

Proceedings of the Iowa Academy of Science

Volume 8 | Annual Issue

Article 26

1900

Betulaceae of Iowa

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Recommended Citation

Fitzpatrick, T. J. and Fitzpatrick, M. F. L. (1900) "Betulaceae of Iowa," *Proceedings of the Iowa Academy of Science*, 8(1), 169-177.

Available at: <https://scholarworks.uni.edu/pias/vol8/iss1/26>

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pecan and *H. minima*. (*C. olivæformis* and *C. amara*.) Barnes, Reppert, and Miller in their Flora of Scott and Muscatine counties mention two hybrids as occurring in the big timber near Muscatine, namely, *Carya olivæformis* X *C. tomentosa* and *Carya olivæformis* X *C. amara*.

BETULACEAE OF IOWA.

BY T. J. AND M. F. L. FITZPATRICK.

BETULACEÆ Agardh, Aphor. 208, 1825.

THE BIRCH FAMILY.

The Birch family as now understood, comprises six genera and about seventy-five species, mostly natives of the northern hemisphere. Some authors include this family with the Oak or Beech family under the name of CUPULIFERÆ. The chief distinction is the arrangement of the pistillate flowers. The Birch family has the pistillate flowers in aments while the Oak family has the pistillate flowers subtended by an involucre which becomes a bur or cup in fruit.

The family may be briefly characterized as trees or shrubs, with alternate petioled simple leaves, deciduous stipules, and monœcious flowers. The sterile flowers are in oblong or subglobose pendulous aments; stamens 2-10, inserted at the base of the regular or scale-like calyx; anthers 2-celled. the cells adnate or distinct. Pistillate aments erect, spreading or drooping, spicate or capitate; calyx adnate to the ovary, sometimes wanting. Ovary 1-2-celled, with 1-2 ovules in each cell; style 2-cleft or 2-parted. Fruit a one-celled, one-seeded nut, solitary or clustered, and usually involucrate. In most cases the fruits should be collected for certain identification.

Iowa has within its borders only seven species distributed through five genera. Only one species, the hazel-nut, is distributed throughout the state. All the others have a

decided preference for the eastern half of the state. The alder and the cherry birch are local or quite limited in their distribution, the former occurring in northeastern Iowa, while the latter may be found in central Iowa. The paper birch occurs in northeastern Iowa, a region noted for many species found nowhere else in our state.

* *Staminate flowers, 3-6 together; fruit destitute of an involucre, winged.*

BETULA. Stamens, 2; filaments, 2-cleft; each division with an anther cell.

ALNUS. Stamens, 4; filaments, simple; anther cells, adnate.

** *Staminate flowers solitary; fruit involucre, wingless*

CORYLUS. Nut enclosed by a leafy involucre.

OSTRYA. Nut at the base of an oblong enclosed bag.

CARPINUS. Nut subtended by a large foliaceous bract.

Betula nigra L. Sp. Pl. 982, 1753. Red or River Birch. A tree, usually thirty to sixty feet high and one to two feet in diameter, with reddish or greenish brown bark, and reddish twigs; peduncles, shoots, and petioles soft downy; leaves rhombic-ovate, acute at both ends, irregularly doubly-serrate, downy beneath when young; nutlet one-seeded, one-celled, broadly winged. *Betula lanulosa* Mx. Fl. Bor. Am. 2, 181.

The species is frequent in the eastern half of the state, less frequent elsewhere. The wood is hard, brown, strong, and of rather light weight. The bark from the branches separates into membranous layers. The species occurs in alluvial soil along rivers. The wood is used for fuel and to some extent for lumber which is used in furniture. The pioneers made ox-yokes from this birch.

Our specimens are from Johnson and Decatur counties. We have observed the species in Allamakee, Clayton, Dubuque, Jackson, Clinton, Wapello, Linn, Appanoose, Jefferson, and Ringgold counties. The State university herbarium has specimens from Delaware, Scott, Muscatine, Louisa, Des Moines, and Polk counties. Professor Fink reports the species from Fayette county; Professor Pammel from Hardin county; and Mr. Mills by letter from Henry county.

