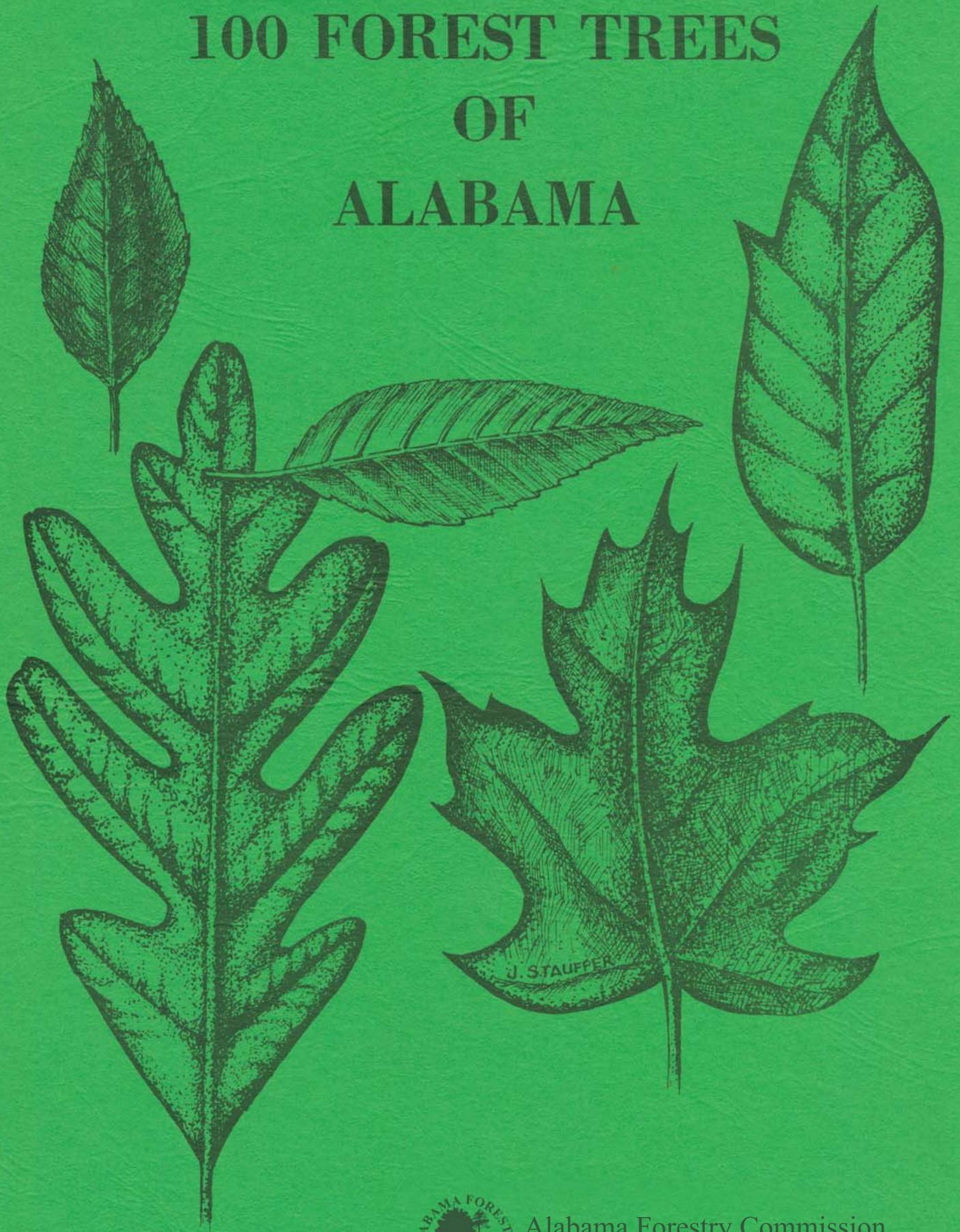


100 FOREST TREES OF ALABAMA



Alabama Forestry Commission
www.forestry.alabama.gov

100 FOREST TREES
of
ALABAMA

by
Harlan H. York, Ph.d., D.Sc.

SECOND EDITION

ISSUED BY

ALABAMA FORESTRY COMMISSION

AND

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FOREWORD

In Plant Life of Alabama, written by Dr. Charles Mohr and published in 1901, there are descriptions of 2400 species and varieties of flowering plants. Of these, 180 are described as trees of which 150 were considered to be of commercial importance.

One hundred native trees are described in this manual. They include the important commercial tree species of Alabama, plus some flora that are quite limited in their range and use. This list of trees was compiled from the following sources: Monograph 9, Economic Botany of Alabama, Part 2 (1928) by Roland M. Harper; Forest Trees of Alabama (1949) by Ivan R. Martin, Extension Forester, Wilber B. DeVall, Head, Forestry Department, Auburn University; Manual of Trees of North America (1922) by Charles Sprague Sargent; and Check List of Native and Naturalized Trees of the United States Including Alaska (1953) by Elbert H. Little, United States Department of Agriculture Handbook No. 41.

The following additional publications were consulted in preparing the tree descriptions: Pennsylvania's Trees by Joseph S. Illick; Trees of New York State, Native and Naturalized by H. P. Brown; Louisiana Trees and Shrubs by Clair A. Brown; and West Virginia Trees by A. B. Brooks; The Audubon Society Field Guide to North American Trees by Elbert L. Little; and Guide to Southern Trees by Ellwood S. Harrar and J. George Harrar.

Permission was obtained from Houghton, Mifflin and Company to photograph from Sargent's Silva of North America the illustrations of the trees included in this manual. Grateful acknowledgement is made to the Company for this very fine cooperation. We also express our deep appreciation to the South Carolina Extension Service and the South Carolina State Commission of Forestry for permitting us to duplicate the cuts showing leaf, fruit and twig characteristics that appear in their joint publication titled Familiar Trees of South Carolina.

100 Forest Trees of Alabama was originally written by Dr. Harlan York during the mid-1950s as a contracted employee of the Division of Forestry, Alabama Department of Conservation. The original rights to the contents of this publication are retained by the Alabama Forestry Commission. The Agribusiness Education Section, Division of Vocational Education Services, State Department of Education has expressed permission to duplicate and market this manual for educational purposes.

In this second edition, revisions were made to reflect changes in scientific nomenclature, relative importance of species, current uses for the wood of each species, and educational needs of participants in FFA and 4-H forestry judging contests. A special note of appreciation is due the Alabama Forestry Association, Auburn University School of Forestry, and the USDA Forest Service for their assistance with this revision.

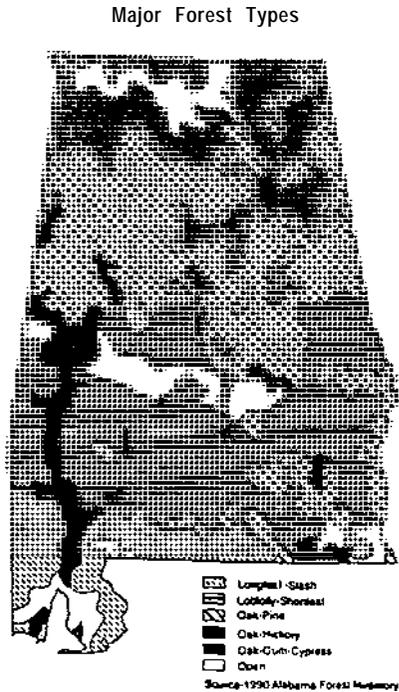
January 1995

INTRODUCTION TO TREE IDENTIFICATION

Forest lands are a tremendously important natural resource in and to Alabama. Of Alabama's total estimated land area of 32.6 million acres, 67 per cent or 21.9 million acres of it is forested. Alabama's forests have always and still do make a substantial and essential contribution to both the economic and environmental well-being of her citizens.

Forest Diversity

Viewed collectively, Alabama's forests are very diverse in composition of plant species for a variety of reasons. Alabama's land surface consists of eight distinct physiographic regions, each having some similarities and some differences in soils, topography and climate. Within each region, further diversity is provided through local variations in topography, soils and drainage patterns which create micro-sites within the landscape.



Besides natural factors, a great deal of diversity in the landscape and forest composition occurs as the result of historical and recent human activity. Land ownership and development objectives determine the extent of land or forest manipulation in terms of appearance, age, size and shape. The degree of change to forest composition depends upon the type and amount of management, abuse or neglect that has been applied.

A third factor in forest diversity comes from the adaptability of each tree species. Some species can survive and thrive under a wide variety of site conditions (generalists), while others are very restrictive in their habitat requirements (specialists).

Using This Manual

The purpose of this manual is to help you recognize some of the most common or significant tree species in Alabama. To know trees, it is necessary to learn their characteristics in order to distinguish one kind from another. The enclosed information will help you in your dendrology, or botanical study of trees.

Before going any further, perhaps it would be good to define what a tree is. Trees, shrubs, and some vines can all be woody plants; but in addition, a tree usually has a single upright trunk that is at least fifteen feet or more in height at maturity. A shrub usually consists of a number of more or less upright stems that arise from the same system of roots. Only tree species are included in this manual.

Secondly, what is meant by species? Trees, like most plants, are identified by one or more common names and a scientific name. Any kind of tree can have a common name in one locality and a different common name in another locality. All plants (and other organisms) also have scientific names that are the same the world over. They are derived from Latin or Greek, usually from Latin, and mean the same to all botanists. Each specific kind of plant is termed a species. Species having certain characteristics in common are grouped into a genus. Genera with certain similarities are assigned to a family, families are grouped into an order, orders into a class, and classes into a phylum.

The scientific name of a plant consists of three parts. The first part is the genus, a noun, and is always capitalized. The second part or word is the species name and is rarely capitalized. It is an adjective, and is descriptive of one of the main characteristics of the species. The third part is an abbreviation for the person who first described and scientifically named the species. For example, the scientific name of the white oak is Quercus alba L. Quercus is Latin for oak, alba is Latin for white, and L is the abbreviation for Linnaeus, the Swiss botanist.

A few words of caution are in order about using this manual. The descriptions are for typical features commonly observed for each species. Occasionally, attributes such as leaves, tree forms and mature size can vary with site and stand conditions, age and position in the tree from which features are observed. A final consideration is that the dimensions for height and trunk diameter were often observations of biologically mature specimens which could be found during the early part of this century when most of the resource materials were written.

Locating Study Specimens

The scope of your study of trees in the outdoors depends upon your individual needs at a particular time. A search can be as simple as looking around your immediate residence or as complex as searching throughout the entire state.

In all cases, keep in mind that all land that you would like to walk on and every tree that you would like to examine belongs to someone. Only 5% of Alabama's forest land is publicly owned and managed by a government entity. The rest of the forest land is private property (62% is owned by families and individuals, 25% is owned by forest industry and the remaining 7% is owned by other corporate investors). You are urged to act responsibly by obtaining permission before entering private property and then showing due respect to the owner and property during your visit. Failure to do this constitutes Trespass under Alabama law.

The easiest way to find several species of trees is to search a variety of "habitats" within walking distance from your home. Examples of habitat would include older upland forest (most likely not virgin), recently disturbed upland forest, bottomland and stream banks, wetland areas and accessible urbanized areas.

If you are collecting samples for a biology class leaf collection you may need to expand your search area to take in special "habitats" in the region around your community. You will do well to start off by consulting one or more of these specialist groups for clues as where to look:

- Science (biology) teachers
- Alabama Forestry Commission
- Department of Conservation and Natural Resources
- Natural Resources Conservation Service
- Private consultant and industry foresters
- US Forest Service
- Environmental organizations

Serious students of dendrology who wish to see all 100 species presented in this book within their natural habitats will have to do some ardent traveling and hiking throughout Alabama. The following suggestions will be of value to you:

- Check in the manual, "Distribution in Alabama" for each species.
- Consult with the same resource organization listed above.
- General species may be encountered at several locations as you travel around the state.

Specialist species may most likely only be found in specific regions (i.e. slash pine in the extreme southeast of the state) or sites (i.e. sand pine on the coast of Baldwin County and eastern hemlock in deep, narrow river gorges of northwest Alabama).

Other Modern Resource Guides

A Field Guide to Trees and Shrubs, George A. Petrides, 1972.
Houghton Mifflin Co., Boston.

A Golden Guide to Trees, Herbert S. Zim and Alexander C. Martin, 1987.
Golden Press, New York.

A Guide to Field Identification: Trees of North America,
C. Frank Brockman, 1987. Golden Press, New York.

Checklist of United States Trees, E. L. Little, Jr., 1979. USDA
Forest Service Agric. Hndbk 541.

Familiar Trees of North America: Eastern Region, 1986. Alfred A. Knopf,
Inc., New York.

Guide to Southern Trees, Ellwood S. Harrar and J. George Harrar,
1962. Dover Publications, Inc., New York.

Textbook of Dendrology, 6th Edition, William Harlow, Ellwood Harrar and
F. White, 1979. McGraw-Hill Book Co., New York.

The Audubon Society Field Guide to North American Trees, Elbert L. Little,
1980. Alfred A. Knopf, Inc., New York.

The Woody Plants of Alabama, R. C. Clark, 1971. *Annals of the Missouri
Botanical Garden* 58 (2) 99-242.

Trees of Georgia and Adjacent States, C. L. Brown and L. K. Kirkman,
1990. Timber Press, Portland.

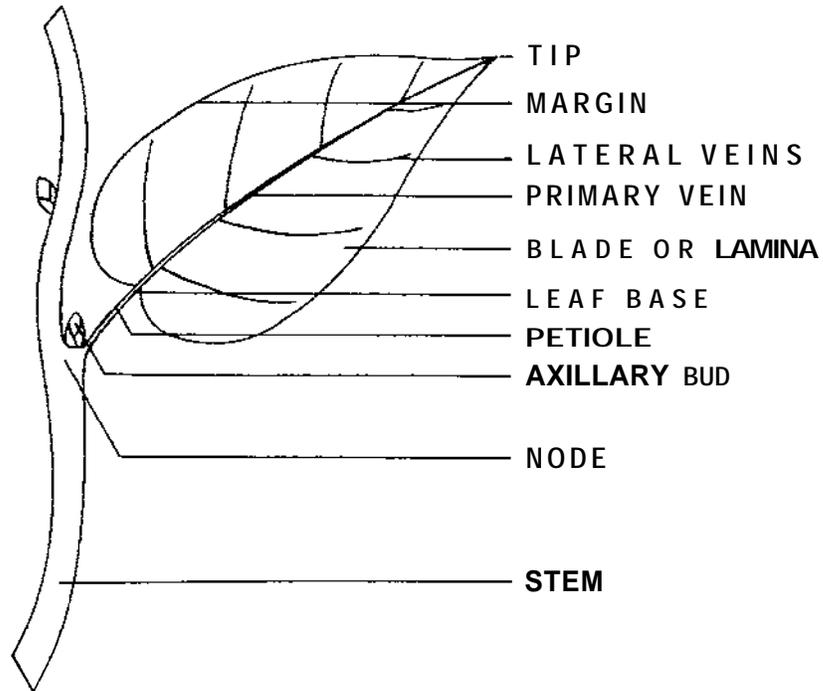
Trees of the Southeastern United States, Wilbur H. Duncan and
Marion B. Duncan, 1988. University of Georgia Press, Athens.

Trees, Shrubs and Woody Vines of Northern Florida and Adjacent
Georgia and Alabama, R. K. Godfrey, 1988. University of Georgia
Press, Athens.

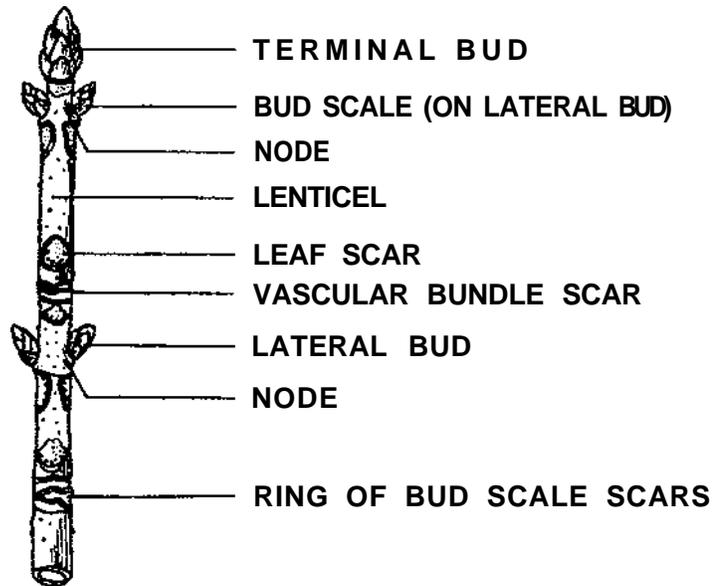
Related Subjects of Study

History of the changing forests throughout Alabama history
Ecosystems in Alabama and the Southeastern US
Influence of plant succession on species diversity
Economic and environmental values of forests
Historical and present uses for wood
Diverse forest ownership and management objectives
Occupations in natural resource management fields

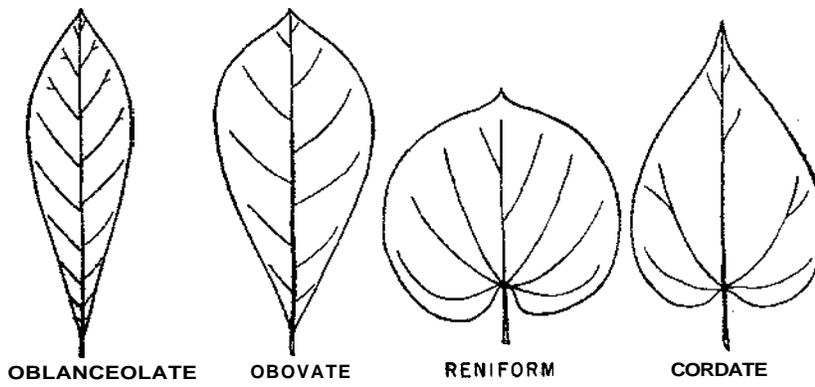
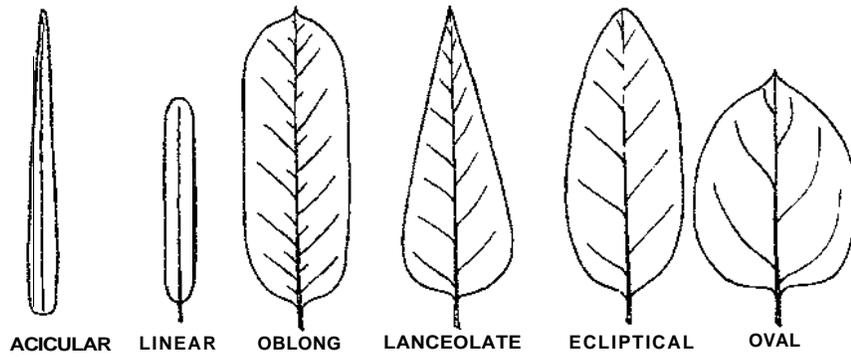
LEAF CHARACTERISTICS



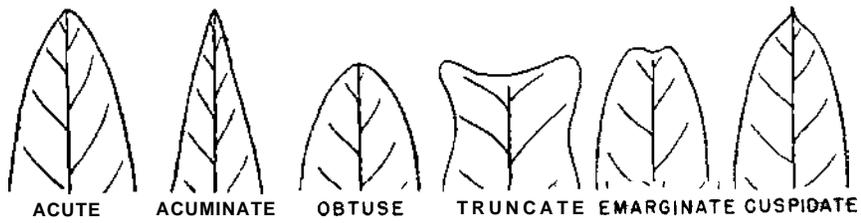
TWIG CHARACTERISTICS



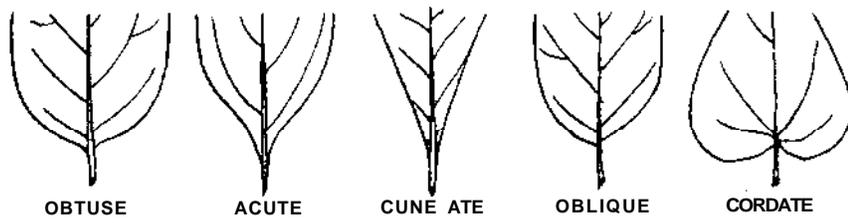
LEAF FORMS



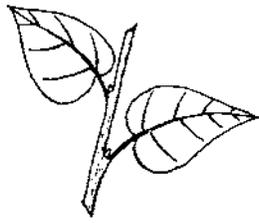
LEAF TIPS



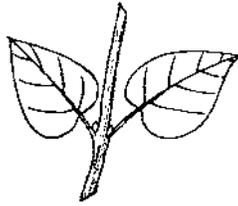
LEAF BASES



LEAF ARRANGEMENT



ALTERNATE



OPPOSITE

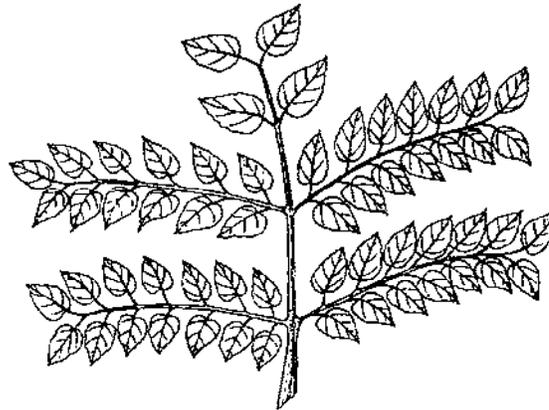


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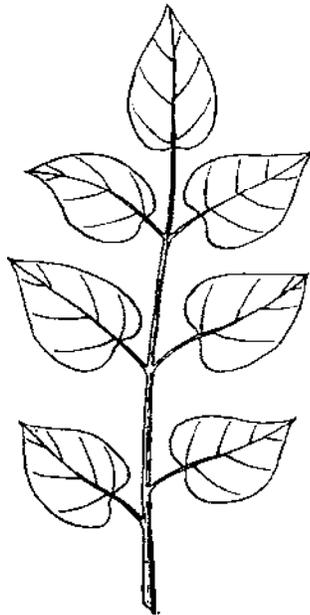
LEAF COMPOSITION



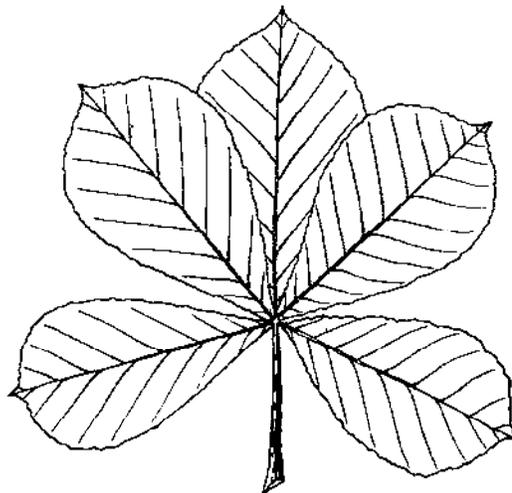
SIMPLE LEAF



BI- PINNATELY COMPOUND LEAF

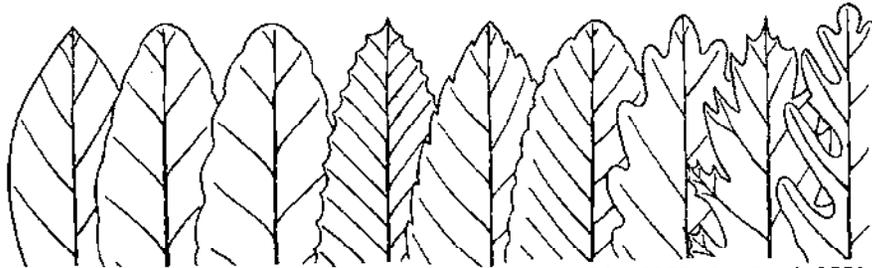


PINNATELY COMPOUND
LEAF



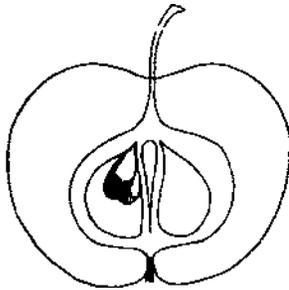
PALMATELY COMPOUND LEAF

LEAF MARGINS

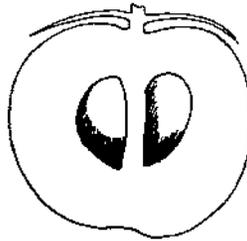


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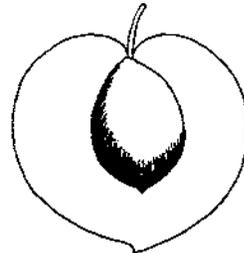
TYPES OF FRUIT



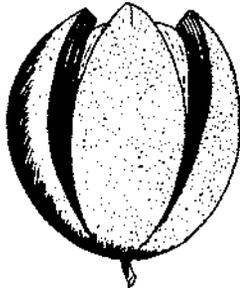
POME
(Apple)



BERRY
(Persimmon)



DRUPE
(Cherry)



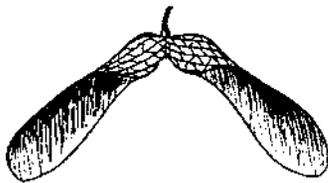
NUT (DEHISCENT HUSK)
(Hickory)



NUT (INDEHISCENT)
(Oak Acorn)



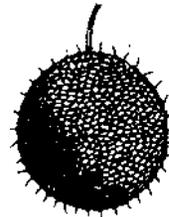
CAPSULE
(Paulownia)



DOUBLE SAMARA
(Maple)



LEGUME
(Black Locust)



MULTIPLE (HEAD OF NUTLETS)
Sycamore

FAMILIES AND GENERA OF TREES

PINACEAE - the Pine Family

<i>Pinus clausa</i> (Chapm.) Vasey	Sand Pine
<i>Pinus echinata</i> Mill.	Shortleaf Pine
<i>Pinus elliottii</i> Engelm.	Slash Pine
<i>Pinus glabra</i> Walt.	Spruce Pine
<i>Pinus palustris</i> Mill.	Longleaf Pine
<i>Pinus serotina</i> Michx.	Pond Pine
<i>Pinus taeda</i> L.	Loblolly Pine
<i>Pinus virginiana</i> Mill.	Virginia Pine
<i>Tsuga canadensis</i> (L) Carr.	Eastern Hemlock

TAXODIACEAE - the Redwood Family

<i>Taxodium distichum</i> (L) Rich.	Baldcypress
-------------------------------------	-------------

CUPRESSACEAE - the Cedar Family

<i>Chamaecyparis thyoides</i> (L) B.S.P.	Atlantic White Cedar
<i>Juniperus virginiana</i> L.	Eastern Redcedar

SALICACEAE - The Willow or Poplar Family

<i>Populus deltoides</i> Bartr.	Eastern Cottonwood
<i>Populus heterophylla</i> L.	Swamp Cottonwood
<i>Salix nigra</i> Marsh.	Black Willow

JUGLANDACEAE - the Walnut Family

<i>Carya aquatica</i> (Michx. f.) Nutt.	Water Hickory
<i>Carya cordiformis</i> (Wangenh.) K. Koch.	Bitternut Hickory
<i>Carya glabra</i> (Mill.) Sweet	Pignut Hickory
<i>Carya illinoensis</i> (Wangenh.) K. Koch.	Pecan
<i>Carya laciniosa</i> (Michx. f.) Loud.	Shellbark Hickory
<i>Carya myristicaeformis</i> (Michx. f.) Nutt	Nutmeg Hickory
<i>Carya ovata</i> (Mill.) K. Koch.	Shagbark Hickory
<i>Carya pallida</i> (Ashe) Engl. and Graebn.	Sand Hickory
<i>Carya tomentosa</i> Poir. Nutt.	Mockernut Hickory
<i>Juglans cinerea</i> L.	Butternut
<i>Juglans nigra</i> L.	Black Walnut

BETULACEAE - The Birch Family

<i>Betula lenta</i> L.	Sweet Birch
<i>Betula nigra</i> L.	River Birch
<i>Carpinus caroliniana</i> Walt.	American Hornbeam
<i>Ostrya virginiana</i> (Mill.) K. Koch.	Eastern Hophornbeam

FAGACEAE - the Beech Family

<i>Castanea dentata</i> (Marsh.) Borkh.	American Chestnut
<i>Castanea pumila</i> Mill.	Allegheny Chinkapin
<i>Fagus grandifolia</i> Ehrh.	American Beech
<i>Quercus alba</i> L.	White Oak
<i>Quercus coccinea</i> Muenchh.	Scarlet Oak
<i>Quercus durandii</i> Buckl.	Durand Oak
<i>Quercus falcata</i> Michx.	Southern Red Oak
<i>Quercus falcata</i> var. <i>pagodaefolia</i> Ell.	Cherrybark Oak
<i>Quercus cinerea</i> Michx.	Bluejack Oak
<i>Quercus laevis</i> Walt.	Turkey Oak
<i>Quercus laurifolia</i> Michx.	Laurel Oak
<i>Quercus lyrata</i> Walt.	Overcup Oak
<i>Quercus macrocarpa</i> Michx.	Bur Oak
<i>Quercus marilandica</i> Muenchh.	Blackjack Oak
<i>Quercus michauxii</i> Nutt.	Swamp Chestnut Oak
<i>Quercus muhlenbergii</i> Engelm.	Chinkapin Oak
<i>Quercus nigra</i> L.	Water Oak
<i>Quercus phellos</i> L.	Willow Oak
<i>Quercus prinus</i> Engelm.	Chestnut Oak
<i>Quercus rubra</i> L.	Northern Red Oak
<i>Quercus shumardii</i> Buckl.	Shumard Oak
<i>Quercus stellata</i> Wangenh.	Post Oak
<i>Quercus velutina</i> Lam.	Black Oak
<i>Quercus virginiana</i> Mill.	Live Oak

ULMACEAE - the Elm Family

<i>Celtis laevigata</i> Willd.	Sugarberry
<i>Celtis occidentalis</i> L.	Hackberry
<i>Ulmus alata</i> Michx.	Winged Elm
<i>Ulmus americana</i> L.	American Elm
<i>Ulmus rubra</i> Muhl.	Slippery Elm
<i>Ulmus serotina</i> Sarg.	September Elm

MORACEAE - the Mulberry Family

<i>Maclura pomifera</i> (Raf.) Schneid.	Osage Orange
<i>Morus rubra</i> L.	Red Mulberry

MAGNOLIACEAE - the Magnolia Family

<i>Liriodendron tulipifera</i> L.	Yellow Poplar
<i>Magnolia acuminata</i> L.	Cucumbertree
<i>Magnolia fraseri</i> Walt.	Fraser Magnolia
<i>Magnolia grandiflora</i> L.	Southern Magnolia
<i>Magnolia macrophylla</i> Michx.	Bigleaf Magnolia
<i>Magnolia virginiana</i> L.	Sweetbay

LAURACEAE - the Laurel Family

<i>Persea borbonia</i> (L) Spreng.	Redbay
<i>Sassafras albidum</i> (Nutt.) Nees.	Sassafrass

HAMAMELIDACEAE - the Witch-hazel Family

Hamamelis virginiana L.
Liquidambar styraciflua L.

Witch Hazel
Sweetgum

PLATANACEAE - the Sycamore Family

Platanus occidentalis L.

American Sycamore

ROSACEAE - the Rose Family

Amelanchier arborea (Michx. F.) Fern
Prunus serotina Ehrh.

Downy Serviceberry
Black Cherry

FABACEAE - the Legume Family

Cercis canadensis L.
Gleditsia triacanthos L.
Robinia pseudacacia L.

Eastern Redbud
Honey Locust
Black Locust

ANACARDIACEAE - the Cashew Family

Cotinus obovatus Raf.

American Smoke-Tree

AQUIFOLIACEAE - the Holly Family

Ilex opaca Ait.

American Holly

ACERACEAE - the Maple Family

Acer negundo L.
Acer rubrum L.
Acer saccharinum L.
Acer saccharum Marsh.

Boxelder
Red Maple
Silver Maple
Sugar Maple

HIPPOCASTANACEAE - The Buckeye Family

Aesculus glabra Willd.
Aesculus octandra Marsh.

Ohio Buckeye
Yellow Buckeye

TILIACEAE - the Linden Family

Tilia heterophylla Vent.

White Basswood

THEACEAE - the Tea Family

Gordonia lasianthus (L.) Ellis

Loblolly-Bay

CORNACEAE - the Dogwood Family

Cornus florida L.

Flowering Dogwood

NYSSACEAE - the Tupelo Family

Nyssa aquatica L.
Nyssa sylvatica Marsh.
Nyssa sylvatica var. *biflora* (Walt.) Sarg.

Water Tupelo
Blackgum
Swamp Tupelo

ERICACEAE - the Heath Family

Oxydendrum arboreum (L.) DC.

Sourwood

EBENACEAE - the Ebony Family

Diospyros virginiana L.

Common Persimmon

STYRACACEAE - the Snowbell Family

Halesia carolina L.

Carolina Silverbell

OLEACEAE - the Olive Family

Fraxinus americana L.
Fraxinus caroliniana Mill.
Fraxinus pennsylvanica Marsh.
Fraxinus quadrangulata Michx.

White Ash
Carolina Ash
Green Ash
Blue Ash

BIGNONIACEAE - the Bignonia Family

Catalpa bignonioides Walt.

Southern Catalpa

DESCRIPTIONS
and
ILLUSTRATIONS
of
TREES

SAND PINE

Pinus clausa (Chapm.) Vasey

OTHER COMMON NAMES: Scrub pine, Spruce pine, Florida spruce pine.

FORM: Usually 15 to 20 feet tall, rarely a foot in diameter, occasionally 70-80 feet tall with a diameter of 2 feet; branches spread to the ground and form a flat bushy top.

BARK: 1/3-1/2 inch thick on lower part of tree, deeply divided by narrow grooves into irregularly shaped and elongated plates that separate into bright red-brown scales, bark on upper part of trunk and branches ashy-gray.

TWIGS: Pale yellow at first, later ashy-gray.

LEAVES: Slender, flexible, dark green, in pairs, 2-3 1/2 inches long, and falling when 3 to 4 years old.

FLOWERS: Male, in short crowded spikes, dark orange color; female, lateral on stout peduncles.

FRUIT: Cones elongated, ovoid-conic, often oblique at base, usually clustered, reflexed, 2-3 1/2 inches long, nearly sessile or short-stalked, with convex scales armed with straight or recurved prickles, some open soon after ripening, others remain closed 3-4 years, others unopened become entirely covered by tissues of the stem; seeds triangular, 1/4 inch long, black, wings 3/4 inch long.

WINTER BUDS: Oblong-cylindrical, narrowed at apex, about 1/4 inch long.

WOOD: Soft, light, not strong, brittle, light orange color or yellow.

USES: Pulp, erosion control, landscaping. Historical uses: ship masts.

HABITAT: Sandy soil and dunes, will grow in pure sand.

DISTINGUISHING CHARACTERISTICS: A low spreading tree; some cones persistent and become imbedded in the wood; leaves slender, limber, dark green, 2-3 inches long.

DISTRIBUTION IN ALABAMA: Southern Alabama, on the coast of Baldwin County.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A branch with staminate flowers | 10. A fruiting branch |
| 2. A staminate flower | 11. A cone scale |
| 3. An anther, front view | 12. A cone scale, upper side, with its seeds |
| 4. An anther, side view | 13. Vertical section of a seed |
| 5. Diagram of the staminate flower | 14. An embryo |
| 6. A branch with pistillate flowers | 15. Section of an imbedded cone |
| 7. A pistillate flower | 16. Tip of a leaf |
| 8. A scale of a pistillate flower, upper side, with its ovules | 17. Cross section of a leaf |
| 9. A scale of pistillate flower, lower side, with its bract | 18. A seedling plant |



Pinus clausa (Chapm.) Vasey

Plate 1

SHORTLEAF PINE

Pinus echinata Mill.

OTHER COMMON NAMES: Southern pine, Yellow pine, Spruce pine, Rosemary pine, Old field pine.

FORM: Usually 80-100 feet high, with a tall tapering trunk 2-4 feet in diameter; crown relatively short, pyramidal or rounded; limbs more or less in whorls.

BARK: On old trunks 3/4-1 inch thick, broken into large, irregularly shaped plates, covered with small, closely appressed, light cinnamon-red scales, pitch pockets visible in plates.

TWIGS: At first pale green or violet-colored with a glaucous bloom, become dark red, brown tinged with purple, bark begins to shed in large scales in the third year.

LEAVES: In clusters of twos and threes, slender, dark bluish-green, 3-5 inches long, begin to fall at the end of their second year and continue to drop until 5 years old.

FLOWERS: Male in short crowded clusters, pale purple; female, in clusters of 2 or 3 on stout ascending stems, pale rose color.

FRUIT: Mature cones are short stalked, dull brown in color, attached more or less at an angle pointing backwards often in clusters of twos and threes, usually remain on trees 2-3 years after maturity; cones more or less conical to oblong-ovate, 1 1/2-2 1/2 inches long and are the smallest of the four important southern pines, each cone scale terminated with a temporary prickle, or broad-based spine; seed pale brown, triangular, 3/16 inch long with wing about 1/2 inch long.

WINTER BUDS: Ovoid, dull-pointed, covered with sharp-pointed, dark brown scales.

WOOD: Resinous, hard, strong, coarse grained, orange colored or yellow-brown, very variable in quality and in the thickness of nearly white sapwood, resembles longleaf pine but lighter. One of the most desirable of the yellow pines for commercial use.

USES: Lumber, carved work, excelsior, crates, pulp. Historical uses: mine props, barrel staves.

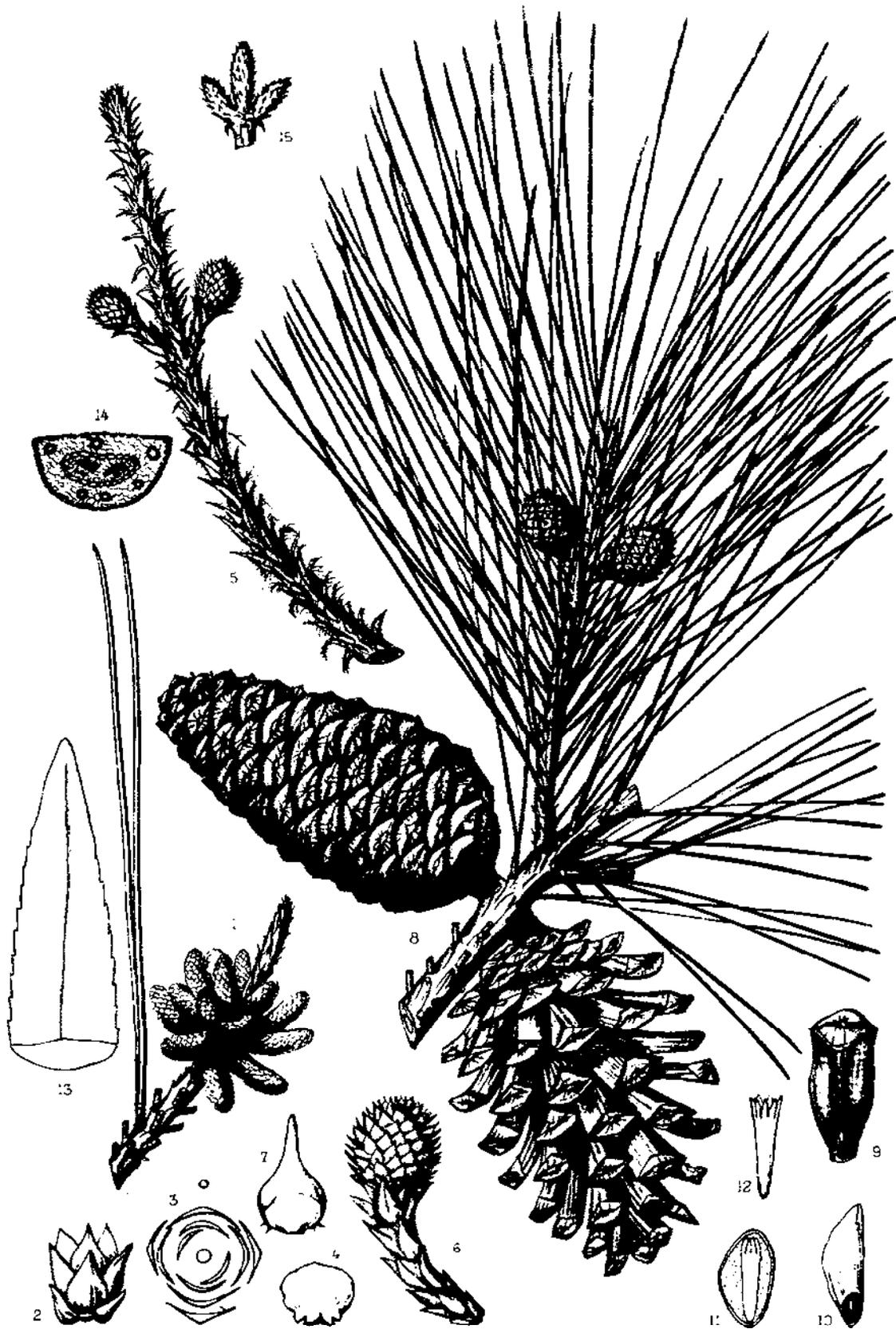
HABITAT: Prefers well drained light sandy or gravelly clay soil, can withstand lower temperatures than any other important southern pine.

DISTINGUISHING CHARACTERISTICS: Needles usually in clusters of twos; cones tend to point backwards on the twigs; sprouts readily from the stump of young trees; bark broken into plates which peel off in irregular scales.

DISTRIBUTION IN ALABAMA: Mostly in the northern half of the state.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. An end of a branch with staminate flowers | 7. A scale of a pistillate flower, lower side, with its bract |
| 2. An involucre of a staminate flower | 8. A fruiting branch |
| 3. Diagram of the involucre of the staminate flower | 9. A cone scale, lower side, with its bract |
| 4. An anther, front view | 10. A seed |
| 5. An end of a branch, with pistillate flowers | 11. Vertical section of a seed |
| 6. A pistillate flower | 12. An embryo |
| | 13. Tip of a leaf |
| | 14. Cross section of a leaf |



Pinus echinata Mill.

Plate 2

SHORTLEAF PINE

Pinus echinata Mill.

OTHER COMMON NAMES: Southern pine, Yellow pine, Spruce pine, Rosemary pine, Old field pine.

FORM: Usually 80-100 feet high, with a tall tapering trunk 2-4 feet in diameter; crown relatively short, pyramidal or rounded; limbs more or less in whorls.

BARK: On old trunks 3/4-1 inch thick, broken into large, irregularly shaped plates, covered with small, closely appressed, light cinnamon-red scales, pitch pockets visible in plates.

TWIGS: At first pale green or violet-colored with a glaucous bloom, become dark red, brown tinged with purple, bark begins to shed in large scales in the third year.

LEAVES: In clusters of twos and threes, slender, dark bluish-green, 3-5 inches long, begin to fall at the end of their second year and continue to drop until 5 years old.

FLOWERS: Male in short crowded clusters, pale purple; female, in clusters of 2 or 3 on stout ascending stems, pale rose color.

FRUIT: Mature cones are short stalked, dull brown in color, attached more or less at an angle pointing backwards often in clusters of twos and threes, usually remain on trees 2-3 years after maturity; cones more or less conical to oblong-ovate, 1 1/2-2 1/2 inches long and are the smallest of the four important southern pines, each cone scale terminated with a temporary prickle, or broad-based spine; seed pale brown, triangular, 3/16 inch long with wing about 1/2 inch long.

WINTER BUDS: Ovoid, dull-pointed, covered with sharp-pointed, dark brown scales.

WOOD: Resinous, hard, strong, coarse grained, orange colored or yellow-brown, very variable in quality and in the thickness of nearly white sapwood, resembles pine but lighter. One of the most desirable of the yellow pines for commercial use.

USES: Lumber, carved work, excelsior, crates, pulp. Historical uses: mine props, barrel staves.

