

THE GENUS *EMPETRUM* IN NORTH AMERICA.

M. L. FERNALD AND K. M. WIEGAND.

IN 1902 attention was called to the fact that we have more than a single Crowberry in eastern North America;¹ and subsequent study has demonstrated that, besides the circumpolar *Empetrum nigrum*, we have in northern New England and Eastern Canada a second very well marked species and in Newfoundland and southern Labrador a third species, which is abundant upon Newfoundland and the French Islands but barely reaches the American Continent in the neighborhood of the Straits of Belle Isle. In checking the characters of these two seemingly endemic species of northeastern North America, we have studied closely not only the material in the Gray Herbarium and the herbarium of the New England Botanical Club, rich in their representation from New England, eastern Canada, and Newfoundland; but have had the advantage of working with the material in the United States National Herbarium, with a remarkable strength in Alaskan specimens, and that of the Academy of Sciences of Philadelphia, strong in its representation from the Canadian Rocky Mountains. For the use of these two collections we are indebted to Messrs. W. N. Maxon and Witmer Stone respectively.

As understood by us our Crowberries belong to three species distinguished as follows:

- A. Branchlets or margins of expanding leaves glandular, the latter not tomentose; mature leaves divergent, soon reflexed.
 - Berries black, with or without a bloom.....1. *E. nigrum*.
 - Berries red or purple: branchlets glabrous, glandular-pulverulent or at most minutely viscid-pilose....1a. *E. nigrum*, var. *purpureum*.
- A. Branchlets and margins of expanding leaves white-tomentose; plant not glandular: leaves ascending to divergent, rarely (and then very tardily) reflexed: fruit pink, red, or purplish-black.
 - Fruit 5-9 mm. in diameter, red to purplish-black, opaque: seeds 2-2.4 mm. long: leaves soon loosely divergent, rarely becoming reflexed; those of the leading shoots with blades (4-)4.5-6.5 mm. long.....2. *E. atropurpureum*.
 - Fruit 3-5 mm. in diameter, pink or light red, becoming translucent: seeds 1.2-1.5 mm. long: leaves crowded, ascending, becoming slightly divergent; those of the leading shoots with blades 2.5-4 mm. long.....3. *E. Eamesii*.

1. *E. NIGRUM* L. Sp. Pl. 1022 (1753); Michx. Fl. Bor. Am. ii. 255 (1803); Pursh, Fl. i. 93 (1814); Bigelow, Fl. Bost. ed. 2, 365 (1824);

¹ Fernald, RHODORA, iv. 147-151 (1902).

Hook, Fl. Bor.-Am. ii. 140 (1838); Torr. Fl. N. Y. ii. 178 (1843); Gray, Man. 409 (1848); Fernald, RHODORA, iv. 150 (1902). *E. purpureum* Raf. New Fl. pt. iii. 50 (1836) in part.—Arctic and boreal regions, extending southward in peaty soils to Newfoundland, Nova Scotia, the Maine coast, the mountains of northern New England and northern New York; Pictured Rocks, northern Michigan (*G. H. Hicks*); Pipestone Valley and Lake Louise, Alberta (*Stewardson Brown*); Selkirk Mts., British Columbia (*J. M. Macoun*); Mt. Rainier, Washington (*E. C. Smith, C. V. Piper*) and Crescent City, California (*Howell*).

Extremely variable in the length and breadth of leaves, which range from linear to elliptic in outline and from 2.5–7 mm. in length. The branchlets, too, are sometimes nearly glabrous, with only minute glandular puberulence, but in our northern regions and the Northwest quite as often minutely pilose with sordid or viscid, not white, hairs. The seeds of the more northern material are commonly about 2 mm. long, ranging between 1.8 and 2.6 mm. and in very rare cases to 3 mm. in length, while toward the southern edge of the range the seeds are frequently smaller, from 1.4–1.8 mm. long. In much of the small-seeded material the leaves run decidedly shorter than in most of the more northern plants and upon first studying the group we inclined to separate as a southern variety the plants with shortest leaves and smallest seeds. The study of a fuller series of specimens shows, however, that no satisfactory line can be drawn either upon the basis of length or shape of leaf or size of seed. The most extreme illustration of this lack of concomitance in these characters is a sheet of specimens from the Mealy Mountains, Labrador (coll. *Dr. A. P. Brown*), with leaves only 3–4 mm. long, but with a fully developed seed 3 mm. long, the largest seed measured by us in the species.

