

THE QUERCUS ELLIPSOIDALIS-QUERCUS COCCINEA COMPLEX.

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Early settlers coming into Wisconsin territory noticed an oak which was tardy in the natural pruning of its lower branches, and they observed that when the branches did break off it was usually at some distance from the trunk, leaving many persistent stumps penetrating to the center of the tree. They remembered an oak from their old homes which did this very thing, and which was there called the Pin Oak. Naturally they called this Wisconsin oak likewise—the Pin Oak—and botanists, apparently, fell into the same error.

The first edition of Gray's Manual (1848) listed *Quercus palustris*, the Swamp Spanish or Pin Oak, as ranging from "South New York to Wisconsin," its occurrence in Wisconsin being validated by Dr. Increase A. Lapham, who had settled in Milwaukee in 1836 and immediately began his work on our flora. This error was perpetuated through four editions of Gray's Manual, and it was not until the 5th edition (1868) that *Q. palustris* was not ranged but simply listed as "In low grounds; rather common." In the 6th edition (1889) it was again ranged this time "From Mass. to Del. and Md., west to Minn., E. Kan., and Ark." which was again erroneous, since this oak is absent from Minnesota as it is from Wisconsin. Gray's 7th edition (1908) finally relegated it to "Mass. to Va., west to Kan. and Ark." Britton & Brown's Illustrated Flora (1896) continued the 60-year-old error by listing it from "Mass. to Wis., Del., and Ark."

Long before the manuals had gotten right on the distribution of *Q. palustris*, it had been discovered that while the Wisconsin tree had the same habit of tardy pruning as the true *Q. palustris*, resulting in persistent dead lateral branches, its acorn was quite different, and that the true *Q. palustris* was absent from Wisconsin. Where, then, should this puzzling oak be allocated? What was this species which persisted for so many years masquerading under the title of *Q. palustris*?

There seemed nothing else to do but to refer it to *Q. coccinea*, the Scarlet Oak, and there it remained for many years. As early as 1870, however, Dr. George Vasey, then a resident of northern Illinois, but editorially connected with the American Entomologist and Botanist, puzzling over this complex, had attempted to divide *Q. coccinea* as he understood it, and one of the forms, his var. *microcarpa* is unmistakably figured (Amer. Entomol. & Bot. 1 : 344-5 f. 213). Wisconsin botanists were also puzzling over an oak with elliptical elongated acorns, quite unlike those described for *Q. coccinea*, but they had no other alternative than to class it as that species, and accordingly both the elliptical and the globose-acorned forms of this tardily pruning oak were grudgingly lumped into *Q. coccinea*.

In 1899, however, Rev. E. J. Hill of Englewood, Ill., an amateur botanist, settled the identity of the elliptical-acorned tree for us by publishing *Q. ellipsoidalis*. (Bot. Gaz. 27 : 204, pl. 2-3), so named because of the elongated acorn. I have in my files a yellowing letter from Mr. Hill in which he naively goes on to say, "It was the difficulty of placing this oak either with *Q. coccinea* or *Q. velutina* that led me to separate it." Mr. Hill made no reference to Dr. Vasey's treatment, published a generation earlier, of this ambiguous oak, nor did he note that Vasey's *Q. coccinea microcarpa* well pictures his own *Q. ellipsoidalis*.

But the ghost was not yet laid. What was to be done with the tree which exactly matched the elliptical-acorned one but with semi-globose acorns? Mr. Hill agreed that the Wisconsin elliptical-acorned tree was a genuine *Q. ellipsoidalis*, but assigned our semi-globose-acorned material to *Q. coccinea*. The good dominie did not quite know the extremes of his own protean-acorned oak, nor did we of Wisconsin. Accordingly it was agreed that both *Q. ellipsoidalis* and *Q. coccinea* were present in Wisconsin, although we were constantly finding intergrading forms which we would put first into one and then into the other. Gray's Manual in its 5th, 6th and 7th editions ranged *Q. coccinea* "West to Minn." which of course would take in our own State.