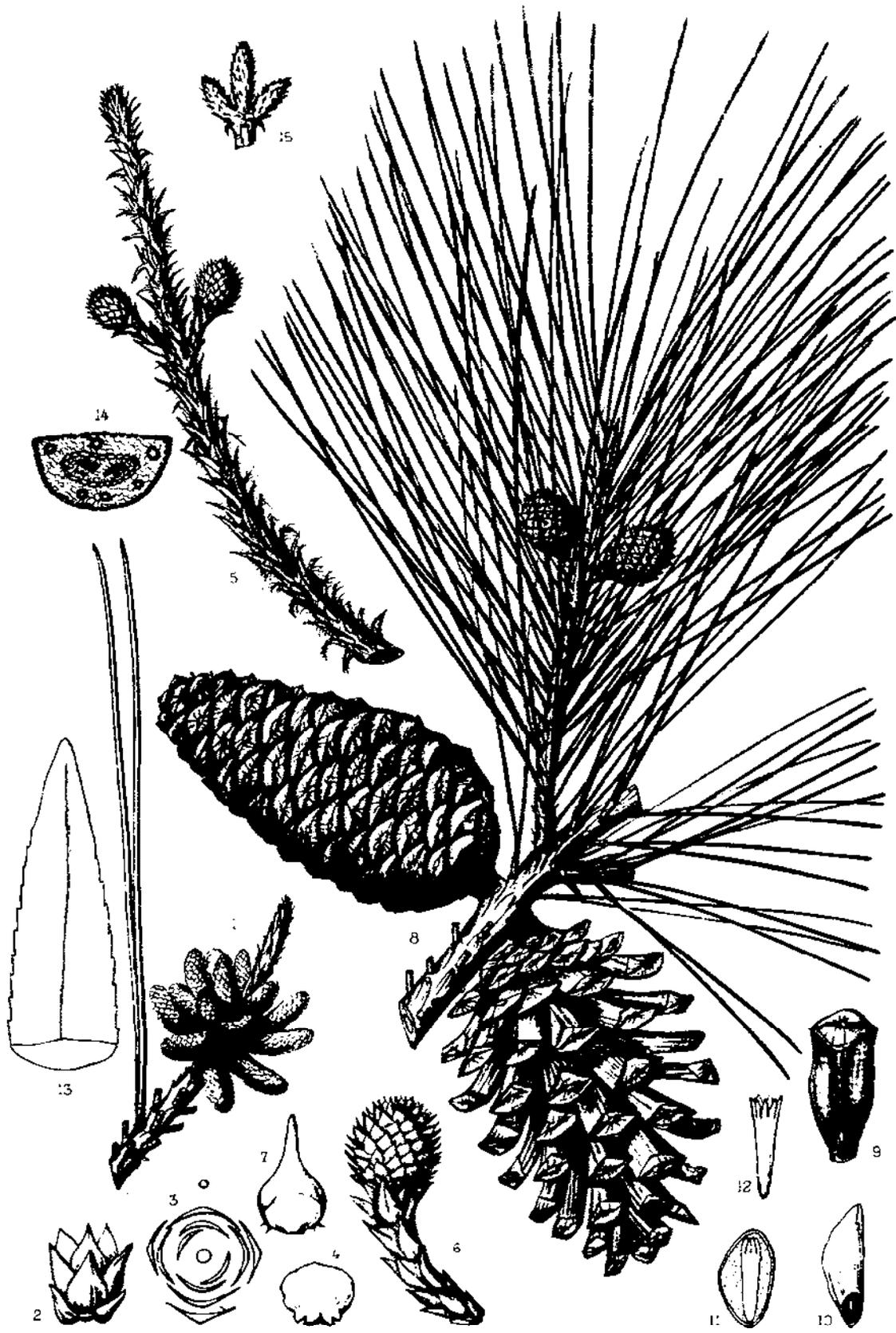
HABITAT: Prefers well drained light sandy or gravelly clay soil, can withstand lower temperatures than any other important southern pine.

DISTINGUISHING CHARACTERISTICS: Needles usually in clusters of twos; cones tend to point backwards on the twigs; sprouts readily from the stump of young trees; bark broken into plates which peel off in irregular scales.

DISTRIBUTION IN ALABAMA: Mostly in the northern half of the state.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. An end of a branch with staminate flowers | 7. A scale of a pistillate flower, lower side, with its bract |
| 2. An involucre of a staminate flower | 8. A fruiting branch |
| 3. Diagram of the involucre of the staminate flower | 9. A cone scale, lower side, with its bract |
| 4. An anther, front view | 10. A seed |
| 5. An end of a branch, with pistillate flowers | 11. Vertical section of a seed |
| 6. A pistillate flower | 12. An embryo |
| | 13. Tip of a leaf |
| | 14. Cross section of a leaf |



Pinus echinata Mill.

Plate 2

SLASH PINE

Pinus elliottii Engelm.

OTHER COMMON NAMES: Swamp pine, Pitch pine, Southern pine, Spruce pine, Meadow pine.

FORM: Often 100 feet high, tall tapering trunk 2-3 feet in diameter, with heavy horizontal branches forming a round-topped head.

BARK: 3/4-1 1/2 inch thick, reddish, deeply grooved in mature trees, separating into large thin scales.

TWIGS: Stout, at first orange-colored, ultimately dark.

LEAVES: Densely crowded on the branches in clusters of twos and threes, stout, dark green, 8-12 inches long, usually falling off at the end of the second year.

FLOWERS: Flowers in January and February before appearance of the new leaves; male in short crowded clusters, dark purple; female, lateral on long peduncles, pink.

FRUIT: Ovoid or ovoid-conic, 2-6 inches long, leathery brown in color, with very short stem, cone scales thin with incurved or recurved prickle; seed almost triangular, 1 1/16-1 1/4 inch long, the wings 3/4-1 inch by 1/4 inch.

WINTER BUDS: Smooth, cylindrical, narrowed at apex.

WOOD: Heavy, very hard, strong, coarse-grained, rich orange in color, durable, sapwood almost white.

USES: Pulp, poles, piling, crossties, lumber, crates, boxes, turpentine. Historical uses: mine props.

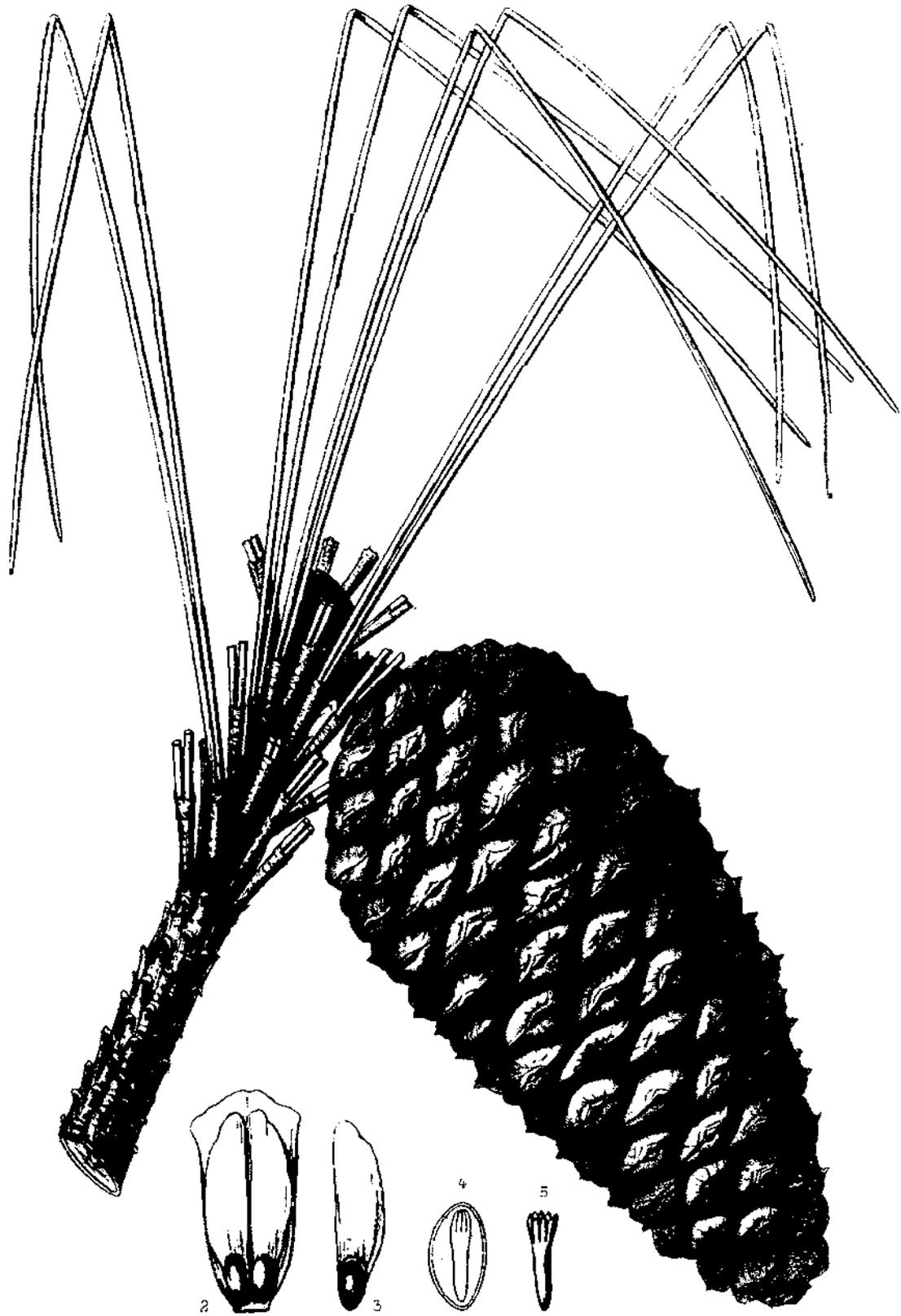
HABITAT: Low moist ground, hummocks in swamps, and places where water table is within a few feet of the surface of the ground, often on adjoining drier sites.

DISTINGUISHING CHARACTERISTICS: Leaves in twos and threes, longer than any southern pine except longleaf pine; the staminate flowers appear in January and February; prefers low, moist ground.

DISTRIBUTION IN ALABAMA: Southward from Washington, Monroe, Conecuh, Butler, Coffee, and Dale Counties.

EXPLANATION OF PLATE

- | | |
|---|-------------------------------|
| 1. A fruiting branch | 3. A seed |
| 2. A cone scale, upper side
with its seeds | 4. Vertical section of a seed |
| | 5. An embryo |



Pinuselliottii Engelm.

Plate 3

SPRUCE PINE

Pinus glabra Walt.

OTHER COMMON NAMES: Cedar pine, Walter pine, White pine, Lowland spruce pine, Black pine.

FORM: Usually 80-100 feet high, occasionally 120 feet, trunk diameter 2-2 1/2 feet comparatively small horizontal branches.

BARK: On young trees and upper trunk smooth, pale gray, 1/2-3/4 inches thick on old stems, slightly and irregularly divided by shallow fissures into flat connected ridges.

TWIGGS: Slender, flexible, at first light red tinged with purple, finally dark reddish-brown.

LEAVES: In twos, soft, slender, dark green, 1 1/2-3 inches long, deciduous at end of second season and in spring of the third year.

FLOWERS: Male in short crowded clusters, yellow; female raised on slender, slightly ascending peduncles.

FRUIT: Cones single or in clusters of 2 or 3, reflexed, on short stalks, oblong-ovoid or subglobose, 1/2-2 inches long, reddish-brown, rather lustrous; scales concave with short prickles that are usually deciduous; seed, more or less triangular, 1/8 inch long, dark gray, mottled with black.

WINTER BUDS: Ovate, acute, about 1/4 inch long; scales ovate, lanceolate, chestnut-brown, separating on the margins into white matted shreds.

WOOD: Soft, light, not strong, brittle, close-grained, light brown, thick, nearly white sapwood.

USES: Pulp, rough lumber.

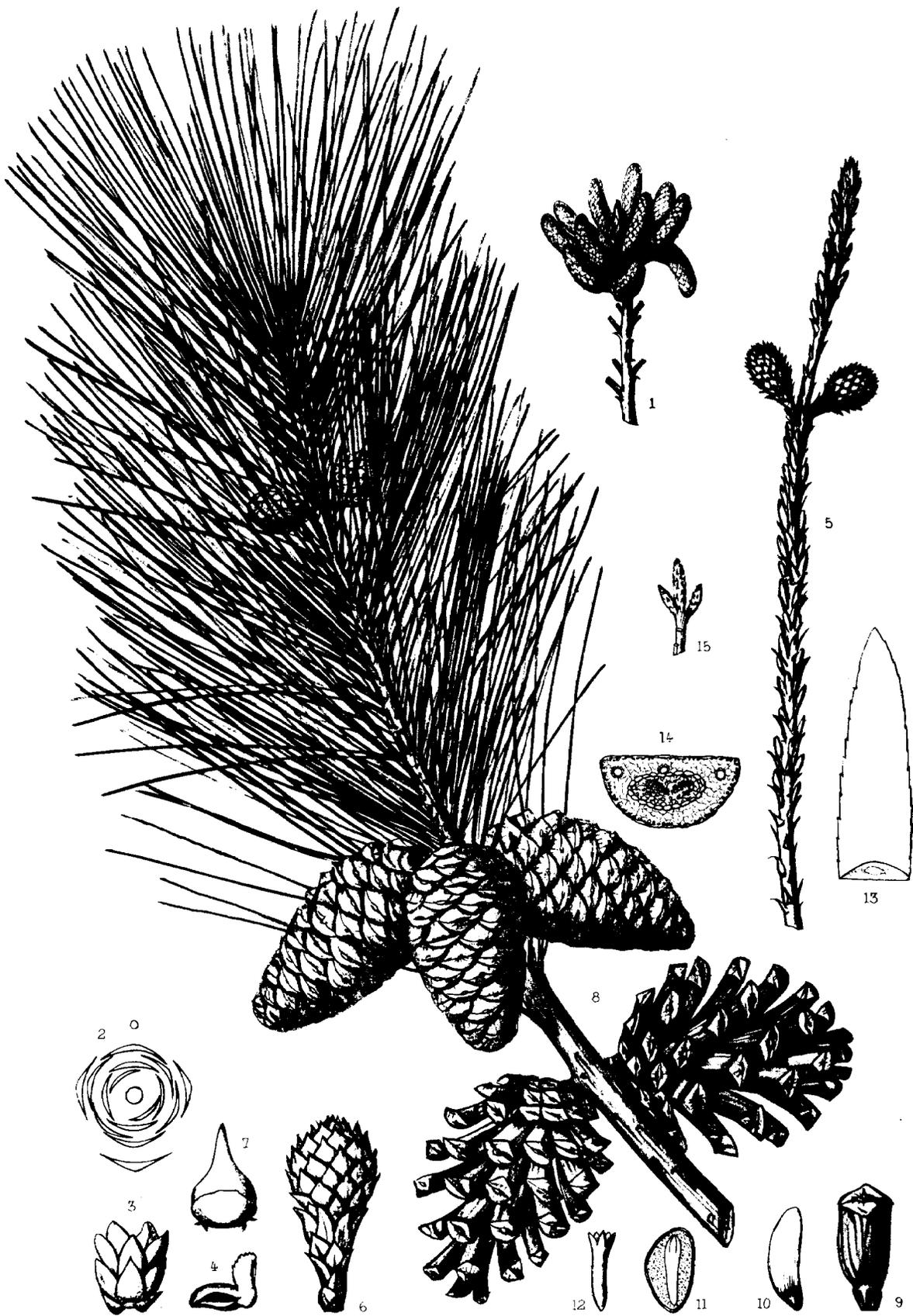
HABITAT: Low terraces along river swamps where subject to overflow, often occurs singly, highly shade tolerant when young.

DISTINGUISHING CHARACTERISTICS: Short, dark green needles in cluster of two; bark resembles that of eastern white pine, gray and smooth on upper trunk and branches; small reddish-brown cones.

DISTRIBUTION IN ALABAMA: Southward from Sumter, Marengo, Dallas, Autauga, Macon, and Lee Counties.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. A cluster of staminate flowers | 8. A fruiting branch |
| 2. Diagram of the involucre of a staminate flower | 9. A cone scale, lower side, with its bract |
| 3. Involucre of a staminate flower | 10. A seed |
| 4. An anther, side view | 11. Vertical section of a seed |
| 5. An end of a branch with female cones | 12. An embryo |
| 6. A pistillate flower | 13. Tip of a leaf |
| 7. A scale of a pistillate flower, lower side, with its bract | 14. Cross section of a leaf |
| | 15. Winter branch buds |



Pinus glabra Walt.

Plate 4

LONGLEAF PINE

Pinus palustris Mill.

OTHER COMMON NAMES: Hard pine, Heart pine, Longstraw pine, Pitch pine.

FORM: 100-120 feet high, 2-2 1/2 feet in diameter, occasionally 3 feet in diameter, slightly tapering trunk, stout, slightly branched, gnarled limbs forming an open, elongated and usually very irregular head, 1/3 to 1/2 the length of the tree.

BARK: 1/16-1/2 inch on the trunk, light orange-brown, separating on the surface into large, closely appressed scales.

TWIGS: Thick, orange-brown.

LEAVES: In clusters of 3, rarely 4 or 5, 8 to 18 inches long, slender, drooping, crowded in dense clusters at the ends of the branches and fall off at the end of the second year.

FLOWERS: Flowers very early in the spring before appearance of the new leaves; male in short dense clusters, dark rose-purple; female just below the apex of the lengthening shoot, in pairs or in clusters of 3 or 4, dark purple.

FRUIT: Mature cones 6 to 10 inches long, cylindric-ovoid, slightly curved and have a very short stem; cone scales thin and flat, rounded at the tip, armed with short or reflexed prickles; seed almost triangular, about 1/2 inch long, often marked with dark blotches on the upper side, wings about 1 3/4 inches long; seed sprout soon after falling to the ground.

WINTER BUDS: Gradually widen from the base to above the middle and then narrow to the acute apex; terminal bud often twice as large as the lateral buds, 2 to 2 1/2 inches long, covered with silvery-white lustrous scales divided on the margin, except near the apex, into long spreading filaments which form a cobweb-like network over the bud.

WOOD: Heavy, very hard, strong, tough, coarse-grained, durable; heartwood light red to orange color; sapwood thin, nearly white.

USES: Lumber, spars, poles, bridges, fencing, flooring, interior woodwork, resinous chemicals, pulp. Historical uses: masts, naval stores.

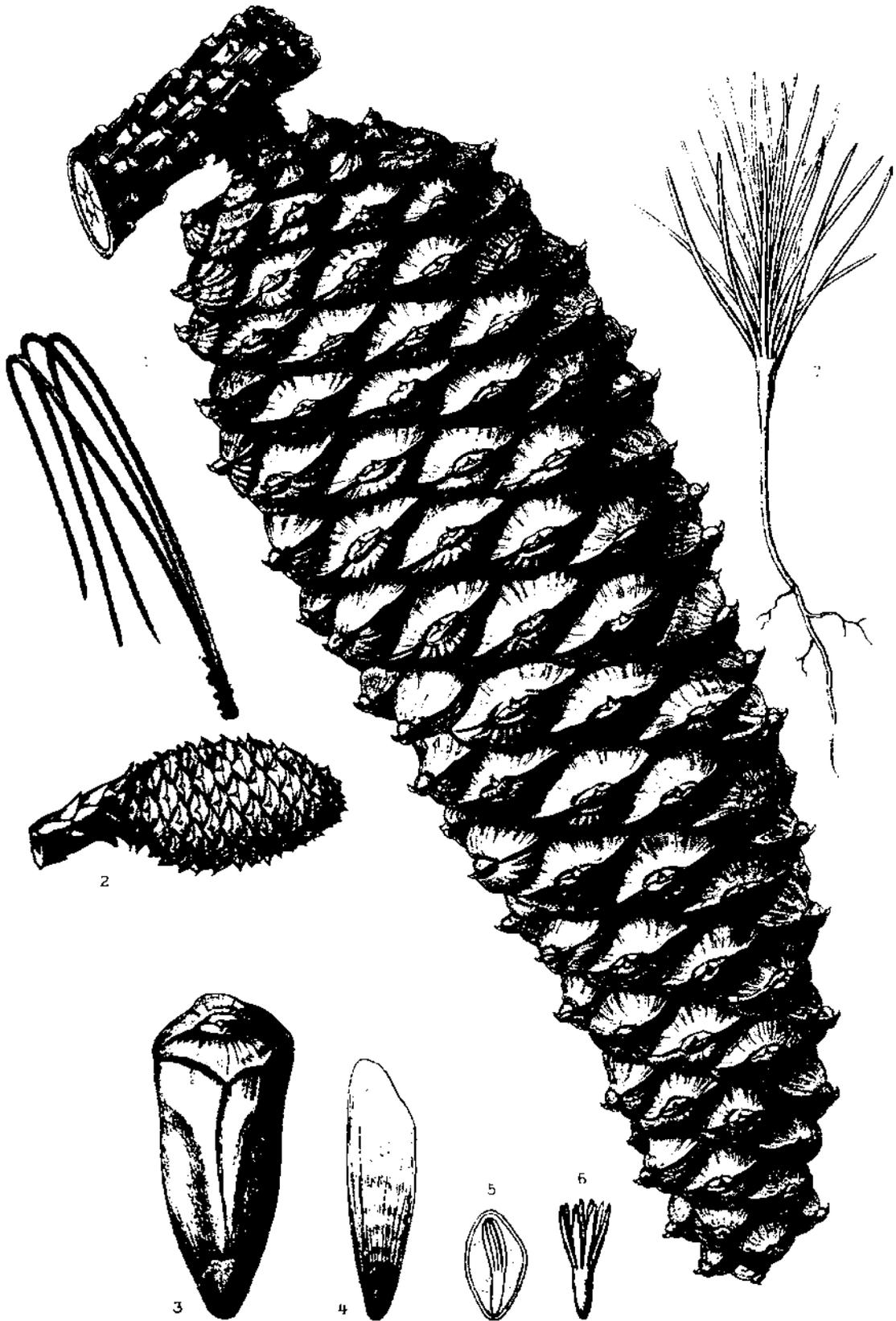
HABITAT: Well-drained, sandy and gravelly soils.

DISTINGUISHED CHARACTERISTICS: Long leaves clustered near the free terminal end of the branches, and open crown; bark of mature trees separating into thin, large scales; large cones.

DISTRIBUTION IN ALABAMA: South from Cherokee County, the full length of the east side of the state; from Walker, south in Hale, Dallas, Elmore and Autauga Counties; on the west side of Alabama from Sumter and Choctaw east and south to the Gulf and the Florida line.

EXPLANATION OF PLATE

- | | |
|-----------------------------|-------------------------------|
| 1. A fruiting branch | 5. Vertical section of a seed |
| 2. A cone, one year old | 6. An embryo |
| 3. A cone scale, lower side | 7. A seedling plant |
| 4. A seed | |



***Pinus palustris* Mill.**

Plate 5

POND PINE

Pinus serotina Michx.

OTHER COMMON NAMES: Marsh pine, Pocosin pine.

FORM: Usually 40-50 feet, occasionally 70-80 feet high, trunk short, generally not more than 2 feet in diameter; stout, often contorted branches, more or less pendulous at the extremities, forming an open round-topped head.

BAK: On the mature trunk 1/2-3/4 inch, thick, dark red-brown, irregularly divided by narrow, shallow fissures into small plates, separating into thin closely appressed scales.

TWIGS Slender, at first dark green, become dark orange color their first winter, finally dark brown or nearly black.

LEAVES: In clusters of 3, occasionally 4, flexuose, dark yellow-green, 6-8 inches long, deciduous their third or fourth year.

FLOWERS: Male flowers in crowded spikes, dark orange color; female clustered or in pairs on stout stems.

FRUIT: Subglobose to ovoid, full and rounded or pointed at the apex, sessile or on short stalks, 2-2 1/2 inches long; scales nearly flat, armed with slender, incurved, mostly deciduous prickles; cones often remain closed 1 to 2 years before opening; seeds nearly triangular, 1/8 inch long.

WINTER BUDS: Broadly ovate, gradually tapering and acute at the apex, 1/3-1/2 inch long; scales ovate, acute, pale chestnut-brown, fimbriate on the margins.

WOOD: Very resinous, heavy, soft, brittle, coarse-grained, dark orange color; thick pale yellow sapwood.

USES: Lumber, pulp.

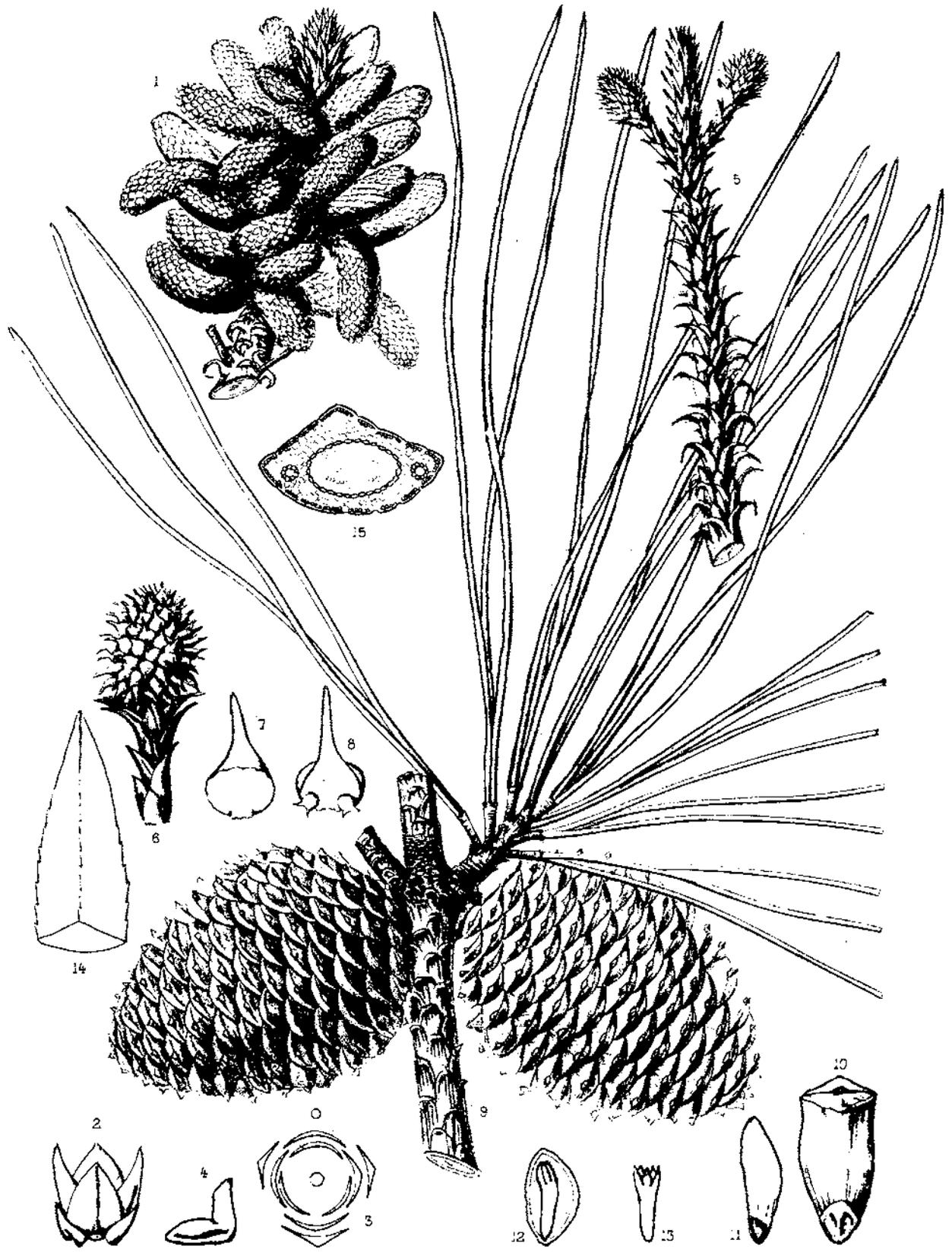
HABITAT: Low flats, sandy or peaty swamps.

DISTINGUISHING CHARACTERISTICS: Needles flexuose, 6-8 inches long; cones subglobose or ovoid, rounded or pointed at apex.

DISTRIBUTION IN ALABAMA: Chilton, Autauga, Dale, Houston, Covington, and Geneva Counties.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. An end of a branch with staminate flowers | 8. A scale of a pistillate flower, upper side, with its ovules |
| 2. An involucre of a staminate flower | 9. A fruiting branch |
| 3. Diagram of the involucre of the staminate, flower | 10. A cone scale, lower side |
| 4. An anther, side view | 11. A seed with its wing |
| 5. An end of a branch with pistillate flowers | 12. Vertical section of a seed |
| 6. A pistillate flower | 13. An embryo |
| 7. A scale of a pistillate flower | 14. Tip of a leaf |
| | 15. Cross section of a leaf |



Pinus serotina Michx.

Plate 6

LOBLOLLY PINE

Pinus taeda L.

OTHER COMMON NAMES: Old field pine, Rosemary pine, Shortleaf pine, Yellow pine, Southern pine, Bull pine.

FORM: Height 80-100 feet, straight trunk, 2 feet and occasionally 5 feet in diameter, with thickened branches, upper branches ascending forming a compact rounded crown.

BARK: On old trunks $\frac{3}{4}$ to 1 $\frac{1}{2}$ inches thick, bright red-brown, irregularly divided by shallow furrows into oblong scaly plates.

TWIGS: Slender and glabrous, during first season tinged with yellow and covered with a glaucous bloom; clothed with the reflexed inner scales of branch buds which fall off during autumn and winter leaving their bases to roughen the branches many years.

LEAVES: 6 to 9 inches long, typically in clusters of threes, bound together by a fibrous sheath and remain on the twigs 3 to 4 years, slender, stiff, slightly twisted and tipped with a sharp point.

FLOWERS: Opening from middle of March to first of May, male crowded in short spikes, yellow; female lateral below apex of the growing shoot, solitary or clustered, yellow.

FRUIT: Mature cones, 3 to 6 inches long, oblong-conic to ovoid-cylindric, becoming reddish-brown; scales thin, rounded at apex, armed with short straight or reflexed prickles; seeds rhomboidal, $\frac{1}{4}$ inch long, blotched with black.

WINTER BUDS: Widened from the base to the middle, acute or acuminate at apex; terminal bud usually twice as large as the lateral buds, being to 1 inch in length.

WOOD: Light brown, coarse-grained, not durable.

USES: Lumber, railroad ties, piling, pulp, pallets.

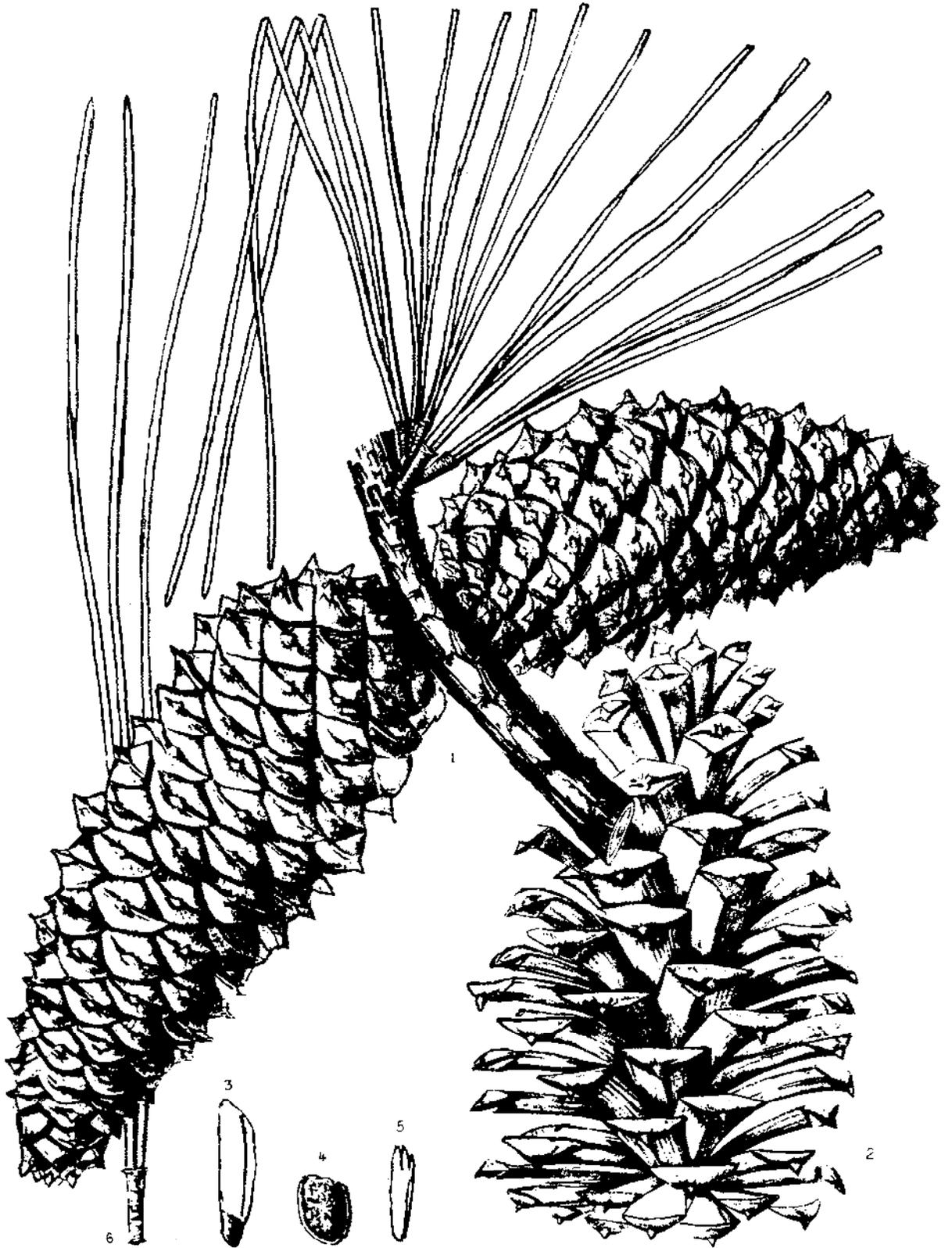
HABITAT: A great variety of soils (except the highest, wettest, and driest); its best growth is on soil that holds moisture during the growing season.

DISTINGUISHING CHARACTERISTICS: Bark deeply furrowed into broad oblong plates that are composed of many thin scales pressed closely together; new branches have a tinge of yellow and in their first season a fine bloom or fuzz; the buds are without resin; cone scales about 1 inch long and end in a strong reflexed spine.

DISTRIBUTION IN ALABAMA: Common throughout the state.

EXPLANATION OF PLATE

- | | |
|----------------------|------------------------|
| 1. A fruiting branch | 4. A seed, enlarged |
| 2. An expanded cone | 5. An embryo |
| 3. A seed | 6. A cluster of leaves |



Pinus taeda L.

Plate 7

VIRGINIA PINE

Pinus virginiana Mill.

OTHER COMMON NAMES: Jersey pine, Scrub pine, Spruce pine, Virginia scrub pine.

FORM: Usually 30-40 feet high, rarely more than 18 inches in diameter, sometimes 100 feet tall with diameter 2 1/2 to 3 feet, the branches are long, horizontal and tend to droop, small branches slender and limber, the crown is often shaped like a flattened cone.

BARK: 1/4 to 1/2 inch thick, broken by shallow grooves into plate-like scales tinged with red.

TWIGS: At first pale green or green tinged with purple, covered with a glaucous bloom, becoming purple and later light gray-brown.

LEAVES: Clustered in twos, 1 1/2 to 3 inches long, somewhat stiff, grayish-green, shed the third or fourth year.

FLOWERS: Male in crowded clusters, orange-brown; female on opposite spreading peduncles near the middle of the shoots of the year, generally a little below and alternate with 1 or 2 lateral branchlets, pale green, about 1/3 of an inch long, the scale tips tinged with rose color.

FRUIT: Cones 2 to 3 inches long, quite red when mature, sessile, conical when closed, ovoid when open, may persist 3 to 4 years; cone scales thin, nearly flat, terminated with a prickle; seeds 1/3 inch long, pale brown.

WINTER BUDS: Ovate, sharp-pointed, 1/4 to 1/2 inch long, covered with overlapping sharp-pointed brown scales.

WOOD: Slightly resinous, light, soft, brittle, pale orange, with light sapwood.

USES: Railroad ties, lumber, fuel, pulp. Historical uses: mine props.

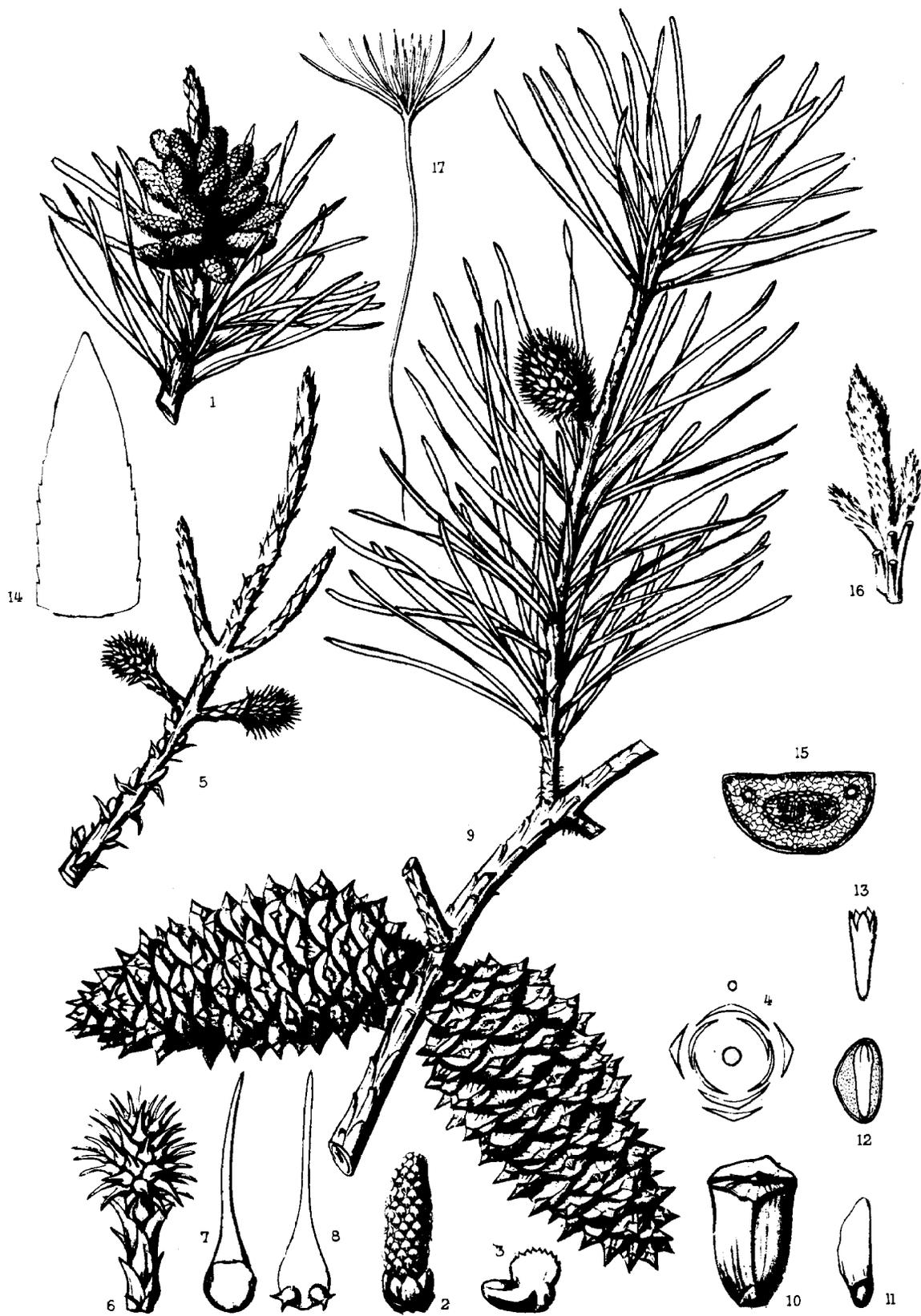
HABITAT: Light sandy soil and rocky mountain slopes and ridges; very prolific.

DISTINGUISHED CHARACTERISTICS: Tree often has ragged appearance; short twisted spreading leaves; youngest branches are purple, often curved; long horizontal or pendulous branches.

DISTRIBUTION IN ALABAMA: Northern part of the state and as far south as Chilton County.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A flowering branch with staminate flowers | 8. A scale of a pistillate flower, upper side, with its ovules |
| 2. A staminate flower | 9. A fruiting branch |
| 3. An anther | 10. A cone scale, lower side, with its bract |
| 4. Diagram of the involucre of the staminate flower | 11. A seed |
| 5. An end of a branch with pistillate flower, lower side, with its bract | 12. Vertical section of a seed |
| 6. A pistillate flower | 13. An embryo |
| 7. A scale of a pistillate flower, lower side, with its bract | 14. Tip of a leaf |
| | 15. Cross section of a leaf |
| | 16. Expanding branch buds |
| | 17. A seedling plant |



Pinus virginiana Mill.

EASTERN HEMLOCK

Tsuga canadensis (L) Carr.

OTHER COMMON NAMES: Canada hemlock, Hemlock, Hemlock spruce.

FORM: Usually 60-70 feet high, occasionally 100 feet tall, with trunk diameter 2-4 feet; in the open the crown is obtusely pyramidal, consisting of horizontal branches, (the lower pendulous), which extend to the ground; in the forest the trunk may be devoid of branches more than half of its length and conspicuously tapers toward its apex; branches and foliage in flat-topped sprays.

BARK: 1/2-3/4 inches thick, reddish or grayish-brown, deeply divided by long fissures into broad ridges, closely scaly on the surface.

TWIGS: Their first winter, yellowish-brown and pubescent, later dark grayish or purplish brown and glabrous.

LEAVES: Alternate, appear to be 2-ranked, oblong-linear, flat, obscurely grooved, rounded or notched at apex, dark yellowish-green above, two broad white glaucous lines beneath, 1/2-2/3 inch long, about 1/16 inch wide.

FLOWERS: Appear about April or May, staminate and pistillate cones usually on the same branch; staminate near the ends of branches of the previous season, about 3/8 inch long, subglobose, yellow; pistillate cones terminal, oblong, about 1/8 inch long, pale green at pollination.

FRUIT: An ovate-oblong cone 1/2-3/4 inch long, suspended on a slender peduncle, turns reddish or grayish-brown in autumn; seeds light brown, winged, about 1/16 inch long.

WINTER BUDS: About 1/16 inch long, ovate, obtuse, slightly puberulous, light chestnut-brown.

WOOD: Light, hard, brash, coarse grained, splintery, subject to wind-shake, light brown tinged with red.

USES: Pulp, rough lumber, Historical uses: source of tannin.

