounds of priority. Since this date it has become widely accepted that on a world basis *Nasturtium* is not distinguishable generically from *Rorippa* and the names of the watercresses then become *R. nasturtium-aquaticum* (L.) Hayek (*N. officinale* R. Br.) and *R. microphylla* (Boenn.) Hyland, whilst for simplicity of reference the sterile triploid hybrid between the two species has been given the name *R.* × *sterilis* Airy Shaw (Shaw 1951).

Both species are natives of Europe, but both have been introduced into the New World, presumably because of their use and value as a salad. Airy Shaw (1948) first recorded the existence of the tetraploid in Canada and the U. S. A., and Green (1955, p. 297-8) added further New World records and noted the existence in the U. S. A. of the sterile hybrid as well. A recent examination of the material in the Gray and New England Botanical Club Herbaria however, has indicated that watercress is far more widely distributed than had at first been expected, and it became apparent that the two species have not been distinguished in American literature. To take the two major Floras in the north-east: Gleason (1952) continued to describe *Nasturtium* as monotypic in 1952, and the figure he published is clearly that of the diploid species. Fernald (1950), however, distinguished a var. *microphyllum* of *N. officinale*, but it is clear from his description, and from annotations he made on specimens in the two herbaria just mentioned, that whilst his concept of var. *microphyllum* is very close to the tetraploid species it is not entirely coincident, and his figure, labeled as *N. offici-*

nale, shows fruit clearly recognizable as those of *Rorippa microphylla*. In the two handbooks for the identification of North American aquatic plants: Muenscher (1944) has one species, which he calls *N. officinale*, and his illustration is clearly that of the tetraploid. Fassett (1940 and 1957) recognizes four named forms based on vegetative characters but he does not mention the name *microphyllum*. Murley in

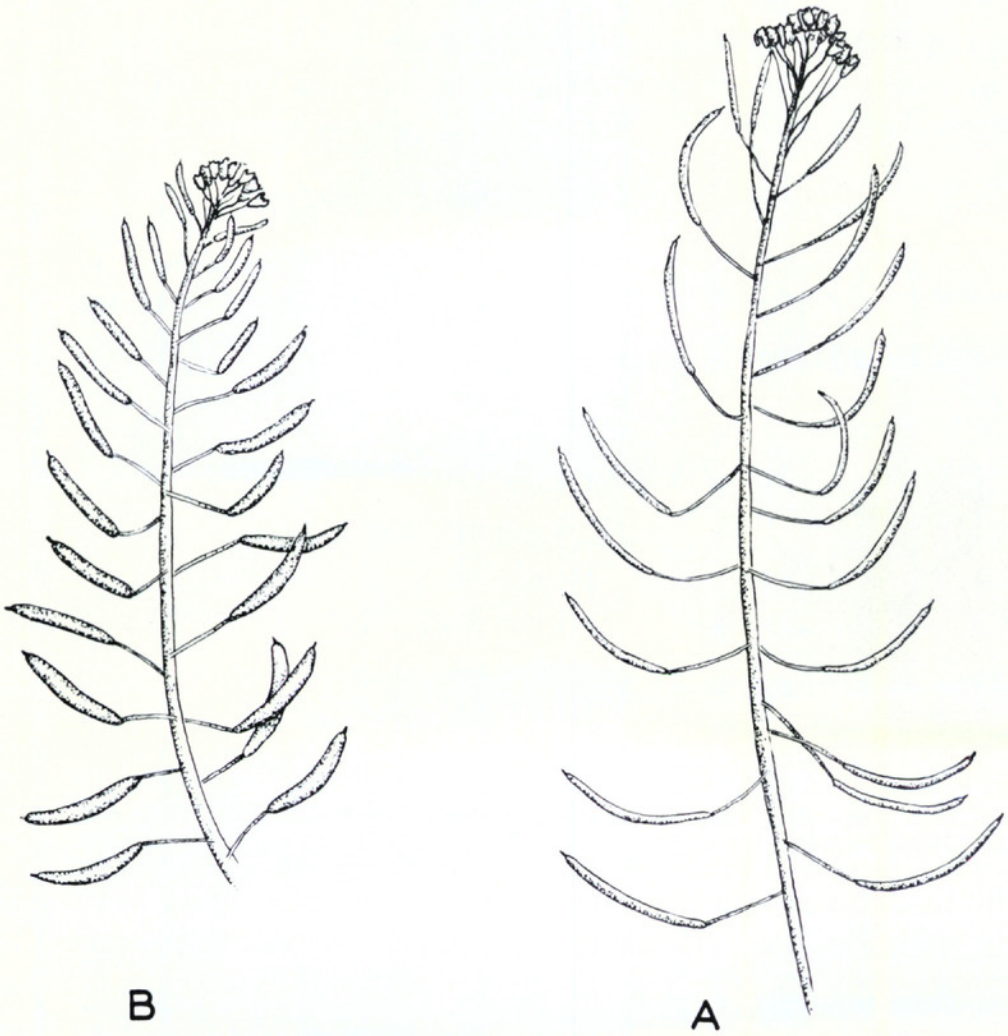

FIG. 1. Fruit and inflorescence of: A, *Rorippa nasturtium-aquaticum* (L.) Hayek; B, *R. microphylla* (Boenn.) Hyland. Half natural size.

