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The Forest Trees of Eastern Nebraska

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THE FOREST TREES OF EASTERN NEBRASKA.

BY CHARLES E. BESSEY.

In studying the distribution of the native forest-trees of Nebraska, I have evidence that most of them have migrated up the Missouri river and westward from it up the rivers which empty into it from the westerly side. A few species have come down from the Rocky Mountains and migrated eastward for greater or less distances.

It has long been my wish to arrange for a joint survey of the two sides of the Missouri river, having for its object the determination of the question of the rapidity of migration of plants on the two banks, and I present the following report in the hope that the Iowa botanists may be ready to join with those of Nebraska in making such a survey with reference to the tree flora.

Family PINACEAE.

Of our three native species only one occurs in eastern Nebraska.

Eastern Red Cedar (*Juniperus virginiana* L.) is found scattered over the eastern United States, and occurs in the various bodies of forests eastward of Nebraska. From these it has moved westward up the river valleys fully two-thirds of the distance across the state (2).

Family ANONACEAE.

Papaw (*Asimina triloba* (L.) Dunal). The large fleshy fruits which contain about eight large hard seeds are edible, and are picked up and carried off, or eaten directly by various quadrupeds. In either case it happens that some of the seeds are carried some distance from the parent trees. This species is very common in the Missouri forests, from which it has moved up the river valleys (4) in southeastern Nebraska (Richardson to Pawnee, Nemaha, Otoe, and Saunders counties).

Family SALICACEAE.

Black Willow (*Salix nigra* Marsh.) is common in the Missouri forests, from which it has spread up the streams, apparently across the state (5).

Almond Willow (*Salix amygdaloides* And.) is found abundantly in the Missouri forests, and has followed the river valleys across the Plains to the Rocky Mountains (6) and even to Oregon.

Shining Willow (*Salix lucida* Muehl.) occurs in the Missouri forests and has moved up the river to Cass county (7).

Sand-bar Willow (*Salix fluviatilis* Nutt.) is abundant in the Missouri forests, from which it has extended up the river valleys, across the plains to the Rock Mountains (8), California and Oregon.

Diamond Willow (*Salix missouriensis* Bebb) is common along the Missouri River in Western Missouri from which region it has extended its range northward along the river, and westward in the Republican, Platte and Niobrara river valleys to the western border (18).

Common Cottonwood (*Populus occidentalis* (Ryd.) Britton) is very abundant in the Missouri forests, from which it has passed up the rivers across the state (15) to the western border and beyond.

Family TILIACEAE.

Basswood or Linden (*Tilia americana* L.) The wing is an extension and enlargement of the bract of the peduncle of the inflorescence. The several spherical, dry fruits at maturity are attached nearly at right angles to this wing, which is slightly bent and twisted. At maturity the bract carrying the fruits separates at its base from the tree, and when caught by the wind whirls horizontally, carrying its freight of seed-bearing fruits often a distance of many metres from the parent tree. The linden occurs abundantly in the forests bordering the Missouri river southeast of Nebraska, and it now extends up that river along the eastern edge of the state (16) along the Niobrara river to Cherry county. It has extended up the valley of the Blue and Republican rivers on the south to Jefferson county, and the Platte river in the central portion of the state, to Nance county.

Family ULMACEAE.

The White Elm (*Ulmus americana* L.) is very abundant in the valley of the Missouri river southeast of Nebraska, and thence eastward to the Atlantic Ocean. From the southeastern forest body of this species it has extended up the several river valleys into all portions of the state (17) to the western counties.

Rock Elm (*Ulmus racemosa* Thomas) occurs commonly in the forest belt bordering the Missouri river southeastward, and from this region it has moved upward along the eastern border of the state (18) and up the Niobrara river near the northern boundary. While it has been recorded from but two stations (Cass and Keya Paha counties) it is highly probable that it occurs somewhat sparingly and perhaps intermittently along the eastern and northeastern border.

Red Elm (*Ulmus fulva* Michx.) is abundant in the Missouri river forest area, from which it has spread westward up the river valleys nearly or quite half way across the state (19). Beyond this area a single station is reported in Frontier County.