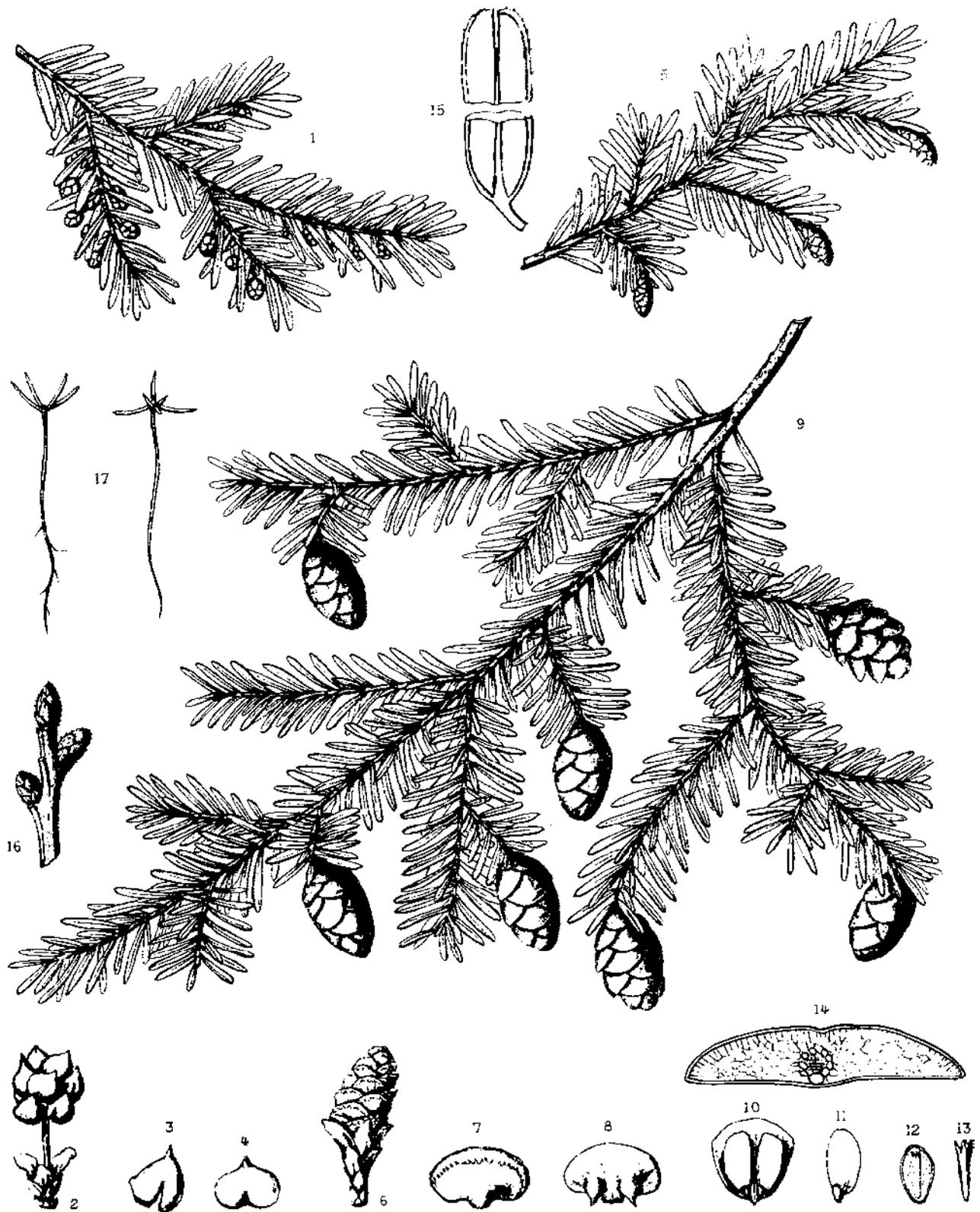
HABITAT: Prefers damp soil along streams, sides of glens or coves, northern slopes, borders of lakes, ponds and margins of swamps.

DISTINGUISHING CHARACTERISTICS: Linear needles with two longitudinal white streaks on the underside; the needles appear 2-ranked, but there is an inconspicuous row of needles on top of the twig; the bark is deeply divided by long fissures.

DISTRIBUTION IN ALABAMA: Franklin, Marion, Winston, Jackson, Bibb, and Jefferson Counties.

EXPLANATION OF PLATE

- | | |
|--|---------------------------------|
| 1. A branch with staminate flowers | 9. A fruiting branch |
| 2. A staminate flower | 10. A cone scale |
| 3. An anther, side view | 11. A seed |
| 4. An anther, front view | 12. Vertical section of a seed |
| 5. A branch with pistillate flowers | 13. An embryo |
| 6. A pistillate flower | 14. Cross section of leaf |
| 7. A scale of a pistillate flower | 15. A leaf divided transversely |
| 8. A scale of a pistillate flower, upper side, with its ovules | 16. Winter branch buds |
| | 17. Seedling plants |



***Tsuga canadensis* (L) Carr.**

BALDCYPRESS

Taxodium distichum (L) Rich.

OTHER COMMON NAMES: Common baldcypress, Gulf cypress, Red cypress, Southern cypress.

FORM: Occasionally 150 feet tall, generally 4-5 feet in diameter above the enlarged buttressed base; crown in old trees broad, rounded, may be 100 feet across.

BARK: 1-2 inches thick, light cinnamon-red, divided by shallow fissures into broad flat ridges separating on the surface into long fibrous scales.

TWIGS: At first light green, then light red-brown, later become darker, lateral branchlets 3-4 inches long, spread at right angles to the branch, become deciduous.

LEAVES: On distichously spreading branchlets, 1/2-3/4 inch long, about 1/12 inch wide, light bright yellow-green occasionally, silvery-white below; on the form with pendulous branchlets, long-pointed, keeled and stomantiferous below, about 1/2 inch long.

FLOWERS: Staminate in slender, purplish, tassel-like clusters 4-5 inches long; pistillate flowers scattered, near the ends of branchlets of the preceding year, solitary or in pairs.

FRUIT: Nearly globose or obovoid, rugose, about 1 inch in diameter, scales usually without tips; seeds with wings, nearly 1/4 inch long, 1/8 inch wide.

WINTER BUDS: Near the tip of the shoot rounded with overlapping sharp-pointed scales; lateral buds smaller; branchlets which fall in the autumn without buds.

WOOD: Light, soft, not strong, easily worked, light or dark brown; very durable.

USES: Lumber fences, interior and exterior paneling. Historical uses: barrel staves.

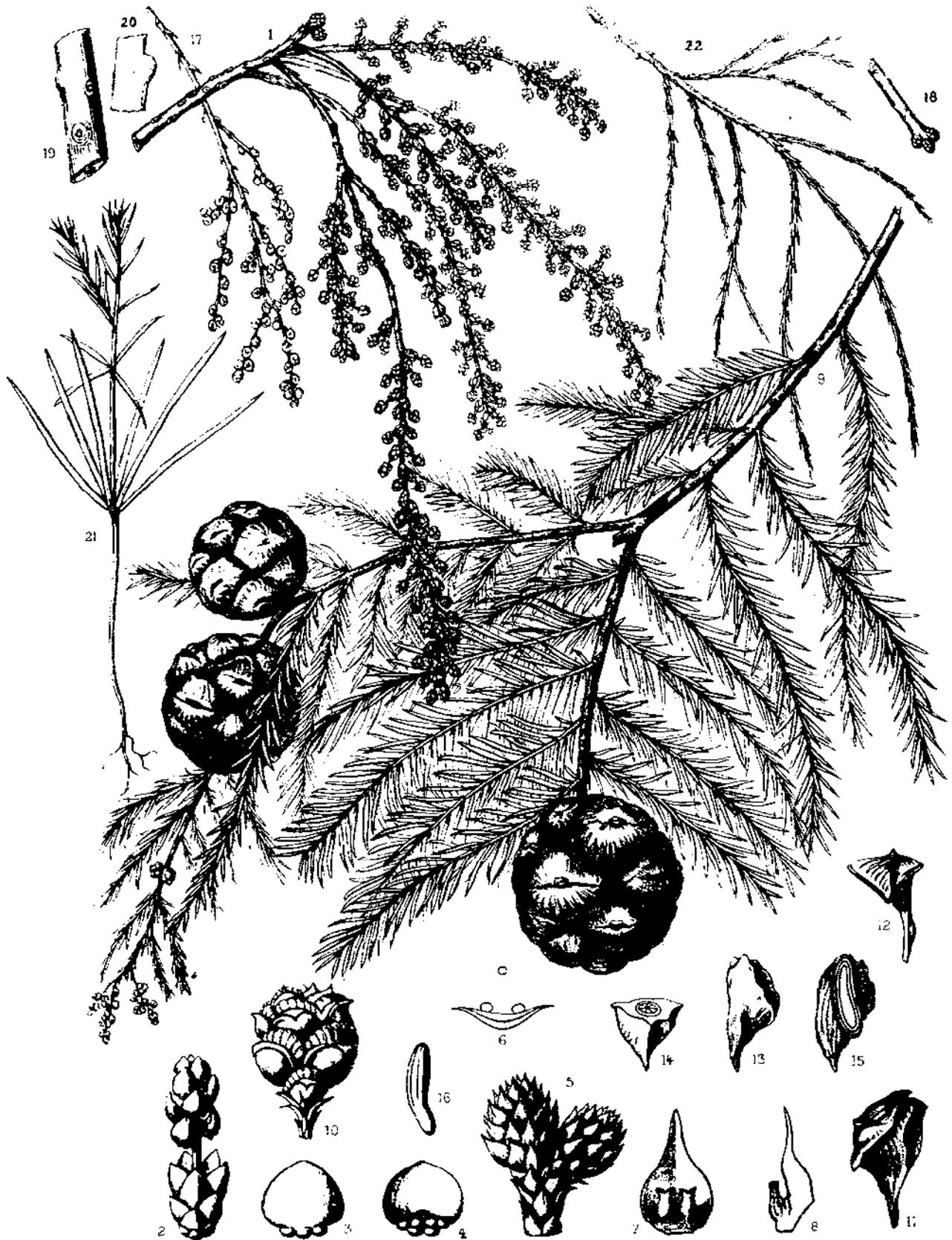
HABITAT: Swamps inundated several months of the year, low wet banks of streams.

DISTINGUISHING CHARACTERISTICS: Large buttressed base of the trunk; seed irregularly triangular, with thick coat; woody protuberances, "cypress knees", often arise from roots. Pondcypress, *Taxodium ascendens* Brong. is found closely associated with baldcypress, but usually on isolated pond areas.

DISTRIBUTION IN ALABAMA: Most abundant in the southern tier of counties and occurs locally elsewhere. Pondcypress appears closer to the Gulf Coast on isolated pond areas.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A flowering branch | 11. A scale of a cone with its seeds, side view |
| 2. A staminate flower | 12. A scale of a cone, its seeds removed |
| 3. A scale of a staminate flower | 13. A seed |
| 4. A scale of a staminate flower, front view | 14. Cross section of a seed |
| 5. A pistillate flower | 15. A vertical section of a seed |
| 6. Diagram of a pistillate flower | 16. An embryo |
| 7. A scale of a pistillate flower, with ovaries, front view | 17. Staminate winter flower buds |
| 8. Vertical section of a scale of a pistillate flower | 18. Pistillate winter buds |
| 9. A fruiting branch | 19. Winter leaf buds |
| 10. A partly grown fruit | 20. Vertical section of a branch with a leaf bud |
| | 21. A seedling |
| | 22. Portion of a branch with acicular leaves |



***Taxodium distichum* (L.) Rich.**

ATLANTIC WHITE CEDAR

Chamaecyparis thyoides (L) B.S.P.

OTHER COMMON NAMES: White cedar, False cypress, Swamp cedar, Southern white cedar.

FORM: 40-50 feet tall, diameter 1-2 feet, may reach a height of 90 feet, trunk straight, tapering, bears slender horizontal branches which form a more or less narrow, conical crown.

BARK: Rather thin, reddish-brown, somewhat furrowed, peels off in long fibrous-like scales $\frac{3}{4}$ inch or slightly more in thickness.

TWIGS: Rather slender, somewhat flattened, at first bluish-green, after the leaves have fallen they become roundish and reddish-brown; terminal twigs often arranged in fan-like clusters.

LEAVES: Opposite, scale-like, ovate, sharp-pointed, appressed, imbricated, dark blue-green, glandular, $\frac{1}{16}$ - $\frac{1}{8}$ inch long, often spreading and awl-shaped on vigorous shoots.

FLOWERS: Monoecious, borne in cones on different sprays; staminate cones terminal, solitary, about $\frac{1}{8}$ inch long; ovulate cones usually solitary $\frac{1}{16}$ - $\frac{1}{8}$ inch long, consist of 6 peltate scales.

FRUIT: A globose, glaucous, inconspicuous, bluish-purple cone about $\frac{1}{4}$ inch in diameter, reddish-brown when ripe, opening the first season in autumn; cone scales peltate; each fertile scale bears 1 to 2 seeds with a dark brown wing; seeds about $\frac{1}{8}$ inch long.

WINTER BUDS: Minute, without scales, protected by the appressed scale-like leaves.

WOOD: Light, soft, weak, close-grained, slightly fragrant, light reddish-brown.

USES: Posts, poles, railroad ties. Very durable in contact with the soil. Historical uses: boat lumber, tubs, shingles.

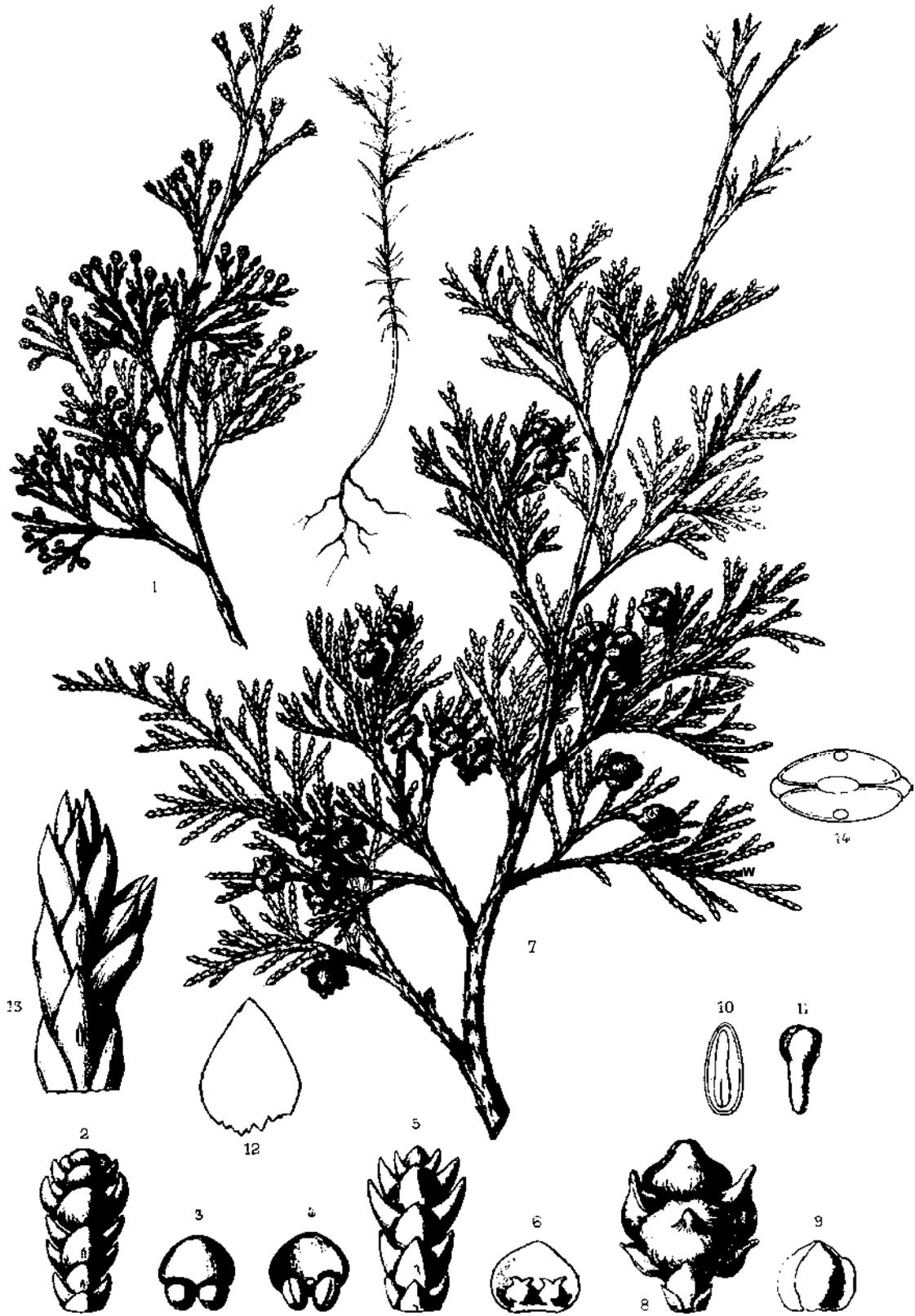
HABITAT: Cold, wet swamps in the North; in the South intermingled with baldcypress. Tree thrives in regions unsuitable for other species.

DISTINGUISHING CHARACTERISTICS: Small globose cones with shield-shape scales, branchlets compressed at first and later become terete; leaves ovate, acuminate with slender callous tips; glandular dots on the leaves.

DISTRIBUTION IN ALABAMA: Washington, Mobile, Baldwin, and Escambia Counties.

EXPLANATION OF PLATE

- | | |
|--|----------------------------------|
| 1. A flowering branch | 9. A seed |
| 2. Staminate flower | 10. Vertical section of a seed |
| 3. A stamen, rear view | 11. An embryo |
| 4. A stamen, front view | 12. A leaf |
| 5. A pistillate flower | 13. End of a branchlet |
| 6. A scale of a pistillate flower,
with ovule, front view | 14. Cross section of a branchlet |
| 7. A fruiting branch | 15. A seedling |
| 8. A fruit | |



***Chamaecyparis thyoides* (L.) B. S. P.**

EASTERN RED CEDAR

Juniperus virginiana L.

OTHER COMMON NAMES: Red juniper, Red cedar, Savin, Cedar, Juniper bush.

FORM: 40-50 feet tall, 10-12 inches diameter, occasionally large; slender branches horizontal on lower part of tree, ascending on upper portion, forming narrow, compact pyramidal head.

BARK: Reddish brown, thin, somewhat grooved, peeling off in long fibrous strips.

TWIGS: Slender, usually four-sided, green until leaf fall, then round and reddish brown.

LEAVES: Of two kinds, scale-like and awl-shaped, scale-like leaves predominate, may persist 3-6 years, 1/16 inch long, opposite, 4 ranked, ovate, acute, usually glandular on the back, closely appressed, dark bluish green, awl-shaped usually on young trees and vigorous shoots, linear lanceolate, without glands, opposite, not overlapping, 1/2-3/4 inch long.

FLOWERS: Appear from February to May, dioecious, (rarely monoecious), borne in cones; staminate cones 1/8-1/4 inch long, oblong-ovate, yellow, in great numbers; pistillate cones solitary, terminal, about 1/16 inch long, ovoid, consisting of about 6 fleshy, spreading, acute, bluish scales.

FRUIT: Subglobose, pale or blue-green, somewhat angled, berry-like cone, 1/4-1/3 inch in diameter, becomes glaucous in autumn, with firm epidermis and thin sweet flesh; seeds 1-2, wingless, 1/16-1/8 inch long.

WINTER BUDS: Inconspicuous because they are small and covered with leaves.

WOOD: Non-porous, without resin ducts; heartwood red; sapwood nearly white; wood light, soft, brittle, fragrant, readily worked, very durable in contact with the soil.

USES: Moth-proof chests, closets, cabinets, interior paneling and millwork, fence posts, furniture, landscaping, handicrafts. Historical uses: pencils, pails, tubs.

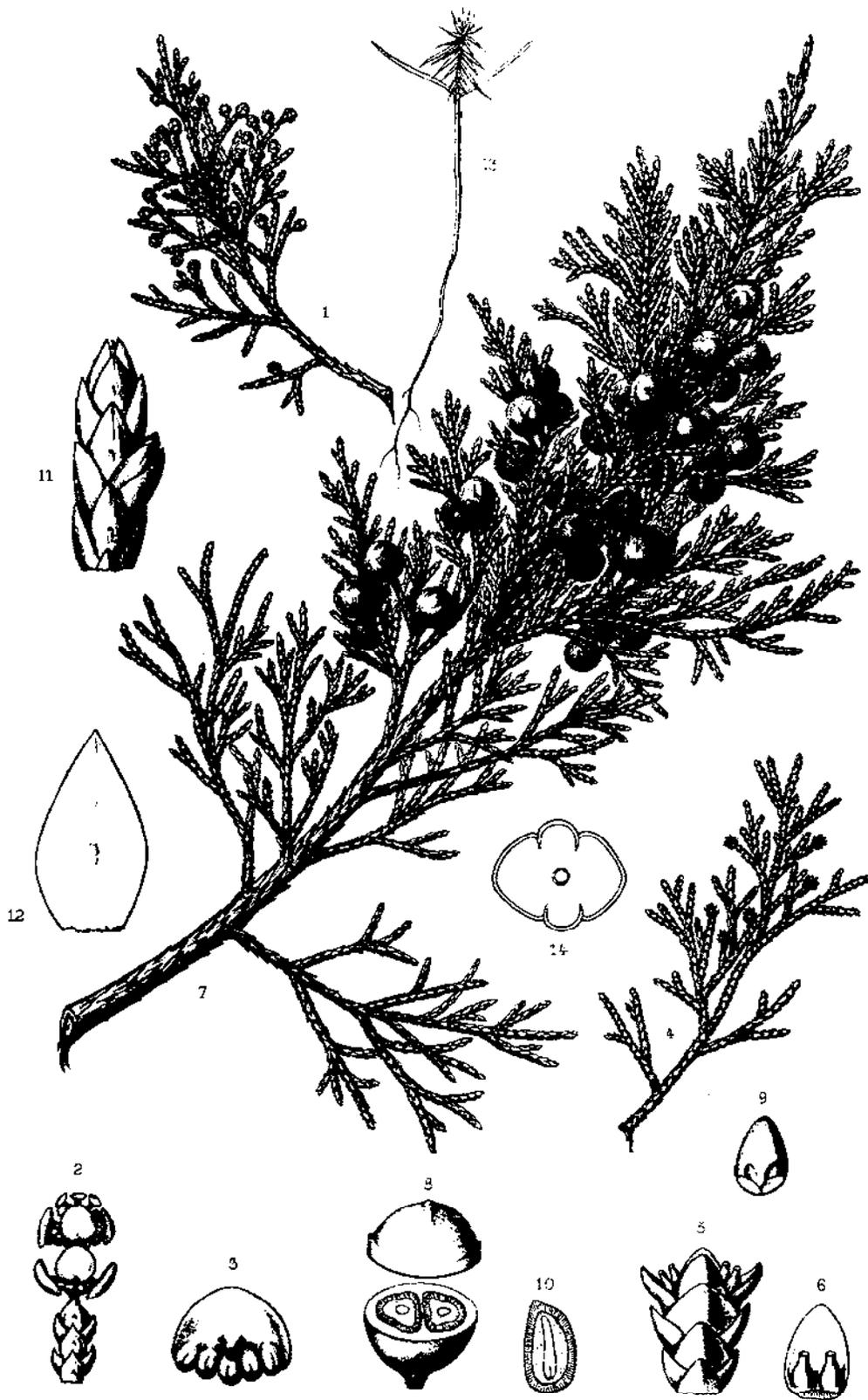
HABITAT: Adapts to variety of soils abandoned fields, rocky cliffs, limestone soil favorable for its growth, best development in alluvial soils of the southern states.

DISTINGUISHING CHARACTERISTICS: Berry-like fruit; scale-like leaves in 4 rows; awl-shaped leaves usually in 2 rows; distinct red heart wood; fragrance of its wood.

DISTRIBUTION IN ALABAMA: Most abundant in northern tier of counties; also in Cherokee, Etowah, Calhoun, Talladega, Blount, Jefferson, Shelby, Tuscaloosa, and Bibb Counties; common in the Black Belt.

EXPLANATION OF PLATE

- | | |
|---|----------------------------------|
| 1. A flowering branch of the staminate tree | 8. A fruit divided transversely |
| 2. A staminate flower | 9. A seed |
| 3. A stamen, front view | 10. Vertical section of a seed |
| 4. A branch of the pistillate tree | 11. End of a branchlet |
| 5. A pistillate flower | 12. A leaf |
| 6. A scale of a pistillate flower with its ovules, front view | 13. A seedling |
| 7. A fruiting branch | 14. Cross section of a branchlet |



Juniperus virginiana L.

EASTERN COTTONWOOD

Populus deltoides Bartr.

OTHER COMMON NAMES: Eastern poplar, Cottonwood, Carolina poplar, Whitewood.

FORM: Usually 50-75 feet in height, trunk diameter 2-3 feet, may reach a height of 100 feet with trunk 6 feet in diameter; bole tapering, continuous well into the crown; crown at first pyramidal, with age rounded, open, nearly as broad as long, lower lateral branches horizontal, most of upper branches ascending.

BARK: Ashy-gray, roughened by long deep furrows, longitudinally parallel, often connecting with one another, smooth and greenish-yellow on young trunks.

TWIGS: Stout, yellow tinged with green or brown, round or ridged below the buds, lenticels large, longitudinally elongated.

LEAVES: Alternate, simple, broadly deltoid-ovate, acute at apex, truncate or cuneate at the base, margin crenate-serrate, 3-5 inches long, thick, shining green above, pale green below, leaf stalks long, flattened.

FLOWERS: Appear before the leaves; dioecious; staminate in many flowered aments that are 3-4 inches long; pistillate flowers borne in sparsely flowered aments 2 1/2-3 1/4 inches long.

FRUIT: A drooping ament, 8-12 inches long and bears green capsules, which contain small seed with a mat of long white hairs.

WINTER BUDS: Large, ovate, acute, 1/2-3/4 inch long, smooth, lustrous, chestnut-brown, covered by 6-7 scales which are sticky resinous on inner surface; lateral buds usually divergent.

WOOD: Light, soft, weak, fine-grained, warps easily, dark brown, with thick nearly white sapwood.

USES: Pulp, crates. Historical uses: boxes, pails, tubs.

HABITAT: Prefers rich, damp soils along streams, borders of lakes, wet meadows and bottom lands.

DISTINGUISHING CHARACTERISTICS: Leaves have laterally flattened leaf-stalks; lateral branches have a tendency to ascend; bud scales resinous on their inner surface; margin of the leaves crenate-serrate.

DISTRIBUTION IN ALABAMA: General; common along rivers and larger creeks, may be along small creeks and ditches, along the Tennessee River, all the way across the state.

EXPLANATION OF PLATE

- | | |
|-----------------------------|-------------------------------|
| 1. A fruiting branch | 4. Vertical section of a seed |
| 2. A fruit with open valves | 5. An embryo |
| 3. A seed | |



Populus deltoides Bartr.

SWAMP COTTONWOOD

Populus heterophylla L.

OTHER COMMON NAMES: Swamp poplar, Cottonwood, Black cottonwood, River cottonwood.

FORM: 80-90 feet high with a trunk diameter 2-3 feet, may reach a height of 100 feet; crown high, rather broad, round topped; bole in large trees straight and columnar.

BARK: Thick, light reddish-brown, rough, broken by long fissures into long narrow plates; on young trunks and large branches, fissures shallower and ridges smoother.

TWIGS: Stout, light yellowish, with a few scattered lenticels and roughened by elevated leaf scars, pith orange-colored.

LEAVES: Alternate, simple, borne on long, hairy terete petioles, broadly ovate, obtuse or subacute at the apex, rounded to cordate at the base, crenate, 4-8 inches long, 3-5 inches wide, thin and firm in texture at maturity, dark green, smooth above, paler and glabrous below.

FLOWERS: Appear before the leaves; dioecious; staminate in densely flowered aments 2-2 1/2 inches long; pistillate in few-flowered aments 1-2 inches long.

FRUIT: A drooping ament, 4-6 inches long, bearing a few dark green capsules containing small seeds covered by a mat of white hairs.

WINTER BUDS: Ovate, acute, puberulous, reddish-brown, covered by 4-7 scales, about 1/4 inch long.

WOOD: Light, soft, weak, close-grained, pale brown, with thin brownish-white sapwood

USES: Pulp, crates. Historical uses: boxes, pails, tubs.

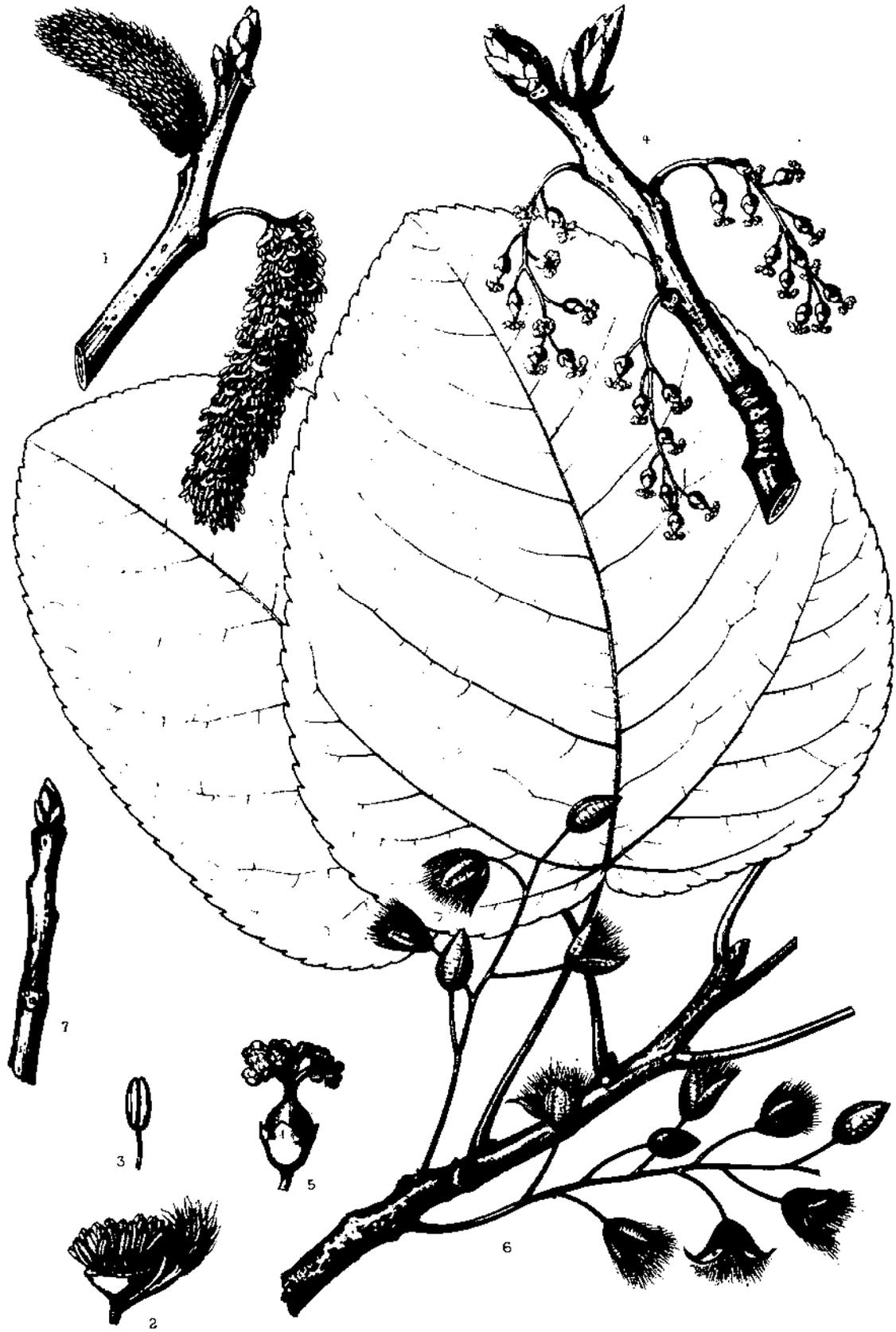
HABITAT: Moisture-loving; low swampy situations, often where the soil inundated long periods of time.

DISTINGUISHING CHARACTERISTICS: Round leaf stalks, not laterally flattened; large bluntly pointed leaves; pith orange-colored; buds slightly pubescent toward the base.

DISTRIBUTION IN ALABAMA: Reported from Montgomery, Clarke, Dallas Counties and lower part of the Mobile Delta.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A flowering branch of the staminate tree | 4. A flowering branch of the pistillate tree |
| 2. A staminate flower with its scale | 5. A pistillate flower |
| 3. A stamen | 6. A fruiting branch |
| | 7. A winter branch |



Populus heterophylla L.

BLACK WILLOW

Salix nigra Marsh.

OTHER COMMON NAMES: Swamp willow, Crack willow.

FORM: Usually 30-40 feet high, with a diameter 10-20 inches, may reach a height of 120 feet, often with several medium sized trunks; thick spreading upright branches forming a broad somewhat open irregular head.

BARK: 1-1 1/4 inch thick, dark brown or nearly black, deeply divided into broad flat connected ridges, separating freely into plate-like scales, becomes shaggy on old trunks.

TWIGS: Pubescent when they first appear, soon glabrous, becoming reddish-brown to orange-colored, slender, drooping, easily separated at the joints.

LEAVES: Alternate, simple, lanceolate, long acuminate, often falcate, cuneate or rounded at base, finely serrate, thin, bright light green above, paler below.

FLOWERS: Appear before the leaves, dioecious, terminal, on short branchlets, borne in the axils of yellow, rounded scales; both staminate and pistillate flowers borne in drooping aments 1-3 inches long.

FRUIT: An ovoid-conic, reddish-brown capsule about 1/8 inch long, opening by 2 sutures at maturity to set free the minute seeds covered with tufts of fine long hairs.

WINTER BUDS: Terminal bud absent, lateral buds 1-scaled, acute, reddish-brown, about 1/16 inch long.

WOOD: Light, soft, weak, fine-grained, pale reddish-brown with nearly white sapwood.

USES: Pulp, cheap furniture, soil erosion. Historical uses: artificial limbs, excelsior, berry boxes, crates.

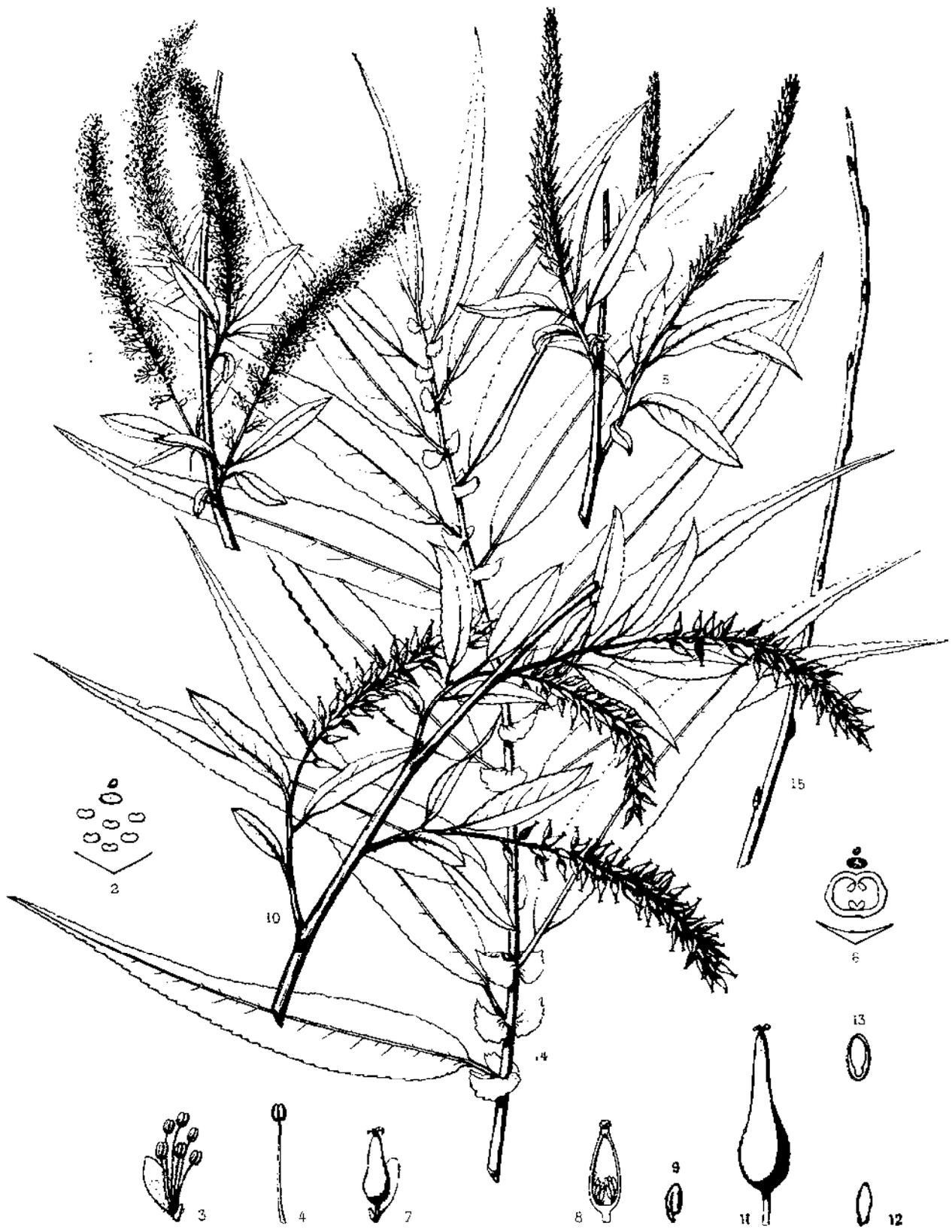
HABITAT: Wet sites along streams, shores of lakes, flat swampy areas.

DISTINGUISHING CHARACTERISTICS: Largest of our native willows; rough, thick-scaled, blackish-brown bark; narrowly lanceolate short petioled leaves; twigs easily separated at the joints.

DISTRIBUTION IN ALABAMA: Apparently grows in every county in the state.

EXPLANATION OF PLATE

- | | |
|---|---------------------------------|
| 1. A flowering branch of the staminate tree | 8. Vertical section of a pistil |
| 2. Diagram of a staminate flower | 9. An ovule |
| 3. A staminate flower with its scale, front view | 10. A fruiting branch |
| 4. A stamen | 11. A capsule |
| 5. A flowering branch of the pistillate tree | 12. A seed |
| 6. Diagram of a pistillate flower | 13. Vertical section of a seed |
| 7. A pistillate flower with its scale, front view | 14. A summer branch |
| | 15. A winter branch |



Salix nigra Marsh.

WATER HICKORY

Carya aquatica (Michx. f.) Nutt.

OTHER COMMON NAMES: Swamp hickory, Bitter pecan, Pignut hickory.

FORM: Occasionally 80-100 feet high, rarely more than 2 feet in diameter with slender upright branches forming a narrow head.

BARK: 1/2-2/3 inch thick, separates into long loose plate-like scales tinged with red.

TWIGS: At first slightly glandular and coated with loose fine hair, finally red-brown, ultimately gray.

LEAVES: Alternate, compound, 9-15 inches long, with 7-13 leaflets that are ovate-lanceolate, long-pointed, somewhat sickle-shaped, base oblique, leaflets 3-5 inches long, 1/2-1 1/2 inch wide, covered with yellow glandular dots, thin, dark green and glabrous above, finely hairy below.

FLOWERS: Monoecious; staminate in solitary or fascicled hirsute aments 2 1/2-3 inches covered with yellow glandular pubescence; pistillate in several flowered spikes, oblong, slightly flattened, 4-angled, glandular-pubescent.

FRUIT Often in clusters of 3-4, somewhat flattened, usually broadest above the middle, slightly narrowed at the base, abruptly narrowed at the apex, conspicuously 4-winged, dark brown or nearly black, covered more or less thickly with bright yellow scales; 1 1/2 inch long, 1-1 1/4 inch wide; nut flattened, nearly as broad as long, abruptly pointed at the apex, dark reddish-brown, irregularly wrinkled, with a thin shell; seed very bitter.

WINTER BUDS: Slightly flattened, sharp-pointed, dark reddish-brown; terminal bud 1/2 inch long, hairy.

WOOD: Heavy, strong, close-grained, rather brittle, dark brown.

USES: Fuel.

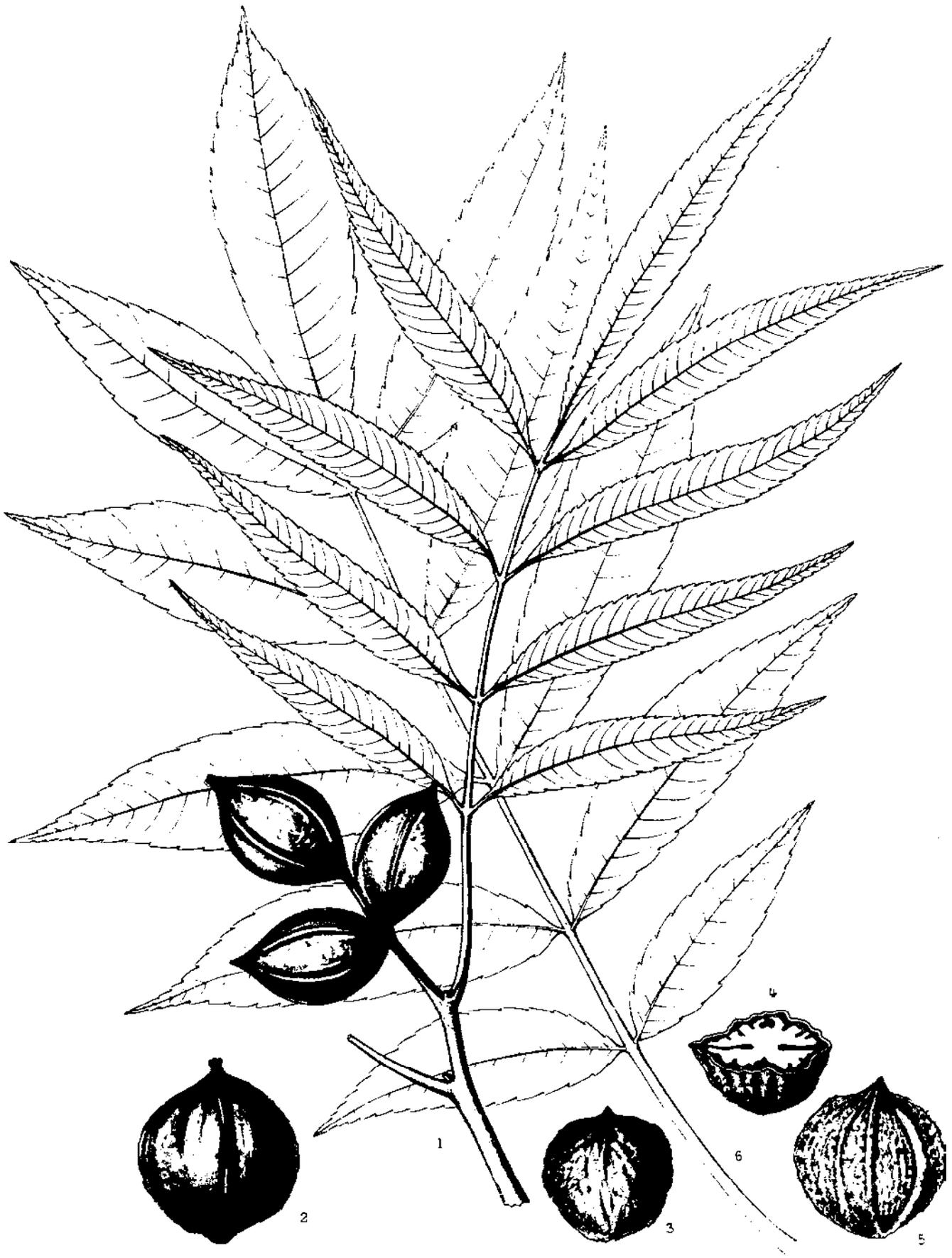
HABITAT: River swamps.

DISTINGUISHING CHARACTERISTICS: Inhabits swamps; nut wrinkled; bark separates into long plate-like scales; leaflets covered more or less thickly with yellow glandular dots.

DISTRIBUTION IN ALABAMA: Reported from Morgan and Tuscaloosa Counties, most common in the Black Belt and lime hills.

EXPLANATION OF PLATE

- | | |
|----------------------|---------------------------|
| 1. A fruiting branch | 4. Cross section of a nut |
| 2. A fruit | 5. A nut |
| 3. A nut | 6. A leaf |



***Carya aquatica* (Michx. f.) Nutt.**

BITTERNUT HICKORY

Carya cordiformis (Wangenh.) K. Koch.

OTHER COMMON NAMES: Swamp hickory, Pig hickory, Pignut, Bitter pecan tree, Bitter pignut, White hickory, Red-heart hickory.

FORM: Usually 50-75 feet high, diameter 1-2 feet, may reach a height of 100 feet, trunk long with little taper; crown round-topped, broadest near the top; lateral branches stout and ascending; small branches may be somewhat pendulous.

BARK: Light gray, rather thin, roughened by shallow fissures and narrow ridges, does not peel or shag off.

TWIGS: At first slender, smooth, glossy, often yellow glandular and hairy toward apex; later become grayish, orange-brown or reddish; at length light gray.

LEAVES: Alternate, 6-10 inches long, compound with 7-10 leaflets that are lanceolate to ovate-lanceolate, sharp-pointed at apex, finely toothed on the margin, obliquely tapering or heart-shaped at the base, dark yellow-green above, paler below.

FLOWERS: Appear when leaves are about half developed, monoecious; staminate green, in aments, 3-4 inches long; pistillate in small clusters on the new growth, about 1/2 inch long, somewhat angled and scurfy-hairy.