Eventually, as this group was given more critical study, it became apparent that *Q. coccinea* did not occur in Wisconsin at all, and that the elliptical and globose-acorned trees were extreme forms of the same species, *Q. ellipsoidalis*.

In 1919, Prof. William Trelease, then of the University of Illinois, published "The Jack Oak" (Trans. Ill. Acad. Sci., vol. 12, pl. 139-143). He described and figured typical *Q. ellipsoidalis* and five forms; four of them, *incurva*, *intermedia*, *depressa* and *coronata*, depending upon acorn characters. He also included a sketch map showing the distribution of *Q. ellipsoidalis* as then known. He confessed that he found it impossible to recognize *Q. coccinea* in the region in which *Q. ellipsoidalis* occurs.

Most Wisconsin botanists had independently reached the same conclusion. In "Wisconsin Trees" 1927, published by the Milwaukee Journal but largely the work of the botanical department of the Milwaukee Public Museum, p. 55, there is this paragraph which sounds as though written by Curator Huron H. Smith,—“Hill’s oak, the latest species to be named in the oak family, passed for many years as the pin oak or the scarlet oak. It was first identified as a different species by the Reverend Elkanah J. Hill, an amateur botanist living in Chicago, who found it growing on the DesPlaines river near Riverside, Ill. As a result of this man’s work, we realize that the scarlet oak has never grown in Wisconsin and we know that we have countless representatives of Hill’s oak.”

In Preliminary Reports on the Flora of Wisconsin XIII. Fagaceae (Trans. Wis. Acad. of Sci., Arts & Letters XXVI : 277-279, 1931) Prof. David F. Costello includes a distributional map of this species, adding that Mr. L. S. Cheney, formerly of the Department of Botany of the University of Wisconsin, now of Barron, Wis., who traveled in the years 1897 and 1898 throughout the state, noting on maps the trees of each region, called this tree *Q. coccinea*, but that there is no doubt but that he described what is now known as *Q. ellipsoidalis*, and that the scarlet oak, *Q. coccinea*, is not known to occur in Wisconsin.

Similar confusion appears to have existed in neighboring states. In "Fagaceae of Iowa," by T. J. and M. P. L. Fitzpatrick (Iowa Acad. of Sci., Vol. VIII, 1901, p. 18) the authors note that *Q. ellipsoidalis* is represented in Iowa by one tree growing near Big Rock, Scott Co. On p. 16 of the same publication they report *Q. coccinea* as widely distributed throughout the state. Prof. Shimek, Curator of the Herbarium, State University of Iowa, writes me that many of the earlier reports from Iowa of *Q. coccinea* were *Q. velutina* (the old *Q. coccinea* var. *tinctoria*).

He is certain that in some cases the varietal name was dropped and the species reported as *Q. coccinea*. In most cases, however, he adds, especially from the northern part of the state, *Q. ellipsoidalis* was reported as *Q. coccinea*. He notes that *Q. ellipsoidalis* is now found to be rather extensively distributed throughout Iowa, but so far no true *Q. coccinea* has been found.

In Michigan the two species have likewise been confounded: Mr. O. A. Farwell in the *American Midland Naturalist*, March 1928 (Vol. XI No. 2, pg. 81) lists *Q. coccinea* from three counties in Michigan, and adds, "Well distributed over the Peninsula." *Q. ellipsoidalis* is reported from two counties. In the same publication for July 1930 (Vol. XII No. 4, p. 120) Mr. Farwell writes that all the collections listed as *Q. coccinea* are not that species but a variety of *Q. ellipsoidalis* which he separates as a new variety *coccinoides*. Mr. Farwell writes me that he has never seen *Q. coccinea* in Michigan or any material of it from Mich. It is interesting to note, in passing, that his variety *coccinoides* very closely matches in acorn characters collections from Racine County, Wisconsin.

In Indiana, Research Forester Deam writes that he has milled over this complex for a long time without getting correctly oriented. In his *Trees of Indiana*, ed. 4, p. 141, he maps *Q. coccinea* from five counties in the extreme northwesterly corner of the state. My guess would be that the report of *Q. coccinea* from these northwesterly counties is erroneous; that later research will find them to be *Q. ellipsoidalis* instead, with *Q. coccinea* confined to the southern third of the state.