1a. Var. PURPUREUM (Raf.) DC. Prodr. xvi. pt. 1, 26 (1869); Simmons, Vasc. Pl. Fl. Ellesmereland, 43 (1906); Robinson & Fernald in Gray, Man. ed. 7, 551 (1908) in part. *E. purpureum* Raf. New Fl. pt. iii. 50 (1836) in part. *E. rubrum*, Durand, Proc. Acad. Sci. Phila., 1863, 95, not Vahl.—Northwestern Greenland, Ellesmereland, and Labrador.—A very little-known plant, resting upon an insecure basis. Rafinesque, assuming a larger knowledge of the northern flora than was at all justified, described his complex *E. purpureum* as follows:

“EMPETRUM PURPUREUM Raf. *E. nigrum* Mx. and all our Amer. botanists, not of Lin. and European bot. *E. rubrum* Lapilaye fl.—Procumbent smooth, leaves scattered crowded, lower patent, upper imbricate, oblong-linear sessile uninerve obtuse flat on both sides, thickish, berries purple, sessile equal to the leaves and costate.—in Canada, Labrador, Newfoundland, White Mountains, Lake Superior, near the rocky shores. Michaux who first noticed this blended it

with the boreal sp. of Europe, and has been followed by all our subservient botanists except Lapilaye who has blended it with *E. rubrum* of Austral America in his Newfoundland Flora. My specimen is from Labrador and has red berries strikingly like those of *Phytolacca*! Those of our Botanists who saw the berries are few, they mostly copy Michaux! is there a sp. in boreal America with black berries? My sp. is perfectly distinct, the branches are terete smooth but sulcate among the leaves, these are only 2 or 3 lines long," etc.

Just how Rafinesque's *Empetrum purpureum* should be interpreted is something of a problem. It is clearly a confusion of different elements, for the plant of Michaux and "all our subservient botanists" up to Rafinesque's time was certainly *E. nigrum*. Michaux's plant has been examined by one of the present writers, it comes from a region where *E. nigrum* abounds, and Michaux's own note upon finding it is to the point: "Le 2 Aoust [1792] arrivé à la Malbaye . . . Depuis le Baye St. Paul, les Eboulements et la Malbaye les Montagnes sont formées de terre argilleux sables et Pierres roulées. Le Cap. Tourmente est formé de roches du Quartz. Sur les rochers un peu avant d'entrer dans la Baye, se trouve un arbuste rampant, *Empetrum nigrum*, f. touj. vertes, petites, ovales, reflechies, . . . Baye noire, aqueuse, semences 9."¹ *E. rubrum* of La Pylaie's *Voyage à l'isle de Terre-Neuve* (his *Flora* mentioned by Rafinesque was never completed), as shown by La Pylaie's own collections and by abundant modern collections from Newfoundland, could not have been the plant which Rafinesque was describing from Labrador; for La Pylaie's Newfoundland *E. rubrum* has the berries bright pink or light coral-red, not "purple" or "strikingly like those of *Phytolacca*!" as emphasized by Rafinesque, and La Pylaie's plant has the branches and young foliage densely white-tomentose while Rafinesque said of his *E. purpureum*: "the branches are terete smooth."

After eliminating from *Empetrum purpureum* the true *E. nigrum* with black fruit of Michaux "and all our Am. botanists" and the *E. rubrum* of La Pylaie, there remains Rafinesque's description of a plant from Labrador with *smooth* branches and berries "purple" or "red . . . strikingly like those of *Phytolacca*!" (which are ordinarily very dark purple). We are not familiar with such a plant but it is possible that it is correctly identified by Simmons with the red-fruited *E. nigrum* of Northwestern Greenland and Ellesmereland. But even

¹ Journal of André Michaux, 1787-1796, ed. C. S. Sargent — Proc. Am. Phil. Soc. xxvi., no. 129, 73 (1888).

then there seems to be almost as much question about the actual occurrence of such a red-fruited plant as there was in Rafinesque's mind in regard to the occurrence of black fruit in America.¹

2. *E. atropurpureum* n. sp., a *E. nigro* recedit ramulis prostratis junioribus albido-tomentosis; foliis junioribus tomentosis vel arachnoideis primo adscendentibus deinde laxe patentibus haud vel rare reflexis, eis ramulorum vegetarum laminis (4-) 4.5-6.5 mm. longis; baccis 5-9 mm. diametro rubris vel atropurpureis opacis; seminibus 2-2.4 mm. longis.