her review of the "Seeds of the Cruciferae of North-eastern North America" (1951) only considers the one species, as *Nasturtium officinale*, and gives a beautiful illustration of a seed of the diploid (her fig. 8).

There is no doubt that both *Rorippa nasturtium-aquaticum* and *R. microphylla* are vegetatively both very variable.

For certain and easy distinction it is necessary to use characters of the fruit. In fact, unless the plants are in fruit it is difficult to differentiate between the two species (see Howard & Lyon 1950). In *R. nasturtium-aquaticum* the siliquae are 10-15(-20) mm. long and relatively stout, whereas in *R. microphylla* they are longer, (14-)17-26, mm. long, and more slender (Fig. 1). The fruits are also borne on slightly shorter pedicels in *R. nasturtium-aquaticum* where they are 6-15(-18) mm. long compared with (6-)10-20 mm. in *R. microphylla*. A field character is further provided by the fact that the seeds appear in *R. nasturtium-aquaticum* to

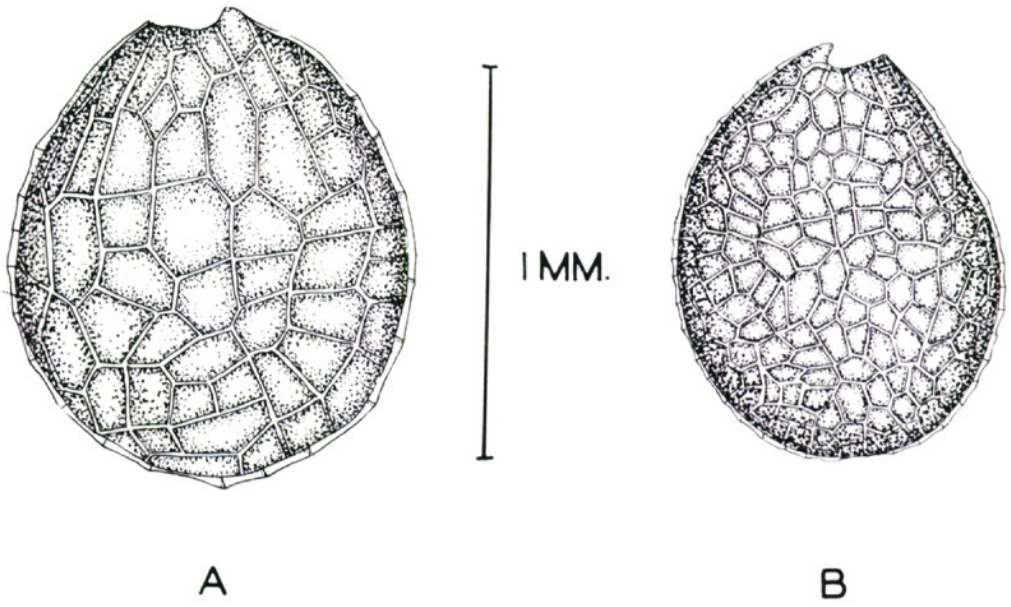

FIG. 2. Individual seed of: A, *Rorippa nasturtium-aquaticum* (L.) Hayek; B, *R. microphylla* (Boenn.) Hyland.

lie in two rows in the pod, whereas in *R. microphylla* they lie in a single row, (hence the epithet *uniseriatum* proposed by Howard & Manton for the tetraploid) but this character has to be used with caution. A character of sure value, however, is provided by the reticulations, or areolae, on the seed coat, which in *R. nasturtium-aquaticum* are large, and number about 35 on any one side of the ripe seed, whilst in *R. microphylla* there are about 150 and these are consequently much smaller (Fig. 2). It is interesting in this connection that a photograph of seeds of *R. nasturtium-aquaticum* is given in one of the plates bound in the center of the 1961 yearbook of

the U. S. Department of Agriculture. If plants to be identified have not reached the fruiting stage then it is possible to distinguish between the species on pollen grain size (Green 1955) and stomatal index (Rowson in Howard & Manton 1946) but the methods are somewhat time consuming.