In Minnesota Drs. Rosendahl and Butters, in "Trees and Shrubs of Minnesota," p. 108, say of *Q. coccinea*: "Less common than the following species [*Q. ellipsoidalis*] with which it has been much confused." Here again my guess is that the tree which they report as *Q. coccinea* will be found to be a form of *Q. ellipsoidalis* and that *Q. coccinea* is absent from Minnesota entirely. My guess is made almost certainly on receiving word from Dr. Ernest J. Palmer of the Arnold Arboretum that one Minnesota collection by Butters & Rosendahl in the Arboretum herbarium labeled *Q. coccinea* has it noted that the autumn leaves are a brilliant red, although it seems to be *Q. ellipsoidalis*.

I might add that *Forest Trees of Wisconsin* by F. G. Wilson, Forester, published by State Conservation Commission 1928, lists both *Q. coccinea* and *Q. ellipsoidalis*, mentioning the for-

mer as “distributed over southern Wisconsin.” I am assured by the gentleman, however, that future editions of this publication will omit *Q. coccinea*, since he is now convinced that it is absent from the state.

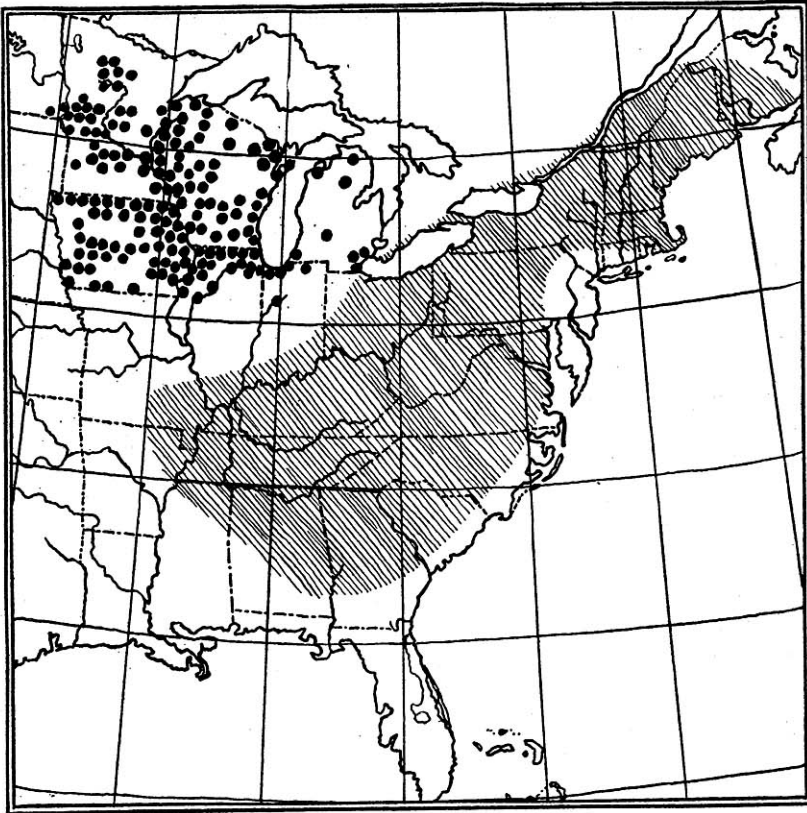


FIG. 1. Map showing the distribution of *Q. ellipsoidalis* (dots) and *Q. coccinea* (shaded area) in the United States.

DISTRIBUTION

In Fig. 1 I have indicated what appears to be the range of *Q. ellipsoidalis* and *Q. coccinea* as now known. The dots show definite localities from which *Q. ellipsoidalis* has been reported, while the shaded area indicates the approximate range of *Q. coccinea* as here understood. It is evident from the map that *Q. coccinea* is more eastern and much more extensive in its

range than *Q. ellipsoidalis* which is confined to a comparatively limited area in the north central states. I have not been able to discover that the two species overlap at any point; if they do, it will probably be found to occur somewhere in northwestern Ohio.