Differing from *E. nigrum* in its trailing branchlets white-tomentose at least when young: leaves tomentose or arachnoid when young, at first ascending, finally loosely spreading, not at all or rarely reflexed; those of the leading shoots with blades (4-) 4.5-6.5 mm. long: berries 5-9 mm. in diameter, red or purplish black, opaque: seeds 2-2.4 mm. long.—*E. nigrum*, var. *andinum* Fernald, RHODORA, iv, 150 (1902); C. H. Knowlton, Rhodora, iv. 196 (1902); Robinson & Fernald in Gray, Man. ed. 7, 551 (1908); not DC. Prodr. xvi. pt. 1, 26 (1869).—Exposed sands or granitic or silicious gravels and ledges, Magdalen Islands, Prince Edward Island and mountains of Maine, New Hampshire and possibly Vermont. MAGDALEN ISLANDS: sand hills between East Cape and East Point, Coffin Island, July 19, 1912, *Fernald, Bartram, Long & St. John*, no. 7733. PRINCE EDWARD ISLAND: sand hills between South Lake and the Gulf, near Bothwell, August 24, 1912, *Fernald, Long & St. John*, no. 7732. MAINE: Mt. Katahdin, August 25, 1847, *G. Thurber*, without date, *E. C. Hamlin*; floor of North Basin, Mt. Katahdin, July 13, 1900, *Fernald*; ledges, north face of Boarstone Mt., altitude 610 m. (2000 ft.), August 16, 1895, *Fernald*; tableland above the pond, altitude 915 m. (3000 ft.), Squaw Mt., July 9, 1895, *Fernald*, no. 277; extensively covering the ledges at about 1065 m. (3500 ft.) altitude, Mt. Saddleback, Rangeley, August 17, 1894, *Fernald* (TYPE in Gray Herb.); above timberline, Mt. Saddleback, Rangeley, July 10, 1895, *F. V. Coville*, no. 73 in U. S. Nat. Herb.; Bald Mt., alt. 455-610 m. (1500-2000 ft.), Plantation No. 4, Franklin Co., July 16, 1902, *Knowlton & Chamberlain*; White Cap, Rumford, August 1, 1889, June 9, 1890, *J. C. Parlin*; Speckled Mt., altitude 610 m. (2000 ft.), Franklin, July 29, 1896, *J. A. Allen*. NEW HAMPSHIRE: White Mts., *Oakes*; Mt. Ingalls, Success, June 25, 1908, *A. S. Pease*, no. 11,165; Carter Notch, August 14, 1855, *Wm. Boott*; on a boulder, Carter Notch, altitude 915 m. (3000 ft.), September 6, 1904, *A. S. Pease*, no. 4086; Mt. John Quincy Adams, July 22, 1907, *Pease*, no. 10,876; Mt. Washington carriage-road, August 12, 1910, *Pease*, no. 12,842; ledgy summit of Mt. Crawford, August 18, 1908, *Pease*, no. 11,460; summit of Mt. Webster, August 21, 1908, *Pease*, no. 11,784; near summit of Mt. Kearsarge, *A. Commons* in

¹ For detailed discussion see Simmons, Vasc. Pl. Ellesmereland, 42 (1906).

herb. Phil. Acad.; Moat Mountain, Conway, July 28, 1879, *W. C. Lane*; disintegrated granite, top of Mt. Chocorua, Sept. 7, 1855, *W. Boott*, August 20, 1898, *C. A. Weatherby*, September 10, 1910, *F. T. Lewis*. VERMONT: Mt. Mansfield, June 5, 1877, *C. G. Pringle* in U. S. Nat. Herb. (a possible confusion since the plant seems not to have been collected by others on Mt. Mansfield, where *E. nigrum* occurs, and the label accompanying the specimen is not an original one).—Sterile specimens from Passage Island, Lake Superior (*W. S. Cooper*, no. 107) may belong here.