Hackberry (*Celtis occidentalis* L.). The globose one-seeded fruits are fleshy, and are in fact small drupes, much like thin-fleshed cherries. They are freely eaten by birds, and thus the seeds may be carried to considerable distances (even to many miles) from the parent trees. This species occurs abundantly in the Missouri forests, from which it has extended its range up the Missouri, Republican, Platte and Niobrara river valleys, across the plains (20) to the Rocky Mountains.

Family MORACEAE.

Red Mulberry (*Morus rubra* L.). The compound fleshy fruit (sorosis) consists of an aggregation of small one-seeded drupes, each surrounded by the fiesny calyx-lobes. They are eaten by many birds, and the hard seeds are voided uninjured, and thus carried far away from the parent trees. The Mulberry is found abundantly in the Missouri forests, from which it has extended northwestward along the eastern border of the state to Cedar county (21).

Family OLEACEAE.

White Ash (*Fraxinus americana* L.) is common in the Missouri forest area, from which it has extended up along the eastern border of the state (22) to Sarpy county.

Green Ash (*Faxinus lanccolata* Bork.) is also common in the Missouri forest area, from which it has spread westward and northward along the river valleys, across the state (24) to the western counties.

Red Ash (*Faxinus pennsylvanica* Marsh.) is found with the preceding (23) and apparently has been disseminated with it.

Family POMACEAE.

Prairie Apple or Western Crab-Apple (*Malus iowensis* (Wood) Britt.). The fleshy fruit contains five two-seeded carpels, and is eaten by swine, cattle, sheep, horses and probably by deer, rabbits, woodchucks and a few other quadrupeds. Such fruits as are carried short distances and then dropped whole, or partially eaten, may supply seeds from which new trees may spring. This species is abundant in the Missouri forests, from which it has extended its range into Nebraska along the Missouri river and up the Niobrara river to Brown county (25). It has been distributed up the Nemaha river valley to Gage county, and the Platte river valley to Butler county.

Blackthorn (*Crataegus tomentosa* L.) occurs in the Missouri forests, from which it has moved up the river into the southeastern counties, from Richardson to Lancaster and Douglas (26).

Downy Haw (*Crataegus mollis* (T. & G.) Scheele) occurs in the Missouri forests, and has extended its range apparently with the preceding species to Lancaster and Douglas counties (27).

Juneberry (*Amelanchier canadensis* (L.) Med.). The little hard-seeded apples have a soft edible flesh which is greedily eaten by birds. Many of the seeds pass through the alimentary canal uninjured and are thus distributed over considerable distances. This species occurs in the Missouri forests, from which it has moved up the valley of the Missouri river as far as Sarpy county (30).

Family DRUPACEAE.

Choke Cherry (*Prunus virginiana* L.) is found in the Missouri forests, from which it has been carried northward along the Missouri river as far as Sarpy county, and westward in the Nemaha, Blue and Republican river valleys to Franklin county (31).

Wild Black Cherry (*Prunus serotina* Ehrh.) occurs in the forests of Missouri, from which it has spread into southern and eastern Nebraska, to Sarpy county along the Missouri river, and Franklin county in the valley of the Republican river (32).

Wild Plum (*Prunus americana* Marsh.) is common in the country east of the Plains, into and across which it appears to have been carried, so that it is now found in the Rocky Mountain region. It is found in all parts of Nebraska (33), even in the "pockets" in the Sandhills into which it must have been carried by birds.

Family Caesalpiniaceae.

Kentucky Coffee Tree (*Gymnocladus dioica* (L.) Koch). The large monocarpellary fruits (15-18 centimetres long, 4-5 wide, and nearly 2 centimetres thick) contain about half a dozen large, spherical, very hard seeds, imbedded in a sweet pulp. The ripened pods hang on the trees for a part of the winter, and when they fall are picked up by quadrupeds which are attracted by their sweet odor. The hardness of the seeds prevents their being crushed. The tree occurs in the Missouri forests, and has followed the Missouri and Niobrara rivers northwestward to Rock county (34). In the southeastern part of the state it has followed the smaller streams westward fifty to sixty miles from the Missouri river.