The hybrid *Rorippa* × *sterilis* is, as its name suggests, easily distinguished by its sterility. The fruits do not develop properly and only an occasional, non-viable, seed is produced. Furthermore, examination of the pollen grains in, for example, a drop of lactic acid, shows that the pollen too is sterile, the grains being very variable in size and the majority of them crumpled and abortive. In fact to be certain of the hybrid it is usually advisable to examine the pollen, for occasional plants of the parental species set little seed from the first flowers to open and, especially in *R. microphylla*, the plant may set very little seed at all if growing under crowded conditions etc.

Because of the variability of vegetative characters the epithet *microphylla* is misleading; leaf shape and size are of no value in distinguishing the species and their hybrid. Large-leaved specimens are found with fruits of *R. microphylla*, and depauperate specimens with small leaves are, as often as not, found to be *R. nasturtium-aquaticum*. A variety *siifolia* has been described within *R. nasturtium-aquaticum* and was recognized by Fernald (1950) along with so-called var. *microphylla*. In it the leaflets are more or less oblong and elongate as opposed to roundish to oval, especially in the case of the terminal leaflet, but such leaves are frequently found in the diploid, tetraploid and hybrid and have no taxonomic significance, at least at the rank of variety.

The distribution of watercress in the U. S. A. and immediately adjacent territories as reflected in the collections of the Gray and New England Botanical Club Herbaria is shown in Fig. 3 (one or two records have been added from a hasty examination of the collections in the herbarium of the New York Botanical Garden made during a recent brief visit). It will be seen that *Rorippa nasturtium-aquaticum* is far more widespread than both *R. microphylla* and the hybrid, which, apart from two records in Idaho and Oregon,

are restricted to eastern Canada and northeastern United States. How many times watercress has been introduced from Europe is unknown, but in view of the esteem in which it has long been held as a salad in England, France and Germany, it is suspected that it has been brought across the Atlantic many times, the first occasion probably having taken place more than 200 years ago. Even from Utah there

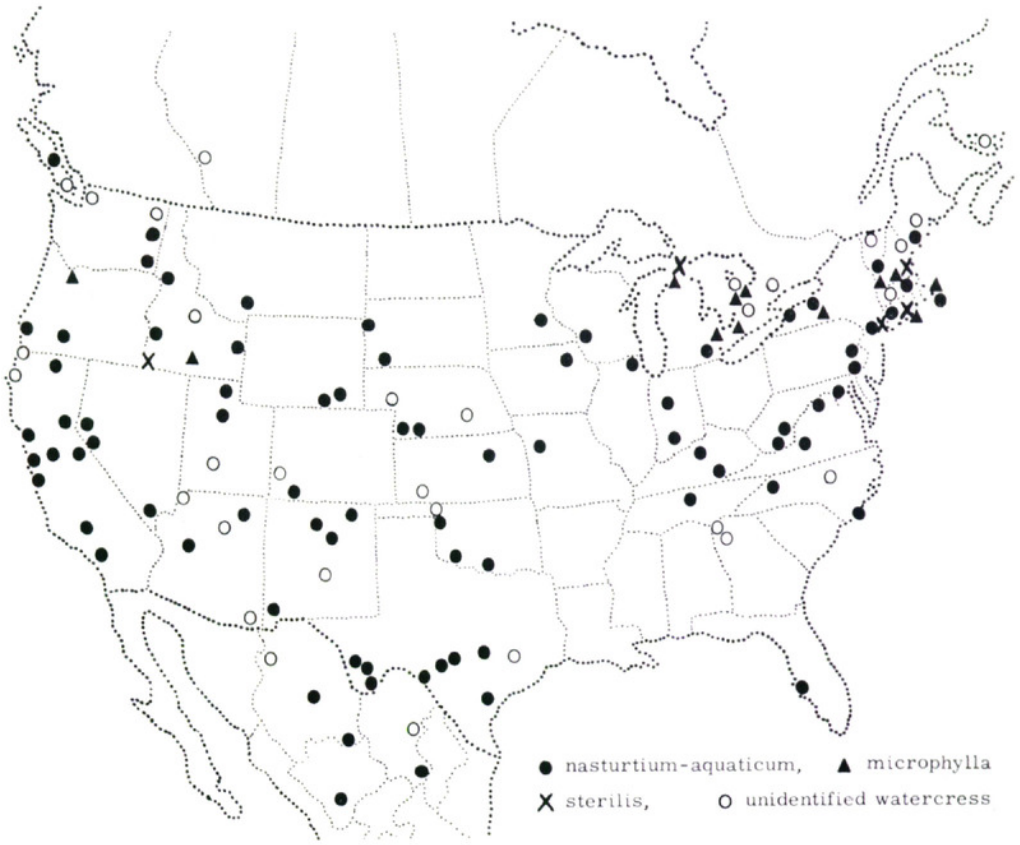

FIG. 3. Distribution map of the watercresses in the U.S.A. and adjacent territories. In the north-east several closely adjacent records may be represented by a single symbol.