E. atropurpureum, heretofore taken to be DeCandolle's *E. nigrum*, var. *andinum* of Chili, proves, throughout its known range in northern New England and the islands of the Gulf of St. Lawrence, to be a constant plant with closely trailing white-tomentose branchlets and it cannot, therefore, be longer maintained as identical with *E. nigrum*, var. *andinum*, for that little-known plant, though having red berries, is described by DeCandolle as having "Ramuli et folia glabriuscula." As already pointed out by Knowlton,¹ in Maine *E. nigrum* "grows best in peat-moss, and the prostrate habit is not particularly prominent, as most of the branchlets are suberect"; while the very trailing *E. atropurpureum* "prefers as a soil the gravel formed by the decomposition of coarse granite, usually containing very little vegetable matter." Similarly, on Prince Edward Island and the Magdalen Islands, where *E. nigrum* is chiefly a plant of the bogs and the humus of headlands, *E. atropurpureum* carpets the open sand hills. In Maine and New Hampshire *E. nigrum* is a plant of the bleak eastern coast (from Penobscot Bay eastward) and the highest alpine districts; *E. atropurpureum*, on the contrary, grows chiefly near timber-line or slightly above it or upon the summits and slopes of the lesser mountains.

3. *E. Eamesii*, n. sp., fruticulus ramulis arcte prostratis junioribus albido-tomentosis; foliis coarctatis adscendentibus plus minusve imbricatis deinde paullo patentibus haud reflexis elliptico- vel spatulato-oblongis ad oblongo-linearibus valde coriaceis nitidis apice rotundatis, eis ramulorum vegetorum laminis 2.4–4 mm. longis; baccis 3–5 mm. diametro roseis vel pallide rubris, pelli tenui translucenti, pulpa aquosa prope ecolorata; seminibus 1.2–1.5 mm. longis.

Shrub with closely prostrate branchlets, the young ones white-tomentose: leaves crowded, ascending and more or less overlapping, in age slightly spreading, elliptic- or spatulate-oblong to oblong-linear, very coriaceous and lustrous, round-tipped; the blades of the leading shoots 2.5–4 mm. long: berries 3–5 mm. in diameter, pink or light red, with thin translucent skin and watery nearly colorless pulp: seeds 1.2–

¹ C. H. Knowlton, RHODORA, iv. 196 (1902).

1.5 mm. long.—*E. rubrum* La Pylaie, Voyage à l'isle de Terre-Neuve, 6, 10 (1825); Gray, Mem. Am. Acad., n. s. iii. 8 (1846); Brunet, Notes sur les Plantes recueillies en 1858 par M. l'Abbe Ferland, 7 (186—); Delamare, Renauld & Cardot, Florule de l'île Miquelon, 28 (1888); Waghorne, Summary Acct. of Wild Berries and other Edible Fruits of Nfd. and Lab. 9 (1888); as to the plant of British America, not Vahl. *E. purpureum* Raf. New Fl. pt. iii. 50 (1836), as to plant of Nfd. *E. nigrum*, var. *purpureum* DC. Prodr. xvii, pt. 1, 26 (1869), as to the plant of Nfd.; Simmons, Vasc. Pl. Ellesmereland, 43 (1906), as to the plant of Nfd.; Fernald, RHODORA, xiii. 117, 123 (1911); not D. C. l. c. (1869) in its restricted sense. *E. nigrum*, var. *andinum* Fernald, RHODORA, iv. 150 (1902) as to the plant of Nfd.; Eames, RHODORA, xi. 95 (1909); not DC. l. c. (1869).—Exposed sands or granitic or silicious gravels or ledges, southern Labrador, Newfoundland, St. Pierre et Miquelon, and coast of Saguenay County, Quebec, westward to the Mécatina region. LABRADOR: sand, l'Anse au Clair, July 7, 1893, Waghorne in U. S. Nat. Herb.; abundant on sand and gneissoid rocks, Blanc Sablon, August 4, 1910, Fernald & Wiegand, no. 3661—plant also noted on the Quebec side of Blanc Sablon River. NEWFOUNDLAND: "les points culminans," La Pylaie; St. John's, July 12, 1892, L. L. Dame; dry exposed summit of hill south of St. John's, August 12, 1911, Fernald & Wiegand, no. 5821; Baccalieu Island, Notre Dame Bay, July, 1902, J. D. Sornborger; open granite slopes, altitude 180–350 m., Mt. Steepmore (or Seemore), July 12, 1910, Fernald & Wiegand, no. 3659 (TYPE in Gray Herb.); alpine heath and open granite ledges at the summit, altitude 565 m., Mt. Musgrave, July 16, 1910, Fernald & Wiegand, no. 3660; dry exposed rocky slopes of Blomidon ("Blow-me-Down") Mts., July 31, 1908, Eames & Godfrey, no. 7032; diorite tableland, altitude about 550 m., northern region of Blomidon, August 22, 1910, Fernald & Wiegand, no. 3662; Bluff Head, September 7, 1898, Waghorne; edge of rock, high upon hill, vicinity of Balena, Hermitage Bay, June 6, 1903, Wm. Palmer, no. 1335 (distributed as *Phyllodoce coerulea*); cited by Waghorne and by Eames from numerous other stations on the South Coast. ST. PIERRE ET MIQUELON: St. Pierre, La Pylaie; August, 1902, Bro. Louis Arsene. QUEBEC: Blanc Sablon (see note above); La Tabatière, 1858, Abbé Ferland.