Honey Locust (*Gleditsia triacanthos* L.) The large twisted and bent monocarpellary fruits (20-30 centimetres long, 2-2.5 wide, and 0.5 thick), contain ten or more very hard, flat seeds imbedded in a sweet pulp. The pods fall from the tree during the winter and are picked up and partly eaten by the larger quadrupeds as swine, cattle, etc., and doubtless were also by deer, buffaloes and other wild animals before the advent of white men. The hardness of the seeds preserves them from injury. The tree is common in the forests of Missouri and has been carried up the Missouri river and its tributaries so that now it occurs as far west as Franklin county in the Republican valley, and Holt county along the Niobrara river (35). It has also passed up the Nemaha and the Blue rivers to Gage and Lancaster counties.

Red Bud (*Cercis canadensis* L.). The bean-like pods are very flat and thin, and are well adapted to be carried in the wind a few metres. It is common in the Missouri forests and has extended northwestward into Nebraska (36) as far as Lancaster and Douglas counties.

Family Platanaceae.

Sycamore (*Platanus occidentalis* L.). The flowers grow in spherical heads, and produce compact, spherical clusters of oblong nutlets, which hang from long peduncles. When they fall from the tree (in the winter) they roll over the ground in the wind carrying their seeds with them. These trees are common in the forests of Missouri, from which they have moved up along the eastern edge of the state to Douglas county (37).

Family RHAMNACEAE.

Buckthorn (*Rhamnus lanceolata* Pursh) is common in the Missouri forests, from which it has moved up along the eastern border of the state to Cherry county on the Niobrara river. It has followed the tributaries of the Missouri river (Nemaha and Blue rivers) to Gage, and (Platte river) Saunders counties (38).

Indian Cherry (*Rhamnus caroliniana* Walt.) occurs somewhat sparingly in the Missouri forests, from which it has advanced into eastern Nebraska (39) having been noticed at two stations (Cass and Saunders counties).

Family ELAEAGNACEAE.

Buffalo Berry (*Lepargyraea argentea* (Pursh) Greene) The small red or amber one-seeded drupes are edible, and are eaten by birds and thus carried away. The seed is protected from injury in the alimentary canal by its hard covering. This small tree is a native of the Rocky Mountain region and westward, from which it has been carried eastward across the state (40) to the banks of the Missouri river (Nemaha county).

Family HIPPOCASTANACEAE.

Buckeye (*Aesculus glabra* Willd.). The large brown shiny seeds drop to the ground as soon as mature, where they are quite conspicuous. Here they are picked up by large animals and sometimes swallowed. They are too hard to be easily masticated, and many must be rejected after trial. In the meantime they have usually been carried some distance from the parent tree. This species occurs in the Missouri forests, from which it has moved into Nebraska (41) as far as Richardson, Pawnee and Nemaha counties.

Family ACERACEAE.

Silver Maple (*Acer saccharinum* L.) occurs abundantly in the Missouri forest area from which it has extended up the Missouri River nearly to the mouth of the Niobrara river (43) and westward fifty to sixty miles, in the moist lands along the streams.

Box Elder or Ash-leaved Maple (*Acer negundo* L.) grows abundantly in the Missouri forests, from which it has extended across the state (44). As this species occurs in the Rocky Mountains from New Mexico northward it is possible that some of the trees in western Nebraska have come down from the mountains and met those disseminated directly from the eastern forest areas.

Family ANACARDIACEAE.

Sumach (*Rhus copallina* L.). The small one-seeded drupes are crimson in color and have an acid flavor. They are eaten by birds, and their seeds are protected from injury by the bony seed coat. This species occurs in the Missouri forests, and has been carried northward (45) to the extreme southeastern corner of the state (Richardson county).

Family JUGLANDACEAE.

Butternut (*Juglans cinerea* L.) is common in the Missouri forests, from which it has been carried into the southeastern part of Nebraska, as far as Gage, Johnson, Otoe and Cass counties (46).

