A Hybrid Oak

B. Shimek
A HYBRID OAK.

BY B. SHIMEK.

The northern limit of the distribution of *Quercus imbricaria* Michx. and *Quercus palustris* Muench, in the valley of the Iowa river is reached near Hills in Johnson county. Here and southward both species occupy the alluvial bottom lands, and before the extensive clearing of the alluvial forests they were freely intermingled. In view of this fact and of the well-known tendency of oaks to hybridize it is not surprising that forms which are evidently hybrids occur.

It is obviously difficult to determine the fact that hybridization has taken place in plants which require many years to reach maturity, when they first fully display their hybrid characters, and the only criterion which may be employed is the mingling of recognized specific characters. Where species are very closely related this is manifestly difficult, if not impossible, but the task is much easier when the species are as well marked as the two here noted.

Among the two or three probable hybrids which were found in a scattered clump of *Q. imbricaria* and *Q. palustris* on the alluvial bottom land south of Old Man's creek, near Hills, the one here discussed shows this mingling of the characters of the parent species most clearly.

A probable hybrid of these species has already been reported by Engelmann. Sargent says of it: "The leaves were broadly lanceolate, mostly acute at the apex, and entire or usually furnished with coarse triangular-toothed acute bristle-pointed teeth; they were pubescent at first, especially on the lower surface, but soon became glabrate, and lustrous above, paler below, from four to six inches long and from one to two inches wide. The fruit was mostly solitary and was borne on a stout peduncle sometimes half an inch in length; the nut was oblong, full and rounded at the apex, about as broad as it was long, light brown, and inclosed for about one-third of its length in the thin cup-shaped or turbinate cup covered by ovate scales rounded at the apex and clothed, except on the bright red-brown margins, with hoary pubescence."

It may be of interest to note that our hybrid agrees substantially with this description, but many of the leaves are quite deeply lobed, and these in some cases reach a width of more than three and one-half inches.

The parent oaks in this case are easily distinguished by the following characters:

**Q. palustris** DuRoi.

**Young leaves:**
- Lower surface quite densely pubescent, with more prominent tufts of hairs in the axils of the large veins.
- Upper surface with few reddish-brown or purplish club-shaped trichomes.
- Margins red, not thickened, not revolute.
- Petioles short.

**Mature leaves:**
- Quite regularly 5 to 7-lobed, each lobe long bristle-pointed.
- Rather thin.
- Veins rather distinct, the midrib projecting above both the upper and lower surfaces.
- Margin scarcely revolute, and not thickened.
- Lower surface smooth, except for tufts of hairs in axils of veins.
- Blade 4 to 6 1/2 inches long and 4 to 5 3/4 inches wide.
- Petioles 1 to 2 inches long, smooth.

**Flowers:**
- Stigmas recurved or spreading, terete, red.
- Staminate flowers with calyx of 4 or 5, mostly unequal, broad, often irregularly slightly lobed sepals, with lacinate margins, and without abruptly tapering apex.

**Fruits:**
- Cup very flat below, shallow, covered with closely appressed tomentum within.
- Acorns sub-spherical or even depressed at apex, and often showing slight longitudinal ribs or angles.

**Q. imbricaria** Michx.

**Young leaves:**
- Lower surface more densely pubescent, without special prominent tufts in the axils of the large veins.
- Upper surface with numerous reddish-brown or purplish club-shaped trichomes.
- Margins green, thickened, distinctly revolute.
- Petioles long, often nearly equal to blade.

**Mature leaves:**
- Entire, or somewhat 3-lobed, and sometimes irregularly repand-lobate on young shoots.
- More leathery.
- Veins more prominent, the midrib in a groove above, at least in its lower half.
- Margin usually distinctly thickened, and somewhat revolute.
- Lower surface quite uniformly pubescent.
- Blade 3 1/2 to 4 1/2 inches long, and 1 to 1 1/2 inches wide.
- Petioles 3/8 to 1/2 inch long, pubescent.