It is a great pleasure to associate with this local and handsome shrub, which has been held to be distinct from *Empetrum nigrum* by most botanists whose field-experience has acquainted them with it, the name of so discriminating a collector as Dr. Edwin H. Eames who, on his herbarium specimens, has written: "seems to be specifically distinct from *E. nigrum*. It's habit, place of growth, small size and color of fruit, leaves, etc., are constantly different"; and who, in discussing the plant in RHODORA (as *E. nigrum*, var. *andinum*), presented

a strong case for the specific recognition of the Newfoundland shrub. The impossibility of taking up for *E. Eamesii* the name *E. purpureum* Raf. has been sufficiently discussed. Similarly its distinctness from *E. nigrum*, var. *andinum*, with which it has been confused, is apparent from the quotation above given from DeCandolle's description. La Pylaie, and following him, Asa Gray, identified the shrub without question as *E. rubrum* Vahl, from the Straits of Magellan, the former writing: "Le détroit de Magellan produit, comme nos hautes montagnes, . . . l'*Empetrum rubrum*, que y'ai retrouvé sur la crête des monticules de l'île Saint-Pierre. Cette plant est identique avec les échantillons magellaniques conservés dans l'herbier de M. DE JUSSIEU." But all the Magellanic material examined by the writers (several specimens) agrees in being much coarser, with more ascending branches and larger darker-colored opaque berries.

A NEW FORM OF *LILIUM PHILADELPHICUM*.

E. F. WILLIAMS.

ON July 8, 1913, I was driving through an old road in Warren township, New Hampshire, when my wife called my attention to a yellow flowered *Lilium philadelphicum* growing by the roadside. We left our carriage to secure this unusual form of the species and were delighted to find a good many such plants in a sandy clearing near by and in thin woods surrounding the clearing. Typical red flowered *Lilium philadelphicum* grew abundantly at this station and perhaps twenty per cent of the individuals had petals of about the same shade of yellow as typical *Lilium canadense*. A few plants were of as pale a yellow shade as *Hemerocallis flava* and in one specimen the outer whorl of stamens was petaloid and sterile. This old road crosses the lower slopes of the southern foot hills of Mt. Moosilauke and it connects East Warren, a tiny hamlet, with Warren Summit on the Boston & Maine Railroad. Many years ago there were seven or eight mountain farms on this road but only one remains inhabited. All the others have been abandoned for a long time and the road is now seldom used. The station for the yellow form of *Lilium philadelphicum* is about a mile



Fernald, Merritt Lyndon and Wiegand, K. M. 1913. "THE GENUS EMPETRUM IN NORTH AMERICA." *Rhodora* 15, 211–217.

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