Walnut (*Juglans nigra* L.) is found in abundance in the forests in the Missouri River Valley southeast of Nebraska, and from here it has moved up that river and up the Niobrara valley to Cherry county. It has occupied the southeastern corner of the state, and the Republican valley to Harlan county (47).

Shellbark Hickory (*Hicoria ovata* (Mill.) Britt.) is common in the Missouri forests, from which it has been carried into the southeastern counties of Nebraska, from Gage to Cass (48).

Big Hickory Nut (*Hicoria laciniosa* (Michx.) Sarg.) occurs in the Missouri forests, from which it has been carried northward along the Missouri river from Richardson to Sarpy counties (49).

Mocker-Nut (*Hicoria alba* (L.) Britt.) occurs in the Missouri forests, from which it is reported to have moved northward (50) into eastern Nebraska (*Sargent.*)

Pig-Nut (*Hicoria glabra* (Mill.) Britt.) is common in the Missouri forests, from which it has been carried along the Missouri River into eastern Nebraska from Richardson to Cass counties (51).

Bitter Hickory (*Hicoria minima* (Marsh.) Britt.) is common in the forests of the Misouri River Valley, from which it has been carried northward into the southeastern counties of Nebraska (52) from Richardson to Pawnee, Lancaster and Cass.

Family FAGACEAE.

White Oak (*Quercus alba* L.) is common in the Missouri forests, from which it has been carried into southeastern Nebraska (53) as far north as Cass county.

Post Oak (*Quercus minor* (Marsh.) Sarg.) is found in the Missouri forests, from which it is reported to have moved northward (54) into southeastern Nebraska (*Sargent*).

Bur-Oak (*Quercus macrocarpa* Michx.) is abundant in the Missouri River valley forests, from which it has migrated along the river valleys fully half way across the state (55), reaching Harlan county on the south, Custer county in the center and Cherry county on the north. It occurs also, in the Black Hills of South Dakota, to which it was probably brought from the same Missouri forest area.

Yellow Oak (*Quercus acuminata* (Michx.) Sarg.) found in the Missouri forests, has barely reached Nebraska (56) in Richardson county.

Low Yellow Oak (*Quercus prinoides* Willd.) of the Missouri forests has barely reached southeastern Nebraska (57) in Richardson county.

Red Oak (*Quercus rubra* L.) is common in the Missouri forests, from which it has been carried northward along the Missouri river to Dixon county (58) and westward fifty or sixty miles.

Scarlet Oak (*Quercus coccinea* Muench.) occurs in the Missouri forests, and has entered the southeastern counties of Nebraska (59) from Richardson to Cass.

Black Oak (*Quercus velutina* Lam.) is found in the Missouri forests, from which it has moved northward along the eastern border of Nebraska (60) to the Platte river.

Black Jack Oak (*Quercus marilandica* Muench.) of the Missouri forests, has moved into the southeastern counties of Nebraska (61), Richardson to Pawnee and Nemaha.

Laurel Oak (*Quercus imbricaria* Michx.) is found in the Missouri forests, from which it has moved northwestward nearly or quite to the southeastern corner of Nebraska (62). Although this species has repeatedly been reported from this part of the state, I have seen no specimens which were collected within our borders. I have specimens collected in Missouri but a short distance from the southeastern extremity of Nebraska.

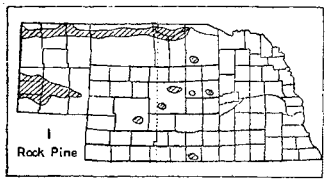
Family BETULACEAE.

Ironwood (*Ostrya virginica* (Miller) Willd.). The small nut is enclosed in a bladdery bag, which is so much larger that it serves the purpose of a wing. A dozen or more of these are aggregated into a loose strobilus. The obvious purpose of this structure is the easy transportation of the seed by the wind either in the whole strobilus, or the separate seed-bearing bags. The tree is abundant in the Missouri forests, from which it has extended up through the eastern and northern counties to Brown, Cherry and Sioux counties (63).