White, Geol. Sur. Iowa, Vol. 1, p. 138; Arthur, Contr. to the Flora of Iowa, p. 29; Sargent, Forest Trees of North America, p. 161; Pammel, Proc. Iowa Acad. of Sciences, Vol. 1, pt. 2, 1890-91, p. 91; Iowa Geol. Sur., Vol. 10, p. 312;

Fink, Proc. Iowa Acad. of Sciences, Vol. 4, p. 101; Fitzpatrick, Proc. Iowa Acad. of Sciences. Vol. 5, p. 127, and p. 163; Vol. 6, p. 196; Cameron, Iowa Geol. Sur., Vol. 8, p. 198; Macbride, Iowa Geol. Sur., Vol. 4, p. 119; Vol. 7, p. 107; Vol. 9, p. 152; Vol. 10, p. 647; Reppert, Iowa Geol. Sur., Vol. 9, p. 386; Britton and Brown, Ills. Flora, Vol. 1, p. 509.

Betula lutea Mx. f. Arb. Am., 2: 152, Pl. 5, 1812.

This species is reported by Barnes, Reppert, and Miller from Scott and Muscatine counties in Proc. Davenport Academy of Natural Sciences, Vol. 8, p. 256. They state that the species is common along rivers. They mention no other birch, and as Mr. Reppert had only shortly before reported *Betula nigra* L. as common along streams in Muscatine county in his article, Forest Trees and Shrubs in Muscatine County, published in volume 9 of the Iowa Geological Survey, there seems a probable error. Britton and Brown give the range of this species as Newfoundland to Manitoba, south to North Carolina and Tennessee, mainly in the Alleghanies. In all probability *Betula nigra* L. was the species considered and that *Betula lutea* Mx. f. does not occur in Iowa.

Betula papyrifera Marsh. Arb. Am., 19, 1785. Paper or Canoe Birch. A tree, usually thirty to sixty feet high, usually one to two feet in diameter, with chalky white bark separable into very thin sheets, and brownish twigs; leaves ovate, acuminate, unequally doubly serrate, slender petioled, base obtuse to subcordate, glabrous and green above, glandular and somewhat pubescent beneath.

This species is frequent in rich woods, along streams, in northeastern Iowa. The wood is light, strong, tough, close-grained; mostly used for fuel in Iowa; may be used in the manufacture of spools, shoe-lasts, pegs, turnery, etc. The tough bark separating easily into thin layers is very durable and impervious to water, and has been used by the Indians in the manufacture of canoes and tents.

Our specimens are from Winneshiek county. We have observed the species in Allamakee, Clayton, and Dubuque counties. The State University herbarium has specimens from Delaware county. Professor Fink reports the species

from Fayette county; Professor Macbride from Humboldt county; Professor Pammel from Hardin county; and Messrs. Nagel and Haupt from Scott county. *Betula alba* var. *populifolia* Winchell, in Ludlow's Rep. Black Hills, 67, not Spach, is a synonym, and is the name given by Professor Bessey for this species in his contributions to the Flora of Iowa.

Bessey, Contr. to the Flora of Iowa, p. 119; Arthur, Contr. to the Flora of Iowa, p. 29; Nagel and Haupt, Proc. Davenport Acad. of Nat. Sciences, Vol. 1, p. 163; Pammel, Proc. Iowa Acad. of Sciences, Vol. 1, pt. 2, 1890-1891, p. 91; Iowa Geol. Sur., Vol. 10, p. 312; Fink, Proc. Iowa Acad. of Sciences, Vol. 4, p. 101; Cameron, Iowa Geol. Sur., Vol. 8, p. 198; Macbride, Iowa Geol. Sur., Vol. 4, p. 119; Vol. 10, p. 646; Fitzpatrick, Proc. Iowa Acad. of Sciences, Vol. 5, p. 127.

Betula lenta L. Sp. Pl. 983, 1753. Cherry Birch. A tree much resembling the cherry, growing forty to sixty feet or more high, with dark brown, smooth bark, which becomes furrowed, but does not separate in layers like our other species, and ovate or ovate-oblong, acute or acuminate, sharply serrulate, short-petioled leaves. Pistillate aments sessile, at the ends of short branches, oblong, proportionately thick, dense.