FRUIT: Egg-shaped or subglobose, 3/4-1 1/2 inches long, 4-winged along the sutures half way to the base, greenish-yellow, rough and finely hairy; husk thin; nut thin-shelled, reddish-brown; kernel very bitter.

WINTER BUDS: Covered by 4 yellowish, glandular dotted scales; terminal bud elongated, flattened, blunt-pointed.

WOOD: Heavy, hard, strong, tough, elastic, close-grained, dark brown.

USES: Tool handles, rough lumber, railroad ties, fuel, barbeque smoke. Historical uses: Wheel spokes.

HABITAT: Prefers low, wet sites, along sluggish streams, occasionally on limestone outcroppings.

DISTINGUISHING CHARACTERISTICS: Leaflets smaller than any native hickory, finely hairy on the underside; yellow buds, with 4-6 bud scales in valvate pairs; terminal bud flattened; lateral buds stalked and superposed; nut globular and thin-shelled.

DISTRIBUTION IN ALABAMA: Reported from Montgomery County and central part of the state, also from Dallas County.

EXPLANATION OF PLATE

- | | |
|---------------------------|------------------------------|
| 1. A fruiting branch | 4. Vertical section of a nut |
| 2. A nut | 5. An embryo |
| 3. Cross section of a nut | |



Carya cordiformis (Wangenh.) K. Koch.

PIGNUT HICKORY

Carya glabra (Mill.) Sweet

OTHER COMMON NAMES: Bitternut, Black hickory, Brown hickory, Red hickory.

FORM: Commonly a height of 80-90 feet, diameter 2-3 feet, occasionally 120 feet tall; trunk slender, slightly tapering, often clean and long; crown oblong, rather narrow, with short, spreading branches, lower somewhat pendulous.

BARK: Close, dark gray, shallow-fissured, narrowly ridged, 1/2-3/4 inch thick; rarely peels off.

TWIGS: Rather slender, usually smooth, yellowish-green, later brown.

LEAVES: Alternate, compound, 8-12 inches long, with 5-7 leaflets that are oblong to obovate-lanceolate, sharply pointed at the apex, finely toothed on the margin, tapering or obliquely rounded at the base, thick, smooth, dark green above, paler below.

FLOWERS: Appear when leaves about half developed, monoecious; staminate in aments 3-5 inches long in clusters of three on a common stalk; pistillate in 2-5 flowered spikes on the new growth.

FRUIT: Variable in shape and size, pear-shaped, globular, or obovoid, 1-3 inches long, tapering at the base, reddish-brown; nut oblong to oval, with thick bony shell; kernel at first sweet, later bitter.

WINTER BUDS: More than 2 ranked, reddish-brown to gray, blunt-pointed; terminal bud 1/4-1/2 inch long; outer bud scales reddish-brown to gray; inner scales of buds pale silky.

WOOD: Heavy, hard, very strong, tough, elastic, close-grained, a valuable grade of hickory timber.

USES: Tool handles, rough lumber, railroad ties, fuel, barbeque smoke. Historical uses: wheel spokes.

HABITAT: An upland species, prefers dry ridges and hillsides.

DISTINGUISHING CHARACTERISTICS: Smooth and rather slender twigs; buds are oval, reddish-brown and smaller than other native hickories; pear-shaped to ovoid fruit; nut with thick bony shell.

DISTRIBUTION IN ALABAMA: Madison, Cherokee, Blount, St. Clair, Jefferson, Tuscaloosa, DeKalb, Bibb, Hale, Pike, and Babour Counties.

EXPLANATION OF PLATE

- | | |
|----------------------|------------------------------|
| 1. A fruiting branch | 4. Vertical Section of a nut |
| 2. A nut | 5. Cross section of a nut |
| 3. A nut | |



Carya glabra (Mill.) Sweet

PECAN

Carya illinoensis (Wangenh.) K. Koch.

OTHER COMMON NAMES: Pecan nut, Pecanier, Pecan-tree.

FORM: 90-100 feet high, occasionally 2 1/2-4 feet in diameter above its enlarged base, stout spreading branches forming in the forest a narrow symmetrical and inversely pyramidal head; in the open with a round-topped crown.

BARK: 1-1 1/2 inch thick, light brown tinged with red, deeply divided irregularly into narrow forked ridges broken on the surface into thick appressed scales.

TWIGS: At first slightly tinged with red and coated with loosely matted hairs; later smooth or minutely hairy, marked by orange-colored lenticels.

LEAVES: Alternate, 12-20 inches long, compound, with 9-17 leaflets that are oblong-lanceolate, more or less sickle-shaped with doubly toothed margins, unequally rounded or heart-shaped at the base, 4-8 inches long, 1-3 inches wide, smooth or somewhat hairy above, pale and smooth or finely hairy below.

FLOWERS: Staminate in slender aments, 3-5 inches long, from buds formed in the axils of the leaves of the previous year, occasionally on shoots of the year, sessile or short-stalked, light yellow-green; pistillate in few or many flowered spikes, oblong, narrowed at the ends, slightly 4-angled.

FRUIT: In clusters of 3-11, pointed at apex, rounded at the base, 1-2 1/2 inches long, 1/2-1 inch broad; husk thin, brittle, splitting to the base at maturity; nut ovoid to ellipsoidal, nearly cylindrical, pointed at the apex, rounded at the base, reddish-brown with irregular black markings, with a thin shell and papery partitions.

WINTER BUDS: Sharp-pointed, covered with clusters of bright yellow articulate hairs and pale tomentum; terminal bud 1/2 inch long; lateral buds often stalked.

WOOD: Heavy, not strong, brittle, coarse-grained, light brown, tinged with red.

USES: Gun stocks, furniture, interior woodwork, cabinet work, veneers, plaques, nuts. Historical uses: wagons, agricultural implements.

HABITAT: Low, rich ground.

DISTINGUISHING CHARACTERISTICS: Excepting the big shellbark hickory, the longest leaves of any of the hickories; nuts oval to oblong; cultivated for its valuable nuts.

DISTRIBUTION IN ALABAMA: Mainly central and southwestern Alabama.

EXPLANATION OF PLATE

- | | |
|----------------------|---|
| 1. A fruiting branch | 5. Cross section of a nut |
| 2. A nut | 6. A thin-shelled nut, cut transversely |
| 3. A nut | 7. A leaf |
| 4. A nut | 8. A winter branchlet |



***Carya illinoensis* '(Wangenh.) K. Koch.**

SHELLBARK HICKORY

Carya laciniosa (Michx. f.) Loud.

OTHER COMMON NAMES: Bigleaf shagbark hickory, Big shellbark.

FORM: In general resembles the shagbark hickory, 50-90 feet high, trunk diameter 2-3 feet, occasionally 120 feet tall; crown in the open oblong or somewhat oval, branches rather short, extend to within 8-10 feet of the ground, lower branches pendulous; in the forest, the crown is somewhat reduced.

BARK: Mature bark light gray, 1-2 inches thick, separates into broad thick plates giving the tree a shaggy appearance.

TWIGS: Stout, somewhat velvety or hairy, buff to nearly orange in color, covered with inconspicuous elongated lenticels.

LEAVES: Alternate, compound, 15-22 inches long with 7-8 ovate to oblong-lanceolate or broadly obovate leaflets; basal pair of leaflets about 1/2 size of terminal leaflet; upper pair broadest between the middle and the apex; toothed on the margin, sharp-pointed at the apex, tapering or rounded at the base, dark green above, pale to brownish and hairy below.

FLOWERS: Appear when leaves about half developed, monoecious; staminate often hairy, in aments clustered in threes and 5-8 inches long; pistillate rusty, woolly, arranged in few or many-flowered spikes.

FRUIT: Oval to broadly oblong, husk thick, 3/4-2 1/2 inches long; nut dull white or yellowish, thick-shelled, flattened and pointed at both ends; kernel light brown and sweet.

WINTER BUDS: Terminal bud oval, 3/4-1 inch long, outer scales loose hairy; lateral buds much smaller.

WOOD: Difficult to distinguish from that of the shagbark hickory (*Carya ovata*); very hard, strong, tough, close-grained, very flexible, dark brown.

USES: Tool handles, rough lumber, railroad ties, fuel, barbeque smoke. Historical uses: wheel spokes.

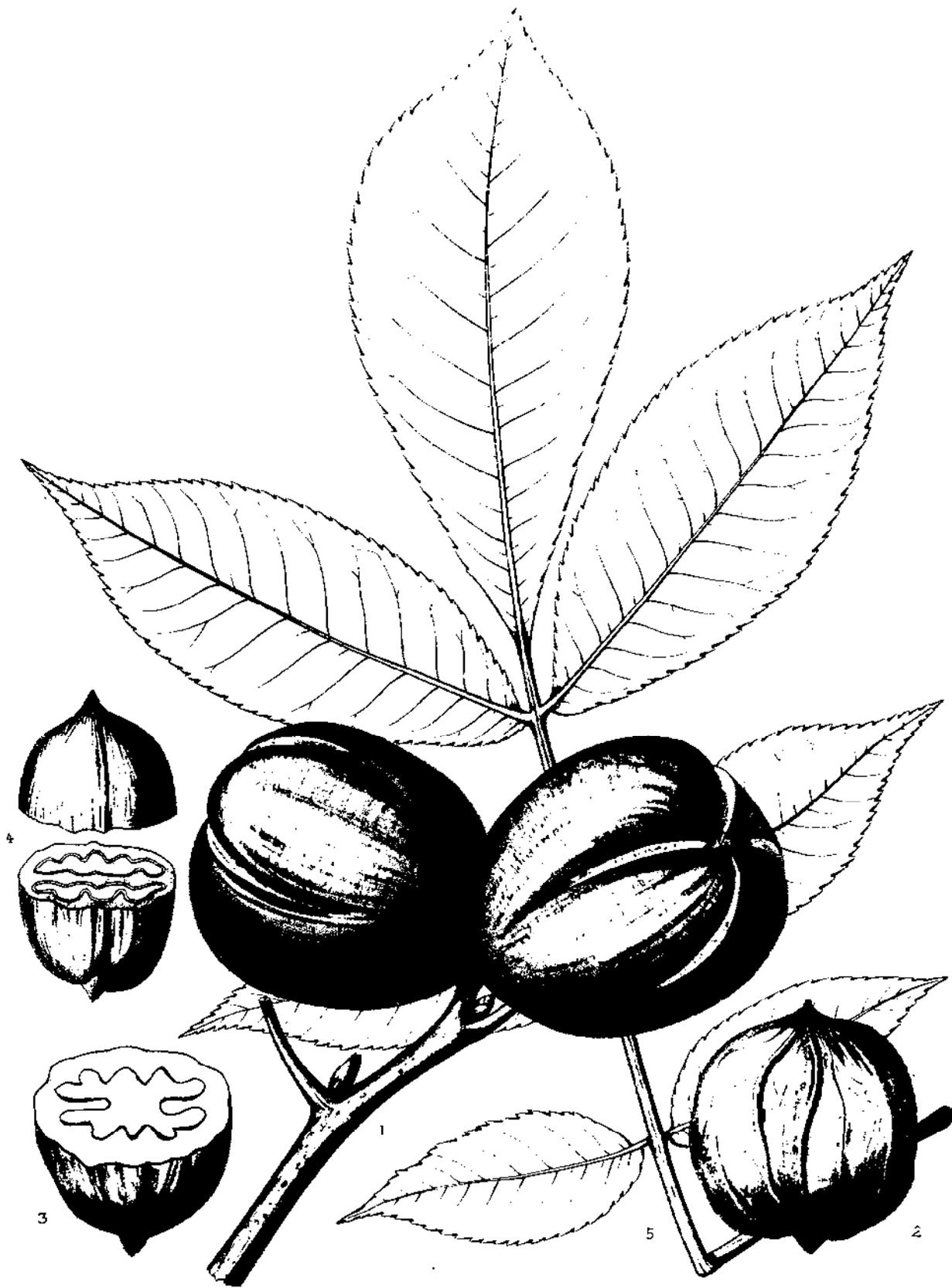
HABITAT: Prefers deep moist soil, rich bottom lands, occasionally hillsides.

DISTINGUISHING CHARACTERISTICS: Dull white or yellowish nuts that are pointed at both ends; leaflets 7-8 and more downy on under surface than in *ovata* which has 5-7 leaflets; large terminal bud.

DISTRIBUTION IN ALABAMA: Distribution apparently not well known. Reported from Dallas County.

EXPLANATION OF PLATE

- | | |
|---------------------------|---------------------------|
| 1. A fruiting branch | 4. A nut cut transversely |
| 2. A nut | 5. A leaf |
| 3. Cross section of a nut | |



Carya laciniosa (Michx. f.) Loud.

NUTMEG HICKORY

Carya myristicaeformis (Michx. f.) Nutt.

OTHER COMMON NAMES: Bitter water hickory, Swamp hickory, Pecan (lumber).

FORM: 80-100 feet high, with tall straight trunk, often 2 feet in diameter; stout and somewhat spreading branches forming a comparatively open crown.

BARK: 1/2-3/4 inch thick, dark brown tinged with red, broken irregularly into small thin appressed scales.

TWIGGS: Slender, coated at first with lustrous golden or brown scales, ultimately reddish-brown with small scattered lenticels.

LEAVES: 7-14 inches long, alternate, compound with 7-9, occasionally 5, ovate-lanceolate to broadly ovate-acute leaflets, equally or sometimes unequally cuneate or rounded at the narrow base, dark yellow-green, smooth above, paler, glabrous or puberulous below.

FLOWERS: Monoecious; staminate in aments 3-4 inches long, coated with dark brown scurfy pubescence; pistillate oblong, narrowed at the ends, slightly 4-angled, covered with thick brown scurfy pubescence.

FRUIT: Usually solitary, ellipsoidal or slightly obovoid, 4-ridged to the base, ridges broad and thick, about 1 1/2 inch long; nut ellipsoidal or ovoid, 1 inch long, rounded and apiculate at both ends, smooth, dark reddish-brown, marked by longitudinal broken bands of spots covering the entire surface at the ends; kernel small, sweet.

WINTER BUDS: Covered with thick brown scurfy pubescence; terminal bud 1/8-1/4 inch long, ovoid, obtuse; lateral buds much smaller, acute, slightly flattened.

WOOD: Hard, very strong, tough, close-grained, light brown, with 80-90 layers of annual growth.

USES:

HABITAT: Banks of rivers and swamps and rich moist soil; rarely on high dry ground.

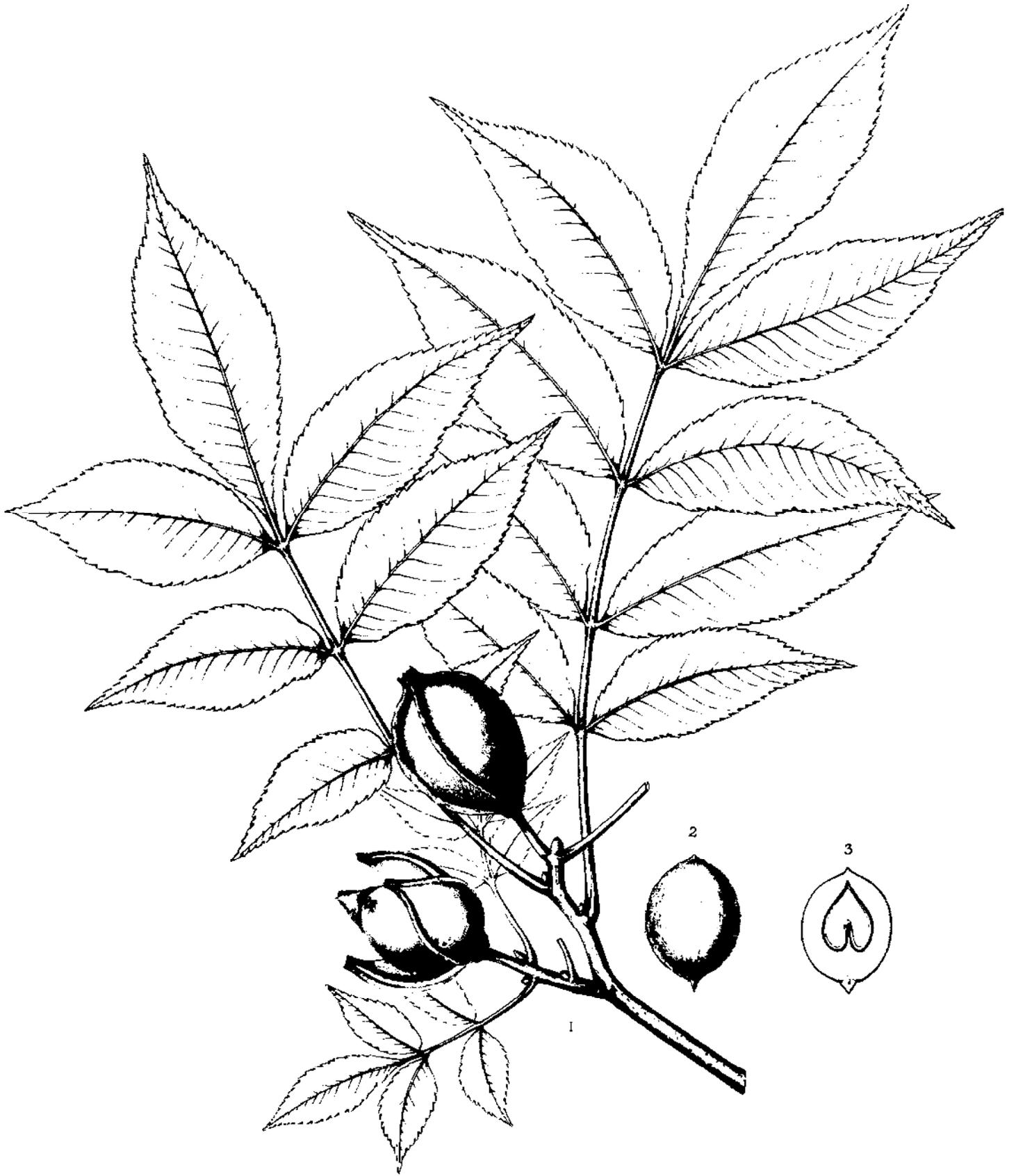
DISTINGUISHING CHARACTERISTICS: Leaflets dark green above, nearly glabrous and silvery-white below; winter buds covered with thick brown scurfy pubescence; fruit usually ellipsoidal, 4-ridged with broad thick ridges; nut usually ellipsoidal, apiculate at the ends, marked by longitudinal broken bands of small gray spots.

DISTRIBUTION IN ALABAMA: Seems to be mainly in the Black Belt, reported from Sumter, Perry, and Dallas Counties.

EXPLANATION OF PLATE

1. A fruiting branch
2. A nut

3. Vertical section of a nut



***Carya myristicaefcirmis* (Michx. f.) Nutt**

SHAGBARK HICKORY

Carya ovata (Mill.) K. Koch.

OTHER COMMON NAMES: Carolina hickory, Scalybark hickory, Shellbark hickory.

FORM: 60-90 feet tall, diameter of trunk 2-3 feet, may reach height of 120 feet; in the open the bole forks into stout ascending limbs, crown irregular and open; in the forest bole columnar, often free of branches 50-60 feet, bearing a narrow crown.

BARK: On old trunks, shaggy, light gray, $\frac{3}{4}$ -1 inch thick, separating into rough strips or plates which are loose at both ends and give the trunk a shaggy appearance.

TWIGS: At first coated with pale glandular pubescence, sometimes smooth and glossy, finally dark reddish-brown and ultimately gray.

LEAVES: Alternate, 8-14 inches long, compound with 5-7 leaflets that are 4-5 inches long, usually acuminate at the apex, inequilateral at the base, margin serrate, except near the base, dark yellowish-green and glabrous above, pale, glabrous or puberulous below.

FLOWERS: Appear when leaves about half developed; monocious; staminate hairy, arranged in aments clustered in threes, 4-6 inches long; pistillate rusty, wooly, arranged 2-5 in large spikes.

FRUIT: Subglobose to obovate, $1\frac{1}{2}$ inches long, 4-channeled from apex to the base, glabrous or pilose; nut white, thin-shelled, usually oblong, very variable in form, with sweet kernel.

WINTER BUDS: Terminal bud ovate, blunt-pointed, $\frac{2}{5}$ - $\frac{4}{5}$ inch long, usually covered by about 10 bud scales, the 3-4 outer scales dark brown, sharp-pointed, apex may terminate in a sharp point, often hairy, especially along the margin.

WOOD: Very strong, heavy, hard, tough, elastic, close and usually straight-grained.

USES: Tool handles, rough lumber, railroad ties, fuel, barbeque smoke. Historical uses: Wheel spokes.

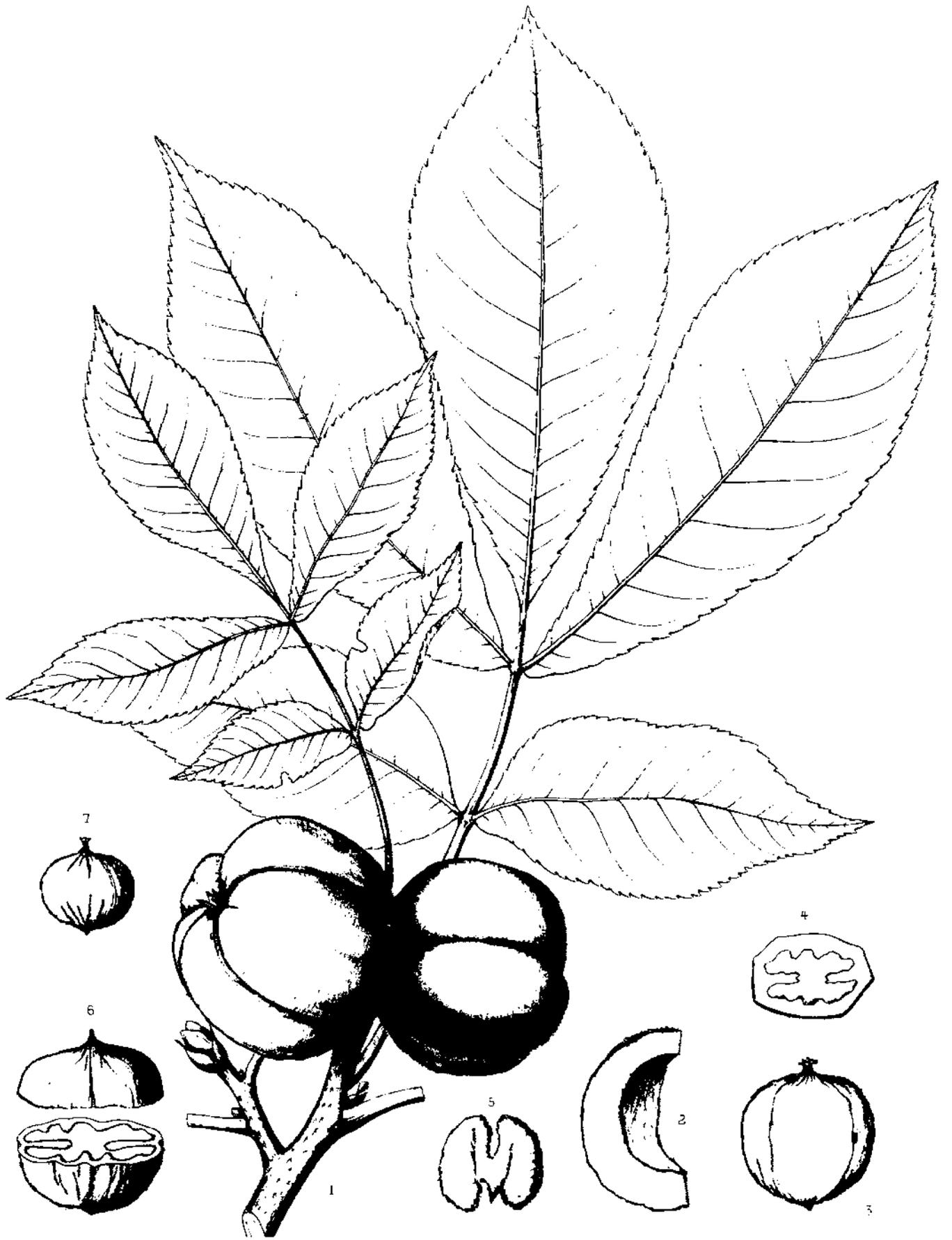
HABITAT: Prefers deep moist soil, along streams and moist hillsides.

DISTINGUISHING CHARACTERISTICS: Shaggy bark; apex of the 3-4 outer bud scales often terminate in a short point; nuts usually white; common hickory nut of commerce.

DISTRIBUTION IN ALABAMA: Limestone, Madison, Lawrence, Marion, Chilton, and Montgomery Counties.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A fruiting branch | 5. An inversed cotyledon |
| 2. A valve of the fruit | 6. A thin shelled nut cut transversely |
| 3. A nut | 7. A nut |
| 4. Cross section of a nut through the middle | |



Carya ovata (Mill.) K. Koch.

SAND HICKORY

Carya pallida (Ashe) Engl. and Graebn.

OTHER COMMON NAMES Pale hickory, Pallid hickory, Pignut hickory.

FORM: Usually 30-40 feet tall, trunk 1-1 1/2 feet in diameter, occasionally 90-110 feet high with a tall trunk 2-3 feet in diameter with stout branches, upper erect, lower often pendulous.

BARK: On large trees in good soil, pale and slightly ridged; on dry ridges, rough, deeply furrowed, dark gray, and southward often nearly black.

TWIGS: Slender red-brown, glabrous or pubescent.

LEAVES: Alternate, 7-15 inches long, compound with 7, rarely 9, leaflets 4-6 inches long, 1-2 inches wide, lanceolate or oblanceolate, finely serrate, acuminate, long-pointed at the apex, cuneate or rounded or often unsymmetrical at the base, resinous, fragrant; light green and lustrous above; pale, pubescent or puberulent below.

FLOWERS: Monoecious; staminate in aments covered with fascicled hairs and silvery scales, 2 1/2-6 inches long, puberulous and glandular on the outer surface; pistillate usually solitary, oblong, covered with yellow scales.

FRUIT: Pubescent and covered with yellow scales, ellipsoidal to broad obovoid, subglobose to depressed globose, 1/2-1 1/2 inch in length, splits tardily to the base by 2 or 3 sutures, may remain unopened until mid-winter; nut white, rounded at the ends or obtusely pointed at the apex, more or less prominently ridged nearly to the base; kernel small, sweet.

WINTER BUDS: Acute or obtuse, reddish-brown, puberulous and covered with silvery scales, terminal bud 1/4 inch long with 6-9 scales; usually fewer scales on the lateral buds.

WOOD: Brown, nearly white sapwood

USES: Probably little used, except for fuel.

HABITAT: Sandy soil, also on rich soil, in Alabama common hickory on gravelly and poor soils of the upland table-lands and ridges of the central part of the state.

DISTINGUISHING CHARACTERISTICS: Leaflets fragrant and long-pointed; fruit slow to open, may remain unopened until mid-winter; small nuts.

DISTRIBUTION IN ALABAMA: Through northern and central parts of the state of Dallas County.

EXPLANATION OF PLATE

- | | |
|------------------------------|-----------------------------------|
| 1. A flowering branch | 5. A nut |
| 2. A male flower, rear view | 6. One of the valves of the fruit |
| 3. A male flower, front view | 7. A winter branchlet |
| 4. A fruiting branch | |



***Carya pallida* (Ashe) Engl. and Graebn.**

MOCKERNUT HICKORY

Carya tomentosa Poir. Nutt.

OTHER COMMON NAMES: Whiteheart hickory, Bullnut, White hickory, Hognut.

FORM: 50-80 feet tall, sometimes 100 feet high with a diameter of 3 feet; in the forest, crown narrowly oblong extending about half-way down the trunk; in the open, a broad, open and rather ragged crown.

BARK: Dark or light gray, 1/2-3/4 inch thick, not shaggy, roughened by irregular furrows which separate broad flat, more or less scaly, ridges.

TWIGS: Very stout, usually downy at first, reddish brown, turning gray the second season.

LEAVES: Alternate, compound, 8-12 inches long, with 7-9 oblong-lanceolate to ovate-lanceolate leaflets, broadest above the middle, sharp-pointed at the apex, toothed on the margin, rounded or tapering at the base, very fragrant; leaflets arranged in pairs along a stout stem; lower pair gradually reduced in size; terminal leaflet gradually narrowed into a stalk; at maturity rather thin, dark green above, pale orange-brown and finely hairy below.

FLOWERS: Appear when the leaves are about half developed, monoecious, staminate borne in slender catkins, 4-5 inches long, in clusters of three on a common stalk; pistillate borne in 2-5 flowered pale hairy spikes.

FRUIT: Globular or oval 1 1/2-2 inches long, 4-channeled from apex to base; at maturity dark reddish-brown, husk thick, splitting to the base; nut pale reddish-brown. Very thick shell, variable in shape, 4-ridged toward the apex; small dark brown, sweet kernel.

WINTER BUDS: Alternate; terminal bud very large, 2/5 to 4/5 inch long, densely hairy, usually blunt-pointed, with overlapping scales, the outer pair drops off in the autumn and exposes inner yellowish-gray silky scales; lateral buds reddish-brown.

WOOD: Best grade of hickory stock, wood hard, strong, heavy, tough and elastic, dark brown with thick sapwood

USES: Tool handles, rough lumber, railroad ties, fuel, barbeque smoke. Historical uses: wheel spokes.

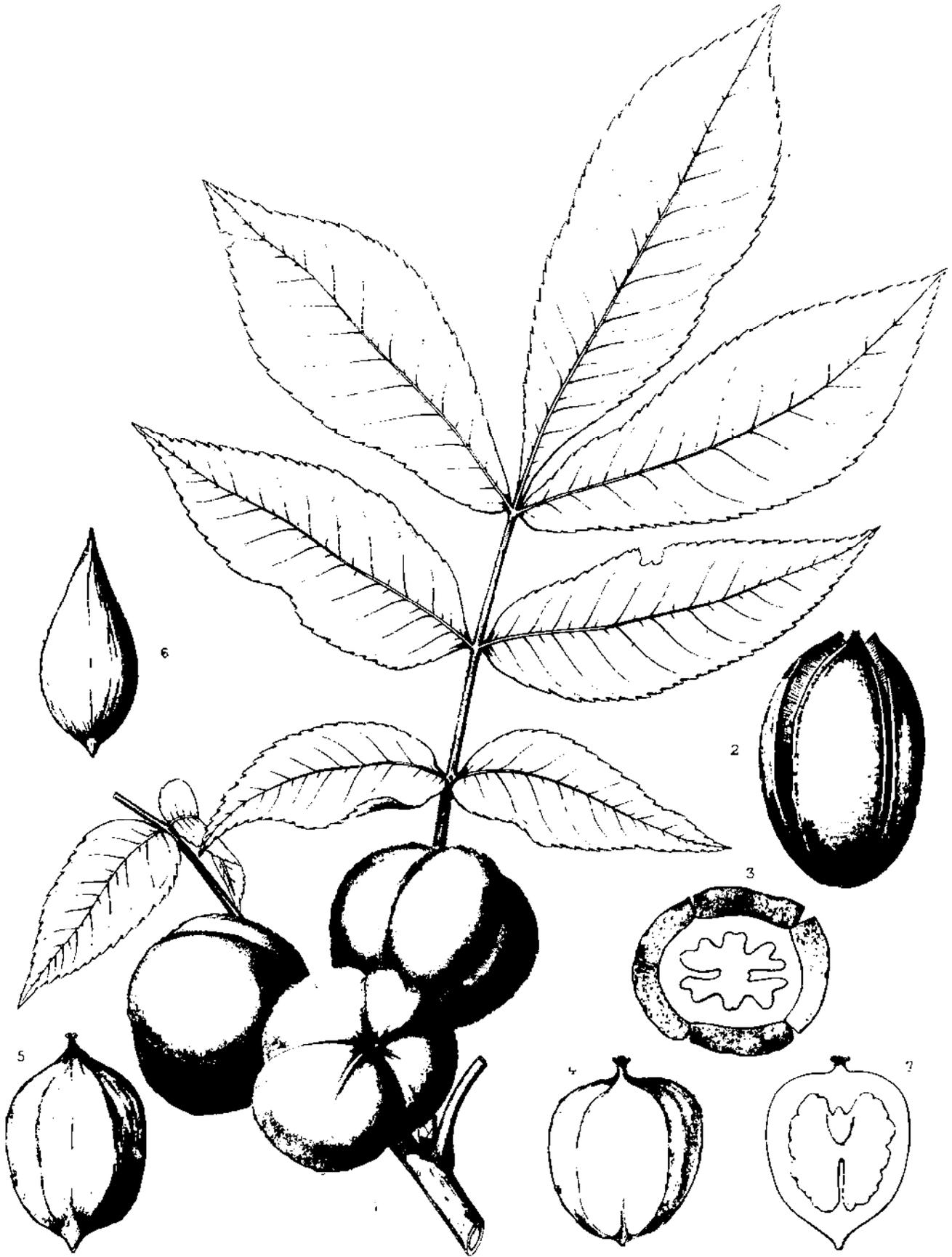
HABITAT: Moisture loving; rich, deep soil, bottom-land.

DISTINGUISHING CHARACTERISTICS: Big bud hickory; bark rough, close-fitting, does not shag off; scurfy rough foliage; thick-shell nut, and small kernel.

DISTRIBUTION IN ALABAMA: In almost every region of the state.

EXPLANATION OF PLATE

- | | |
|-----------------------------|------------------------------|
| 1. A fruting branch | 5. A nut |
| 2. An oblong fruit | 6. A nut |
| 3. Cross section of a fruit | 7. Vertical section of a nut |
| 4. A nut | |



***Carya tomentosa* Poir. Nutt.**

BUTTERNUT

Juglans cinerea L.

OTHER COMMON NAMES: White walnut, Oilnut, Walnut, American white walnut.

FORM: Usually 30-50 feet tall, with a short stout trunk 1-2 feet in diameter, may attain height of 100 feet with a diameter of 3-4 feet; trunk divides 15-20 feet above the ground into several stout spreading limbs; crown, broad unsymmetrical, round-topped, rather open.

BARK: On young trunks rather smooth, light gray, on old trunks roughened by black fissures which separate into wide, smooth light gray ridges; inner bark light in color, becomes yellow on exposure.

TWIGS: Stout, round, at first hairy and sticky, later smooth, roughened by leaf scars, greenish-gray to buff in color; pith chambered, dark brown.

LEAVES: Alternate, 15-30 inches long, compound with 11-17 leaflets which are 3-5 inches long, serrate on margin, apex acute, unequally rounded at the base, usually sessile or nearly so.

FLOWERS: Appear when leaves are about half developed, monoecious; staminate in stout unbranched aments, on the growth of the preceding season; pistillate in terminal, 6-8 flowered spikes, capping the growth of the season.

FRUIT: An elongated, 5-ridged sculptured nut, covered with a sticky, fleshy indehiscent husk; nut pointed at one end; contains a sweet edible and oily kernel.

WINTER BUDS: Covered with dense pale gray down, terminal bud $1/2$ - $3/4$ inch long, flattened, blunt-pointed, with its outer scales lobed; lateral buds smaller than terminal, ovate, very blunt-pointed, often superposed; scaly cone-like lateral buds often present, which are the partially developed staminate catkins.

WOOD: Light, soft, weak, rather coarse-grained, easily worked and polished, light brown, darkening with exposure.

USES: Cabinet work, furniture, toys.

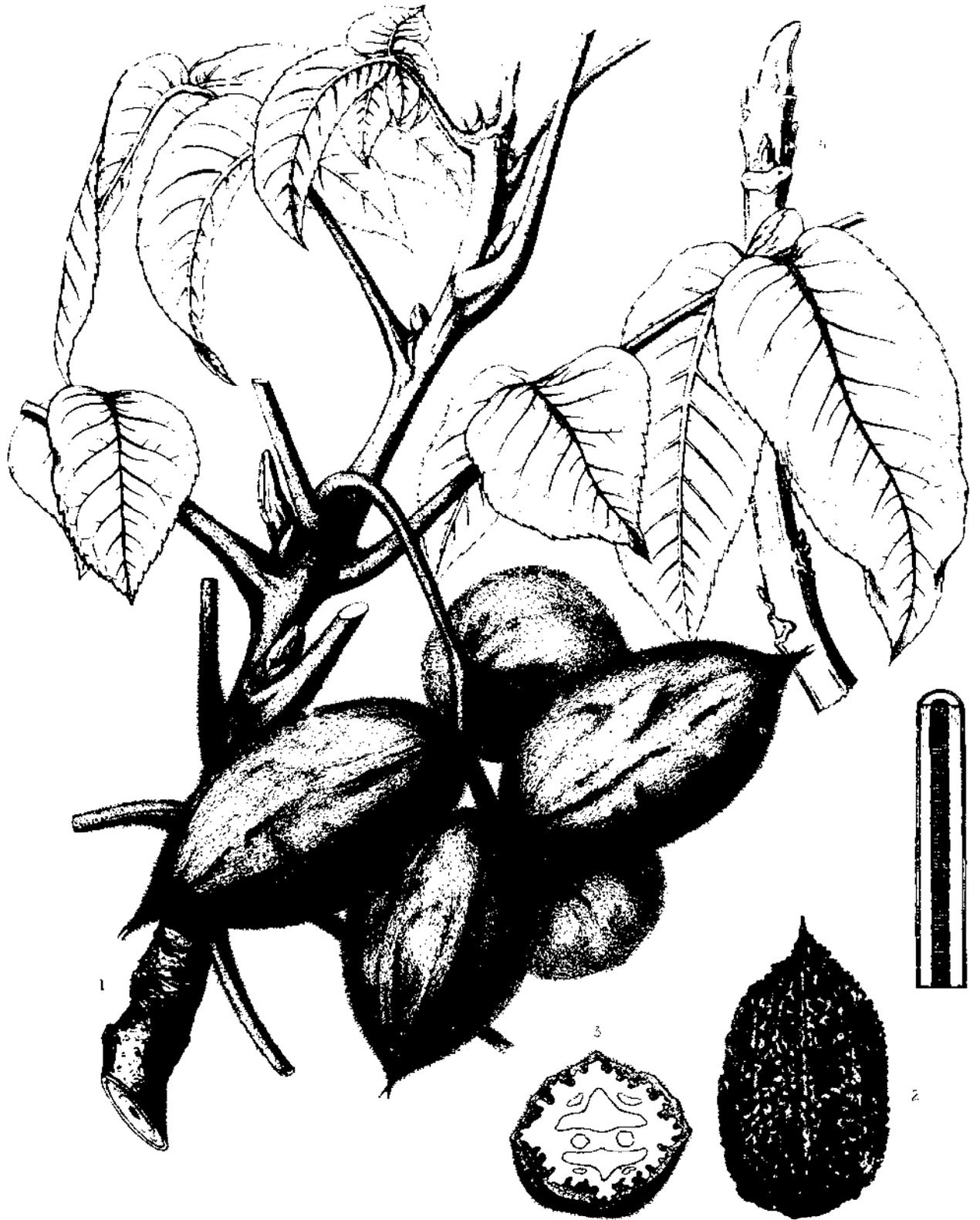
HABITAT: Prefers rich, moist soils, along stream courses, also on rocky hills.

DISTINGUISHING CHARACTERISTICS: Elongated ovate fruit; dark brown, chambered pith; terminal leaflet long-stalked.

DISTRIBUTION IN ALABAMA: Reported from Limestone and Winston Counties and possibly in Blount County.

EXPLANATION OF PLATE

- | | |
|---------------------------|---|
| 1. A fruiting branch | 4. A winter branchlet |
| 2. A nut | 5. Vertical section of a branchlet showing the pith |
| 3. Cross section of a nut | |



Juglans cinerea L.

BLACK WALNUT

Juglans nigra L.

OTHER COMMON NAMES: Eastern black walnut, American walnut, Gunwood.

FORM: Usually attains a height of 75-100 feet with a trunk diameter 2-3 feet; may reach a height of 150 feet, trunk diameter 5-6 feet; trunk straight, continuous into the crown, gradually breaks up into stout limbs that form a narrow or broad round-topped crown.

BARK: Mature bark dark brown to grayish-black, 2-3 inches thick, divided by deep fissures into broad, rounded ridges, thick, scaly at the surface.

LEAVES: Alternate, 1-2 feet long, compound with 13-23 leaflets which are 3-3 1/2 inches long, 1-1 1/4 inch wide, acuminate at the apex, rounded and usually unequilateral at the base, sharply serrate except at base, yellowish, lustrous and glabrous above, soft pubescent beneath.

FLOWERS: Appear when leaves about half developed, monoecious; staminate in stout unbranched aments, 3-5 inches long, on the growth of the preceding season; pistillate in terminal 2-5 flowered spikes, capping the growth of the season.

FRUIT: A deeply sculptured nut with a fleshy indehiscent covering; nut globose or oblong; fruit borne singly or in pairs, occasionally in threes; kernel edible, somewhat oily.

WINTER BUDS: Alternate, covered with pubescent scales; terminal bud rarely more than 1/3 of an inch long, blunt-pointed; lateral buds, smaller, blunt, often superposed.

WOOD: Hard, heavy, strong, somewhat coarse-grained, easily worked; one of the most valuable timber trees of Eastern United States.

USES: Gun stocks, furniture, interior woodwork, cabinet work, veneers, plaques, nuts.

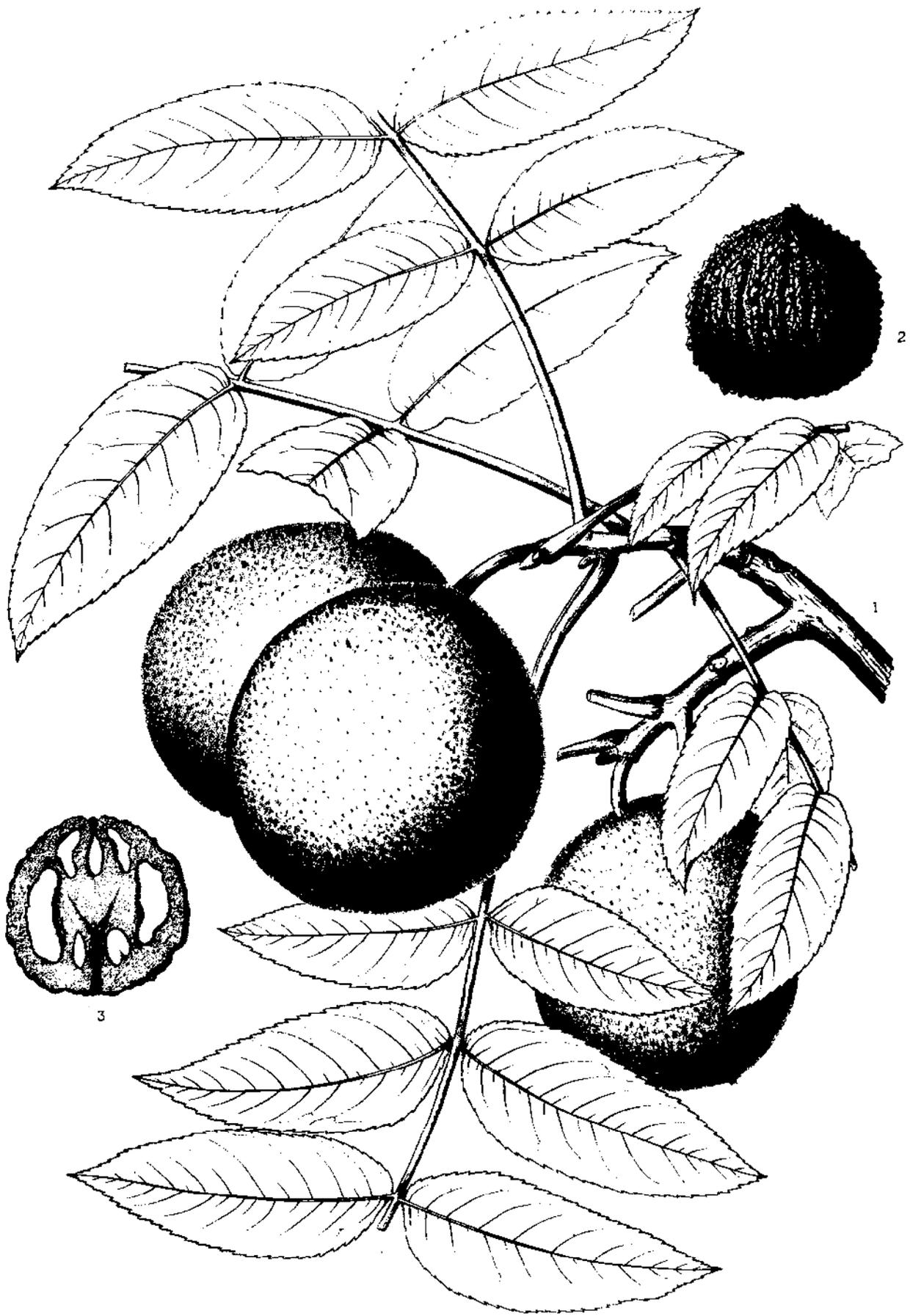
HABITAT: Prefers a deep, moist, well-drained soil, especially deep alluvial soils.