**Flowers:**
- Stigmas short, yellowish-green.

**Staminate flowers** with calyx of 4, mostly equal, lance-ovate, entire sepals, with abruptly tapering tips which are lacinate-tufted at the apex.

**Fruits:**
- Cup somewhat obconical or turbinate, somewhat deeper, the scales rather loose, especially toward margin of cup, and its inner surface nearly smooth.
- Acorns more conical, and terete.

With special reference to the characters here brought out the hybrid may be described as follows:

In general aspect and habit it resembles both parents, which are very similar in this respect.

The young leaves have the lower surface densely tomentose, without prominent tufts in the axils of the large veins, resembling **Q. imbricaria**. In other respects the young leaves are intermediate, having margins somewhat revolute, slightly thickened, and in part red, especially toward the base, and with medium petioles. In division of blade the young leaves are also intermediate between the parent species.

The mature leaves vary from quite entire to deeply lobed, the sinuses extending fully half way to the midrib. The lobes are rounded or acute, more or less spreading or curved outward at apex, and when distinct terminating in a long bristle point, as in **Q. palustris**. From one to three lobes may appear on each side, and they are usually unequal and irregular. In texture they resemble **Q. palustris**, but the venation is intermediate in prominence and the midrib rises to the level of the upper surface, or is sometimes slightly depressed in an imperfect groove at the base of the blade. The margin is somewhat thickened and sometimes slightly revolute. The lower surface is smooth except for tufts of hairs in most of the axils of large veins and occasional patches of scant pubescence, especially toward the base of the blade. The blades vary in
length from 4¼ to 6 inches, and in width from 1½ inches in the entire form to 3½ inches in the deeply lobed forms. The petioles vary from ¾ to ¾ of an inch in length, and are smooth or irregularly pubescent.

The stigmas resemble those of *Q. palustris* in form and color. The sepals of the staminate flowers are mostly unequal, broad and somewhat lobed, in these characters resembling *Q. palustris*, but being narrower, and showing a somewhat tapering rather abrupt tip which is somewhat lacinate tufted, in this respect approaching *Q. imbricaria*.

The cup is intermediate in form and arrangement of scales and is almost smooth within. The acorn resembles some of the more spherical forms of *Q. imbricaria* and is also intermediate.

It will be noticed that in form, dimensions and division of the blade, margin, venation, and lower surface of the leaf, the surface of the petiole, the form of the sepals, the form, arrangement of scales, inner surface and depth of the cup, and in the form of the acorn, the hybrid is intermediate between the parent species, sometimes approaching one, sometimes the other. The form and color of the stigmas, and the texture of the leaves are more nearly like those of *Q. palustris*, but the length of the petiole and the lower surface of the young leaf suggest *Q. imbricaria*.

The accompanying plates I and II illustrate both the parent species and the hybrid.

The hybrid here described is a double tree growing at the eastern edge of a mixed oak grove east of the railroad, in the south half of sec. 27, T. 78, R. VI W. The following oaks were found in this grove: *Q. imbricaria*, *Q. palustris*, *Q. velutina*, *Q. macrocarpa*, and *Q. imbricaria × palustris*. One of the oaks may be a hybrid, *Q. imbricaria × velutina*, but this was not satisfactorily determined.
Fig. 1. Leaves. (See p. 81.)

*Quercus palustris* DuRoi. The two lobed leaves.

*Quercus imbricaria* Michx. The three entire leaves.

Fig. 2. Leaves. (See p. 81.)

*Quercus imbricaria* × *palustris*. Three leaves showing variation in form.
Fig. 1. Acorns. (See p. 83.)

*Quercus imbricaria* Michx. The four left-hand figures in the lower row.

*Quercus palustris* DuRoi. The four right-hand figures in the lower row.

*Quercus imbricaria x palustris.* The upper row.

Fig. 2. Leaves. (See p. 83.)

*Quercus imbricaria x palustris.* Three leaves showing variation in form.
FIG. 1.

FIG. 2.