is a specimen in the Gray Herbarium collected by E. Palmer as long ago as 1875 which bears a note "introduced from France by J. E. Johnson" and one may believe that the introduction to the eastern states took place long before this, although the earliest specimen I have seen was collected in 1847 from Niagara, New York. The diploid, *R. nasturtium-aquaticum*, is far more widespread than the tetraploid species and is recorded from almost every state. Muenscher (1944) published a map in which it is recorded from every

state but six and I have seen material from three of these six in the course of this investigation. It is debatable whether watercress was intentionally introduced to every state where it now occurs and although it frequently has the appearance of a native plant and is often found remote from any habitation, it must be borne in mind that it commonly grows on muddy stream banks and seed may be relatively easily transported over long distances embedded in mud attached to the feet of birds, and broken portions of the plant can easily be carried down stream once it is established in a particular river or stream. The records of *R. microphylla* and the hybrid in the west almost certainly represent separate introductions and it is not without significance perhaps that at least in recent times the watercresses which are grown commercially in Britain (see Howard 1947) are the diploid, *R. nasturtium-aquaticum*, which is the most widespread introduction, and the hybrid. It is possible too that diploid *R. nasturtium-aquaticum* is more able to flourish in the warmer more southern states, and this is suggested by its distribution outside the United States, whereas the tetraploid is probably the hardier species and the one more able to survive the rigorous winters in the north-east. No doubt the examination of watercress material in other herbaria and the painstaking measurement of pollen grains in material showing only flowers would increase our knowledge of the detailed distribution of the species but it is felt that sufficient indication of the total range is given by the map (fig. 3) and by the citation of the specimens below, to draw the attention of botanists in America to the existence of the two species and how they may be distinguished.

In Central America, the West Indies and South America only material of *Rorippa nasturtium-aquaticum* in the strict sense has been seen. There are three sheets of apparently sterile plants from Cuba in the Gray Herbarium, but examination of the pollen shows that the grains are fully formed and not largely crumpled and abortive as in the hybrid, *R.* × *sterilis*. However, the fruits seem undeveloped and empty, yet in each case the whole plant appears small and the leaves reduced, with few pinnae; it is felt that further comment on

their identity should be reserved until more is known of the conditions under which they were growing. Schulz (1934, p. 41) recorded *Nasturtium officinale* var. *microphyllum* from Chile, but this identification was apparently based on leaf shape alone and in this investigation only the diploid has been seen with certainty from Chile, or for that matter, from the whole of South America.

MATERIAL EXAMINED*

Rorippa nasturtium-aquaticum (L.) Hayek
(*Nasturtium officinale* R. Br.)

CANADA. **British Columbia:** Comox, July 18, 1915, *J. M. Macoun 91854.*

UNITED STATES. **Maine:** Cumberland Co., Yarmouthville, Yarmouth, Aug. 1904, *Kate Furbish* (NEBC). **Vermont:** Rutland Co., Rutland, June 15, 1892, *Willard W. Eggleston 1.* **Massachusetts:** Berkshire Co., Pittsfield, Sept. 23, 1899, *R. Hoffmann;* Norfolk Co., Dedham, Purgatory Swamp, June 27, 1897, *J. M. Greenman 260;* Nantucket Co., Nantucket, Polpis, June 1, 1900, *M. A. Day 2* (GH, NEBC). **Rhode Island:** Newport Co., Block Island, June 24, 1917, *R. P. Marshall* (NEBC). **Connecticut:** Fairfield Co., Bridgeport, June 3, 1902, *E. H. Eames* (NEBC); Hartford Co., Southington, June 30, 1898, *L. Andrews 311;* Litchfield Co., Woodbury, June 12, 1909, *E. B. Harger 5548* (NEBC); New Haven Co., North Branford, Aug. 5, 1914, *E. B. Harger 6415* (NEBC); New London Co., Franklin, June 18, 29, 1915, *R. W. Woodward.* **New York:** Niagara Co., Niagara Falls near Table Rock, June 1847, *John A. Lowell;* Wayne Co., Newark, Aug. 31, 1872, *E. L. Hankenson.* **Pennsylvania:** Berks Co., Hamburg, July 19, 1892, *C. D. Lippincott;* Chester Co., 1858-1864, *S. P. Sharples;* Lebanon Co., Miners Village, May 30, 1889, *A. A. Heller.* **Delaware:** New Castle Co., Centreville, May 20, 1865, *A. Commons.* **Maryland:** Montgomery Co., shores of Potomac, June 6, 1881, *John Donnell Smith.* **W. Virginia:** Munroe Co., Sweet Springs, Sept. 15, 1903, *E. S. and Mrs. Steele 315;* Pocahontas Co., Minnehaha Spring, July 31, 1930, *W. V. U. Botanical Exped.* **Virginia:** Botetourt Co., E. Buchanan, along the Otter Rd., May 17, 1892, *John K. Small;* Page Co., Luray, Stony Man Mountain and vicinity in the Blue Ridge, Aug. 12, 1901, *E. S. and Mrs. Steele 161.* **North Carolina:** Avery Co., Cranberry, on US 19E, June 17, 1958, *Harry E. Ahles & J. A. Duke 43572;* New Hanover Co., Carolina Beach, April 18, 1938, *R. K. Godfrey & M. F. Buell 3542.* **Florida:** Sarasota Co., Sarasota, March 31, 1943, *Anne E. Perkins.* **Michigan:** Washtenaw Co., edge of Fleming Creek, 4¾ mi. east of Ann Arbor, *F. J. Hermann 6950.* **Ohio:** Portage Co., Garrettsville, July 18, 1896, *R. J. Webb 156.* **Indiana:** Tippecanoe Co., 0.5 mi. s.w. of Lafayette, west