Walter Beech (*Carpinus caroliniana* Walter.). The small nut is attached to a foliaceous, somewhat three-lobed bract, which serves as a wing. These bracts are not crowded into a strobilus, but constitute a loose raceme. On falling from the tree the bracts serve to float the seed in the wind for some distance from the parent tree. This species occurs in the Missouri forests and has been reported from eastern (Sarpy county) and northern stations (Brown county) in Nebraska (64) to which it has apparently extended its range.

Canoe Birch (*Betula papyrifera* Marshall). This tree occurs in Minnesota and Montana, the Black Hills of North Dakota, and at a single station on the Iowa river in central Iowa (Hardin county). In Nebraska it is found only on the bluffs and in the ravines along the Niobrara River in Keya Paha, Brown, and Cherry counties (65). The occurrence of this tree in Nebraska is a puzzle to the botanical geographers for it is difficult to conceive of any means by which the seeds could be carried from the nearest known stations. Even should we consider the possibility of its dissemination from the Black Hills the difficulty is nearly as great, for the distance is fully one hundred and fifty miles, a part of it across the very rough country known as the "Bad Lands".

River Birch (*Betula nigra* L.) is found in the Missouri forests southeastward, and has extended its range northward along the eastern border of the state, being reported from Cass county (67).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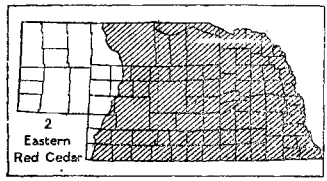
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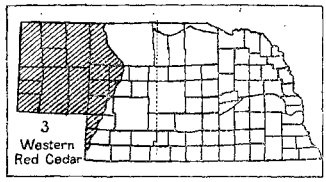
Eastern
Red Cedar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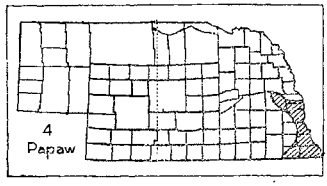
Red Cedar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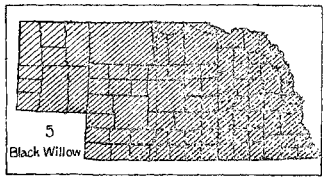
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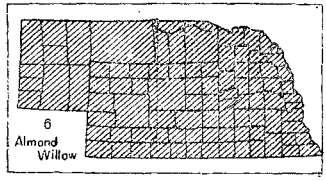