DISTINGUISHING CHARACTERISTICS: Terminal leaflet often lacking; pith chambered, usually light brown; globose nut; bark dark brown to almost black; leaflets 13-23, not sticky-hairy.

DISTRIBUTION IN ALABAMA: Reported from Walker, Macon, Dallas, Wilcox, and Clarke Counties; possibly found in others.

EXPLANATION OF PLATE

1. A fruiting branch
2. A nut
3. Cross section of a nut



Juglans nigra L.

SWEET BIRCH

Betula lenta L.

OTHER COMMON NAMES: Black birch, Cherry birch.

FORM: Usually 50-60 feet high with a diameter 1-3 feet, may reach a height of 80 feet with a diameter of 5 feet; crown in old trees round-topped with long, slender, horizontal or somewhat pendulous branches.

BARK: On old trunks distinctly black, broken into large irregular plates; on young stems and branches, smooth, dark brown, tinged with red.

TWIGS: At first light green and hairy, later reddish-brown, smooth and with wintergreen flavor.

LEAVES: Alternate, simple, oval, heart-shaped at the base, finely toothed on the margin, long-pointed apex, dark green above, pale green below, 2 1/2-6 inches long, 1 1/2-3 inches wide.

FLOWERS: Appear before the leaves; monoecious; staminate formed in the fall, remaining over winter as aments, about 3/4 inch long, in clusters of three which elongate to about 3-4 inches in the spring; pistillate aments are about 1/2-3/4 inch long, slender and pale green.

FRUIT: Cone-like, 1 1/2-2 inches long, composed of 3 lobed scales and small winged nutlets; terminal lobe of scales sharp-pointed.

WINTER BUDS: Alternate, 1/4 inch long, conical, sharp-pointed, shining; bud scales reddish-brown with downy margins; 3 bud scales visible on buds of terminal shoots; 5-8 on spur shoots.

WOOD: With indistinct rays; heavy, strong, hard, dark brown, thin, yellowing sapwood.

USES: Pulp, fuel. Historical uses: furniture, woodwork, wintergreen oil.

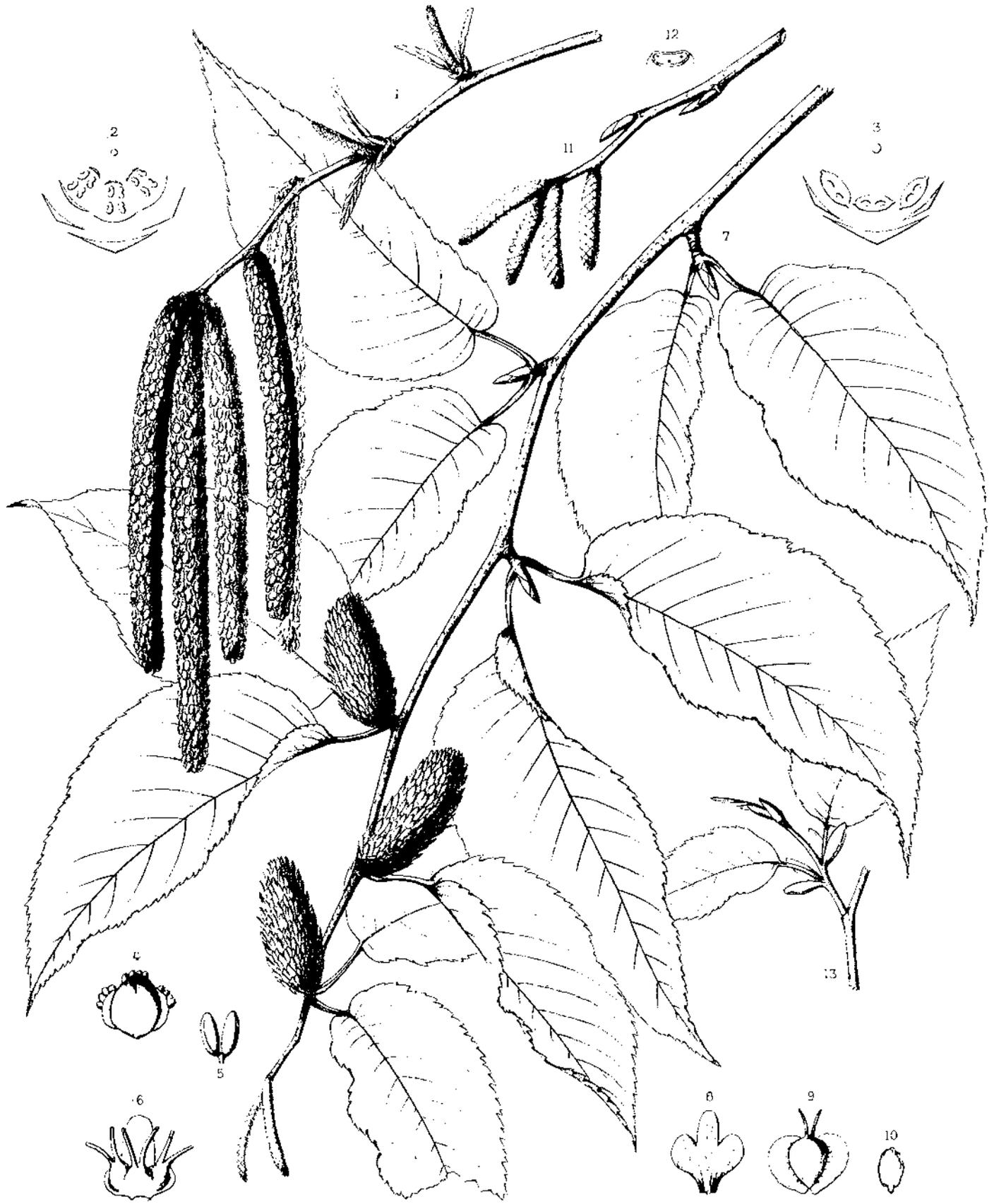
HABITAT: Usually in upland situations on moist or dry gravelly or rocky soils.

DISTINGUISHING CHARACTERISTICS: Close, blackish, cherry-like bark, which does not peel into thin film-like layers; twigs have a distinct wintergreen flavor; scales of the fruit smooth.

DISTRIBUTION IN ALABAMA: Winston, Jackson, St. Clair, Cleburne, Clay, and Talladega Counties.

EXPLANATION OF PLATE

- | | |
|--|---|
| 1. A flowering branch | 7. A fruiting branch |
| 2. Diagram of a cluster of staminate flowers | 8. Scale of a strobile |
| 3. Diagram of a cluster of pistillate flowers | 9. A nut |
| 4. Scale of a staminate ament, rear view | 10. An embryo |
| 5. A stamen | 11. A winter branch with staminate aments |
| 6. Pistillate flowers with their scale, front view | 12. A leaf scar |
| | 13. A young branchlet with unfolding leaves |



Betula lenta L.

RIVER BIRCH

Betula nigra L.

OTHER COMMON NAMES: Red birch, Black birch, Water birch.

FORM: Usually 50-60 feet tall, may attain a height of 80 feet or more; trunk short, usually dividing near the base into a few divergent ascending limbs, eventually form a round-topped, irregular crown.

BARK: Varies with the age and location on the tree; reddish-brown, roughened by fissures at the base of old trees; on younger trunks and upper part of older ones, peels off in thin papery, reddish-brown to greenish-brown scales.

TWIGS: Slender, at first hairy and greenish; later smooth, reddish-brown.

LEAVES: Alternate, simple, broadly oval, 1 1/2-3 inches long, 1-2 inches wide, wedge-shaped at the base, apex pointed, doubly toothed on the margin, dark green above, yellowing-green below.

FLOWERS: Appear before the leaves; monoecious, but usually on the same branch; staminate formed in the fall, remaining over winter as aments 3/4 inch long, usually in clusters of three, which elongate to 2-3 inches the following spring; pistillate aments develop in the spring from buds below the staminate flowers.

FRUIT: Cone-like, erect, 1 1/2-2 inches long, consisting of 3-lobed finely hairy scales which bear small, hairy winged nuts; terminal lobe of the scales longer than the laterals.

WINTER BUDS: Alternate, ovoid, acute, lustrous, and bright chestnut-brown in winter; inner scales strap-shaped.

WOOD: Light, medium hard, strong, close-grained, light brown with pale sapwood.

USES: Pulp, fuel. Historical uses: furniture, woodwork.

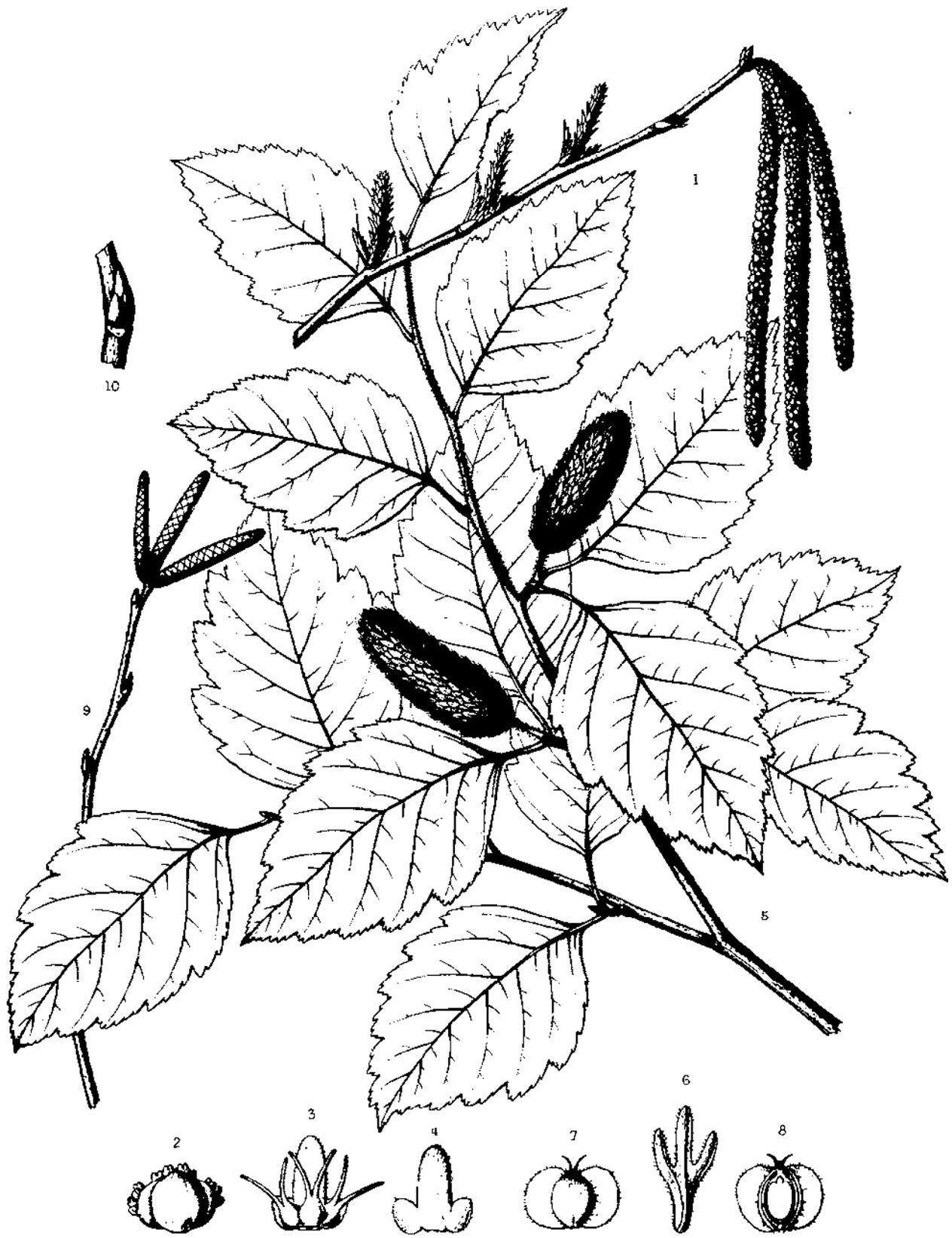
HABITAT: Prefers banks of streams, lakes and swamps, occasionally in drier places.

DISTINGUISHING CHARACTERISTICS: Reddish-brown, or cinnamon-red bark, which peels off in thin papery scales; twigs reddish-brown; wings of the nutlets narrower than the nutlets.

DISTRIBUTION IN ALABAMA: Pretty well throughout the state, along rivers and creeks.

EXPLANATION OF PLATE

- | | |
|--|---|
| 1. A flowering branch | 5. A fruiting branch |
| 2. Scale of a staminate ament, rear view | 6. Scale of a strobile |
| 3. Pistillate flowers with their scale, front view | 7. A nut |
| 4. Scale of pistillate ament, rear view | 8. Vertical section of a nut |
| | 9. A winter branch with staminate flowers |
| | 10. A sterile winter bud |



Betula nigra L.

AMERICAN HORNBEAN

Carpinus caroliniana Walt.

OTHER COMMON NAMES: Bluebeech, Water beech, Ironwood, Hornbean

FORM: Usually 10-30 feet tall, diameter 8-12 inches, may reach a height of 40 feet with diameter of 2 feet; crown round-topped, wide spreading, consisting of long wiry ascending branches often pendulous at the tips.

BARK: Vertically corrugated, smooth, thin, close fitting, bluish-gray tinged with brown.

TWIGS: At first silky, hairy and green, becoming smooth, reddish to orange.

LEAVES: Alternate, simple, oval-oblong, doubly toothed on the margin, rounded or wedge-shaped at the base, 2-4 inches long, 1-1 3/4 inch wide, deep green above, paler below.

FLOWERS: Appear with the leaves, monoecious; staminate begin to develop in the fall and remain over winter as buds larger than the leaf buds, when fully developed they are drooping aments about 1 1/2 inch long; pistillate are in aments about 2/3 inch long with bright red styles.

FRUIT: A long pendulous cluster of 3-lobed leaf-like bodies, each bearing adaxilly a rough, light brown nutlet.

WINTER BUDS: Alternate, axillary, oval, pointed, 1/8 inch long, reddish-brown, covered with 8-12 scales; terminal bud absent.

WOOD: Rays conspicuous, heavy, hard, strong, light brown with broad sapwood

USES: Tool handles, fuel.

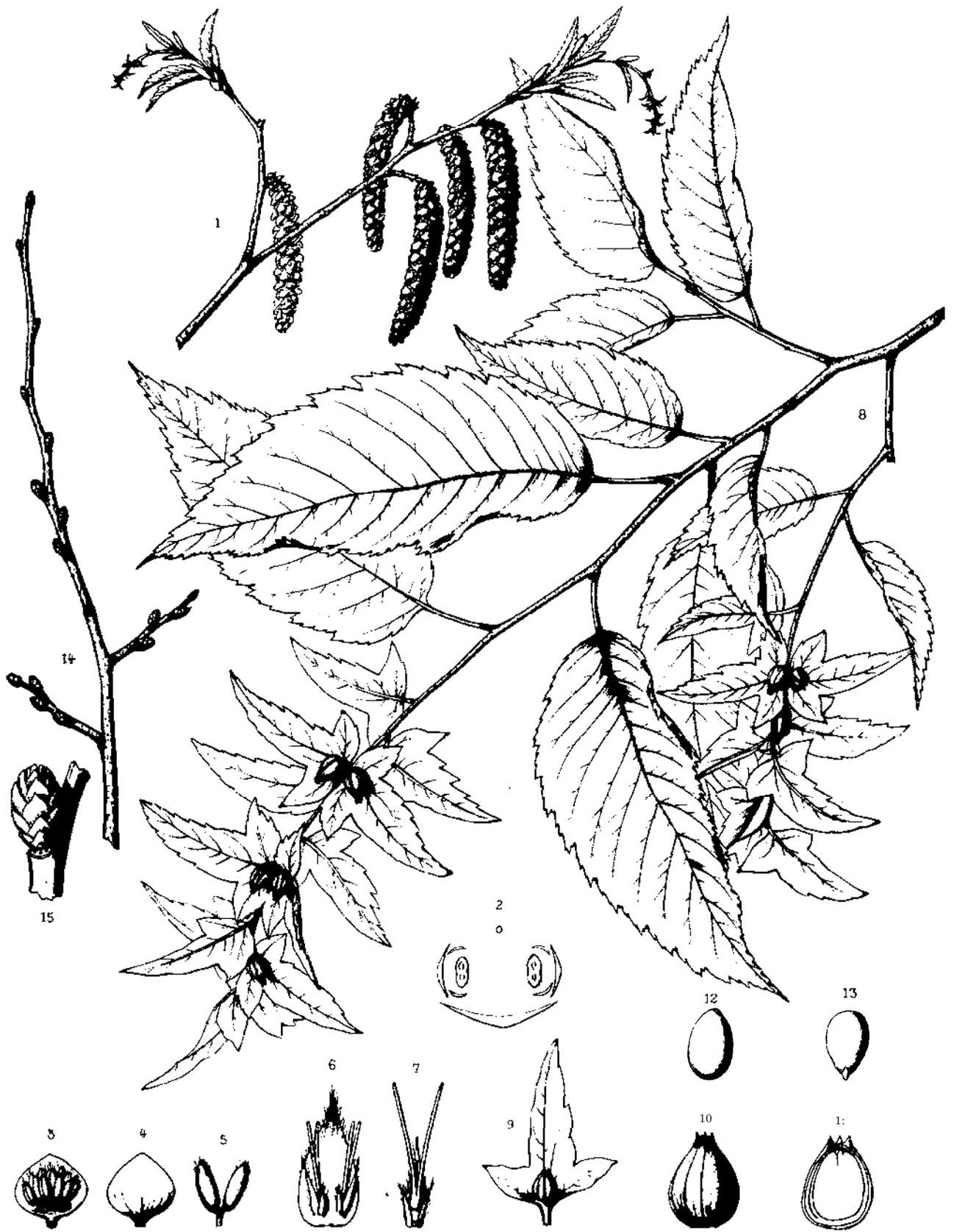
HABITAT: In swamps, on the border of streams.

DISTINGUISHING CHARACTERISTICS: Vertical, corrugated, bluish-gray bark; clusters of 3-lobed leaf-like bodies each with a rough nut; buds usually downy at the apex.

DISTRIBUTION IN ALABAMA: Pretty well over the state with the exception of the southern tier of counties.

EXPLANATION OF PLATE

- | | |
|---|---------------------------------|
| 1. A flowering branch | 8. A fruiting branch |
| 2. Diagram of a pistillate flower cluster | 9. A nut |
| 3. A staminate flower with its scales, front view | 10. A nut |
| 4. Scale of a staminate ament, A stamen | 11. Vertical section of nut |
| 6. Pistillate flowers with their scales, front view | 12. A seed |
| 7. A pistillate flower with bract and bractlets | 13. An embryo |
| | 14. A winter branch |
| | 15. A staminate ament in winter |



***Carpinus caroliniana* Walt.**

EASTERN HOPHORNBEAM

Ostrya virginiana (Mill.) K. Koch.

OTHER COMMON NAMES: American hophornbeam, Hornbeam, Ironwood.

FORM: Usually 20-40 feet high with a short trunk 8-15 inches in diameter, occasionally 70 feet tall with a diameter of 2 feet; crown rather high, open, broad round-topped, formed by widely spreading, often drooping, branches with ascending branchlets.

BARK: Grayish-brown, thin, roughened by flattish scales which are loose at the end and give a shreddy appearance to the bole.

TWIGS: At first slender, hairy, green, later smooth, lustrous, dark brown.

LEAVES: Alternate, simple, ovate-oblong to ovate-lanceolate, 3-5 inches long, 1 1/2-2 inches wide, acuminate or acute at the apex, rounded or cordate and inequilateral at the base, finely doubly serrate.

FLOWERS: Appear with leaves, monoecious, in aments; staminate aments preformed preceding season in about threes at end of twigs, about 2 inches long in the spring; pistillate flowers in erect aments, each enclosed in a hairy bladder-like bract.

FRUIT: A long, pendulous, creamy-white, cone-like body 1 1/2-2 1/2 inches long, 2/3-1 inch wide, consisting of bladder-like involucre forming a hop-like fruit; fruiting involucre 3/4 inch long, stiff, stinging hairs at base, enclosing a flattened, chestnut-brown nutlet.

WINTER BUDS: Alternate, ovate, 1/4 inch long, sharp-pointed, divergent, slightly pubescent, gummy, covered with 8 visible, longitudinally striated, 4-ranked scales; terminal bud absent.

WOOD: Very heavy, hard, strong, tough, close-grained, light brown, reddish-brown or nearly white, with thick pale white sapwood.

USES: Tool handles, fuel.

HABITAT: Dry, gravelly, and stony soils, occasionally moist situations.

DISTINGUISHING CHARACTERISTICS: Hop-like fruit; grayish-brown bark peels in narrow flat scales; 2-ranked leaf scars with 3-bundle scars; hardness of wood.

DISTRIBUTION IN ALABAMA: Fairly well distributed over the state.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. A flowering branch | 9. A fruiting branch |
| 2. A scale of the staminate ament, rear view | 10. A fruiting involucre |
| 3. A staminate flower with its scale, front view | 11. Vertical section of a fruiting involucre, showing the nut |
| 4. A stamen | 12. Vertical section of a nut |
| 5. Diagram of a pistillate flower | 13. A seed |
| 6. Pistillate flower | 14. An embryo |
| 7. A pistillate flower enclosed in its bract and bractlets | 15. A winter branch with staminate aments |
| 8. A pistillate flower with its bract and bractlets laid open | 16. A leaf scar |



Ostrya virginiana (Mill.) K. Koch.

AMERICAN CHESTNUT

Castanea dentata (Marsh.) Borkh.

OTHER COMMON NAMES: Chestnut.

FORM: Once grew to 60-80 feet tall, sometimes reaching a height of 100 feet or more with a diameter of 10 feet, commonly 3-4 feet in diameter. The chestnut blight removed this stately tree from the Alabama forests, except for reoccuringsprouts from old tree stumps.

BARK: Deeply fissured on old trunks, commonly 1-2 inches thick, dark brown, divided by shallow irregular and often interrupted fissures into broad flat ridges, separating on the surface into small closely appressed scales.

TWIGS: Stout, smooth, greenish to brown, round or angular, swollen at the nodes.

LEAVES: Alternate, simple, oblong-lanceolate, sharp-pointed at apex, cuneate at base, coarsely serrate, dark green above, pale yellow beneath.

FLOWERS: Appear late June or July; monoecious; staminate crowded in clusters along ament, 6-8 inches long; pistillate appear in globular involucre at the base of the upper androgynous aments; ovary 3-celled, with 6 white linear styles with stigmatic surface.

FRUIT: Matures in September and October; a globose, prickly burr; opens by 4 valves exposing 1-3 edible nuts.

WINTER BUDS: Terminal bud absent, lateral buds ovate, acute, divergent, about 1/4 inch long, with thin dark chestnut-brown scales.

WOOD: Light, coarse-grained, rather weak, yellowish-brown, splits easily, rich in tannic acid, very durable in contact with the soil.

USES: Historical uses: Lumber, poles, posts, coffins, interior finish, tannin.

HABITAT: Wide variety of sites and soils, avoids limestone and wet soils.

DISTINGUISHING CHARACTERISTICS: Sprouts readily from stumps; durability of the wood and wide variety of uses; the burr-like fruit.

DISTRIBUTION IN ALABAMA: Common in most parts of the state except the southernmost counties; almost exterminated by the fungus *Endothia parasitica* (Murr.) A. and A. The fungus persists in living stumps and eventually kills the larger sprouts.

EXPLANATION OF PLATE

- | | |
|------------------------------|--|
| 1. A fruiting branch | 6. A seed |
| 2. An involucreal spine | 7. End of a young branchlet with unfolding leaves, stipules, and and partly grown aments |
| 3. A nut | 8. A winter branch |
| 4. A nut | 9. An axillary bud end and leaf scar |
| 5. Vertical section of a nut | |



Castanea dentata (Marsh.) Borkh.

ALLEGHENY CHINKAPIN

Castanea pumila Mill.

OTHER COMMON NAMES: Chinkapin.

FORM: A small tree or shrub, usually 20-30 feet in height, may reach a height of 50 feet with a diameter 2-3 feet, with slender spreading branches forming a roundish crown; as a shrub, it may spread by stolons with stout stems 4-5 feet tall.

BARK: On the main trunk 1/2 to nearly 1 inch thick, light brown tinged with red, fissured and broken on the surface into loose plate-like scales.

TWIGS: At first pale woolly, finally reddish-brown to dark brown, with numerous lenticels.

LEAVES: Alternate, simple, oblong-elliptic to oblong-obovate, acute, coarsely serrate with spreading or incurved teeth, gradually narrowed and usually unequal and rounded or cuneate at base; yellowish-green and smooth on the upper surface; pale and whitish down beneath; 3-5 inches long, 1 1/2-2 inches wide.

FLOWERS: Appear in May or June; staminate in crowded clusters along aments; pistillate at base of upper aments.

FRUIT: Matures in September or October; a stiff spiny burr, 1-1 1/2 inches in diameter, usually contains 1, occasionally 2, sweet brown nuts with a more or less hairy apex, edible.

WINTER BUDS: Alternate; terminal bud absent, ovoid, blunt-pointed, about 1/8 inch long.

WOOD: Hard, strong, brown, durable, rich in tannic acid.

USES: Landscaping.

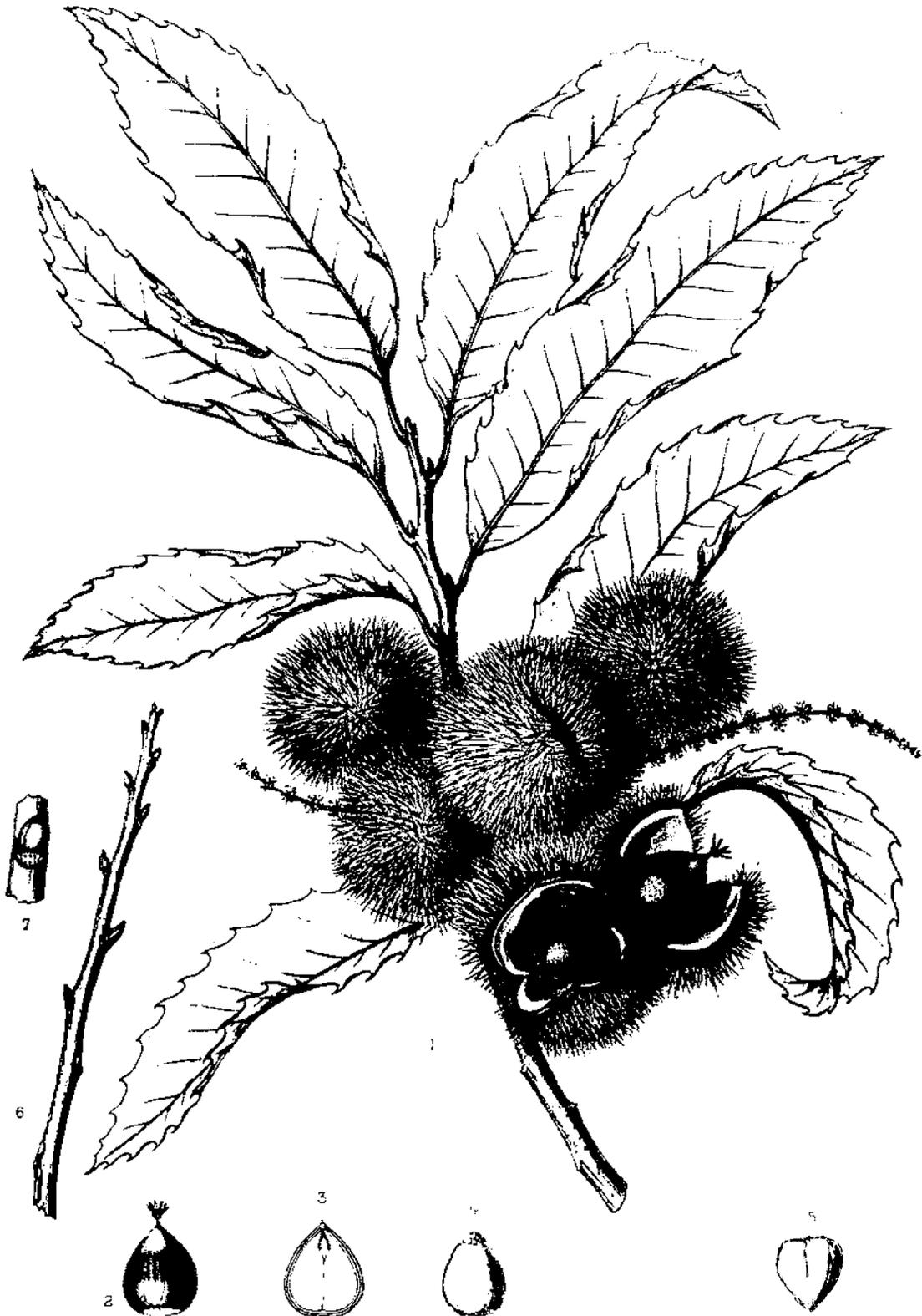
HABITAT: Dry sandy slopes, fertile hillsides, margins of ponds and streams.

DISTINGUISHING CHARACTERISTICS: Small fruit; whitish down on lower side of leaves; scurfy red buds.

IN ALABAMA: Tuscaloosa, Clay, Perry, Greene, Autauga, Montgomery, Dallas, Russell, Dale, Coffee, Choctaw, Wilcox, Baldwin, and Mobile Counties.

EXPLANATION OF PLATE

- | | |
|------------------------------|---------------------------------------|
| 1. A fruiting branch | 5. An embryo |
| 2. A nut | 6. A winter branch |
| 3. Vertical section of a nut | 7. An axillary leaf bud and leaf scar |
| 4. A seed | |



Castanea pumila Mitt.

AMERICAN BEECH

Fagus grandifolia Ehrh.

OTHER COMMON NAMES: Beech.

FORM: Usually 50-60 feet tall, diameter 2-3 feet, may reach a height of 120 feet with a diameter of 4 1/2 feet; in the open, trunk short and thick, breaks up a few feet above ground into numerous spreading limbs and slender, somewhat drooping branches, forming a broad round-topped head; in the forest, trunk often tall, slender, free of branches, with a narrow compact crown.

BARK: Very close, smooth, light, gray, mottled with dark spots.

TWIGS: Slender, at first dark yellow to gray, hairy; later smooth, zigzag, marked by bud scale scars.

LEAVES: Alternate, simple, ovate, 2 1/2-6 inches long, 1-3 inches wide, stiff, leathery with tapering apex, sharp-toothed margin, light green above, greenish-yellow below.

FLOWERS: Open when the leaves are about one-third grown; monoecious; staminate in many-flowered drooping heads, borne on slender peduncles about 2 inches long; pistillate flowers in clusters of 2 on short woolly pedicels with an involucre of scales clothed with long white hairs subtended by deciduous, pink bracts.

FRUIT: A stalked, prickly, thick-walled burr, about 3/4 inch long; opens in the autumn by 4 valves and frees 2 triangular, lustrous, brown nuts.

WINTER BUDS: Alternate; terminal bud present, about 5 times as long as wide, slender, sharp-pointed, conical, usually smooth, covered by scales.

WOOD: With broad medullary rays with narrow ones intervening; hard, strong, tough, not durable, difficult to season, light red in color.

USES: Pulp, wildlife, aesthetics.

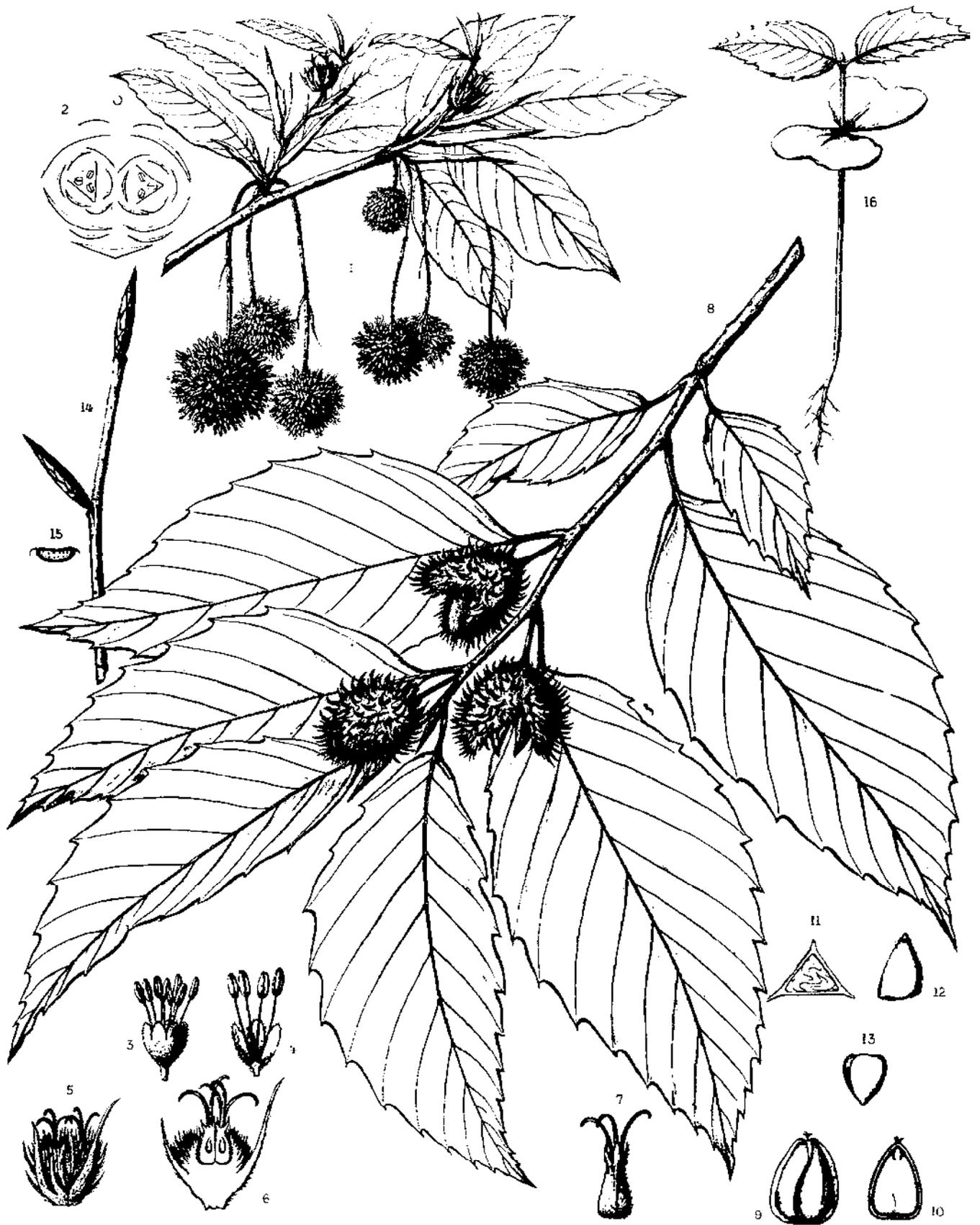
HABITAT: Prefers rich moist bottom-lands, occurs also on gravelly slopes and rich uplands.

DISTINGUISHING CHARACTERISTICS: Close, smooth, light gray bark; prickly, stalked fruit with triangular seeds; long, slender, sharp-pointed reddish-brown buds.

DISTRIBUTION IN ALABAMA: Pretty well over the state; most abundant in northern part.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A flowering branch | 9. A nut |
| 2. Diagram of a pistillate inflorescence | 10. Vertical section of a nut |
| 3. A staminate flower | 11. Cross section of a nut |
| 4. Vertical section of a staminate flower | 12. A seed with the hairy dissepiment attached at its apex and slightly separated below, and the abortive ovules |
| 5. A cluster of pistillate flowers with their involucre | 13. An embryo |
| 6. Vertical section of a cluster of pistillate flowers with their involucre | 14. A winter branch |
| 7. A pistillate flower | 15. A leaf scar |
| 8. A fruiting branch | 16. A seedling plant with cotyledons and young leaves |



Fagus grandifolia Ehrh.

WHITE OAK

Quercus alba L.

OTHER COMMON NAMES: Fork-leaf white oak, Ridge white oak, Stave oak.

FORM: Usually 60-80 feet high, with trunk diameter 2-4 feet, may reach a height of 140 feet, diameter 5 feet; trees in dense forests have long clean bole with little taper and a narrow crown; in the open, bole soon divides into massive, wide, spreading branches forming an open irregular crown.

BARK: Mature bark light gray or nearly white, thick, divided by shallow fissures into long, irregular, thin scales.

TWIGS: At first light green, tinged with red; coated with loose, pale hairs; later ashy gray.

LEAVES: Alternate, simple 5-9 inches long, 2-4 inches wide, obovate in outline, cuneate at base, 3-9 lobed; lobes blunt, separated by rounded sinuses which are shallow or extend nearly to the midrib; thin, bright green, smooth above, paler and smooth below.

FLOWERS: Appear when the leaves are about a third grown, monoecious; staminate in hairy aments 2 1/2-3 inches long, calyx very hairy, yellow; pistillate flowers small, solitary in axils of the leaves of the season, mostly on short stalks, red spreading styles.

FRUIT: A sessile or stalked acorn maturing in a single season, nut ovoid-oblong, light chestnut-brown, shiny at maturity, about 3/4 inch long, enclosed for 1/4 of its length in the bowl-shaped cup, slightly pubescent within, consisting of numerous scales, knobby near the base.

WINTER BUDS: Alternate, those near the tip clustered about the terminal bud, broadly ovate, obtuse, reddish-brown, about 1/8 inch long.

WOOD: Produces best grade of oak timber, wood hard, heavy, strong, durable, pale brown with lighter colored sapwood.

USES: Water-tight barrels, inside woodwork, furniture, lumber, millwork, railroad ties, pulp. Historical uses: shipbuilding, fences, agricultural implements.

HABITAT: Tolerant of many soils, sandy, moist bottom lands, rich uplands, stony ridges, prefers rich moist soil.

DISTINGUISHING CHARACTERISTICS: Loose, scaly, grayish or white bark; deeply round-lobed leaves; buds small, obtuse: pistillate flowers borne in axils of the leaves of the season.

DISTRIBUTION IN ALABAMA: Common throughout the state with the exception of the southernmost counties.

EXPLANATION OF PLATE

- | | |
|----------------------|------------------------------|
| 1. A fruiting branch | 5. Vertical section of a nut |
| 2. A nut, basal view | 6. A seed |
| 3. A cup | 7. A germinating nut |
| 4. A cup scale | 8. A winter branchlet |



Quercus alba L.

Plate 34

SCARLET OAK

Quercus coccinea Muenchh.

OTHER COMMON NAMES: Black oak, Red oak, Spanish oak, Spotted oak.

FORM: Medium sized tree 60-80 feet high, occasionally 150 feet tall, with diameter of 4 feet; lateral branches ascending above, horizontal in the middle, drooping below, lower ones die readily from shading; crown in the open, narrow, irregular, rounded or oblong.

BARK: Smooth on young stems and branches, light brown on old trunks; 1/2-1 inch thick, divided by shallow fissures into irregular ridges covered by small light brown scales tinged with red.

TWIGS: Slender, smooth, lustrous, light reddish-brown or grayish-brown, covered with pale lenticels, finally dark brown.

LEAVES: Alternate, simple, broadly obovate to oval, 3-6 inches long, 2 1/2-4 inches wide, truncate or cuneate at the base, 7-9 lobed; lobes repandly dentate, bristle-tipped at apex, separated by deep wide sinuses which extend over half way to the midrib; glabrous, dark green above, paler below.

FLOWERS: Appear when leaves are about one-half grown; monoecious; staminate in interrupted, pendulous hairy aments 3-4 inches long, borne on the growth of the preceding season or from the axils of the inner scales of the terminal bud; pistillate flowers in groups of 2-3, or solitary, borne on short stalks in the axils of the leaves of the season.

FRUIT: An acorn, borne solitary or in pairs, ripens the second season; nut ovoid, pale reddish-brown, often striated, round-pointed at apex 1/2-1 inch long, 1/3-1/2 of its length enclosed in the cup; cup turbinate, thin, pale, reddish-brown.

WINTER BUDS: Alternate; those near the tip clustered about the terminal bud; broadly ovate, acute, dark reddish-brown, somewhat pubescent.

WOOD: With prominent medullary rays, strong, heavy, coarse in texture.

USES: Lumber, interior woodwork, furniture, landscaping.

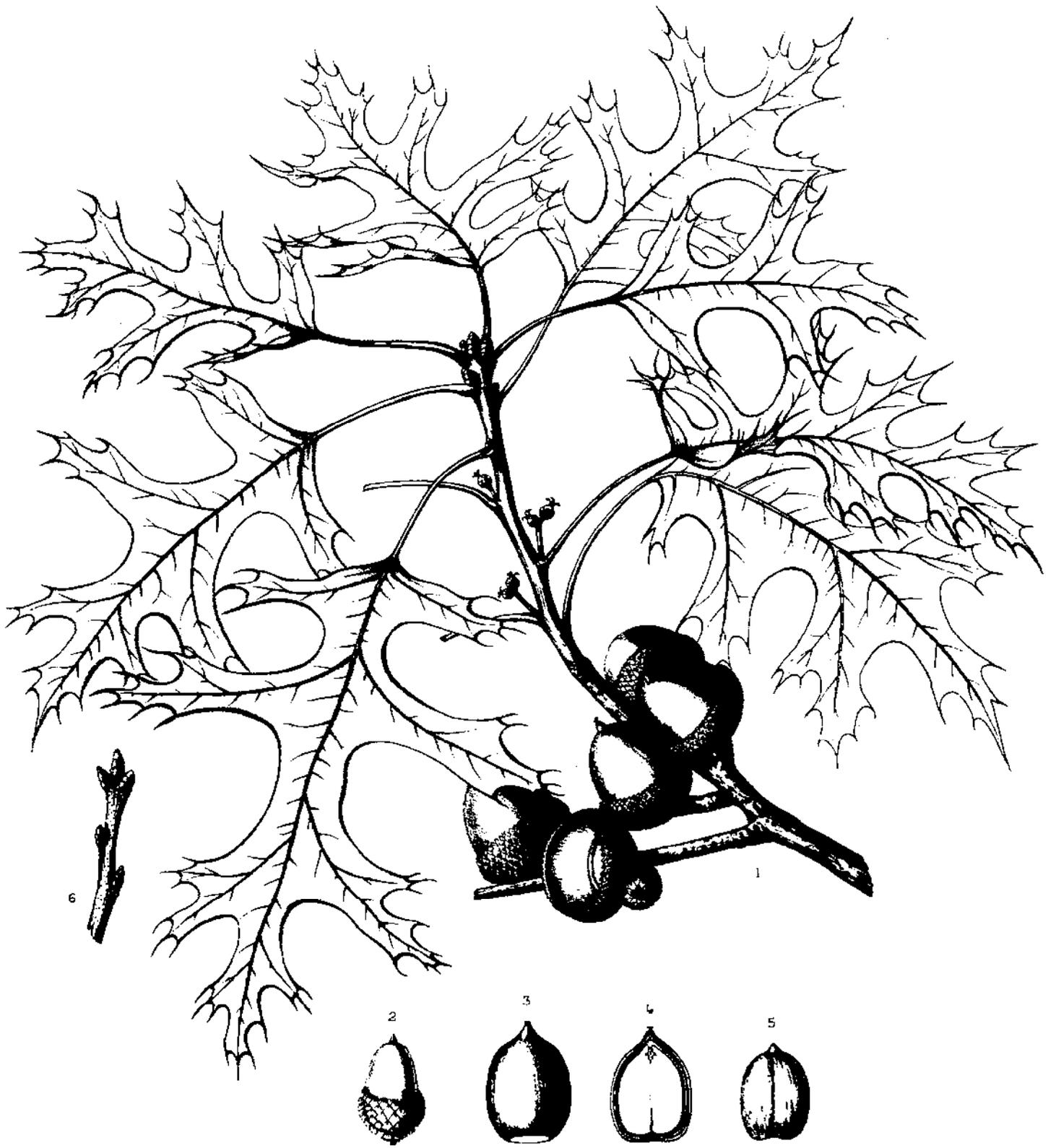
HABITAT: Prefers light sandy or gravelly soils.