*Specimens in the Gray Herbarium unless otherwise stated.

bank of Wabash River valley, June 2, 1945, *Ray C. Friesner 18859.* **Kentucky:** Jefferson Co., near Beuchel, July 5, 1939, *M. Seargent 49;* Wayne Co., Beaver Creek, s.w. of Monticello, July 12-14, 1937, *L. B. Smith & A. R. Hodgdon 3868.* **Tennessee:** Davidson Co., Nashville, June 14, 1960, *Howard S. Gentry 18589.* **Wisconsin:** LaCrosse Co., Bohemian Creek, *Thomas A. Hartley 778* (NY). **Illinois:** Kane Co., Elgin, June 9, 1911, *Earl E. Sherff;* McHenry Co., McHenry, June 25, 1860, *George Vasey 2105.* **Minnesota:** Dakota Co., railroad near Nicols, Sept. 19, 1941, *J. W. Moore, E. K. Butters & D. Jenkins 15113.* **Iowa:** Fayette Co., Fayette, Aug. 1894, *B. Fink.* **Missouri:** Clay Co., Randolph, June 20, 1897, *Kenneth K. MacKenzie* (NY). **South Dakota:** Fall River Co., Black Hills, Hot Springs, June 14, 1892, *P. A. Rydberg 531.* **Nebraska:** Dundy Co., Rock Creek Park, Aug. 3, 1945, *Walter Kiener 19417;* Redwillow Co., 8 miles west of McCook, July 31, 1945, *Walter Kiener 19411.* **Kansas:** Riley Co., 1896, *J. B. Norton 613.* **Oklahoma:** Carter Co., between Ardmore and Springer, April 29, 1961, *Reed C. Rollins 61156;* Comanche Co., Fort Sill, June 16, 1916, *Mrs. J. Clemens 11601;* Ellis Co., on edge of Wolf Creek near Shattuck, June 10, 1914, *R. L. Clifton 3200K;* Love Co., 2 miles s.w. of Bomar, June 23, 1953, *G. J. Goodman & E. L. Rice 5686.* **Texas:** Brewster Co., Leoncita Springs, Kokernot ranch, April 30, 1948, *Barton H. Warnock & F. M. Churchill 7725;* Gonzales Co., Cottonwood Springs, April 16, 1934, *V. L. Cory 8271;* Jeff Davis Co., Limpia Canyon 10 miles north of Ft. Davis, June 13, 1941, *R. R. Innes & Brunelle Moon 1095;* Kerr Co., Kerrville, May 14-21, 1894, *A. A. Heller 1753;* Real Co., Prade Ranch, headwaters of Rio Frio, April 18, 1959, *R. C. Rollins & D. S. Correll 5940;* Travis Co., Austin, May 15, 1872, *Elihu Hall 14;* Valverde Co., along the Rio Grande from Brownsville to El Paso, Devil's River, April 20, 1919, *H. C. Hanson 523.* **Montana:** Gallatin Co., Bozeman, July 10, 1902, *W. W. Jones.* **Idaho:** Ada Co., Boise, Aug. 19, 1911, *June A. Clark 257;* Canyon Co., Falk's Store, July 7, 1910, *J. F. Macbride 327;* Teton Co., Victor, July 11, 1901, *E. D. Merrill & E. N. Wilcox 1015;* Nez Perce Co., Upper Ferry, above Lewiston, Clearwater River, June 2, 1892, *J. H. Sandberg, D. T. MacDougal & A. A. Heller 298.* **Wyoming:** Albany Co., Laramie, Sept. 30, 1984, *Aven Nelson 1152;* Crook Co., Sand Creek near Beulah, June 21, 1950, *C. L. Porter 5349;* Platte Co., Sibyllee Creek, July 18, 1945, *C. L. Porter 3692.* **Colorado:** La Plata Co., T. 34 N., R. 8 W., Aug. 14, 1937, *Marion Ownbey 1439.* **Utah:** Cache Co., half mile west of Logan, July 30, 1940, *Bassett Maguire 20099;* Salt Lake Co., Salt Lake City, 1869, *Sereno Watson 6;* Utah Co., Spring Lake, 1875, *E. Palmer.* **Nevada:** Clark Co., Willow Springs, Aug. 6, 1935, *I. W. Clokey 5481;* Mineral Co., Corey Canon. Wassuk Mts., June 27, 1919, *Ivar Tidestrom 10084;* Ormsby Co., King's Canon, June 11, 1902, *C. F. Baker 1057.* **New Mexico:** Colfax Co., vincinty of Ute Park, Sept. 10, 1916, *Paul C. Standley 14611;* Grant Co., Fort Bayard Watershed, Stephen's Ranch, Oct. 22, 1905, *J. C. Blumer 112;* San Miguel Co., near Pecos, Aug. 20,