Q. ellipsoidalis appears in its western range to cease only where the forests merge gradually into the prairies through a region of prairie groves and savannahs. Dr. Trelease (l. c.) concludes that the peculiar and abrupt ending of the range of the Jack Oak in Illinois may be due primarily to its intolerance of the iron, sulphur, magnesium, etc., with which the rocks of the coal country are charged. So far I have been unable to connect its distribution with evident barriers (except on its western borders), drainage systems, soil belts or glacier limits.

Professor Shimek writes me as follows of its occurrence in Iowa: "As far as its relation to the coal country, there is none noticeable. It is a common species on the borders of prairie groves, especially northward, but this is in no way related to the Carboniferous. The species is less common southward, it is true (this being in the Carboniferous territory in part) but this seems to be due rather to the fact that it has sharper competition with other trees, of which there are many more southward. The species does not stop abruptly at the coal areas. It stops abruptly locally where the forest runs out. It shares with *Q. macrocarpa* the place of a border species, being more common northeastward, while *Q. macrocarpa* extends farther west, being perhaps the more xerophytic of the two species. It rarely occurs in deeper woods."

Rosendahl & Butters (l. c.) find it "rare in the groves of the prairie districts."

Occasionally I find *Q. ellipsoidalis* an inhabitant of the flood plain, but it is essentially an upland species, preferring the sandy gravelly morainic hills so common in our area where it and the hickories seem to possess the land practically unchallenged.

DISTINCTION BETWEEN *Q. ELLIPSODALIS* AND *Q. COCCINEA*.

Dr. Palmer of the Arnold Arboretum writes that he was considerably puzzled by trees which he saw at the Morton Arboretum (Du Page County, Illinois, 25 miles west of Chicago) growing in native woods, since some of the trees there were

turning a brilliant red in the autumn while most of them were yellow or orange, although he decided that all of them should be referred to *Q. ellipsoidalis*. He also reports a Minnesota collection previously mentioned on which is noted that the autumn leaves are a brilliant red, although the species appears to be *Q. ellipsoidalis*. It seems quite certain that while the autumn coloration in these two species is ordinarily a distinguishing feature, there is occasional variation in individual trees which has confused many observers and made them think they had found the scarlet oak where it really does not occur.

I have seen freshly gathered material of *Q. coccinea*, from the tree at the Arnold Arboretum so labeled, as well as from the State Forest Reserve of Indiana, and from southeastern Ohio, and it seems to me there should be no confusion between these two species when the freshly gathered acorns and winter buds are at hand. In *Q. coccinea* the buds are rather large, 3-5 mm. long, 1.5-3 mm. wide; in *Q. ellipsoidalis*, rather small, 1-3 mm. long, .75-1.5 mm. wide. In *Q. coccinea* the acorn may be designated as oval or oblong-ovoid with a pronounced shoulder, of a light reddish brown color and dull. In *Q. ellipsoidalis* the acorn varies from the typical ellipsoid form to semi-globose, but always gradually tapering to the point; acorns shiny as though freshly varnished, medium to dark brown, and very frequently striped with darker lines.

The cup scales are strikingly dissimilar; in *Q. coccinea* they are deltoid-lanceolate, acute, yellow with reddish brown edges and not closely appressed; in *Q. ellipsoidalis* they are light brown, homochromous, ovate, obtuse, or truncate, and very closely appressed. I feel that the confusion existing between the two species is largely an inherited one rather than because of the fact that *Q. ellipsoidalis* is not markedly distinct from its congeners.

I should like to express my appreciation to Dr. E. J. Palmer of the Arnold Arboretum, Dr. J. H. Ehlers, University of Michigan, Research Forester Deam of Indiana, Mr. O. A. Farwell, Botanist of Parke, Davis & Co., and Professors Shimek and Rosendahl for information on county records and other helpful data. It has been a real pleasure to correspond with these fine helpful gentlemen.

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