DISTINGUISHING CHARACTERISTICS: Deep round-based sinuses of its leaves; buds pubescent from the middle to the apex; turbinate, deep cup-shaped acorns; brilliant scarlet color of its foliage in autumn.

DISTRIBUTION IN ALABAMA: Commonest in the northern part of the state, occurs as far south as Covington, Coffee, and Dale Counties.

EXPLANATION OF PLATE

- | | |
|-------------------------------|------------------------------|
| 1. A fruiting branch | 4. Vertical section of a nut |
| 2. A fruit (from Minnesota) | 5. A seed |
| 3. A NUT (from Massachusetts) | 6. A winter branchlet |



Quercus coccinea Muenchh.

DURAND OAK

Quercus durandii Buckl.

OTHER COMMON NAMES: Bluff oak, Durand white oak, White oak, Basket oak.

FORM: Often 60-90 feet high with a tall trunk 2-3 feet in diameter; comparatively small branches, lower horizontal, upper ascending, forming a dense round-topped head.

BARK: Thin, light gray or nearly white, broken into thin loosely appressed scales.

TWIGS: Pale gray-brown, at first covered with fascicled hairs, soon glabrous or puberulous and darker in their second season.

LEAVES: Simple, alternate, thin, obovate to elliptic, margin entire, 3-lobed toward the rounded or acute apex or irregularly laterally lobed; the three forms occur on different branches of the same tree, on lower branches usually lobed, dark green, lustrous above, often green and glabrous below, sometimes 6-7 inches long, 3-3 1/2 inches wide; on upper branches mostly white and pubescent or tomentose below, 2 1/2-3 inches long, 1 1/2-1 1/2 inch wide.

FLOWERS: Monoecious; staminate in slender villose aments, 3-4 inches long; pistillate on a short tomentose peduncle, stigma red.

FRTJIT: Acorns solitary or in pairs; nut ovoid or slightly obovoid, rounded or rarely acute at apex, nearly truncate at base, pale chestnut-brown 1/2-2/3 inch long, barely enclosed in the thin shallow cup; mature at end of first season.

WINTER BUDS: Ovoid, acute, 1/4-1/3 inch long, dark chestnut-brown, scales ciliate on the margin.

WOOD: Very heavy, hard and strong, brittle.

USES: Pulp. Historical uses: pins in cotton gins, spools, baskets, wagon hubs.

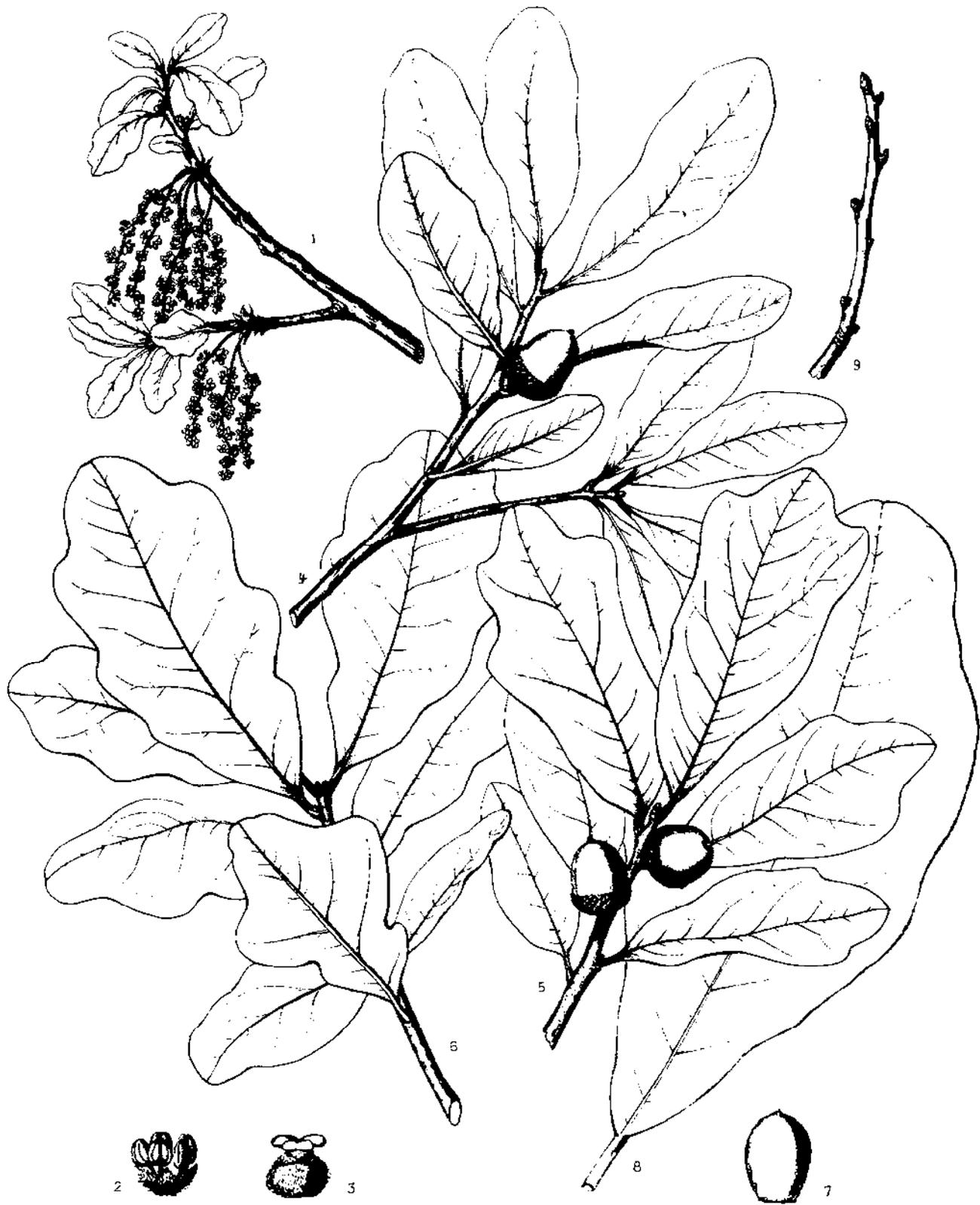
HABITAT: Rich limestone prairie soils and other soils rich in lime.

DISTINGUISHING CHARACTERISTICS: Leaves entire or slightly lobed, they vary in size and shape on the same tree; the cup of the acorn very shallow, saucer-shaped; tree with a dense round-topped head; bark thin, light gray or nearly white.

DISTRIBUTION IN ALABAMA: Comparatively rare in the state. Reported from Morgan, Blount, Jefferson, Tuscaloosa, Bibb, Sumter, Greene, Hale, Perry, Dallas, Wilcox, Choctaw, and Clarke Counties.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 6. A sterile branch |
| 2. A staminate flower | 7. A nut |
| 3. A pistillate flower | A leaf |
| 4. A fruiting branch | 9. A winter branchlet |
| 5. A fruiting branch | |



Quercus durandii Buckl.

SOUTHERN RED OAK

Quercus falcata Michx.

OTHER COMMON NAMES: Red oak, Spanish oak, Water oak.

FORM: Usually 70-80 feet high, trunk 2-3 feet in diameter, large spreading branches forming a broad round-topped, open head.

BARK: 3/4-1 inch thick, dark brown or pale, divided by shallow fissures into broad ridges covered with thin closely appressed scales.

TWIGS: Stout, at first coated with orange-colored tomentum, dark red or reddish-brown by autumn, later red-brown or ashy-gray.

LEAVES: Alternate, simple, ovate to obovate, narrowed and rounded or cuneate at base; in one form divided by deep oblique sinuses rounded at bottom into 3, 5, or 7 bristle-pointed lobes; terminal lobe usually much elongated, often falcate, acute, entire or repanddentate near apex, with 1 or 2 large bristle-pointed teeth; lateral lobes oblique or spreading, often falcate, acute, entire; in 5 or 7 lobed leaves, middle or upper pairs of lobes are oblique and lobulate at apex; in another form, leaves oblong-obovate, divided at apex by wide or narrow sinuses broad and rounded at bottom into three rounded or acute entire or dentate lobes; both forms occur on same or different trees or on same branch.

FLOWERS: Monoecious; staminate in tomentose aments 3-5 inches long; pistillate on stout tomentose peduncles; involucre scales coated with rusty tomentum.

FRUIT: Nut subglobose to ellipsoidal, rounded at apex, truncate and rounded at base, about 1/2 inch long, light orange-brown, enclosed only at base, sometimes 1/3 of its length in thin saucer-shaped cup.

WINTER BUDS: Ovoid or oval, acute, 1/8-1/4 inch long with bright chestnut-brown puberulous or pilose scales.

WOOD: Hard, strong, coarse-grained, light red with thick, lighter colored sapwood

USES: Lumber, pulp, furniture, cabinets, veneer, millwork, fuel. Historical uses: tannin, medicine.

Dry gravelly uplands, rich and often inundated bottom lands.

DISTINGUISHING CHARACTERISTICS: Variation in shape of leaves on the same tree, and on same branch; drooping habit of leaves and rusty covering on their lower surface.

DISTRIBUTION IN ALABAMA: Common in almost every region of the state.

EXPLANATION OF PLATE

- | | |
|-------------|------------|
| 1. A leaf | 5. A fruit |
| 2. A branch | 6. A fruit |
| 3. A leaf | 7. A fruit |
| 4. A fruit | |



Quercus falcata Michx.

CHERRYBARK OAK

Quercus falcata var. *pagodaefolia* Ell.

OTHER COMMON NAMES: Bottomland red oak, Elliot oak, Red oak, Swamp oak, Swamp Spanish oak.

FORM: May reach height of 120 feet, diameter 4-5 feet, branches form short narrow crown in the forest; in the open, a wide spreading head.

BARK: About 1 inch thick, roughened by small rather closely appressed plate-like, light gray, gray-brown or dark brown scales.

TWIGS: At first hoary tomentose, tomentose or pubescent first winter, later dark reddish-brown.

LEAVES: Alternate; simple, elliptic to oblong, acuminate, gradually cuneate or rarely truncate at base, deeply divided by wide sinuses, rounded in the bottom into 5-11 acuminate usually repand-dentate lobes often falcate and spreading at right angles to the midrib or pointed toward the apex of the leaf; maturity dark green, very lustrous above, pale and tomentose below, 6-8 inches long, 5-6 inches wide.

FLOWERS: Flowers as in *Quercus falcata* Michx.

FRUIT: Without or with a very short stalk; acorn ripens the second year; nut varies from short ovate to subglobose, light yellow-brown, puberulous toward the rounded apex, about 5/8 inch in diameter with thin shell lined with pale tomentum tinged with red; the cup which encloses nearly 1/2 of the nut is flat or slightly turbinate on the bottom.

WINTER BUDS: Ovoid, acute, often 4-angled, about 1/4 inch in length, with light red-brown puberulous scales.

WOOD: Light reddish-brown with thin sapwood.

USES: Lumber, pulp, furniture, cabinets, veneer, millwork, fuel. Historical uses: tannin, medicine.

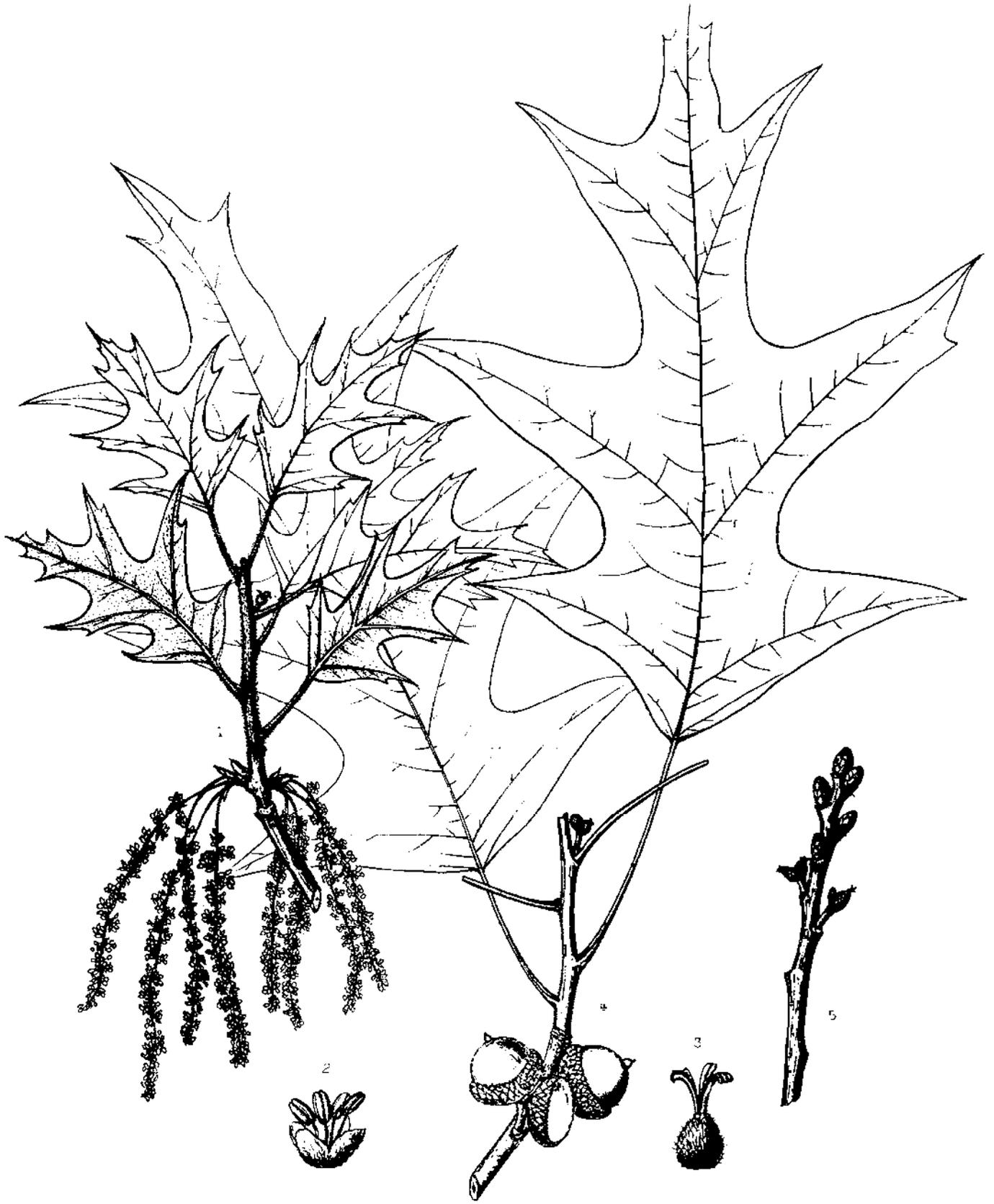
HABITAT: Rich bottom-lands and alluvial flats.

DISTINGUISHING CHARACTERISTICS: Leaves deeply divided by wide sinuses rounded at the bottom into 5-11 lobes that spread at right angles to the midrib; bark roughened by small rather closely appressed scales; short narrow crown in the forest; in the open a great open head.

DISTRIBUTION IN ALABAMA: In alluvial bottoms of creeks and rivers. Reported from Morgan, Etowah, St. Clair, Jefferson, Talladega, Franklin, Chilton, Hale, Autauga, Sumter, Lowndes, Wilcox, Marengo, Choctaw, and Monroe Counties.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 4. A fruiting branch |
| 2. A staminate flower | 5. A winter branchlet |
| 3. A pistillate flower | |



Quercus falcata var. pagodaefolia Ell.

BLUEJACK OAK

Quercus cinerea Michx.

OTHER COMMON NAMES: Cinnamon oak, Sand jack, Shin oak, Turkey oak, Upland willow oak.

FORM: Usually 15-20 feet high, trunk 5-6 inches in diameter, stout branches forming a narrow irregular head; on low moist soil may reach height of 60-75 feet, trunk diameter 18-20 inches.

BARK: 3/4- 1 1/2 inches thick, divided into thick, nearly square plates, 1-2 inches long, covered by small dark brown or nearly black scales, slightly tinged with red.

TWIGS: At first fulvous or hoary tomentum, soon glabrous or puberulous, dark brown, sometimes tinged with red, later darker.

LEAVES: Alternate, simple, oblong-lanceolate to oblong-obovate, narrowed or cuneate, or sometimes rounded at base, acute or rounded and apiculate at apex, with slightly thickened undulate margins; occasionally 3-lobed at apex on vigorous sterile branches; mature leaves blue-green, lustrous above, pale tomentose below, 2-5 inches long, 1/2- 1 1/2 inches wide.

FLOWERS: Monoecious; staminate in hoary tomentose aments 2-3 inches long, calyx bright red, becoming yellow as it opens; pistillate on short tomentose peduncles, stigmas dark red.

FRUIT: Ripens the second year, occasionally on branches 3-4 years old; nut ovate, rounded at both ends or subglobose, about 1/2 inch long, light brown, often striate, hoary pubescent at apex; cup saucer-shaped, embraces only the bottom of the nut or is cup-shaped and encloses half of the nut.

WINTER BUDS: Ovoid, acute, with numerous scales ciliate on their margins, often 1/4 inch long on vigorous branches.

WOOD: Hard, close-grained, strong, light brown tinged with red, sapwood darker colored,

USES: Firewood.

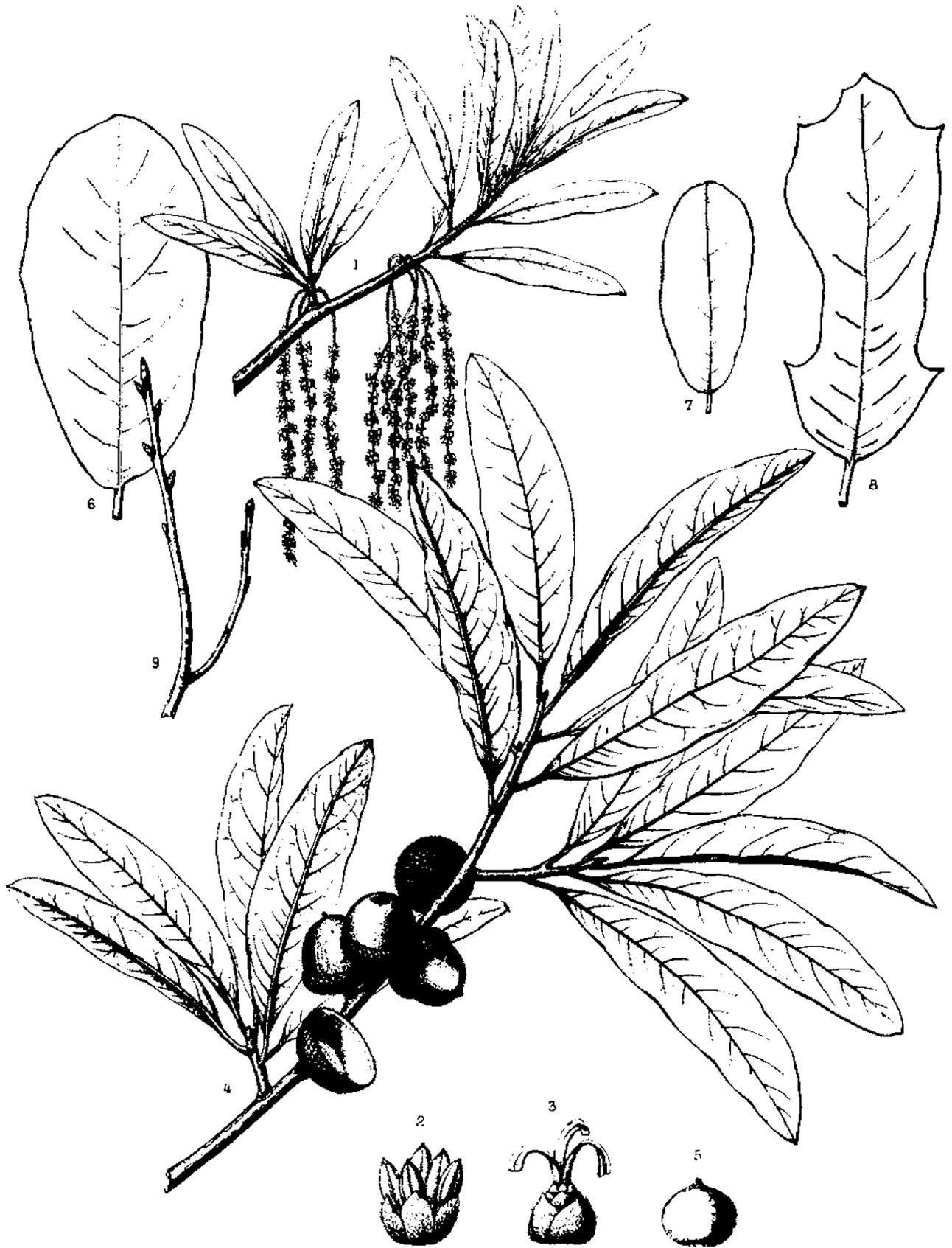
HABITAT: Sandy barrens, dry upland ridges, rich moist soil of pine-covered flats.

DISTINGUISHING CHARACTERISTICS: Leaves pale blue-green, hoary tomentose below; nut rounded at both ends, hoary-pubescent at apex; bark divided into thick, nearly square plates.

DISTRIBUTION IN ALABAMA: Reported from Etowah, Walker, Chilton, Tuscaloosa, Macon, Autauga, Montgomery, Dallas, Choctaw, and Monroe Counties. Common in Washington, Mobile, Escambia, Covington, Geneva, and Houston Counties.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 6. A leaf |
| 2. A staminate flower | 7. A leaf |
| 3. A pistillate flower | a. A Leaf |
| 4. A fruiting branch | 9. A winter branchlet |
| 5. A nut | |



Quercus cinerea Michx.

TURKEY OAK

Quercus laevis Walt.

OTHER COMMON NAMES: Scrub oak.

FORM: This tree reaches 20-40 feet in height with an irregular, open crown of crooked branches; often a shrub on very poor sites.

LEAVES: Alternate, simple, deciduous; 4-8" long, 3-6" wide; spreading from pointed base into 3-5 (rarely 7) long narrow lobes each with 1-3 bristle-tipped teeth. Shiny yellow-green above, light green beneath with prominent veins and tufts of rust-colored hairs in vein angles; petioles short, stout and grooved.

BARK: Gray to blackish; becoming thick, very rough, deeply furrowed into irregular ridges; inner bark reddish.

TWIGS: Stout; red becoming dark brown and glabrous; terminal buds are clustered at the end of the twig; insect galls are common; partially developed acorns may be present.

WINTER BUDS: Larger buds are mostly 3/8-1/2" long; slender and acute; circular in cross section; rusty hairy but not woolly.

FLOWERS: Appear with the leaves; unisexual, the staminate is in slender, 4-5" long, hairy catkins; the pistillate is on short, stout, hairy stalks.

FRUIT: Acorns are 3/4-1" long; egg-shaped, about 1/3 enclosed by top-shaped cup with loose scales; inner surface of nut shell is woolly; short-stalked; maturing in their second year.

HABITAT: Occurs on dry, sandy, sterile hills and ridges; often in pure stands or in close association with Longleaf pine.

DISTINGUISHING CHARACTERISTICS: The common name refers to the shape of the 3-lobed leaves suggesting a turkey's foot. Spreads by 'underground runners, especially after frequent fires.

WOOD: Very heavy, dense and strong wood with high fuel value, but with grain characteristics that limit lumber production and use.

USES: Firewood, some pulpwood and mast for wildlife.

IN ALABAMA: Occurs mostly within the lower coastal plain of southern third of the state below 500 feet elevation.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 4. A fruiting branch |
| 2. A staminate flower | 5. A cup |
| 3. A pistillate flower | 6. A winter branchlet |



Quercus laevis Walt.

LAUREL OAK

Quercus laurifolia Michx.

OTHER COMMON NAMES: Darlington oak, Laurel-leaved oak, Water oak, Swamp laurel oak.

FORM: Occasionally 100 feet high, diameter of trunk 3-4 feet, slender branches spreading into a broad dense round-topped head.

BARK: On young trees 1/2-1 inch thick, dark brown, more or less tinged with red, with small closely appressed scales; at base of old trees 1-2 inches thick, nearly black, divided by deep fissures into broad flat ridges.

TWIGS: Slender, glabrous, at first dark red, later reddish-brown or dark gray.

LEAVES: Alternate, simple, elliptic, acuminate at the ends, apiculate at apex, occasionally lanceolate or oblong-obovate and rounded at apex, sometimes 3-lobed at apex, terminal lobe acuminate, frequently unequally lobed on vigorous branches of young trees, green and lustrous above, paler below, 3-4 inches long, 3/4 inch wide.

FLOWERS: Monoecious; staminate in hoary tomentose aments 2-3 inches long, calyx pubescent, divided into 4 rounded segments; pistillate on stout glabrous peduncles, stigmas dark red.

FRUIT: Generally solitary; nut ovoid to hemispheric, broad and slightly rounded at base, apex rounded, puberulous, dark brown, about 1/2 inch long, about 1/4 enclosed in a thin saucer-shaped cup; acorns ripen the second year.

WINTER BUDS: Broadly ovoid or oval, acute at apex, 1/16-1/8 inch long, with numerous, closely imbricated bright red-brown scales.

WOOD: Heavy, very strong and hard, coarse-grained, dark brown tinged with red, with thick lighter colored sapwood.

USES: Firewood, pulp.

HABITAT: Sandy banks of streams, swamps and rich hummocks.

DISTINGUISHING CHARACTERISTICS: Leaves elliptic, remain green on the tree until spring; nut dark brown, about 1/2 inch long, about 1/4 of its length enclosed in a thin saucer-shaped cup; crown broad, dense, round-topped.

DISTRIBUTION IN ALABAMA: Occurs in Tuscaloosa, Bibb, Chilton, and Coosa Counties, frequent southeastward from Tuscaloosa County.

EXPLANATION OF PLATE

1. A flowering branch
2. A staminate flower
3. A pistillate flower
4. A fruiting branch
5. A leaf of a sterile branch of a young tree
6. A winter branchlet



Quercus laurifolia Michx.

OVERCUP OAK

Quercus lyrata Walt.

OTHER COMMON NAMES: Swamp post oak, Swamp white oak, Water white oak, White oak.

FORM: May attain a height of 100 feet, with trunk diameter 2-3 feet, trunk generally divided 15-20 feet above ground into comparatively small, often pendulous branches forming a symmetrical round-topped head.

BARK: 3/4-1 inch thick, light gray, tinged with red, broken into thick plates separating on the surface into thin, irregular, appressed scales.

TWIGGS: Slender, green, more or less tinged with red; at first pilose or pubescent;
ultimately ashy-gray or light brown.

LEAVES: Alternate, simple, oblong-obovate, narrowed and cuneate at base, divided into spreading or ascending lobes by deep or shallow sinuses rounded, straight, or oblique on the bottom, the terminal lobe acute or acuminate at apex; dark green and glabrous above, usually silvery-white below; 7-10 inches long, 1-4 inches wide.

FLOWERS: Monoecious; staminate in slender hoary aments 4-6 inches long, calyx light yellow; pistillate sessile or stalked.

FRUIT: Matures the first year; nut subglobose or ovoid or rarely to ovoid-oblong, 1/2-1
inch long, usually broader at base than long, chestnut-brown, about 2/3 enclosed in the
ovoid, nearly spherical, or deep cup-shaped, thin cup.

WINTER BUDS: Ovoid, obtuse, about 1/8 inch long with light chestnut-brown scales covered, near their margins, with loose pale tomentum.

WOOD: Heavy, hard, strong, tough, rich dark brown with lighter colored sapwood

USES: Lumber, pulp, furniture, firewood.

HABITAT: River swamps, small deep depressions on rich bottom lands usually wet throughout the year.

DISTINGUISHING CHARACTERISTICS: Nut more or less enclosed in the cup; lyre-shaped leaves; trunk usually divided 15-20 feet above ground into comparatively small, often pendulous branches.

DISTRIBUTION IN ALABAMA: Nowhere abundant. More or less generally distributed in the state, usually in low flatwoods, alluvial bottoms, but not in the immediate vicinity of streams.

EXPLANATION OF PLATE

- | | |
|------------------------|--|
| 1. A flowering branch | 6. A nut |
| 2. A staminate flower | 7. Part of the base of a cup |
| 3. A pistillate flower | 8. A leaf |
| 4. A fruiting branch | 9. A winter branchlet |
| 5. A fruit | 10. An axillary winter bud with persistent stipule |



Quercus lyrata Walt,

BUR OAK

Quercus macrocarpa Michx.

OTHER COMMON NAMES: Blue oak, Mossycup oak, Mossy-over-cup oak.

FORM: Sometimes 170 feet high, trunk 6-7 feet in diameter, may be clear of limbs 70-80 feet above the ground, with a broad head of great spreading branches; usually not more than 80 feet high, trunk diameter 3-4 feet.

BARK: 1-2 inches thick, deeply furrowed and broken on the surface into irregular plate-like brown scales.

TWIGS: Stout, coated at first with soft pale deciduous pubescence, ultimately dark brown, sometimes with corky wings 1-1 1/2 inch wide.

LEAVES: Alternate, simple, 6-12 inches long, 3-6 inches wide; sometimes pilose on upper side, pubescent on lower; obovate or oblong, cuneate or occasionally narrow and rounded at base, divided by wide sinuses into 5-7 lobes, terminal lobe large, oval or obovate, regularly crenately lobed, rounded or acute at apex.

FLOWERS: Monoecious; staminate in interrupted hairy filiform aments 4-6 inches long, borne on the growth of the preceding season or from the axils of the inner scales of the terminal bud, calyx yellowish-green; pistillate sessile or pedunculate, borne in the axils of the leaves of the season.

FRUIT: Matures first year, variable in size and shape; nut ellipsoidal or broadly ovoid, broad at base, rounded or depressed at apex, covered with soft pale pubescence; 3/5 inch long and 1/3 inch thick in the north; sometimes 2 inches long and 1 1/2 inch thick in the south; cup thick or thin, light brown, downy on inner side, outside covered with overlapping scales, forming a distinct fringe near the upper edge.

WINTER BUDS: Broadly ovoid, acute, or obtuse, 1/8-1/4 inch long with light red-brown scales coated with soft pale pubescence.

WOOD: Heavy, strong, hard, tough, close-grained, very durable, dark or rich light brown, with thin lighter colored sapwood.

USES: Lumber, pulp, furniture, firewood, landscaping.

HABITAT: Low rich bottom-lands and intervals, rarely on dry hills.

DISTINGUISHING CHARACTERISTICS: Distinctly fringed cups; leaves have deep rounded sinuses that reach almost to the midrib; corky winged projections on the small branches; mature bark divided by deep furrows into irregular, scaly plates.

DISTRIBUTION IN ALABAMA: Very limited but reported one-half mile west of Snowdown, Montgomery County, Alabama.

EXPLANATION OF PLATE

- | | |
|---------------------------------|------------|
| 1. A branch with immature fruit | 5. A fruit |
| 2. A fruit | 6. A leaf |
| 3. A fruit | 7. A leaf |
| 4. A fruit | |



Quercus macrocarpa Michx.

BLUEJACK OAK

Quercus cinerea Michx.

OTHER COMMON NAMES: Cinnamon oak, Sand jack, Shin oak, Turkey oak, Upland willow oak.

FORM: Usually 15-20 feet high, trunk 5-6 inches in diameter, stout branches forming a narrow irregular head; on low moist soil may reach height of 60-75 feet, trunk diameter 18-20 inches.

BARK: 3/4- 1 1/2 inches thick, divided into thick, nearly square plates, 1-2 inches long, covered by small dark brown or nearly black scales, slightly tinged with red.

TWIGS: At first fulvous or hoary tomentum, soon glabrous or puberulous, dark brown, sometimes tinged with red, later darker.

LEAVES: Alternate, simple, oblong-lanceolate to oblong-obovate, narrowed or cuneate, or sometimes rounded at base, acute or rounded and apiculate at apex, with slightly thickened undulate margins; occasionally 3-lobed at apex on vigorous sterile branches; mature leaves blue-green, lustrous above, pale tomentose below, 2-5 inches long, 1/2- 1 1/2 inches wide.

FLOWERS: Monoecious; staminate in hoary tomentose aments 2-3 inches long, calyx bright red, becoming yellow as it opens; pistillate on short tomentose peduncles, stigmas dark red.

FRUIT: Ripens the second year, occasionally on branches 3-4 years old; nut ovate, rounded at both ends or subglobose, about 1/2 inch long, light brown, often striate, hoary pubescent at apex; cup saucer-shaped, embraces only the bottom of the nut or is cup-shaped and encloses half of the nut.

WINTER BUDS: Ovoid, acute, with numerous scales ciliate on their margins, often 1/4 inch long on vigorous branches.

WOOD: Hard, close-grained, strong, light brown tinged with red, sapwood darker colored,

USES: Firewood.

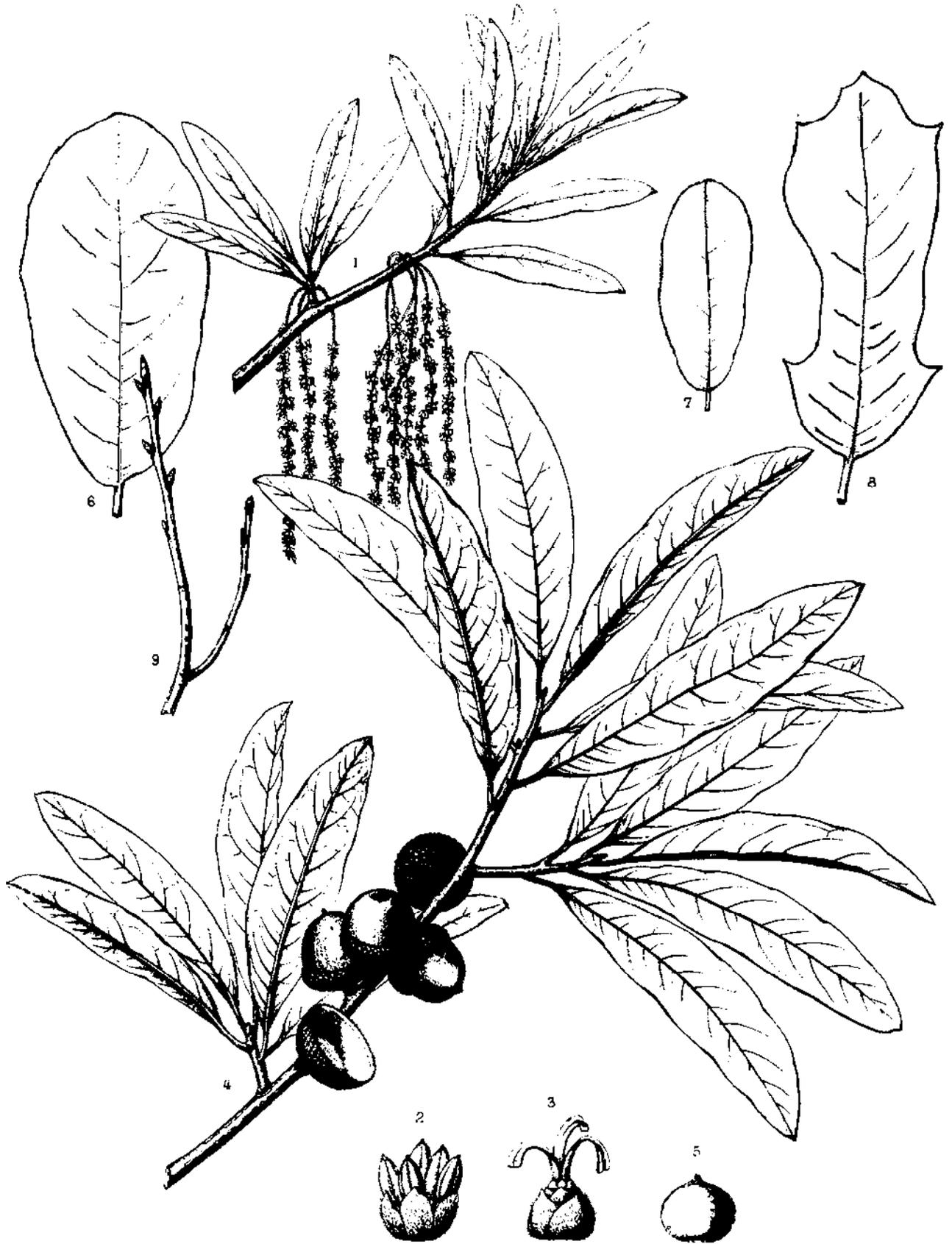
HABITAT: Sandy barrens, dry upland ridges, rich moist soil of pine-covered flats.

DISTINGUISHING CHARACTERISTICS: Leaves pale blue-green, hoary tomentose below; nut rounded at both ends, hoary-pubescent at apex; bark divided into thick, nearly square plates.

DISTRIBUTION IN ALABAMA: Reported from Etowah, Walker, Chilton, Tuscaloosa, Macon, Autauga, Montgomery, Dallas, Choctaw, and Monroe Counties. Common in Washington, Mobile, Escambia, Covington, Geneva, and Houston Counties.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 6. A leaf |
| 2. A staminate flower | 7. A leaf |
| 3. A pistillate flower | a. A Leaf |
| 4. A fruiting branch | 9. A winter branchlet |
| 5. A nut | |



Quercus cinerea Michx.

SWAMP CHESTNUT OAK

Quercus michauxii Nutt.

OTHER COMMON NAMES: Basket oak, Cow oak, White oak.

FORM: Often 100 feet high, 3-7 feet in diameter, trunk sometimes free of branches 40-50 feet, branches ascend at narrow angles and form a round-topped rather compact head.

BARK: 1/2-1 inch thick, separating into thin closely appressed silvery-white or ashy-gray scales, more or less deeply tinged with red.

TWIGS: Bright red-brown or orange-brown their first winter, ultimately ashy-gray.

LEAVES: Alternate, simple, broadly obovate to oblong-obovate, acute or acuminate at apex with a short broad point, cuneate or rounded at the broad or narrow base, regularly crenately lobed, with oblique rounded entire lobes, sometimes with glandular tips or rarely entire with undulate margins, thick and firm, dark green lustrous above, pubescent on the pale green or silvery-white lower side, 6-8 inches long, 3-6 inches wide; resembles leaf of the chestnut.

FLOWERS: Monoecious; staminate, yellow, in interrupted filiform hairy aments 3-4 inches long; pistillate in few-flowered spikes.

FRUIT: Matures the first year; nut ovoid or ellipsoidal, with a broad base, acute, rounded, occasionally truncate at apex, bright brown, 1-1 1/2 inch long, 3/4-1 1/4 inch thick, enclosed about 1/3 of its length in the thick cup-shaped cut, seed sweet and edible.

WINTER BUDS: Broadly ovoid or oval, acute, 1/4 inch long, scales dark red, puberulous with pale margins.

WOOD: Heavy, hard, strong, tough, close-grained, durable, light brown, with thin darker colored

USES: Lumber, pulp, furniture, firewood.

HABITAT: Borders of streams, swamps, bottom-lands often covered with water.

DISTINGUISHING CHARACTERISTICS: The shape and lobing of the leaves; the closely appressed silvery-white or ashy-gray scales of the bark; large nuts.

DISTRIBUTION IN ALABAMA: Grows mostly in river and creek bottoms, fairly well distributed throughout the state.

EXPLANATION OF PLATE

1. A fruiting branch
2. A nut
3. A winter branchlet



Quercus michauxii Nutt.

CHINKAPIN OAK

Quercus mublenbergii Engelm.

OTHER COMMON NAMES: Chestnut oak, Rock chestnut oak, Rock oak, Yellow chestnut oak, Yellow oak.

FORM: 80-100, occasionally 160 feet high, with tall straight trunk 3-4 feet in diameter, with comparatively small branches forming a narrow round-topped head.

BARK: Rarely over 1/2 inch thick, broken on the surface into thin loose silvery-white scales sometimes tinged with brown.

TWIGS Light orange color or reddish-brown during first winter, ultimately gray or brown.

LEAVES: Alternate, simple, usually crowded at the ends of the branches, oblong-lanceolate to broadly obovate, acute or acuminate with a long narrow or with a short broad point, abruptly or gradually narrowed and rounded or cordate at base, equally serrate with acute and often incurved or broad and rounded teeth tipped with small glandular mucros, at maturity thick and firm, light yellow-green above, often silvery-white and finely pubescent below, 4-7 inches long, 1-5 inches wide.

FLOWERS: Monoecious; staminate in interrupted filiform aments 3-4 inches long, yellow anthers, notched; pistillate flowers clustered, sessile or pedunculate, styles, 3, bright red.

FRUIT: Matures the first season; nut ovoid, narrowed and rounded at apex, 1/2 to nearly 1 inch long, light chestnut-brown, about half of its length enclosed in a thin cup-shaped, light brown cup, hairy tomentose on its inner surface.

WINTER BUDS: Ovoid, acute, 1/8-1/4 inch long, with chestnut-brown scales white and scarious on the margins.

WOOD: Heavy, very hard. strong, close-grained, with thin light-colored sapwood

USES: Lumber, barrel staves, railroad ties, pulp. Historical uses: Wheel spokes, fencing.

HABITAT Dry hillsides, prefers dry limestone ridges, reaches best development on rich bottom land.

DISTINGUISHING CHARACTERISTICS: Oblong leaves, coarsely and regularly serrate except at the base; bole often buttressed below; mature bark, gray or nearly white, thin and shallowly fissured.

DISTRIBUTION IN ALABAMA: Mostly on limestone outcroppings, limestone slopes and on shady ridges and bluffs. Reported from Winston, Cullman, Fayette, Walker, Tuscaloosa, Jefferson, Blount, Sumter, Hale, Autauga, Wilcox, Clarke, and Houston Counties.

EXPLANATION OF PLATE

- | | |
|------------------------|----------------------------|
| 1. A flowering branch | 6. A leaf |
| 2. A staminate flower | 7. A leaf |
| 3. A pistillate flower | 8. A winter branchlet |
| 4. A fruiting branch | 9. An auxillary winter bud |
| 5. A fruit | |



Quercus muhlenbergii Engelm.

WATER OAK

Quercus nigra L

OTHER COMMON NAMES: Possum oak, Duck oak, Pin oak.

FORM: Occasionally 80 feet high, trunk 2-3 1/2 feet in diameter, numerous branches spreading gradually from the stem form a symmetrical, round-topped head.

BARK: 1/2-3/4 inch thick, smooth, light brown surface, slightly tinged with red and covered with closely appressed scales.

TWIGS: Light to dull red the first season, grayish-brown their second year.

LEAVES: Alternate, simple, oblong-obovate, gradually narrowed and cuneate at base, often enlarged abruptly at the broad rounded entire or occasionally 3-lobed apex; on vigorous young branchlets sometimes pinnatifid, with acute, acuminate or rounded lobes of broadly oblong-obovate and rounded apex or undulate margins; on upper branches occasionally linear-lanceolate, on occasional trees narrowed to an elongated cuneate base and widened above into a more or less deeply 3-lobed apex, the lobes rounded or acute; on upper branches sometimes linear-lanceolate to linear-obovate, acute or rounded at apex, divided above the middle by deep rounded sinuses into elongated, lanceolate, acute, entire lobes or pinnatifid above the middle, at maturity bluish-green above, paler below, usually 2 1/2 inches long, 1 1/2 inches wide, or on fertile branches 6 inches long, 2 inches wide.

FLOWERS: Monoecious; staminate in red hairy stemmed aments 2-3 inches long; pistillate on short tomentose peduncles, stigmas deep red.

FRUIT: Matures second season, usually solitary; nut ovoid, broad and flat at base, full and rounded at the pubescent apex, light yellow-brown, often striate, 1/2-2/3 inch long and nearly as thick, usually enclosed only at the base in a saucer-shaped cup.

WINTER BUDS: Ovoid, acute, strongly angled, scales loosely imbricated, dark red-brown, slightly ciliate on the margins.