The range for this species as given by Britton and Brown is Newfoundland to western Ontario, Florida and Tennessee. This places Iowa far west of the supposed range, yet Professor Pammel reports the species from central Iowa, the locality being Steamboat Rock, Hardin county. He says: "Some large trees one foot in diameter occur in moist woods below the sandstone ledges. Much of the birch has been removed. This is very valuable wood and is much used by cabinet makers. Its occurrence in central Iowa is quite unusual."

Pammel, Iowa Geol. Sur., Vol. 10, p. 312.

Alnus incana (L.) Willd. Speckled or Hoary Alder. A shrub, eight to twenty feet high, and about one foot or less in diameter, with glabrous twigs, and pubescent shoots; leaves ovate or oval, acute, usually whitened and downy

beneath; stipules oblong-lanceolate; fruit orbicular, coriaceous-margined. *Betula alnus* var. *incana* L. Sp. Pl. II, Ed. 2, 1394, 1763; *Alnus incana* Willd. Sp. Pl. 4, 335, 1805.

The wood of this species is light brown, close-grained, soft, light, and checks in drying. In New England it is said to be used in the final baking of bricks and in the manufacture of gunpowder.

According to Professor Macbride, this species is common along the Yellow river in Allamakee county. Specimens from Allamakee and Jones counties are in the State university herbarium. Professor Arthur reports the species from Floyd county.

Arthur, Contr. to the Flora of Iowa, p. 29; Flora of Floyd County in History of Floyd County, p. 310; Botanical Gazette, Vol. 7, p. 127; Macbride, Iowa Geol. Sur., Vol. 4, p. 119.

Corylus americana Walt. Fl. Car. 236, 1788. Hazel-nut. A shrub, four to eight feet high, growing in clumps, young shoots hispid, twigs glabrous; leaves ovate, acuminate, serrulate all around, petioled, glabrous above, tomentulose beneath, base obtuse to cordate; involucre of two leaf-like laciniately margined pubescent bractlets, exceeding the oval or oblong nut.

This species makes up much of our thickets. We have observed thickets covering hundreds of acres composed mostly of this hazel with an occasional shrubby bur oak, red haws, plums, etc. Under present conditions the hazel is found along the highway, open upland woods, and uncleared thickets. The only economic value which this species possesses is the use of its fruit which is ripe in August and September. The nuts are small, somewhat striate, compressed, light brown, a half inch or less in length. These nuts have been gathered to a considerable extent and sold in the markets. The difficulty in hulling them has retarded their greater use. A certain species of chipmunk store up quantities of hulled nuts in burrows and some gatherers, knowing the habits of these rodents, systematically rob them of their winter's store much to the profit of the gatherers.

Our specimens are from Johnson, Van Buren, Decatur, Ringgold, Page, and Shelby counties. We have observed the species in Winneshiek, Allamakee, Dubuque, Muscatine, Wapello, Appanoose, Clarke, Adams, Montgomery, and Pottawattamie counties. The State University herbarium has specimens from Winnebago, Emmet, Cerro Gordo, Delaware, Dallas, Webster, Jasper, and Dickinson counties. Professor Bessey reports the species from Story, Fayette, and Des Moines counties; Professor Pammel from Woodbury and Boone counties; Messrs. Nagel and Haupt from Scott county; Professor Macbride from Humboldt county; Mr. J. P. Anderson, by note, from Lucas county; and Mr. Mills, by letter, from Henry county.