1908, *Paul C. Standley 5129;* Sierra Co., Berendo Creek, May 20, 1904, *O. B. Metcalfe 907;* Socorro Co., Mogollon Mts., on or near the west fork of the Gila River, Aug. 25, 1903, *O. B. Metcalfe 606.* **Arizona:** Coconino Co., Painted Desert, Tuba Oasis, July 15-20, 1920, *W. N. Clute 107;* Yavapai Co., 6 miles east of Prescott, June 29, 1928, *Carl B. Wolf 2375.* **California:** Inyo Co., White Mts., Roberts Ranch, Wyman Creek, July 21, 1931, *Victor Duran 3140;* Los Angeles Co., Claremont, May 28, 1910, *J. D. Taylor 133;* Marin Co., Tomales Point, one mile west of Indian Beach, May 24, 1941; *H. L. Mason 12424;* Mono Co., Lakeview Spring, 6.5 miles from Bridgeport-Sweetwater Highway, Aug. 3, 1945, *Ira L. Wiggins & R. C. Rollins 546;* Monterey Co., Pacific Grove, July 1, 1905, *C. P. Smith 1005;* Riverside Co.; Santa Anna River at Chino Creek, May 28, 1933, *L. C. Wheeler 1747;* Santa Clara Co., Palo Alto estate, May 4, 1894; Siskiyou Co., near the Box Canyon of the Sacramento near Mt. Shasta City, July 12, 1940, *W. B. Cooke 15321;* Stanislaus Co., Modesto, July 13, 1935, *R. F. Hoover 686.* **Oregon:** Curry Co., Port Orford near Battle Rock, June 4, 1928, *J. W. Thompson 4480;* Klamath Co., near Ft. Klamath, Aug. 7, 1894, *J. B. Leiberg 665.* **Washington:** Spokane Co., Clark Springs, Spokane, July 8, 1902, *F. O. Kreager 124;* Walla Walla Co., Waitsburg, May 25, 1897, *R. M. Horner B54;* Whitman Co., Wawawai, June 4, 1892, *Lake & Hull 477.* **Alaska:** Manley Hot Springs, near the Tanana River, Sept. 15-19, 1949, *Edith Scamman 5798.*

MEXICO: **Chihuahua:** vicinity of Chihuahua, May 1-21, 1908, *Edward Palmer 184.* **Coahuila:** Saltillo, June 1898, *Edw. Palmer 223;* **Durango:** Durango, July 25, 1944, *C. V. Morton 44191.* **Hidalgo:** Pachuca, near Zerezo and below Parque Nacional El Chico, May 12, 1947, *H. E. Moore 2793.* **Jalisco:** Guadalajara, May 15, 1901, *C. G. Pringle 8494.* **Michoacan:** Zitácuaro, Sept. 5, 1935, *Geo. B. Hinton et al. 11848.* **Mexico:** Vallee de Mexico, June 4, 1865-6, *Bourgeau 18.* **Puebla:** Huauchinango, sand along Rio Necaxa, March 27, 1945, *A. J. Sharp 45369.*

CUBA. Santa Clara Prov., Mina Carlota, southeast of Cumanayagua, Sierra de San Juan, March 21-23, 1938, *H. A. Senn 332.* Oriente Prov., 1856-1857, *C. Wright 7.*

HAITI. San Michel to Marmelade, Aug. 6, 1905, *George V. Nash & Norman Taylor 1472* (NY).