WOOD: Heavy, hard, strong, close-grained, light brown with thick, lighter colored sapwood.

USES: Rough lumber, firewood, pulp, landscaping.

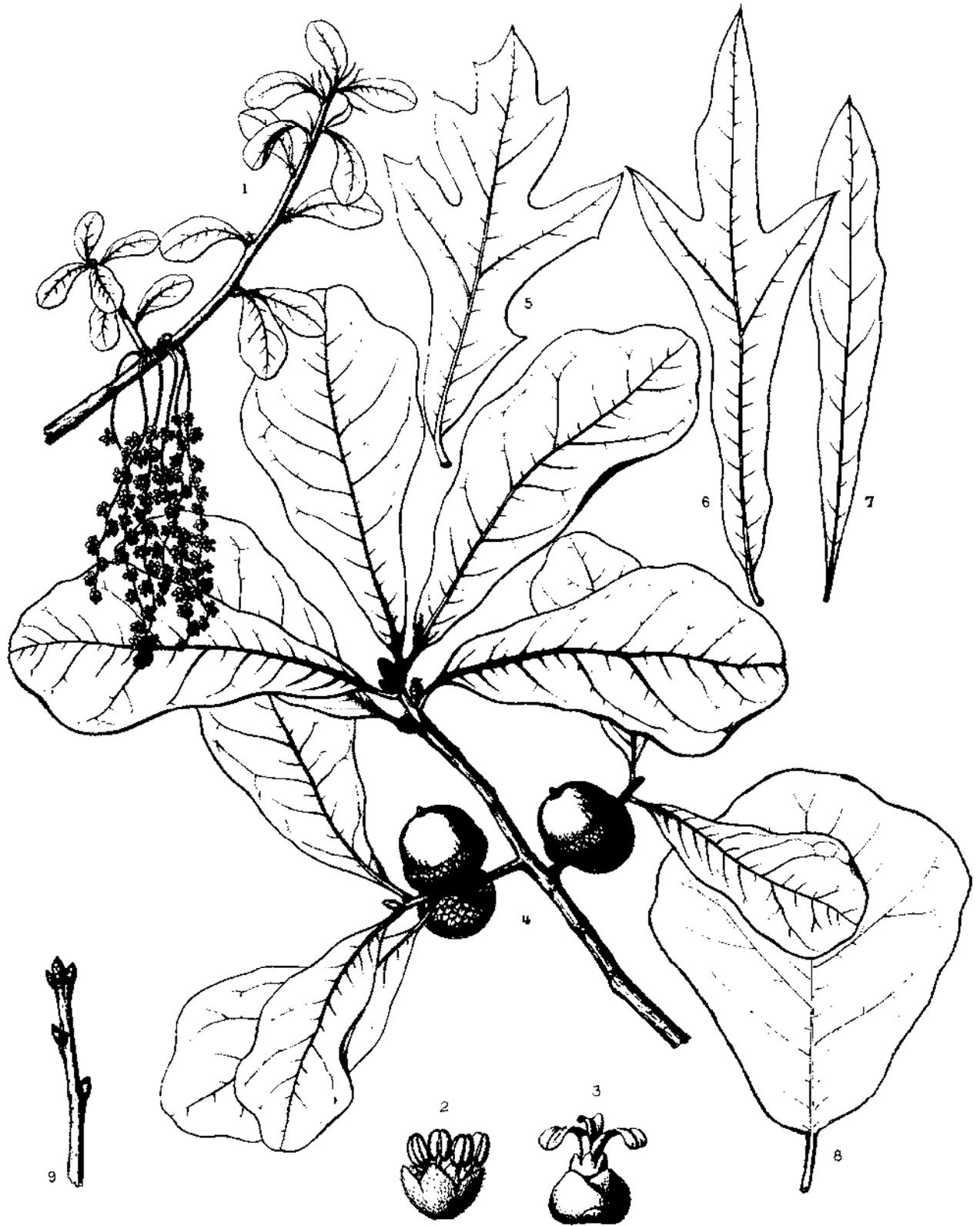
HABITAT: High sandy borders of swamps and streams, rich bottom lands.

DISTINGUISHING CHARACTERISTICS: Leaves quite variable in form; bark smooth, covered with closely appressed scales. A good shade tree.

DISTRIBUTION IN ALABAMA: Distributed pretty well over the state, seems to be most abundant in the Black Belt.

EXPLANATION OF PLATE

- | | |
|------------------------|-----------------------|
| 1. A flowering branch | 6. A leaf |
| 2. A staminate flower | 7. A leaf |
| 3. A pistillate flower | 8. A leaf |
| 4. A fruiting branch | 9. A winter branchlet |
| 5. A leaf | |



Quercus nigra L

WILLOW OAK

Quercus phellos L.

OTHER COMMON NAMES: Peach oak, Pin oak, Swamp willow oak.

FORM: Often 70-90 feet high, 2 feet, rarely 4 feet in diameter with small branches spreading into a comparatively narrow open or conical round-topped head.

BARK: 1/2-3/4 inch thick, light red-brown, slightly tinged with red, generally smooth; on old trees broken by shallow fissures into irregular plates covered by closely appressed scales.

TWIGS: Glabrous, reddish-brown, roughened by dark lenticels, second year dark brown, tinged with red or grayish-brown.

LEAVES: Alternate, simple, ovate-lanceolate, rarely obovate-lanceolate, often somewhat falcate, narrowed and acute at both ends, entire with slightly undulate margins, glabrous, light green, rather lustrous above, dull and paler or rarely hoary pubescent below, 2 1/2-5 inches long, 1/4-1 inch wide.

FLOWERS: Monoecious; staminate in slender-stemmed aments 2-3 inches long, calyx yellow; pistillate flowers on slender glabrous peduncles, stigmas bright red.

FRUIT: Matures the second season; nut hemispheric, light, yellow-brown, coated with pale pubescence, enclosed only at the very base in the thin pale reddish-brown saucer-shaped cup, about 1/2 inch in diameter.

WINTER BUDS: Ovoid, acute, about 1/8 inch long with dark chestnut-brown scales scarious on the margins.

WOOD: Heavy, strong, not hard, rather close-grained, light brown tinged with red, thin lighter colored sapwood

USES: Rough lumber, firewood, pulp, landscaping.

HABITAT: Low wet borders of swamps and streams and rich sandy uplands.

DISTINGUISHING CHARACTERISTICS: Willow-shaped leaves; flat cups of the acorns; small acorns; can tolerate water better than most oaks.

DISTRIBUTION IN ALABAMA: Fairly well distributed over the state; found mostly in alluvial bottoms and damp clayey woods.

EXPLANATION OF PLATE

- | | |
|------------------------|---------------------------------------|
| 1. A flowering branch | 4. A fruiting branch |
| 2. A staminate flower | 5. A leaf from a young vigorous shoot |
| 3. A pistillate flower | 6. A winter branchlet |



Quercus phellos L.

CHESTNUT OAK

Quercus prinus Engelm.

OTHER COMMON NAMES: Rock oak, Rock chestnut oak, White oak.

FORM: Usually 60-70 feet high, occasionally 100 feet, diameter of trunk 3-4 feet, rarely 6-7 feet, bole generally divided 15-20 feet above ground into large limbs spreading into a broad open rather irregular head.

BARK: 3/4-1 1/2 inch thick, dark reddish-brown almost black, divided into broad rounded ridges covered with closely appressed scales.

TWIGS: At first green, tinged with purple or bronze color, glabrous or pilose, later light orange color or reddish-brown, ultimately dark gray or brown.

LEAVES: Alternate, simple, obovate or oblong to lanceolate, acute or acuminate or rounded at apex, cuneate or rounded or subcordate at the narrow entire base, irregularly and coarsely crenulate-toothed, with rounded, acute or sometimes nearly triangular oblique teeth, yellow-green on the upper surface; lower paler and finely pubescent, 4 1/2 -9 inches long, 1 1/2-3 inches wide.

FLOWERS: Monoecious; staminate in elongated hirsute aments, calyx yellow; pistillate in short spikes on stout puberulous dark green peduncles, stigmas dark red.

FRUIT: Matures the first season; nut ovoid or ellipsoidal, rounded, rather obtuse or pointed at apex, bright chestnut-brown, very lustrous, 1-1 1/2 inch long, 5/8-1 inch thick, about half of its length enclosed, sometimes only at the base, in a turbinate or cup-shaped thin cup.

WINTER BUDS: Ovoid, acute or acuminate, 1/4-1/2 inch long, with bright chestnut-brown scales ciliate on their margins.

WOOD: Heavy, hard, strong, tough, close-grained, durable in the soil.

USES: Rough lumber, pulp, railroad ties, firewood. Historical uses: fencing, tannin.

DISTINGUISHING CHARACTERISTICS: Irregularly and coarsely crenulate-toothed leaves; bark divided into broad, rounded ridges; large buds with scales ciliate on their margins; large acorns.

DISTRIBUTION IN ALABAMA: Mainly north and east of a line extending through the southeast corner of Randolph, northwest corner of Chambers, northern part of and Autauga, through Perry, Hale, Tuscaloosa, and Fayette Counties.

EXPLANATION OF PLATE

- | | |
|------------------------------|------------------------------|
| 1. A fruiting branch | 4. A seed |
| 2. A cup | 5. Part of the base of a cup |
| 3. Vertical section of a nut | 6. A winter branchlet |



Quercus prinus Engelm.

NORTHERN RED OAK

Quercus rubra L.

OTHER COMMON NAMES: Gray oak, Eastern red oak, Red oak.

FORM: Usually 70-80 feet high, diameter 2-4 feet, occasionally 150 feet tall; in the open, trunk short, massive, soon breaking up into stout limbs forming a broad symmetrical head; in dense stands, bole continues into narrow round-topped head.

BARK: Mature bark dark brown, thick, divided by shallow fissures into regular, continuous flat-topped ridges, scaly at the surface.

TWIGS: Slender, smooth greenish-brown to dark brown, lenticels pale, indistinct.

LEAVES: Alternate, simple, oblong to oval-obovate, 5-9 inches long, 4-6 inches wide, 7-11 lobed, with sinuses extending half way to the midrib, lobes usually sinuately 3-toothed and bristle-tipped, dark green above, paler and glabrous below.

FLOWERS: Monoecious; staminate in pubescent aments 4-5 inches long, calyx divided into 4-5 ovate rounded lobes; pistillate on short glabrous peduncles, stigmas bright green.

FRUIT: An acorn, borne solitary or in pairs, ripening the second season; nut oblong-ovoid, chestnut-brown, round-pointed at the apex, $3/4-1\ 1/4$ inch long, about $1/4$ of the length enclosed in the cup, cup saucer-shaped, pubescent within.

WINTER BUDS: Alternate, $1/6-1/3$ inch long, near the tip of the branch clustered about the terminal bud which is ovate, acute, light chestnut-brown.

WOOD: Hard, heavy, strong, close-grained, pale reddish-brown with paler sapwood.

USES: Lumber, pulp, furniture, cabinets, veneer, millwork, fuel. Historical uses: tannin, medicine.

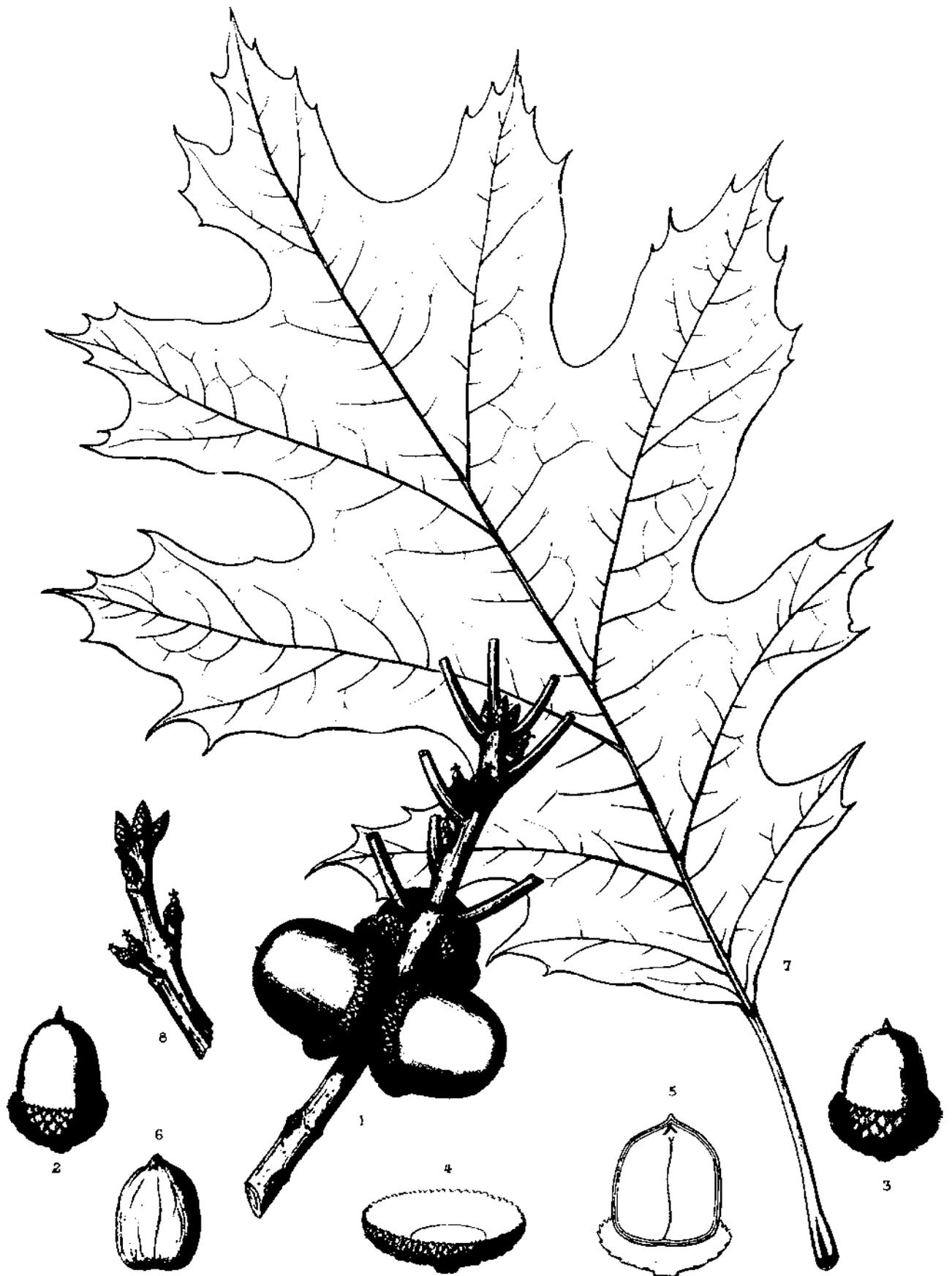
HABITAT: Well-drained site, gravelly or sandy or clay loams; intolerant to wet soils.

DISTINGUISHING CHARACTERISTICS: The flat-topped ridges of the mature bark; the light reddish inner bark; the sharp-pointed, light brown buds which are often constricted at the base; large acorns with broad shallow cups.

DISTRIBUTION IN ALABAMA: More or less generally distributed from Northern Alabama as far south as Monroe and Clarke Counties.

EXPLANATION OF PLATE 50

- | | |
|----------------------|--------------------------------|
| 1. A fruiting branch | 5. Vertical section of a fruit |
| 2. A fruit | 6. A seed |
| 3. A fruit | 7. A leaf |
| 4. A cup | 8. A fertile winter branchlet |



Quercus rubra L.

SHUMARD OAK

Quercus shumardii Buckl.

FORM: In the forest on a good site this species can become a large, straight tree with broad, rounded, open crown; reaching mature heights of 90-125 feet and diameters of 1-2 & 1/2 feet.

LEAVES: Alternate, simple, deciduous, obovate; 6-8" long, 4-6" wide; apex, acuminate; base, wedge-shaped or flattened; margin with 7-9 keeplly divided bristle-tipped lobes, often subdivided into secondary lobes by rounded sinuses; dark green and glabrous above, paler below and with tufts of axillary hairs in vein angles.

BARK: Gray and smooth; becoming dark gray and slightly furrowed into ridges with age.

TWIGS: Moderately stout; glabrous, gray-brown.

WINTER BUDS: Terminal buds, 1/4" long, ovoid, acute, usually angled, gray-brown; lateral buds, similar but shorter.

FLOWERS: Unisexual; the staminate in a glabrous, 6-7" catkins; the pistillate, solitary or paired, borne on pubescent stalks.

FRUIT: Acorn, solitary or in pairs; the nut is up to 1 1/2" long and 1" diameter; shallow, caucer-shaped cup with tightly overlapping, blunt scales.

HABITAT: Most abundant on deep, rich, bottomland soils along stream and swamp borders; usually occurring as an occasional tree in mixed hardwood forests.

DISTINGUISHING CHARACTERISTICS: The trunk of these trees may be slightly buttressed on wet sites, but otherwise symmetrical and uncommonly clear for most of its length.

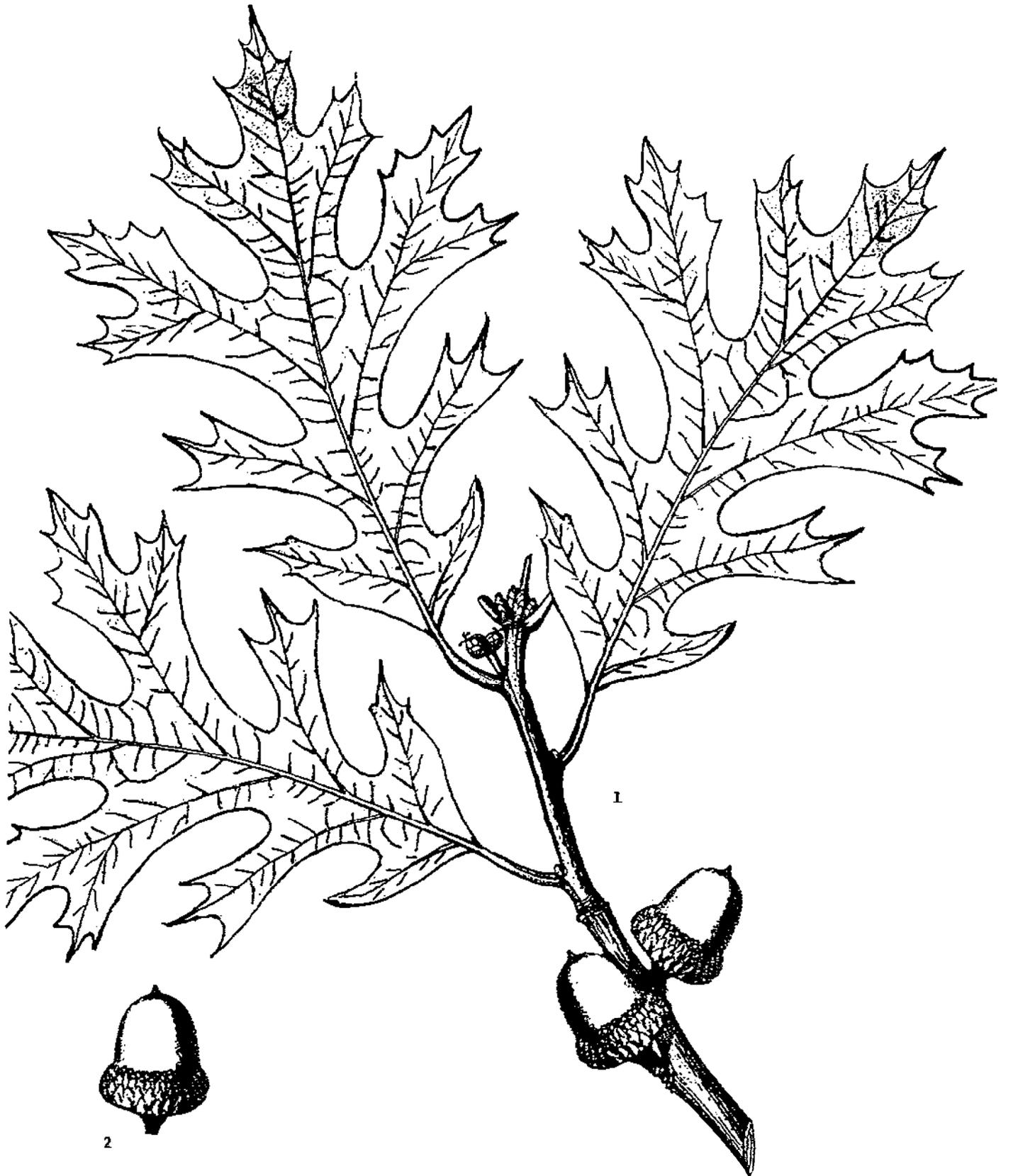
WOOD: Generally straight-grained, heavy and hard with very good working capabilities.

USES: A very important timber species used for flooring, furniture, molding and cabinetry; incidental uses as firewood and pulpwood. Good landscaping species if well cared for.

DISTRIBUTION IN ALABAMA: May occur almost anywhere in the state, but more common in bottomlands and swamps of the coastal plains and rare in the Appalachians and Piedmont.

EXPLANATION OF PLATE

1. A fruiting branch
2. A fruit



Quercus shumardii Buckl.

POST OAK

Quercus stellata Wangenh.

OTHER COMMON NAMES: Iron oak, Box white oak, White oak.

FORM: One of the most variable of North American oaks. Usually 50-60 feet high, trunk diameter 1-2 feet, may reach a height of 80-100 feet, with a long clean bole, in its northern limits reduced to a shrub, crown broad, dense, round-topped with stout spreading branches; crown much reduced in the forest.

BARK: 1/2-1 inch thick, red, more or less deeply tinged with brown, divided by deep fissures into broad ridges covered on the surface with narrow closely appressed scales.

TWIGS: At the end of the first season covered with a short pubescence, ultimately gray, dary brown, nearly black or bright brown tinged with orange.

LEAVES: Alternate, simple, oblong-obovate, deeply 5-lobed with broad sinuses oblique in the bottom, and short wide lobes, broad and truncate or obtusely pointed at apex; cuneate, or occasionally abruptly narrowed and cuneate or rounded at base, usually 4-5 inches long, and 3-4 inches wide across the lateral lobes, but occasionally larger; often in the form of a crude thick cross.

FLOWERS: Monoecious; staminate, bracteolate in interrupted aments 2 1/2-4 inches long, calyx yellow, anthers covered with short pale hairs; pistillate, sessile or stalked, stigmas bright red.

FRUIT: Matures the first season; nut oval to ovoid, or ovoid-oblong, broad at base, obtuse, naked or pubescent at apex, 1/2-1 inch long, 1/4-3/4 inch thick, sometimes striate with dark longitudinal stripes, enclosed 1/3-1/2 of its length in the cup-shaped, turbinate or rarely saucer-shaped cup.

WINTER BUDS: Broadly ovoid, obtuse or rarely acute, 1/8-1/4 inch long, with bright chestnut-brown scales.

WOOD: Very heavy, hard, close-grained, durable in contact with the soil, light or dark brown with lighter colored sapwood

USES: Pulp, firewood, lumber, railroad ties. Historical uses: barrel staves, agricultural implements.

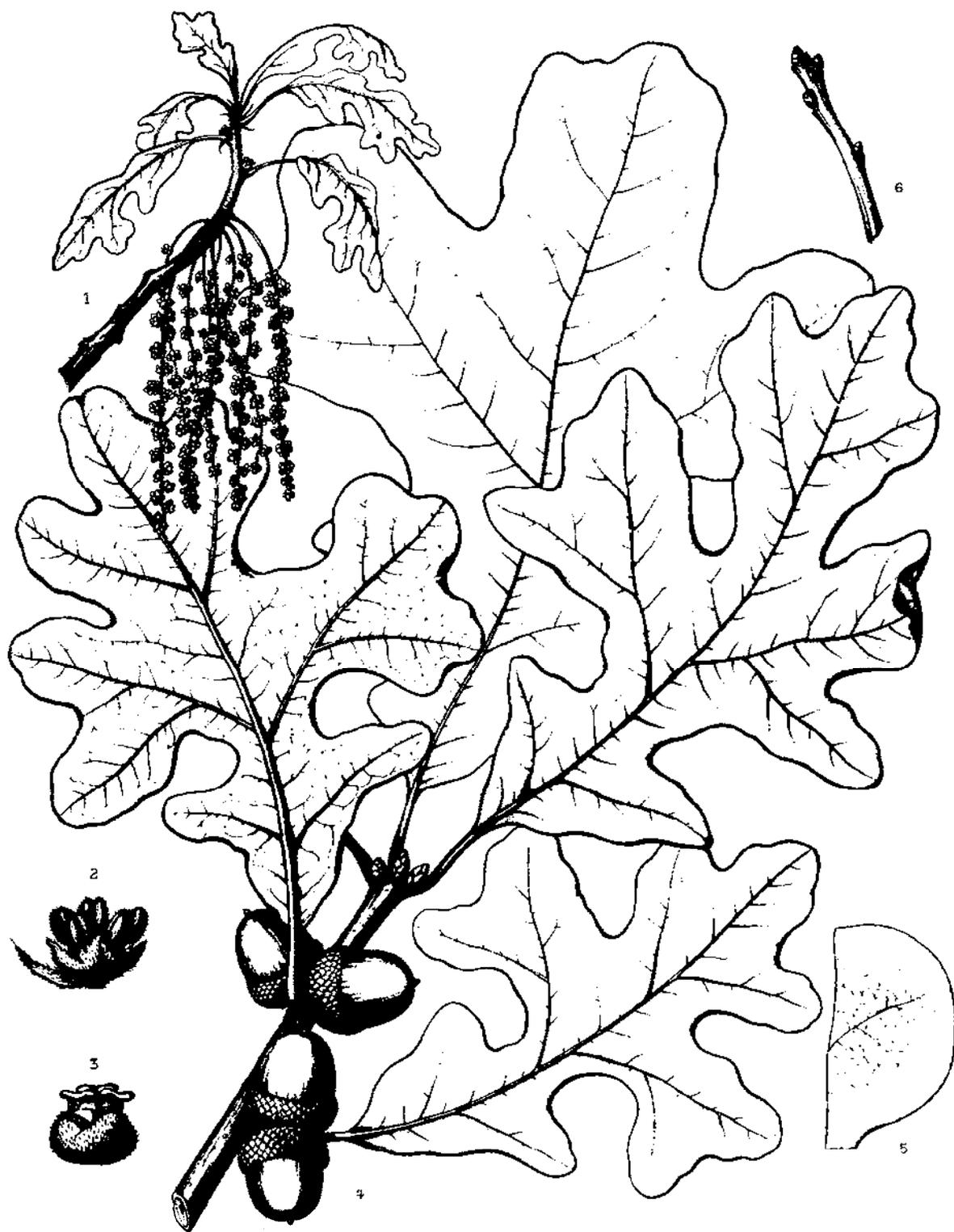
HABITAT: Dry gravelly or sandy uplands.

DISTINGUISHING CHARACTERISTICS: Peculiar cross-shaped form of the leaves; stout rusty pubescent twigs; small and bright chestnut-brown color of winter buds.

DISTRIBUTION IN ALABAMA: Widely distributed over the state.

EXPLANATION OF PLATE

1. A fruiting branch showing nearly entire and deeply lobed leaves
2. A leaf
3. A leaf
4. A leaf
5. A fruit with a deep cup
6. A fruit with a shallow cup



Quercus stellata Wangenh.

BLACK OAK

Quercus velutina Lam.

OTHER COMMON NAMES: Smooth-bark oak, Yellow oak, Quercitron oak.

FORM: Often 70-80 feet and occasionally 150 feet high, trunk diameter 3-4 feet, with slender branches spreading gradually into a narrow open head.

BARK: 3/4-1 1/2 inches thick on old trunks, deeply divided into broad rounded ridges, broken on the surface into thick dark brown or nearly black, closely appressed plate-like scales.

TWIGS: Stout, pale lenticellate, smooth or sparingly pubescent, dull reddish-brown or nearly black.

LEAVES: Alternate, simple, obovate or oblong, rounded, cuneate or truncate at base, mostly 7-lobed sometimes divided nearly to the middle by wide rounded sinuses into narrow obovate more or less repand-dentate lobes or into elongated nearly entire mucronate lobes, usually 5-6 inches long, 3-4 inches wide, dark green, glabrous and lustrous above, pale yellow-green below.

FLOWERS: Monoecious; staminate flowers in interrupted filiform hairy aments 4-6 inches long, borne on the growth of the preceding season or from the axils of the inner scales of the terminal bud; anthers yellow; pistillate flowers in groups of 2-3, occasionally solitary, on short peduncles, borne in the axils of the leaves of the season.

FRUIT: Ripens the second season; nut ovate to oval, reddish-brown, often striate and pubescent, round-pointed at apex, 1/2-3/4 inch long, about half of its length enclosed in the turbinate cup.

WINTER BUDS: Alternate, ovoid, strongly angled, narrowed at base, obtuse at apex, hoary-tomentose, 1/4-1/2 inch long.

WOOD: Hard, heavy, strong, coarse-grained, light reddish-brown with paler sapwood.

USES: Firewood, pulp. Historical uses: tannin, dyes.

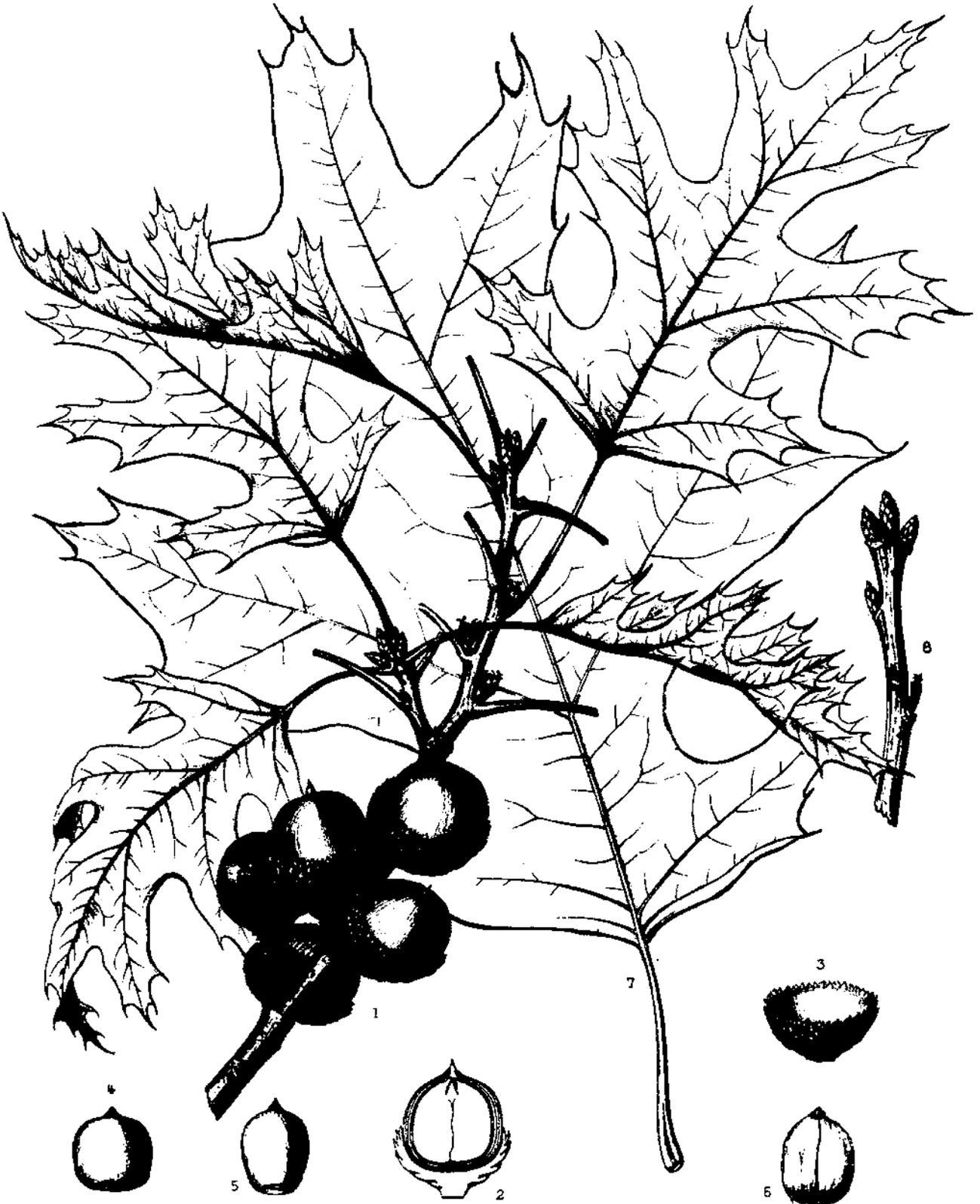
HABITAT: Prefers well-drained sites on ridges and hills, highly tolerant of poor soils.

DISTINGUISHING CHARACTERISTICS: Its yellow inner bark and bitter taste; many varieties of leaves on the same tree; large angular hoary-tomentose buds; rough outer bark on old trunks; yields quercitron, a yellow dye.

DISTRIBUTION IN ALABAMA: Widely distributed over the state as far south as Monroe County.

EXPLANATION OF PLATE

- | | |
|--------------------------------|-----------------------|
| 1. A fruiting branch | 5. A nut |
| 2. Vertical section of a fruit | 6. A seed |
| 3. A cup | 7. A leaf |
| 4. A nut | 8. A winter branchlet |



Quercus velutina Lam.

LIVE OAK

Quercus virginiana Mill.

OTHER COMMON NAMES: Virginia live oak.

FORM: Often 40-50 feet high, trunk 3-4 feet in diameter, usually divides a few feet above the ground into 3-4 horizontal spreading limbs, forming a low dense round-topped head sometimes 130 feet across; occasionally 60-70 feet tall, trunk diameter of 6-7 feet.

BARK: 1/2-1 inch thick, dark brown tinged with red, slightly furrowed, separating on the surface into small, closely appressed scales.

TWIGS: Become ashy-gray or light brown and pubescent or puberulous by the first winter, ultimately darker and glabrous.

LEAVES: Oblong elliptic or obovate, rounded or acute at apex, gradually narrowed and cuneate or rarely rounded or cordate at base, usually entire with slightly revolute margins or rarely spinose-dentate above the middle, dark green and lustrous above, lower surface pale and pubescent, 2-5 inches long, 1/2-2 1/2 inches wide.

FLOWERS: Monoecious; staminate in hairy aments, calyx light yellow, divided into 5-7 segments, anthers hirsute; pistillate in spikes on slender peduncles 1-3 inches long, stigmas bright red.

FRUIT: Usually in 3-5 fruited spikes, rarely in pairs or single; nut ellipsoidal or slightly obovoid, narrowed at base, rounded or acute at apex, dark chestnut-brown, lustrous, 1 inch long, 1/2 inch wide, about 1/4 of its length enclosed in a turbinate cup.

WINTER BUDS: Globose or slightly obovoid, about 1/6 inch long with thin light chestnut-brown scales, white and scarious on margins.

WOOD: Very heavy, hard, strong, tough, close-grained, light brown or yellow, with thin, nearly white sapwood.

USES: Landscaping, pulp, firewood. Historical uses: Shipbuilding.

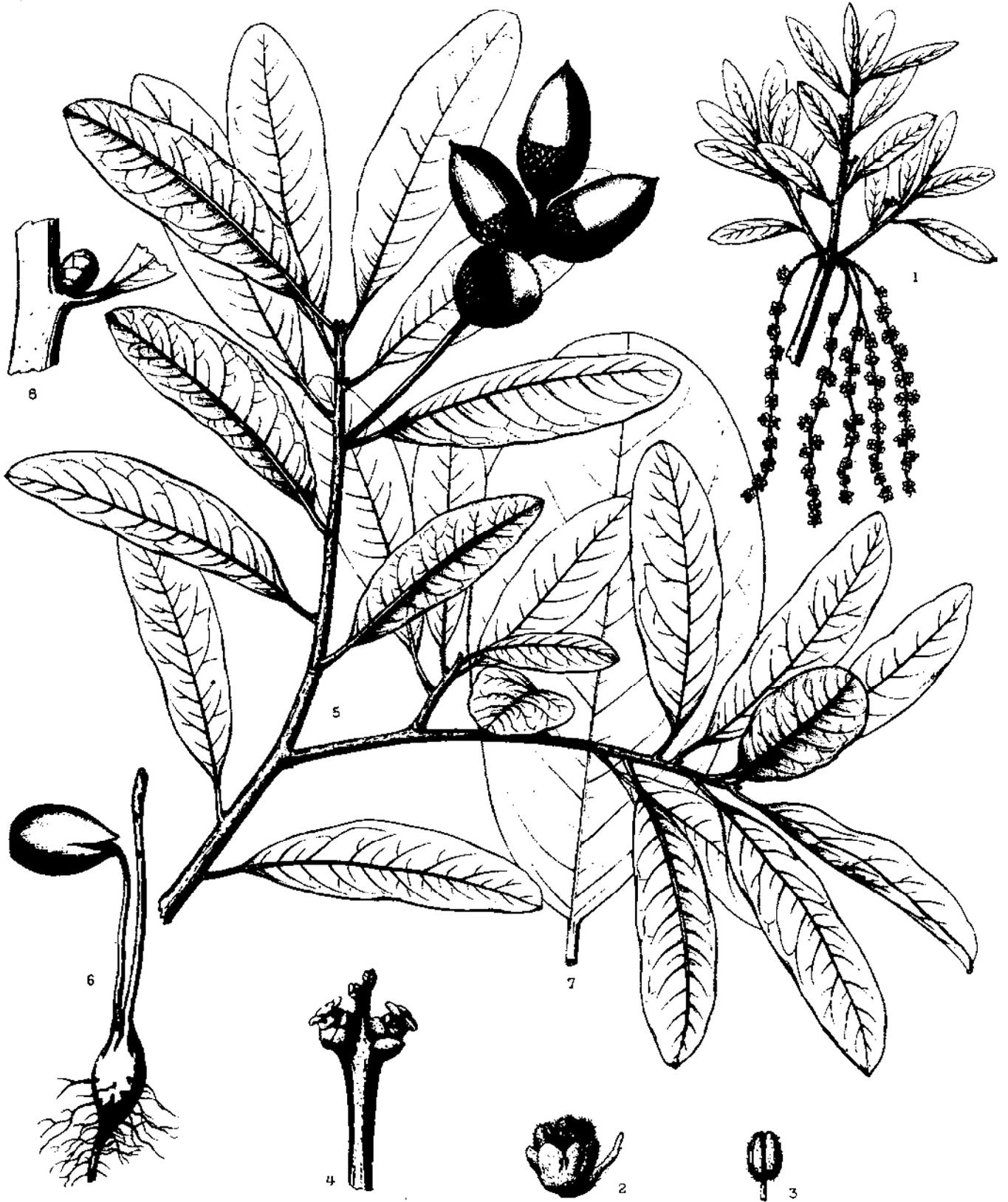
HABITAT: Moist, deep soils often mixed with water oaks.

DISTINGUISHING CHARACTERISTICS: Leaves yellow-green, persist until new leaves appear; acorns long-stalked; bark on trunk slightly furrowed, separating on surface into small scales.

DISTRIBUTION IN ALABAMA: Reported from Mobile, Baldwin, and Covington Counties.

EXPLANATION OF PLATE

- | | |
|-------------------------------|----------------------|
| 1. A flowering branch | 5. A fruiting branch |
| 2. A staminate flower | 6. A germinating nut |
| 3. A stamen | 7. A leaf |
| 4. A pistillate inflorescence | 8. A winter bud |



Quercus virginiana Mill.

SUGARBERRY

Celtis laevigata Willd.

OTHER COMMON NAMES: Sugar hackberry, Hackberry, Texas sugarberry.

FORM: 60-80 feet high, trunk diameter 2-3 feet, spreading or pendulous branches form a round head.

BARK: 1/2-2/3 inch thick, pale gray, covered with prominent excrescences.

TWIGS: At first light green, glabrous, or pubescent, later become reddish-brown, rather lustrous, marked by pale oblong lenticels.

LEAVES: Alternate, simple, oblong-lanceolate, long-pointed and acuminate at apex, unsymmetrically rounded or cuneate or obliquely cuneate at base, other falcate, entire or with few teeth near the apex, or serrate, thin, smooth, glabrous or rarely rough above, light green on both surfaces, 2 1/2-5 inches long, 3/4-1 1/2 inch wide, with a narrow yellow midrib.

FLOWERS On slender glabrous pedicels; calyx divided into 5 ovate-lanceolate glabrous or puberulous scarious lobes with tufts of long white hairs at apex.

FRUIT: A drupe, glabrous, short-oblong to ellipsoid or obovoid, orange or yellow, 1/4 inch diameter, nutlet slightly wrinkled.

WINTER BUDS: Small, 1/16-1/8 inch long, ovate, sharp-pointed, scales chestnut-brown.

WOOD: Soft, not strong, coarsely grained, yellowish.

USES: Pulp, rough lumber. Historical uses: boxes, crates.

HABITAT: Prefers rich moist soil, also on upland soils.

DISTINGUISHING CHARACTERISTICS: Corkybark; leaves oblong-lanceolate, long-pointed, entire or few teeth near apex; fruit on glabrous pedicels shorter or only slightly longer than the petioles.

DISTRIBUTION IN ALABAMA: Apparently no special locality reported.

EXPLANATION OF PLATE

- | | |
|--------------------------------------|--|
| 1. A flowering branch | 8. A seed |
| 2. A staminate flower just expanding | 9. A branchlet with lanceolate entire leaves |
| 3. A staminate flower after anthesis | 10. A leaf |
| 4. A pistillate flower | 11. A leaf |
| 5. A fruiting branch | 12. Winter branchlet |
| 6. A fruit cut transversely | 13. A winter bud and leaf scar |
| 7. A nutlet | |



***Celtis laevigata* Willd.**

HACKBERRY

Celtis occidentalis L.

OTHER COMMON NAMES: Common hackberry, Sugarberry.

FORM: Rarely more than 40-50 feet high, on rich soils may reach a height of more than 100 feet; in the open the trunk is short, breaking up into stout spreading limbs 8-10 feet above the ground to form a more or less round-topped crown.

BARK: Grayish-brown, 1-1 1/2 inch thick, may be smooth or more or less thickly covered and roughened by irregular wart-like excrescences or by long ridges.

TWIGS: Slender, somewhat shiny, occasionally slightly downy, brownish, covered with scattered raised lenticels.

LEAVES: Alternate, simple, broadly ovate and somewhat falcate, 2 1/2-4 inches long, 1-2 inches wide, acuminate at the apex, rounded and inequilateral at the base, coarsely serrate except at the ends, rough on upper surface, 3-ribbed, somewhat hairy on prominent veins below.

FLOWERS: Three kinds; staminate cymose from buds at the base of the growth of the season; the perfect and pistillate, solitary or in few-flowered fascicles from the axils of the upper leaves, calyx pale yellowish-green, divided into 5 linear scarious lobes.

FRUIT: Thick skinned, subglobose or oblong, long-stalked, one-seeded drupe, about 1/4 inch long, tipped with persistent style.

WINTER BUDS: 1/4 inch long, ovate, sharp-pointed, appressed, bud scales sometimes longitudinally striated and dark margined.

WOOD: Heavy, not strong, coarse-grained, rather soft, pale yellow with white sapwood.

USES: Pulp, rough lumber. Historical uses: boxes, crates.

HABITAT: Prefers rich soil, also grows on gravelly uplands, usually solitary.

DISTINGUISHING CHARACTERISTICS: Pith is chambered; dark fruit; leaves ovate, short acuminate; corky bark usually present on old trees.

DISTRIBUTION IN ALABAMA: Statewide.

EXPLANATION OF PLATE

- | | |
|---|-----------------------------------|
| 1. A flowering branch | 8. A fruiting branch |
| 2. Diagram of a flower | 9. Vertical section of a fruit |
| 3. A staminate flower before the straightening of the filaments | 10. A fruit cut open transversely |
| 4. A staminate flower expanded | 11. An embryo |
| 5. A perfect flower | 12. An embryo partly displayed |
| 6. Vertical section of a perfect flower | 13. A winter branchlet |
| 7. An ovule | |



Celtis occidentalis L.

WINGED ELM

Ulmus alata Michx.

OTHER COMMON NAMES: Cork Elm, Witch elm, Water elm, Southern elm.