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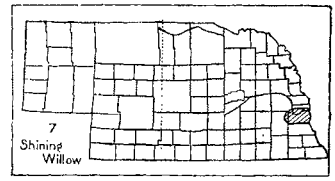
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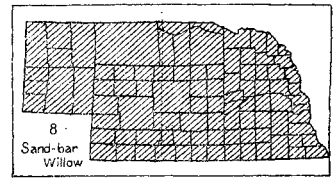
Shining
Willow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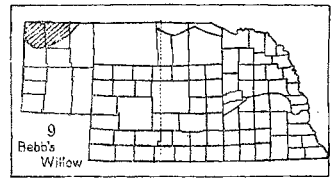
Sand-bar
Willow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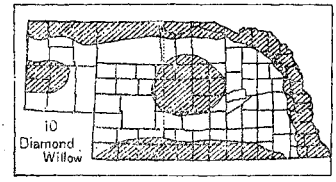
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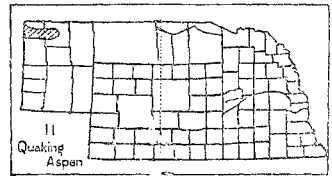
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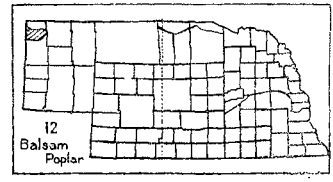
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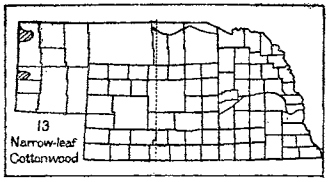
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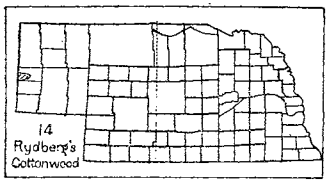
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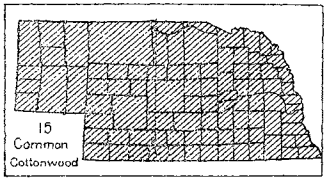
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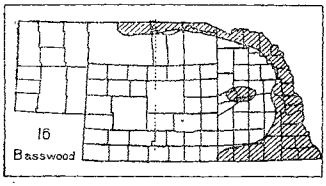
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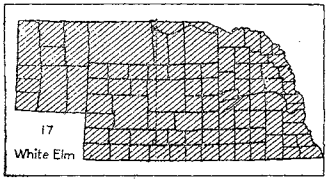
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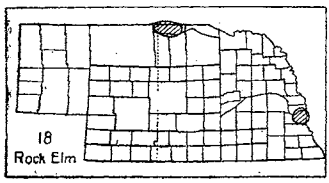
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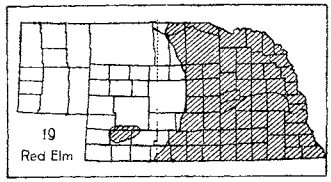
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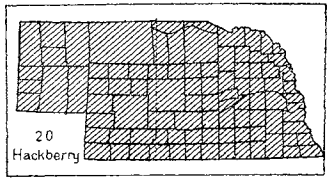
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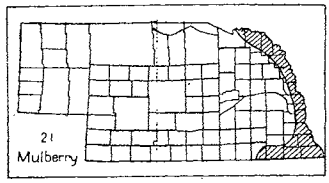
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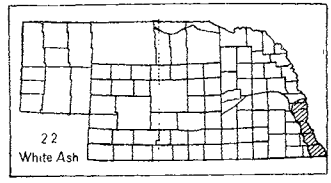
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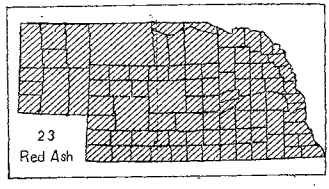
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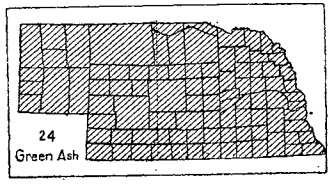
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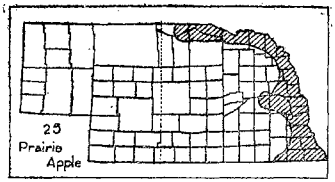
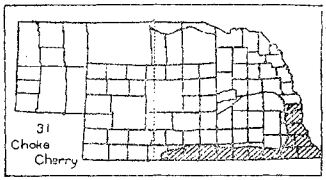
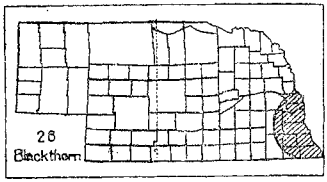
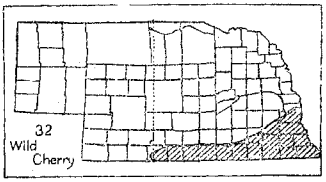
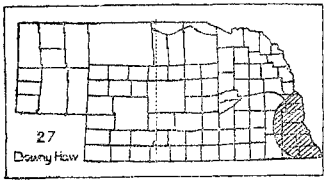
Green Ash