DOMINICA. Prov. San Juan, El Cercado, Juan Santiago, Hondo Valle, Sept. 1, 1946, *R. A. & E. S. Howard 8743.*

PUERTO RICO. Adjuntas, in mont "Cienega", April 11, 1886, *P. Sintenis 4116.*

VENEZUELA. Near Tovar, 1854-1855, *A. Fendler 20.*

COLOMBIA. Dept. of Cundinamarca, Bogota, Oct. 4-8, 1917, *Francis W. Pennell 2348.*

ECUADOR, Prov. Canar, near village of San Marcos, Azogues, April 1, 1945, *Francisco Prieto E2479.* Prov. Chimborazo, Canon of the rio Chanchan near Huigra, May 7-14, 1945, *W. H. Camp E3153.*

PERU. Dept. Lima, Prov. Chancay near Supe, Sept. 4, 1938, *Alan A. Beetle & O. B. Horton 9064.* Dept. of Cusco, Pisac, April 30, 1925, *Francis W. Pennell 13718.* Dept. of Junin, Oroya, 1919, *Margaret Kalenborn 60.*

CHILE. Prov. Aconcagua, Valle de Marga-Marga, 1930-32, *Felix Jaffuel & Anastasio Pirion 3265.* Prov. Atacama, Dept. Copiapó, vicinity of Copiapó, Nov. 16, 1925, *Ivan M. Johnston 4992.* Prov. Coquimbo, Dept. Elqui, El Colorada, 70 km. on road from Rivadavia to Laguna, tributary dam of Laguna River, Feb. 16, 1940, *R. Wagenknecht 18501.* Prov. Osorno, Puerto Octay, A orillas del lago Llanquihue, Nov. 29, 1939, *Hugo Gunckel 9323.* Prov. Santiago, Penalobu, Jan. 2, 1927, *G. Looser 79.* Prov. Valdivia, Rinihue, Feb. 12, 1933, *Hugo Gunckel 5821.*

BRAZIL. S. Leopoldo, Oct. 1940, *J. Eugenio Leite 1794.* S. Rosa, Sombrie, S. Catarina, Oct. 11, 1944, *R. Reitz C767.*

BOLIVIA. Dept. Cochabamba, Cuidad de Cochabamba garten, Dec. 26, 1928, *José Steinbach 8788.* Dept. La Paz, La Paz, Oct. 10, 1921, *Otto Buchtien 244.*

URUGUAY. Dept. Motevideo, Cerro Casabo, Sept. 1926, *G. Herter 443 (80926).*

ARGENTINA. Prov. Buenos Aires, Partido de Tornquist, Sierra de la Ventana, Albra de la Ventana, Nov. 7, 1938, *A. L. Cabrera 4693.* Prov. de Cordoba, Unquillo, 1926, *C. Bruch.* Prov. of Tucuman: Dept. Famaillá, Rio Colorado, Sept. 1919, *S. Venturi 415.* Terr. de Rio Negro, Region del Lago Nahuel Huapi, Basiloche, Feb. 5, 1940, *A. L. Cabrera 5965.*

Rorippa microphylla (Boenn.) Hyland. (*Nasturtium microphyllum* (Boenn.) Reichb., *N. uniseriatum* Howard & Manton)

CANADA. **Newfoundland:** Waterford River between Waterford Bridge and St. John's, Aug. 1, 1911, *M. L. Fernald & K. M. Wiegand 5482.* **Ontario:** Simcoe Co., Collingwood, Baie Georgienne, Aug. 26, 1933, *F. Marie-Victorin, F. Rolland-Germain, & René Meilleur 45069;* Bruce Co., Mouth of Pine River, 6 mi. south of Kincardin, L. Huron, June 19, 1948, *J. H. Soper & H. M. Dale 3952.*

UNITED STATES. **New Hampshire:** Strafford Co., along Oyster River, near Northwood-Durham turnpike, July 4, 1943, *A. R. Hodgdon 4565* (NEBC). **Vermont:** Bennington Co., Arlington, July 3-4, 1903, *W. W. Eggleston 3229* (NY). **Massachusetts:** Barnstable Co., Harwich, the head of Allen's Harbor Creek, Aug. 6, 1919, *M. L. Fernald & Bayard Long 18502;* Berkshire Co., North Adams, June 25, 1913, *M. L. Fernald & Bayard Long 9553* (GH, NEBC); Essex Co., Newburyport, "The Gully", July 31, 1940, *R. C. Bean* (NEBC); Franklin Co., Greenfield, July 25, 1911, *C. H. Knowlton* (NEBC); Middlesex Co., Waltham, 1861, *Wm. Boott;* Norfolk Co., Wrentham, near north end Archers Pond, Sept. 18, 1897, *F. G. Floyd 374* (NEBC); Plymouth Co., West Hingham, July 25, 1888, *Walter Deane* (NEBC); Suffolk Co., Jamaica Plain, Arnold Arboretum, Bussey Brook, June 27, 1927, *E. J.*