Parry, in Owen's Report Geol. Sur. Wis., Iowa, and Minn., p. 618; Bessey, Contr. to the Flora of Iowa, p. 119; Arthur, Contr. to the Flora of Iowa, p. 29; Hitchcock, Trans. St. Louis Acad. of Science, Vol. 5, p. 517; Nagel and Haupt, Proc. Davenport Acad. of Nat. Sciences, Vol. 1, p. 163; Pammel, Proc. Iowa Acad. of Sciences, Vol. 3, p. 132; Iowa Geol. Sur., Vol. 5, p. 237; Vol. 9, p. 240; Fink, Proc. Iowa Acad. of Sciences, Vol. 4, p. 101; Fitzpatrick, Proc. Iowa Acad. of Sciences, Vol. 5, p. 127; Vol. 5, p. 163; Vol. 6, p. 196; Iowa Geol. Sur. Vol. 8, p. 313; Cameron, Iowa Geol. Sur., Vol. 8, p. 198; Macbride, Iowa Geol. Sur., Vol. 7, p. 107; Vol. 9, p. 152; Vol. 10, p. 238 and p. 647; Reppert, Iowa Geol. Sur., Vol. 9, p. 386; Barnes, Reppert, and Miller, Proc. Davenport Acad. of Nat. Sciences, Vol. 8, p. 256; Arthur, Flora of Floyd county, in History of Floyd County, p. 309; Bot. Gaz., Vol. 7, p. 127.

Corylus rostrata, Ait. Hort. Kew., 3: 364, 1789. Beaked hazelnut. Professor Bessey reports this species from Fayette county in his contribution to the Flora of Iowa in the Fourth Report of the Iowa Agricultural College. No other observer has recorded this species as occurring in Iowa, although the state is within the range of the species. We very much doubt if this species has ever been collected in Iowa.

Ostrya virginiana (Mill.) Willd. Hop-hornbeam. Ironwood. A tree, twenty to fifty feet high, with grayish,

furrowed bark; leaves ovate or oblong-ovate; acuminate, sharply and doubly serrate, glabrous above, downy beneath, short-petioled; flowers appearing before or with the leaves; nut small, smooth, ovoid-oblong, sessile at the base of a large inflated oblong closed bag formed from the bractlet, the loosely imbricated involucre hop-like, bristly-hairy at the base. *Carpinus virginiana* Mill. Gard. Dict., Ed. 8, 1768; *Ostrya virginica* Willd. Sp. Pl. 4: 469, 1805.

This species occurs on wooded bluffs and is frequent throughout the state. The flowers appear in April and May and the fruit is ripe in July and August. The wood is dense, strong, durable, and valuable for constructions requiring great strength.

Our specimens are from Winneshiek, Johnson, Henry, Decatur, Union, and Fremont counties. We have observed the species in Allamakee and Clayton counties. The State University herbarium has specimens from Emmet, Calhoun, Cerro Gordo, Webster, Delaware, Lee, and Pottawattamie counties. Professor Pammel reports the species from Harrison, Boone, Hardin, and Woodbury counties; Professor Bessey, from Story and Des Moines counties; Professor Arthur, from Floyd county; Professor Fink, from Fayette county; and Professor Macbride, from Dubuque, Dickinson, and Humboldt counties.

Bessey, Contr. to the Flora of Iowa, p. 119; Arthur, Flora of Floyd county, in History of Floyd County, p. 300; Botanical Gazette, Vol. 7, p. 127; Contr. to the Flora of Iowa, p. 29; Hitchcock, Trans. St. Louis Acad. of Science, Vol. 5, p. 517; Pammel, Proc. Iowa Acad. of Sciences, Vol. 3, p. 132; Iowa Geol. Sur., Vol. 5, p. 237; Vol. 9, p. 240; Vol. 10, p. 312; Fink, Proc. Iowa Acad. of Sciences, Vol. 4, p. 101; Fitzpatrick, Proc. Iowa Acad. of Sciences, Vol. 5, p. 127 and p. 163; Vol. 6, p. 196; Iowa Geol. Sur., Vol. 8, p. 313; Cameron, Iowa Geol. Sur., Vol. 8, p. 198; Macbride, Iowa Geol. Sur., Vol. 4, p. 119; Vol. 7, p. 107; Vol. 9, p. 152; Vol. 10, p. 238 and p. 647; Reppert, Iowa Geol. Sur., Vol. 9, p. 386; Shimek, Iowa Geol. Sur., Vol. 10, p. 162; Barnes, Reppert. and Miller, Proc. Davenport Acad. of Nat. Sciences, Vol. 8, p. 256; Rigg, Notes on the Flora of Calhoun County, p. 25; Sargent, Forest Trees of N. A., p. 158.