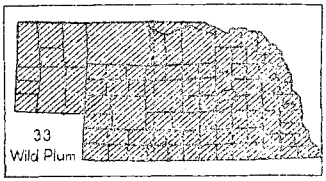


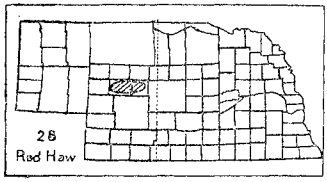


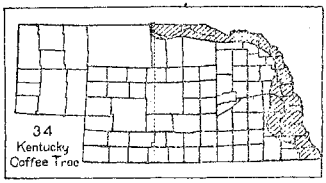


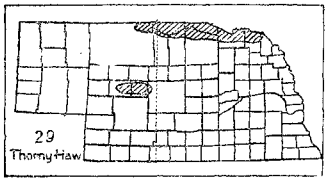


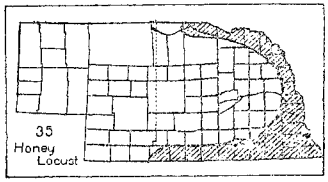


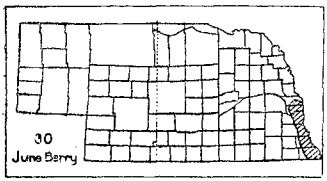


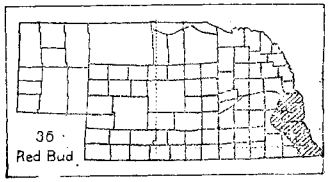


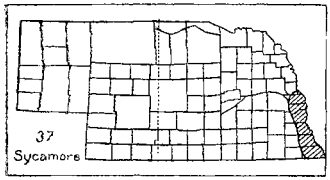


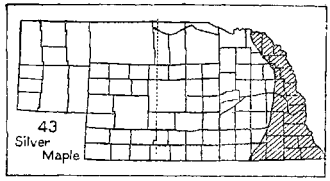


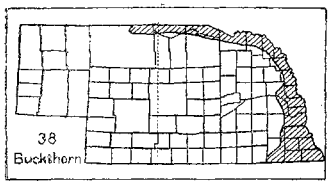


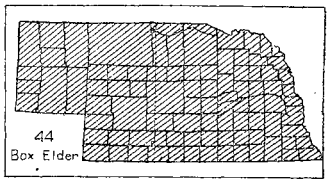





37
Sycamore


43
Silver
Maple


38
Buckthorn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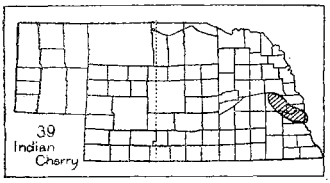
Box Elder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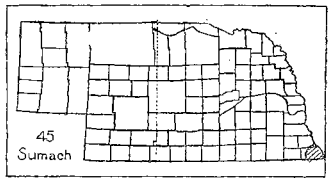
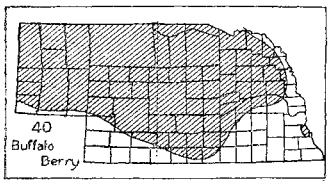
Indian
Cherry


45
Sumach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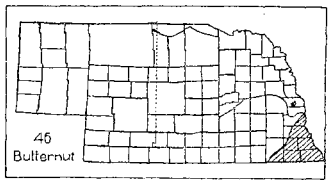
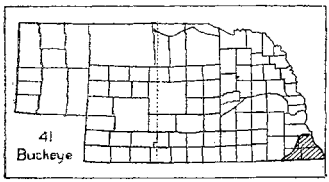
Buffalo
Berry


46
Butternut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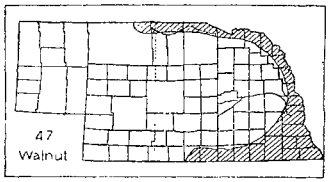
Buckeye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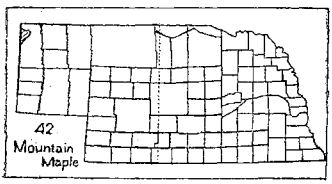
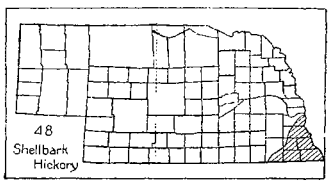
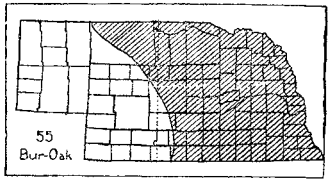
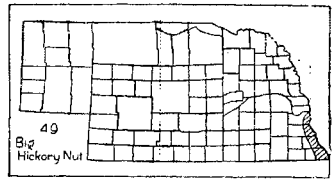
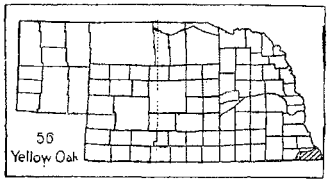
Walnut