Palmer 28003 (A). **Rhode Island:** Providence Co., Goosenest Brook, Wickford Junction, July 31, 1909, *Thomas Hope* (NEBC). **New York:** Tompkins Co., Ithaca, Dwyer's Pond, July 29, 1913, *E. L. Palmer 564;* Cortland Co., Inlet to Mud Pond, McLean Wild Life Preserve, July 29, 1932, *W. C. Muenscher 17921.* **Michigan:** Emmett Co., Pickerel Lake, east of Petoskey, July 6, 1933, *H. A. Gleason 100.* **Idaho:** Blaine Co., Picabo, July 3, 1916, *J. F. Macbride & Edwin B. Payson 3009.* **Oregon:** Hood River, May 28 & July 1885, *W. N. Suksdorf 506.*

Rorippa × sterilis Airy Shaw

(Rorippa microphylla × R. nasturtium-aquaticum)

UNITED STATES. **New Hampshire:** Strafford Co., Durham, near Madbury Line, Aug. 1, 1943, *A. R. Hodgdon 4569* (NEBC). **Connecticut:** Fairfield Co., Bridgeport, June 19, 1896, *E. H. Eames;* Hartford Co., East Hartford, June 3, 1893, *C. A. Weatherby* (NEBC); New Haven Co., Oxford, July 21, 1896, *E. B. Harger 200* (NEBC). **Michigan:** Mackinac Co., Mackinac Island, July 30, 1924, *F. W. Hunnewell 9308.* **Idaho:** Owyhee Co., Flint Creek, July 30, 1910, *J. F. Macbride 492.*

Two final comments are thought to be of value. Airy Shaw (1948) recorded *R. microphylla* from California, however, he considered both of the records he gave to be doubtful, and one, based on *Copeland 368* from Jonesville, Butte Co., was found (Green, 1955) on examination of the pollen grains not to be a watercress at all. Examination of a duplicate of this in the Gray Herbarium, and comparison there with the extensive collections from North America shows that it is a rather depauperate specimen of *Cardamine breweri* S. Wats.

Finally, whilst not strictly concerning the watercresses of the New World, the opportunity was taken to examine the material in the Gray Herbarium from Japan. Previous examination of Japanese material (Green, 1955) in the herbaria at Edinburgh and Kew showed all the flowering specimens to be *R. × sterilis* alone. Three further collections in the Gray Herbarium have now been seen and they too are each of them the hybrid. (Hondo: June 2, 1929, *K. Shiota 1044;* May 19, 1935, *K. Shiota 8437.* Shikoku: June 2, 1935, *I. Yogo 9557*). It is interesting to see, however, that Kitamura and Murata (1961) list *Nasturtium officinale* R. Br. and illustrate (their fig. 86 (i)) a typical fruit of the diploid; their coloured illustration (plate 42) however, shows only flowers and has no fruits. — ARNOLD ARBORETUM OF HARVARD UNIVERSITY.

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A NEW SPECIES OF SCIRPUS IN THE NORTHEASTERN UNITED STATES

ALFRED E. SCHUYLER

While collecting leafy species of *Scirpus* in the Connecticut River valley through Vermont, Massachusetts, and Connecticut during the summer of 1960, I was surprised to find a population of plants which did not conform to any descriptions in the standard manuals for this region (Fernald, 1950; Gleason, 1952). Vegetatively the plants appeared very similar to *Scirpus atrovirens* Willd., which is widespread in eastern North America. However, an examination of the comparatively large achenes and rigid perianth bristles revealed some striking differences from *S. atrovirens*, and later, other differences were discovered. Also, more specimens of this taxon were found in herbarium folders containing specimens of *S. atrovirens* and its relative, *S. polyphyllus* Vahl.[1] Because of its well-marked distinctions from previously recognized species of *Scirpus*, I herein describe it as a new species.

[1]I am indebted to the curators of the following herbaria where I visited or obtained loans: Gray Herbarium, University of Massachusetts, Dartmouth College, New York State Museum, Wiegand Herbarium, New York Botanical Garden, Pennsylvania State University, Philadelphia Academy of Natural Sciences, U. S. National Museum, University of Michigan, and Missouri Botanical Garden.