Carpinus caroliniana Walt., Fl. Car., 236, 1788. American Hornbeam. Blue Beech. A small tree, ten to thirty feet high, with smooth bluish gray bark; leaves ovate-oblong, acute or acuminate, doubly serrate, base rounded to subcordate, short-petioled, both sides green, glabrous above, somewhat pubescent on the veins beneath; bractlets veiny, 3-lobed at the base, the middle lobe twice the length of the lateral ones, sparingly toothed; fruit a small ovoid nut, which is borne at the base of a large bractlet.

This species is frequent in the northeastern and eastern portions of Iowa. It occurs in woods near streams and blooms in April and May, while the fruit ripens in August and September. The majority of the individuals are but little better than mere shrubs or bushes. The wood is hard, strong, of a light brown color, and is very durable. Owing to the scarcity and small size of the species the wood has but little utility in Iowa, though for small articles, as levers, handles, etc., nothing better could be used.

Specimens in our collection are from Muscatine and Johnson counties. We have observed the species in Allamakee, Clayton, Dubuque, Des Moines, Van Buren, and Wapello counties. The State University herbarium has specimens from Emmet, Delaware, Henry, and Lee counties. Professor Bessey reports the species from Boone county; Professor Pammel, from Hardin county; Professor Fink, from Fayette county; Messrs. Nagel and Haupt, from Scott county; and Professor Macbride, from Humboldt county.

Bessey, Contr. to the Flora of Iowa, p. 119; Arthur, Contr. to the Flora of Iowa, p. 29; Nagel and Haupt, Proc. Davenport Acad. of Nat. Sciences, Vol. 1, p. 163; Fink, Proc. Iowa Acad. of Sciences, Vol. 4, p. 101; Fitzpatrick, Proc. Iowa Acad. of Sciences, Vol. 5, p. 127 and p. 163; Pammel, Iowa Geol. Sur., Vol. 5, p. 237; Vol. 8, p. 314; Vol. 10, p. 312; Cameron, Iowa Geol. Sur., Vol. 8, p. 198; Macbride, Iowa Geol. Sur., Vol. 4, p. 119; Vol. 7, p. 107; Vol. 9, p. 152; Vol. 10, p. 647; Reppert, Iowa Geol. Sur., Vol. 9, p. 336; Gray's Manual, 6th Ed., p. 474; Barnes, Reppert,

and Miller, Proc. Davenport Acad. of Nat. Sciences, Vol. 8, p. 256; MacMillan, Met. Minn. Valley, p. 186.

THE FAGACEAE OF IOWA.

BY T. J. AND M. F. L. FITZPATRICK.

FAGACEAE Drude, Phan., 409, 1879.

OAK OR BEECH FAMILY.

The oak family comprises five genera and 375 species. The family is of wide geographical distribution, and from an economic point of view, of very great value. Four genera occur in the United States, namely, *Fagus* (the Beech), *Castanea* (the Chestnut), *Quercus* (the Oak), and *Castanopsis*. The number of species and varieties recognized is 87. Of this number 82 belong to the genus *Quercus*, one each to *Fagus* and *Castanopsis*, and three to *Castanea*. The only genus indigenous to Iowa is *Quercus*, the oak, and the number of species recognized is 15. The chestnut, *Castanea dentata* (Marsh.) Borkh. has been planted in some communities and seems to thrive. A fine grove of this species may be seen in the southern part of Johnson county and solitary or few trees that are hardy, ornamental, and useful are infrequently observed near dwellings. As the species ranges from Maine to Michigan, south to Tennessee, Iowa may be said to occupy a geographical position suited to chestnut raising. The wood of the species is coarse-grained and very durable. The beech, *Fagus americana* Sweet, ranges from Nova Scotia to Florida, westward to Wisconsin and Texas, but occurs nowhere in Iowa, yet the species might very naturally be expected. The beech belongs to a rather numerous class of species that may be found to the north, east, or south of Iowa, yet refuses to enter within our limits, or if at all, only in very restricted localities in the north-eastern or eastern portions of the state.