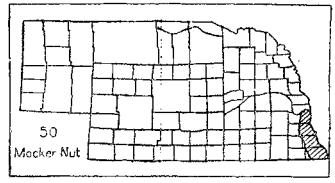

42
Mountain
Maple


48
Shellbark
Hickory


55
Burr Oak


49
Big
Hickory Nut


56
Yellow Oak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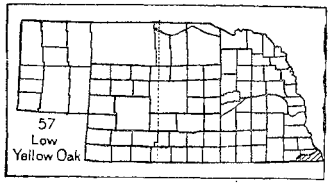
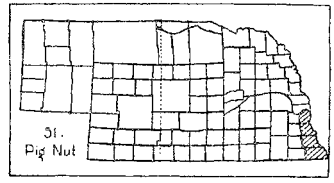
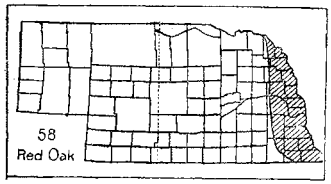
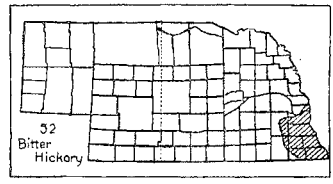
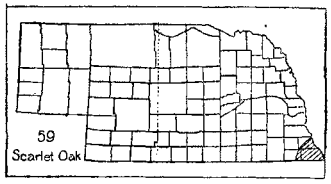
Mocker Nut

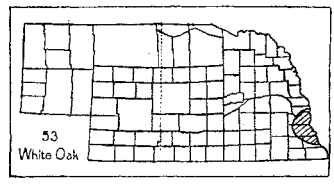

57
Low
Yellow Oak


51.
Pig Nut


58
Red Oak


52
Bitter
Hickory


59
Scarlet Oak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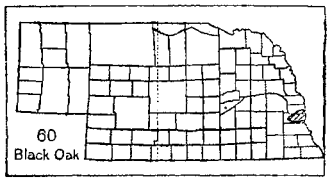
White Oak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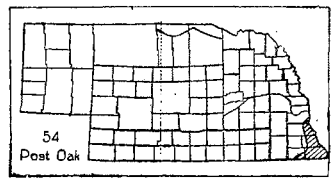
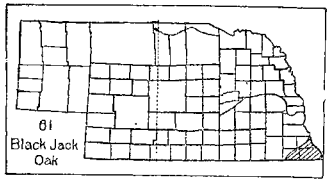
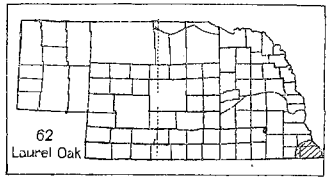
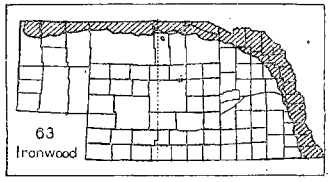
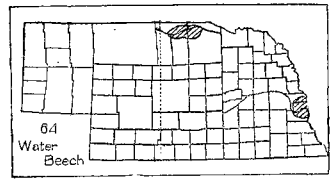
Black Oak

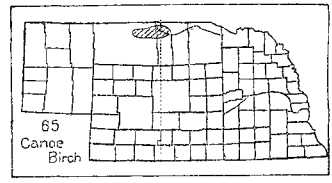

54
Post Oak

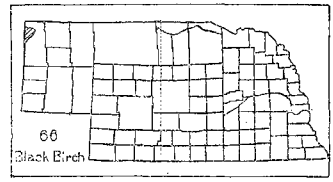

61
Black Jack
Oak

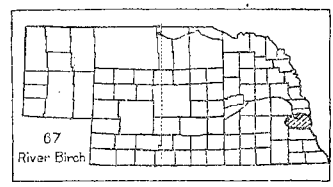

62
Laurel Oak


63
Ironwood


64
Water
Beech


65
Canoe
Birch


66
Black Birch


67
River Birch