FORM: Usually about 40-50 feet high, diameter of trunk 2-3 feet, occasionally 80-100 feet high, short, stout, straight or erect branches forming a narrow oblong rather open round-topped head.

BARK: Rarely more than 1/4 inch thick, light brown, tinged with red, divided by irregular shallow fissures into flat ridges covered by small closely appressed scales.

TWIGS: At first glabrous or puberulous and light green tinged with red, become reddish-brown and glabrous in their first winter; usually with 2 corky ridges beginning to grow during their first or more often during their second season, abruptly arrested at the nodes, often 1/2 inch wide, and persist many years.

LEAVES: Alternate, simple, ovate-oblong to oblong-lanceolate, often somewhat falcate, acute or acuminate at apex, unequally cuneate or rounded or subcordate at base, coarsely doubly serrate with incurved teeth, at maturity thick and firm or subcoriaceous, dark green, smooth above, pale and soft pubescent below, 2-2 1/2 inches long, 1/2-3/4 inch wide.

FLOWERS: On drooping pedicels, in short, few-flowered fascicles; calyx glabrous, divided nearly to the middle into 5 broad ovate rounded lobes as long as the hoary-tomentose ovary.

FRUIT: Ripens before or with unfolding of the leaves, oblong, 1/3 inch in length, contracted at the base into a long slender stalk, gradually narrowed and tipped at apex with long curved awns.

WINTER BUDS: Slender, acute, 1/8 inch long, dark chestnut-brown with glabrous or puberulous scales.

WOOD: Heavy, hard, not strong, close-grained, difficult to split, light brown, thick, lighter colored

USES: Landscaping, pulp. Historical uses: barrels, baskets, chairs, crates, twine, wheel hubs.

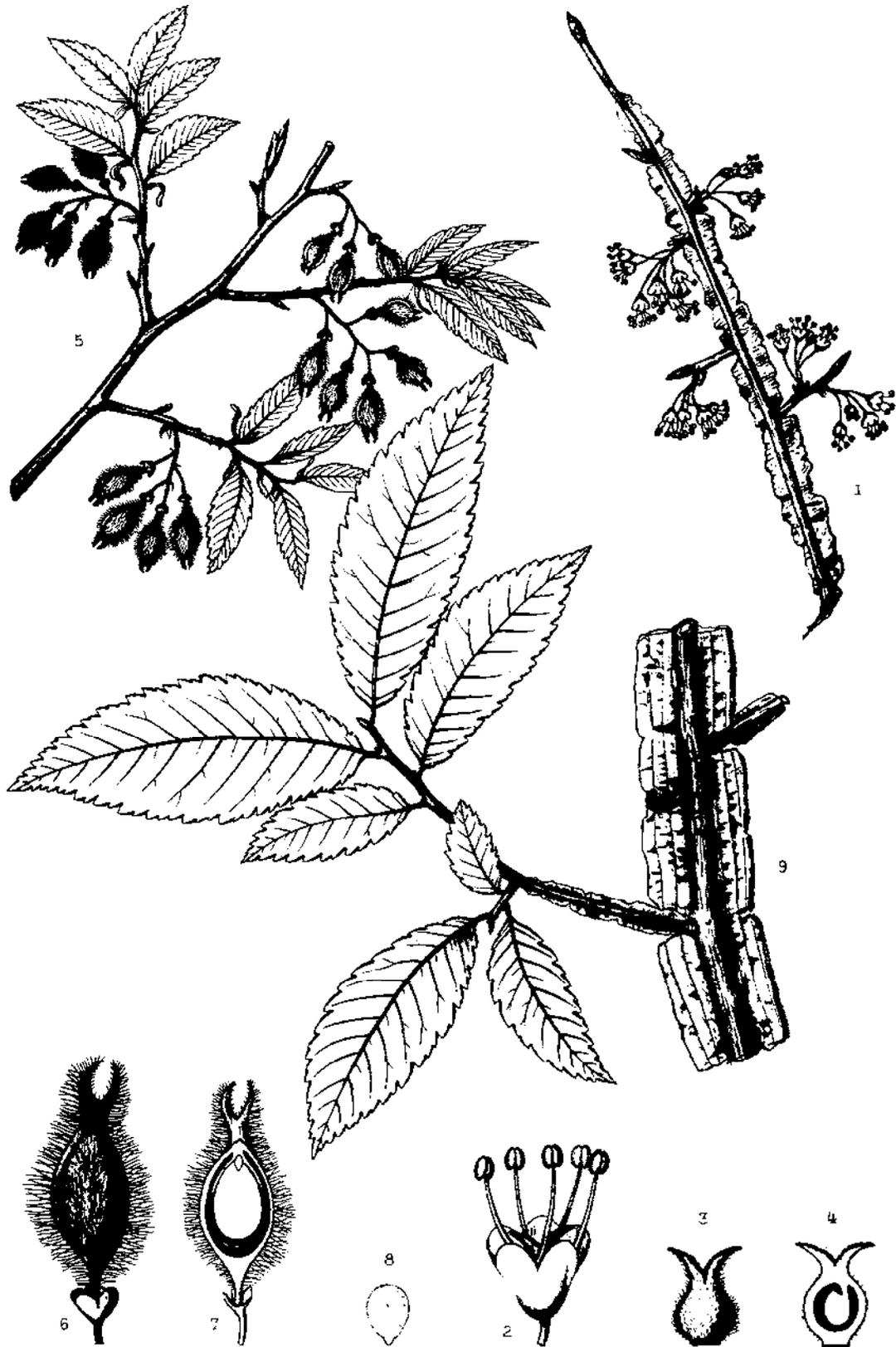
HABITAT: Usually on gravelly uplands, less common in alluvial soil, often on clayey calcareous soils.

DISTINGUISHING CHARACTERISTICS: Wing of the fruit narrow; branchlets usually with broad corky wings; leaves ovate-oblong to oblong-lanceolate; fruit gradually narrowed and tipped at apex with long awns.

DISTRIBUTION IN ALABAMA: Fairly common over the state except southernmost counties.

EXPLANATION OF PLATE

- | | |
|---------------------------------|--------------------------------|
| 1. A flowering branch | 6. A fruit |
| 2. A flower | 7. Vertical section of a fruit |
| 3. A pistil | 8. An embryo |
| 4. Vertical section of a pistil | 9. A summer branch |
| 5. A fruiting branch | |



***Ulmus alata* Michx.**

AMERICAN ELM
Ulmus americana L.

OTHER COMMON NAMES: White elm, Gray elm.

FORM: Usually 60-100 feet high, with trunk diameter 2-5 feet, under optimum conditions 120-140 feet high, with trunk 6-11 feet in diameter, with crown spread of more than 70 feet, occasionally may be 60 feet or more without a branch, more commonly divided 30-40 feet above ground into numerous upright limbs, gradually spreading and forming an inversely conic round-topped head.

BARK: Mature bark 1-1 1/2 inch thick, rough, ashy-gray, irregularly divided by deep fissures into broad scaly ridges.

TWIGS: Slender, at first greenish and pubescent, later smooth and reddish-brown, roughened by leaf scars and lenticels, base of twig marked with persistent ring-like bud-scale scars.

LEAVES: Alternate, simple, oval or obovate-oblong, 4-6 inches long, 1-3 inches wide, acuminate at apex, rounded and inequilateral at base, coarsely doubly serrate, dark green and glabrate, slightly scabrous above, paler and soft pubescent or glabrous below.

FLOWERS: Perfect, appear before the leaves in long pedunculate, 3-4 flowered inflorescences from the axils of the inner scales of the flower buds, each bud giving rise to 5-8 fascicles, calyx reddish-green, anthers reddish, styles light green.

FRUIT A one-seeded, oval to obovate-oblong, long-stalked, pale green samara, 1/2 inch long, deeply notched at apex, teeth incurved and overlapping.

WINTER BUDS: Terminal bud absent; leaf buds ovate, acute, chestnut-brown, about 1/8 inch long; flower buds slightly larger, borne below leaf buds.

WOOD: Heavy, hard, strong, coarse-grained, tough, light brown, wide paler sapwood.

USES: Landscaping, pulp, lumber. Historical uses: barrels, baskets, chairs, crates, twine, wheel hubs.

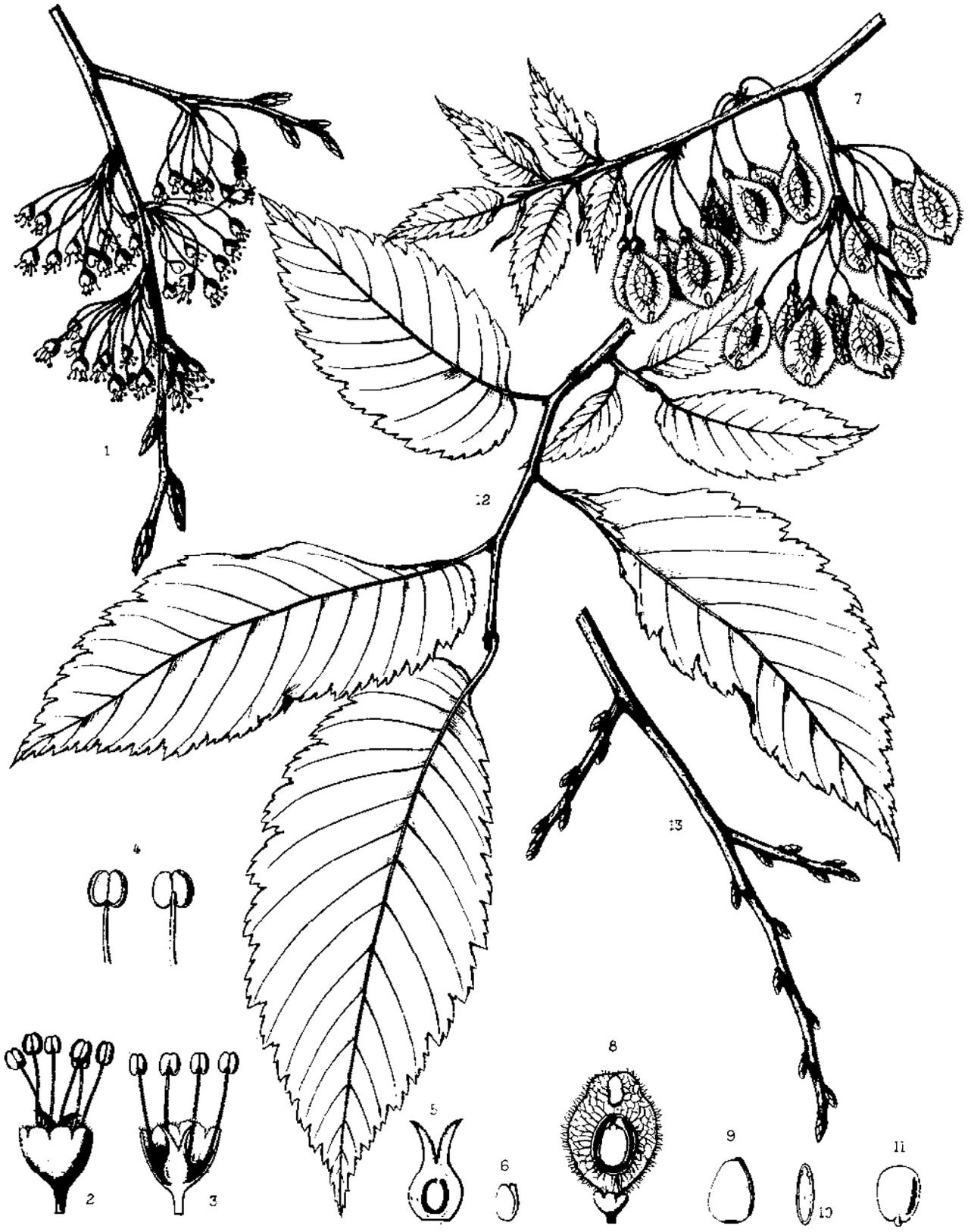
HABITAT: Prefers moist, rich alluvial soils along stream courses, fertile upland soils.

DISTINGUISHING CHARACTERISTICS: Wing of fruit ciliate, deeply notched at apex; bud scales glabrous; leaves coarsely doubly serrate on the margin; bark ashy-gray, divided by deep fissures.

DISTRIBUTION IN ALABAMA: Distributed over the entire state, most common northward.

EXPLANATION OF PLATE

- | | |
|-----------------------------------|--------------------------------|
| 1. A flowering branch | 8. Vertical section of a fruit |
| 2. A flower | 9. A seed |
| 3. Vertical section of a flower | 10. Vertical section of a seed |
| 4. A stamen, front and rear views | 11. An embryo |
| 5. Vertical section of a pistil | 12. A summer branch |
| 6. An ovule | 13. A winter branch |
| 7. A fruiting branch | |



Ulmus americana L.

SLIPPERY ELM

Ulmus rubra Muhl.

OTHER COMMON NAMES: Red elm, Gray elm, Soft elm.

FORM: Usually 40-60 feet high with a diameter of 1-2 1/2 feet, occasionally 80 feet tall, bole usually short, soon breaking up into a number of large, spreading limbs forming a broad, open, flat-topped head.

BARK: Mature bark thick, rough, shallowly fissured, ashy-gray to dark reddish-brown, inner bark strongly mucilaginous.

TWIGS: Stout, somewhat scabrous roughened by the raised lenticels and leaf scars, ultimately dark grayish-brown.

LEAVES: Alternate, simple, oval to obovate, 5-7 inches long, 2-3 inches wide, acuminate at apex, rounded and inequilateral at base, coarsely doubly serrate, dark green and rough papillose with impressed vein above, pale dense white hairy below.

FLOWERS: Appear before the leaves from separate flower buds, on short pedicels in crowded fascicles, calyx green, divided into 5-9 short, rounded, thin lobes, anthers dark red, stigmas reddish-purple.

FRUIT: A one-seeded, oval orbicular, short-stalked, pale green samara, 1/2-3/4 inch long, consisting of a flat seed surrounded by a wing; the fruit is hairy only over the seed.

WINTERBUDS: Alternate, terminal bud absent, leaf buds toward end of twig, ovate, bluntly acute, rusty tomentose, dark chestnut-brown, about 1/4 inch long, flower buds larger than the leaf buds, farther back on the twig.

WOOD: Hard, heavy, strong, coarse-grained, dark reddish-brown with paler sapwood.

USES: Landscaping, pulp. Historical uses: barrels, baskets, chairs, crates, twine, wheel hubs.

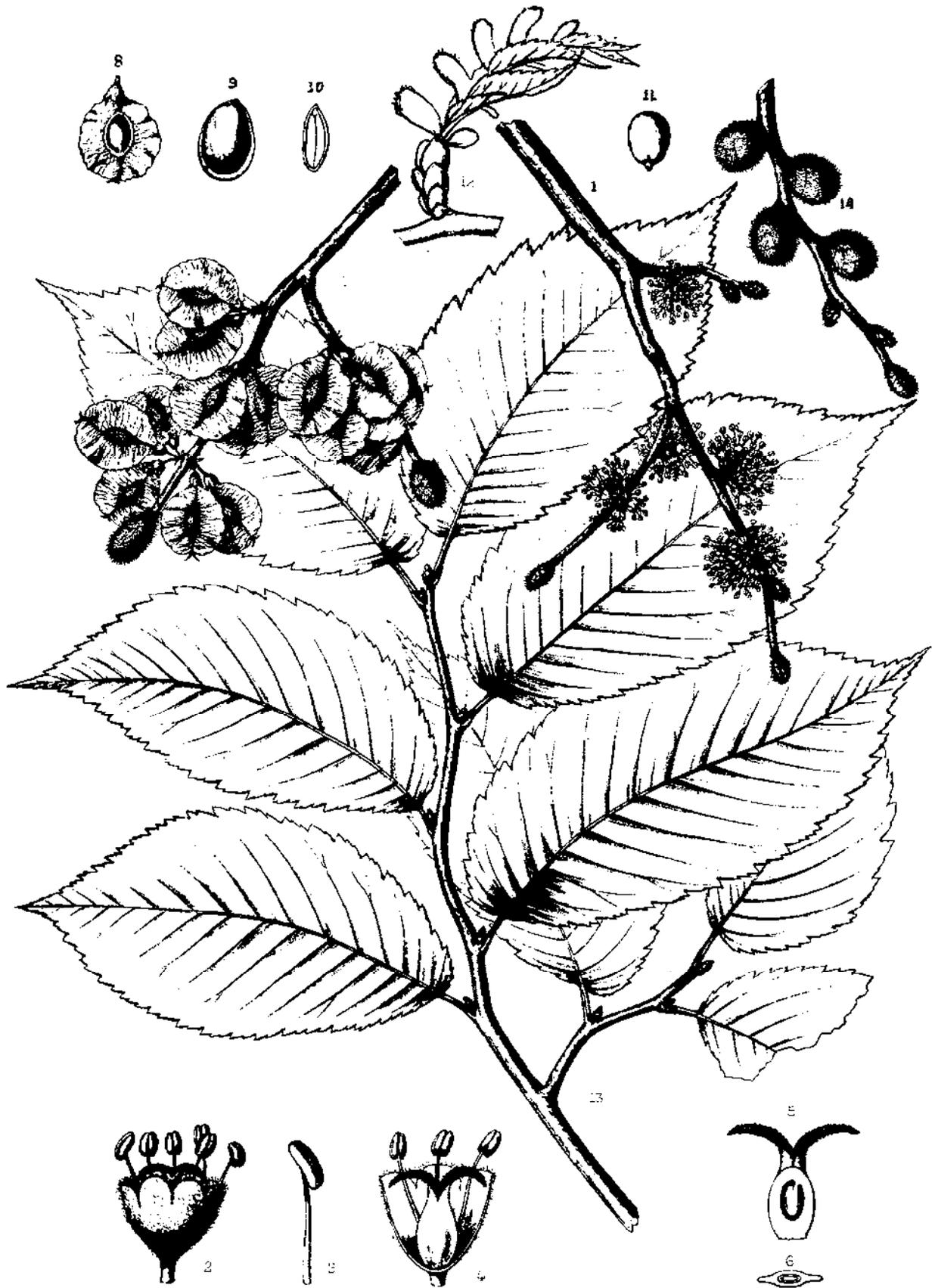
HABITAT: Stream banks, low fertile slopes, thrive on limestone outcrops.

DISTINGUISHING CHARACTERISTICS: Fragrant and mucilaginous inner bark; chestnut-brown buds covered with dusty brown pubescence; leaves are rough and coarsely serrate; fruit hairy only over the seed.

DISTRIBUTION IN ALABAMA: Very largely in the northern half of the state.

EXPLANATION OF PLATE

- | | |
|---------------------------------|---|
| 1. A flowering branch | 9. A seed |
| 2. A flower | 10. Vertical section of a seed |
| 3. A stamen | 11. An embryo |
| 4. Vertical section of a flower | 12. A young branch with unfolding leaves showing the accrescent bud scales and stipules |
| 5. Vertical section of a pistil | 13. A summer branch |
| 6. Cross section of an ovary | 14. A winter branch, the flower buds beginning to enlarge |
| 7. A fruiting branch | |
| 8. Vertical section of a fruit | |



Ulmus rubra Muhl.

Ulmus serotina Sarg.

OTHER COMMON USES: Red elm.

FORM: 50-60 feet high, trunk 2-3 feet in diameter, comparatively small spreading or pendulous branches often forming a broad head.

BARK: 1/4-3/8 inch thick, light brown, slightly tinged with red, divided by shallow fissures into broad flat ridges broken on the surface into large, thin, closely appressed scales.

TWIGS: At first glabrous, occasionally puberulous, become brown lustrous, ultimately dark gray-grown, often with 2-3 thick cork wings their second and third year.

LEAVES: Oblong to oblong-obovate, acuminate, very oblique at base, coarsely and doubly crenulate-serrate, yellow-green, glabrous on upper surface, pale and puberulous on midrib, 2-4 inches long, 1-1 3/4 inch wide.

FLOWERS: Open in September, on slender jointed pedicels often 1/8 inch long, in many-flowered racemes 1-1 1/2 inch long, calyx parted, with oblong-obovate red-brown divisions, ovary sessile, villose.

FRUIT: Ripens early in November, borne in racemes, stipitate, oblong-elliptic, deeply divided at apex, fringed on the margin with long silvery-white hairs, about 1/2 inch long,

WINTER BUDS: Ovoid, acute, 1/4 inch long, outer scales oblong-obovate, dark chesnut-brown.

WOOD: Hard, close-grained, very strong and tough, light red-brown, with pale yellow sapwood.

USES: Landscaping, pulp. Historical uses: barrels, baskets, chairs, crates, twine, wheel hubs.

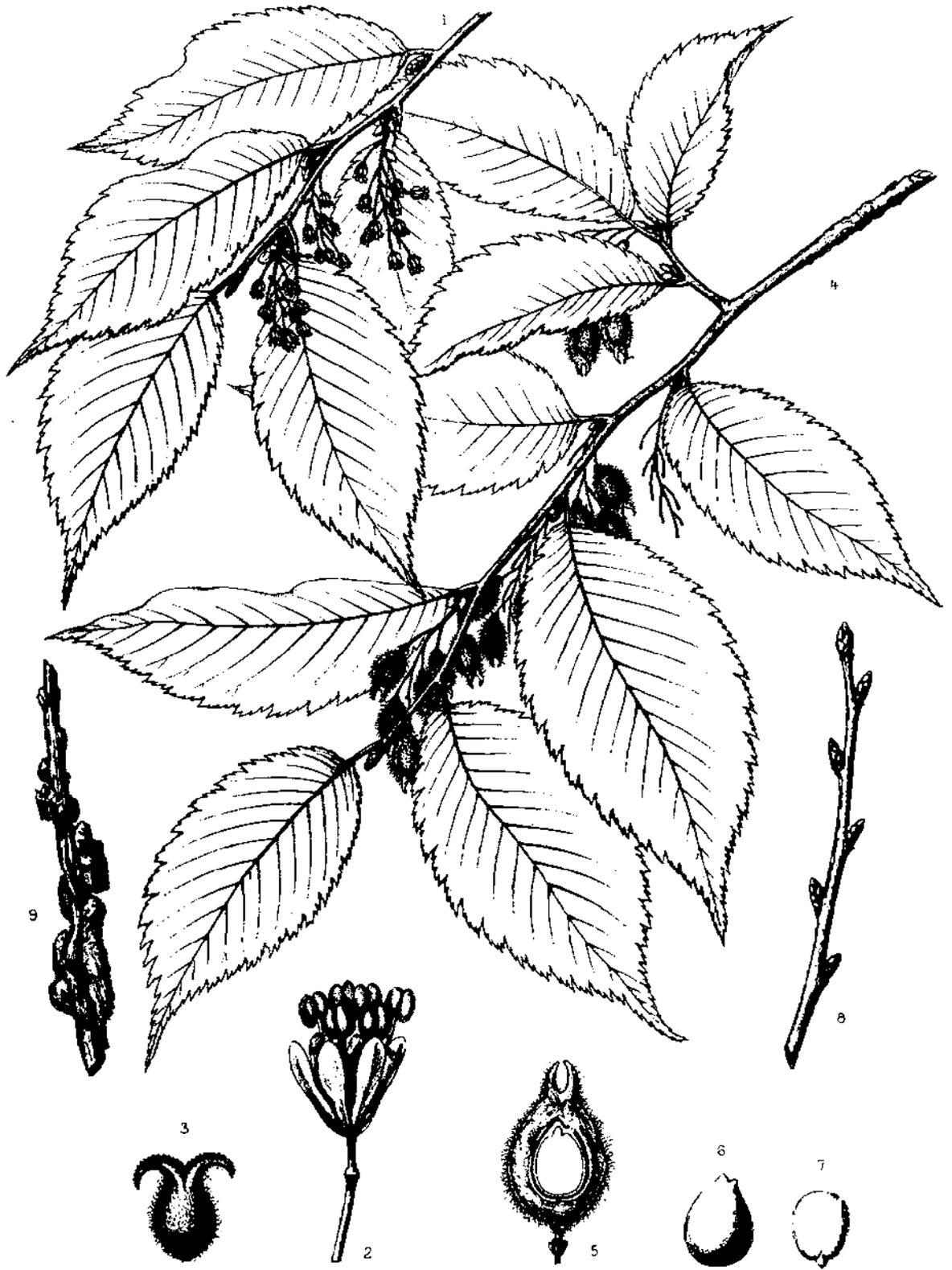
HABITAT: Limestone hills and river banks.

DISTINGUISHING CHARACTERISTICS: Flowers in September; they appear in axils of leaves of the year; bud scales glabrous; fruit fringed on the margin with long silvery-white hairs.

DISTRIBUTION IN ALABAMA: Reported from Colbert, Madison, Walker, Tuscaloosa, and Jefferson Counties.

EXPLANATION OF PLATE

- | | |
|--------------------------------|--------------------------------|
| 1. A flowering branch | 6. A seed |
| 2. A flower | 7. An embryo |
| 3. A pistil | 8. A winter branchlet |
| 4. A fruiting branch | 9. Portion of a branchlet with |
| 5. Vertical section of a fruit | corky wings |



Ulmus serotina Sarg .

OSAGE ORANGE

Maclura pomifera (Raf.) Schneid.

OTHER COMMON NAMES: Bodark, Bois-d'art, Bowwood, Hedge, Mockorange.

FORM: Height 20-40 feet with a diameter 12 inches, may reach a height of 50-60 feet, with diameter 2-3 feet, trunk usually short, stout, often covered with a dense growth of sprouts, crown round-topped, rather open, often irregular.

BARK: Mature bark 3/4 inch thick, dark gray, or dark orange-colored, longitudinally or sometimes diagonally furrowed, with prominent ridges which scale off into thin scales.

TWIGS: Stout, at first greenish, slightly pubescent, often armed with straight axillary spines and stout, lateral branchlets.

LEAVES: Alternate, simple, 3-5 inches long, 2-3 inches wide, acute at apex, rounded or cordate at the base, entire, dark green and lustrous above, paler below, petioles exude a milky juice when broken.

FLOWER: Dioecious; staminate in stout globose, long-stalked racemes from axils of leaves crowded on short spurs; pistillate sessile in short-stalked, globose, many-flowered heads on shoots of the year.

FRUIT: Pale green, orange-like in appearance, 4-5 inches in diameter, composed of many small drupes closely grown together, exudes a milky juice when punctured.

WINTER BUDS: Terminal bud absent; lateral buds alternate, blunt, small, pale chestnut-brown, ciliate, immersed in the bark.

WOOD: Heavy, very hard and strong, coarse-grained, durable, bright orange on fresh section, thin pale sapwood.

USES: Fence posts, landscaping, hedges. Historical uses: bows, dyes.

HABITAT: Prefers rich bottom lands, rarely on sandy soils.

DISTINGUISHING CHARACTERISTICS: Orange-like green fruit; twigs armed with axillary spines; contains a milky juice; roots deep yellow.

DISTRIBUTION IN ALABAMA: Not native to Alabama; has escaped cultivation and grows wild mainly in the Black Belt.

EXPLANATION OF PLATE

- | | |
|--------------------------------------|--|
| 1. A fruiting branch | 6. A winter branchlet |
| 2. A nutlet | 7. Portion of winter branchlet
with a spine and lateral bud |
| 3. Vertical section of a | 8. A leaf scar |
| 4. An embryo seen from the two sides | |



Maclura pomifera (Raf.) Schneid.

RED MULBERRY

Morus rubra L.

OTHER COMMON NAMES: Mulberry, Black Mulberry.

FORM: Usually 30-60 feet high, trunk diameter 1-1 1/2 feet, may reach height of 70 feet with diameter of 3-4 feet, trunk usually short, subdividing near the ground, crown broad, round-topped and dense.

BARK: On old trunks rather thin, dark grayish-brown, peels off in long narrow flakes.

TWIGS: Slender, slightly zigzag, smooth, semi-lustrous to dull, pale reddish or orange-brown, finally dark reddish-brown.

LEAVES: Alternate, simple, broadly ovate to ovate-orbicular, 3-5 inches long, 2 1/2-4 inches wide, acute at apex, cordate at base, margin coarsely and occasionally doubly serrate, occasionally 3-5 lobed with deep, broad sinuses, thin, membranous, veiny, dark bluish-green, slightly rough on upper surface, pale, pubescent below.

FLOWERS: Staminate and pistillate flowers separate and usually on separate trees; staminate in narrow spikes 2-2 1/2 inches long, from the axils of the inner bud scales or lower leaves; pistillate in oblong, sometimes androgynous, pedunculate, densely flowered spikes from the upper leaf axils.

FRUIT: A fleshy, multiple fruit (syncarp), 1-1 1/4 inch long, composed of many small drupes, dark purple at maturity, sweet and edible; seed ovoid, sharp-pointed, light brown.

WINTER BUDS: Terminal bud absent; lateral buds alternate, ovate, rounded or bluntly pointed at apex, somewhat divergent and laterally inclined, chestnut-brown, 1/4 inch long.

WOOD: Wood soft, light, weak, coarse-grained, durable in contact with the soil, pale orange, turns russet-brown on exposure to light, thick lighter sapwood.

USES: Pulp. Historical uses: posts, furniture, railroad ties, barrel staves.

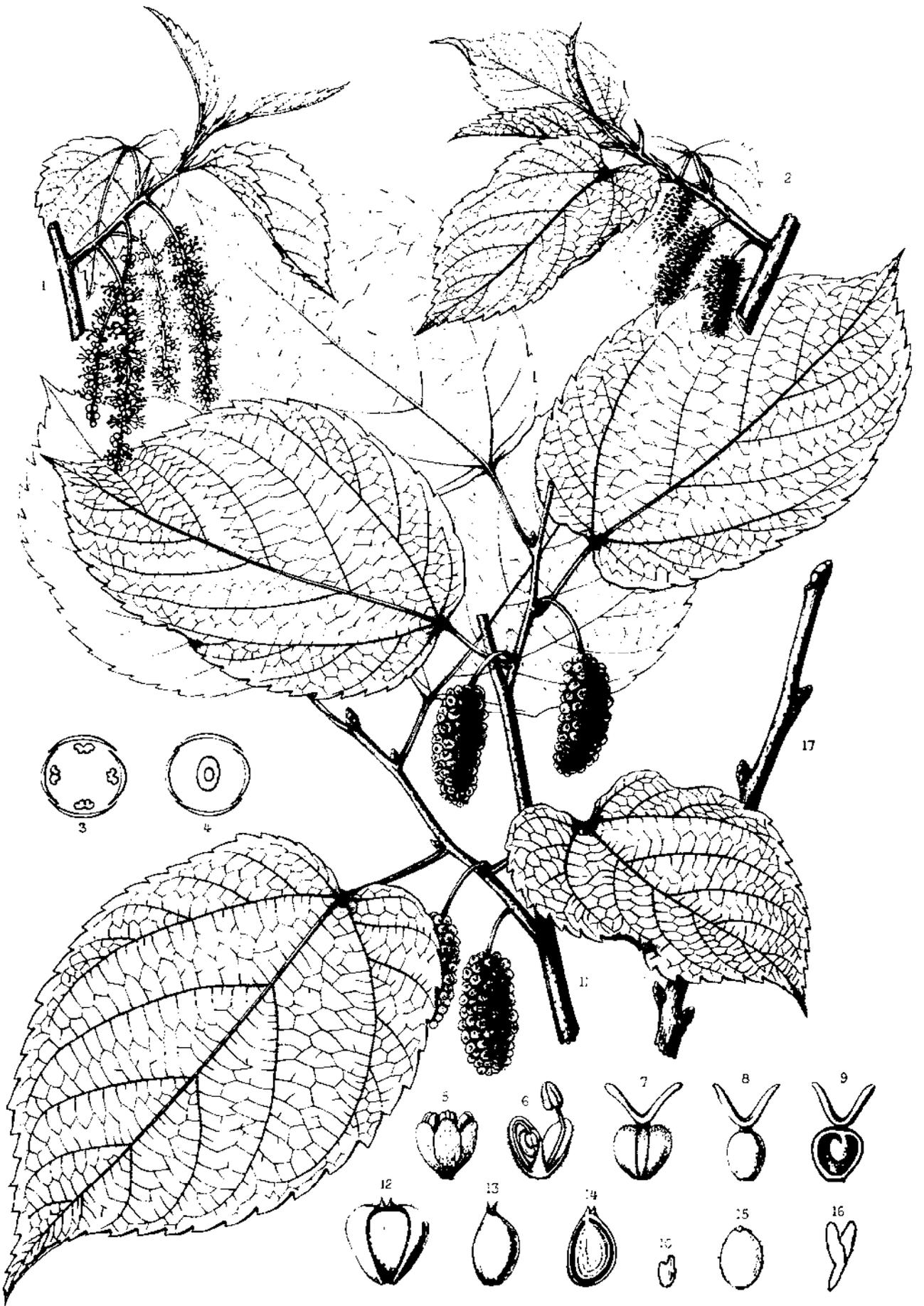
HABITAT: Prefers deep moist soils along stream courses, in rich woods, fertile slopes.

DISTINGUISHING CHARACTERISTICS: 3-veined leaves with veins sunken; its berry-like fruit; milky juice of twigs; roots bright yellow.

DISTRIBUTION IN ALABAMA: Common throughout the state, but nowhere abundant.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A flowering branch with staminate flowers | 8. A pistil |
| 2. A flowering branch with pistillate flowers | 9. Vertical section of a pistil |
| 3. Diagram of a staminate flower | 10. An ovule |
| 4. Diagram of a pistillate flower | 11. A fruiting branch |
| 5. A staminate flower before the exertion of the stamens | 12. A fruit enclosed in the fleshy calyx |
| 6. Vertical section of a staminate flower with one stamen partly exerted | 13. A nutlet |
| 7. A pistillate flower | 14. Vertical section of a |
| | 15. A seed |
| | 16. An embryo |
| | 17. A winter branchlet |



Morus rubra L.

YELLOW-POPLAR

Liriodendron tulipifera L.

OTHER COMMON NAMES: Tuliptree, Poplar, Tulip-poplar, White-poplar, Whitewood.

FORM: One of the largest trees of the Eastern states; reaches greatest height in the South, where it may attain a height of 150 feet with trunk diameter 5-6 feet; farther north, its height 50-80 feet, diameter 2-3 feet; crown in young trees pyramidal, in older, rather shallow, broad, and spreading.

BARK: On young trees, smooth and ashy-gray; on mature trees bark thick, brown, with shallow furrows, and rounded ridges.

TWIGS: At first green, smooth, rather slender, often branching, become somewhat glaucous, reddish-brown, finally dark gray.

LEAVES: Alternate, simple, broadly ovate to orbicular, 5-6 inches long, truncate or broadly notched at the apex, rounded or cuneate at the base, sinuately **4-lobed**, dark green and lustrous above, dull green and paler below.

FLOWERS: Appear after the leaves, terminal, solitary, greenish-yellow with orange markings, cup-shaped, 2-5 inches wide, 1-1 1/2 inches deep, perfect, with 3 reflexed sepals, and 6 converging petals.

FRUIT: A light brown oblong-pointed cone, 2-3 inches long, about 1/2 inch wide, consisting of carpels 1-1 1/2 inch long in the base of which the seeds are contained.

WINTER BUDS: Terminal bud oblong, flattened, obtuse, dark red, lustrous, somewhat glaucous, with white dots, 1/2-1 inch long; bud scales stipular, and valvate in pairs; lateral buds similar, divergent, sometimes superposed or terminal on short spurs, inch long.

WOOD: Light, soft, brittle, weak, straight-grained, pale greenish-yellow or greenish-brown, thin nearly white sapwood.

USES: Lumber, furniture, veneer. Historical uses: Shingles, woodenware.

HABITAT: Prefers deep, rich, moist soil along streams, bottom lands and on moist slopes,

DISTINGUISHING CHARACTERISTICS: Leaves peculiar only to the yellow-poplar; the tulip-shaped flower; stipular scars encircling the twigs at the nodes; pith often divided by partitions of stone cells.

DISTRIBUTION IN ALABAMA: In every county in the state.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. A fruit | 9. An ovule |
| 2. Diagram of a flower | 10. A carpel |
| 3. A flower, a sepal and two petals removed | 11. Vertical section of a carpel |
| 4. A stamen, anterior view | 12. A seed showing the raphe |
| 5. A stamen, posterior view | 13. A seed, showing the side opposite the |
| 6. A pistil | 14. Vertical section of a seed |
| 7. A stigma | 15. Cross section of a seed |
| 8. Vertical section of an ovary | 16. An embryo |



Liriodendron tulipifera L.

CUCUMBERTREE

Magnolia acuminata L.

OTHER COMMON NAMES: Cucumbertree magnolia, Cucumber magnolia, Mountain magnolia.

FORM: Height 80-90 feet, trunk diameter 3-4 feet; in the open, the bole is tapering, continuous through the pyramidal crown, lateral limbs clothe the trunk almost to the ground; in the forest, the bole may be free of branches 40-50 feet and the crown much restricted.

BARK: Grayish-brown to brown, 1/3-1/2 inch thick, furrowed, covered by numerous thin scales.

TWIGS: Rather slender, at first with soft, pale caducous hairs, soon bright red-brown, eventually gray.

LEAVES: Alternate, simple, ovate to oblong, 4-12 inches long, acute at apex, rounded or slightly cordate at base, margin entire, thin, dark green, smooth and glabrous above, paler, slightly pubescent beneath.

FLOWERS: Terminal, glaucous-green, tinged with yellow, campanulate, about 3 inches long, perfect, sepals 3, petals 6, 2 1/2-3 inches long.

FRUIT: A red, cone-like cylindrical mass about 2-2 1/2 inches long, composed of numerous coherent follicles which open at maturity to release the fleshy seeds; seed scarlet, drupe-like, suspended at maturity by long, slender, white threads.

WINTER BUDS: Alternate, densely covered with thick, pale, silky hairs, terminal bud ovate-oblong, acute, somewhat curved, 2/5-4/5 inch long, lateral buds smaller, almost surrounded by the leaf scars.

WOOD: Light, soft, close-grained, brittle, pale yellowish-brown, thin yellowish-white sapwood.

USES: Pulp, interior wood, furniture. Historical uses: veneer, crating, Venetian blinds.

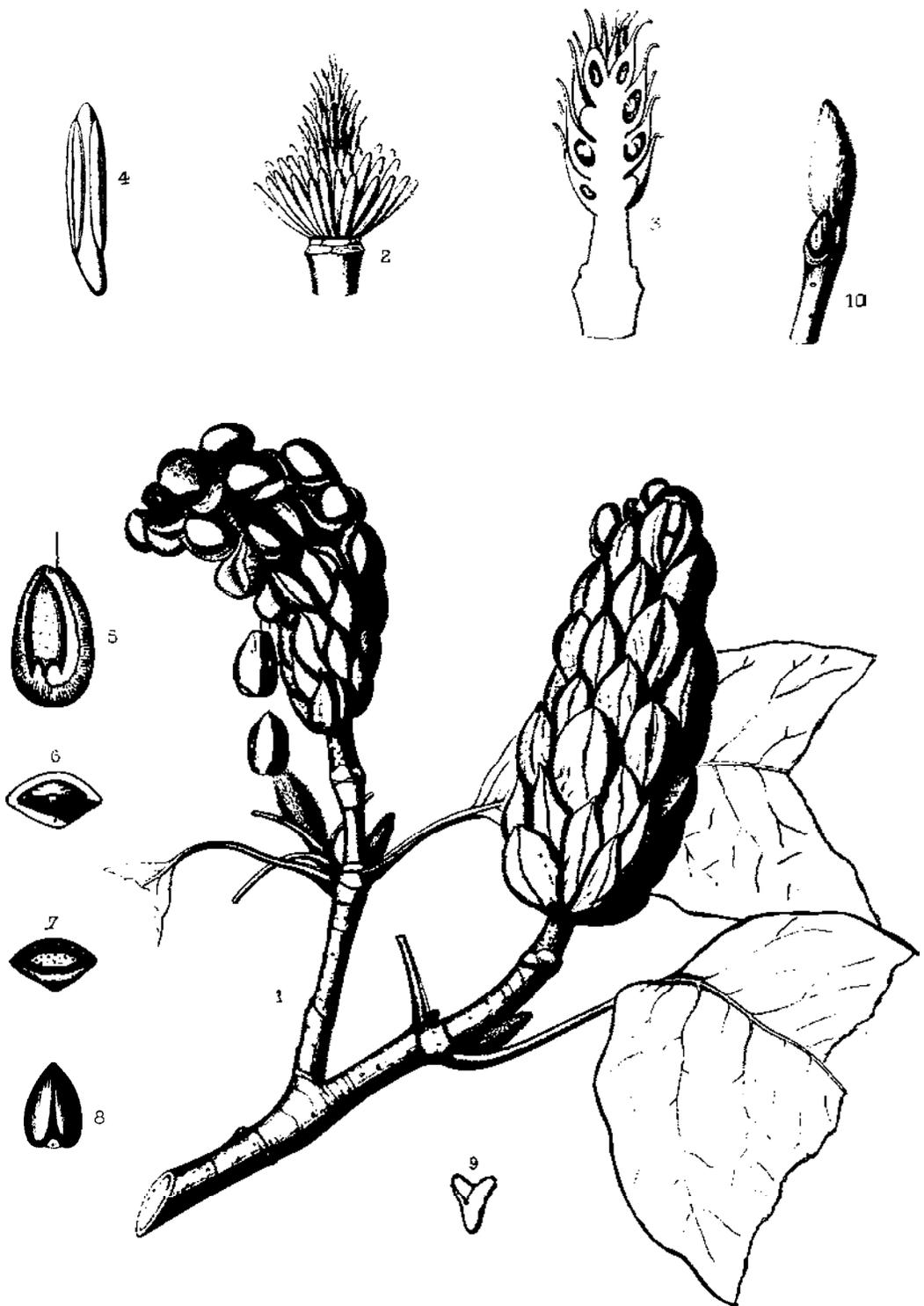
HABITAT: Rich woods close to streams, moist slopes.

DISTINGUISHING CHARACTERISTICS: Shape and size of the leaves; flowers greenish; cone-like fruit; thick and deeply ridged bark.

DISTRIBUTION IN ALABAMA: Madison, Cullman, Fayette, Walker, Tuscaloosa, Lamar, Pickens, Bibb, Chilton, Greene, Autauga, Pike, Coffee, Covington, Wilcox, Choctaw, Monroe, Butler, and Baldwin Counties.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A fruiting branch | 7. Cross section of a seed |
| 2. A flower, the calyx and corolla removed | 8. A seed, the fleshy part of the testa removed, showing the stony portion |
| 3. Vertical section of the gynoecium | 9. An embryo |
| 4. A stamen | 10. A winter bud |
| 5. Vertical section of a seed | |
| 6. A seed, the base of the pulpy portion of the removed, showing the stony interior portion | |



Magnolia acuminata L.

FRASER MAGNOLIA

Magnolia fraseri Walt.

OTHER COMMON NAMES: Mountain magnolia, Ear-leaf cucumber tree, Long-leaved cucumber tree.

FORM: Height 30-40 feet, with straight or inclining trunk 12-18 inches in diameter, often undivided for half of its length, or separating at the ground into a number of stout diverging stems with wide spreading or more or less contorted branches.

BARK: Rarely more than $\frac{1}{3}$ inch thick, dark brown, smooth with small excrescences, broken into minute scales on old trees.

TWIGS Brittle; soon become bright red, lustrous, grayish the second year.

LEAVES: Obovate-spatulate, acute or bluntly pointed at apex, cordate and markedly auriculate at base, bright green, often red along the veins on the upper surface, 10-12 inches long, 6-7 inches wide, sometimes twice that size on young vigorous plants; they fall in autumn without change of color.

FLOWERS Borne on glabrous pedicels 1-1 $\frac{1}{2}$ inch long, pale yellow, sweet-scented, 8-10 inches across, sepals narrowly obovate, rounded at apex, 4-5 inches long, deciduous almost immediately after the opening of the bud, shorter than the obovate petals of which there are 6-9.

FRUIT: Oblong, glabrous, bright red when ripe, 4-6 inches long, 1 $\frac{1}{2}$ -2 inches thick; mature carpels end in long subulate persistent tips; seeds obovoid, compressed $\frac{5}{8}$ inch long.

WINTER BUDS: Terminal, glabrous, purple 1 $\frac{1}{2}$ -2 inches long, $\frac{1}{2}$ inch thick; axillary buds minute, obtuse.

WOOD: Light, soft, close-grained, not strong, light brown, cream-colored sapwood.

USES: Landscaping

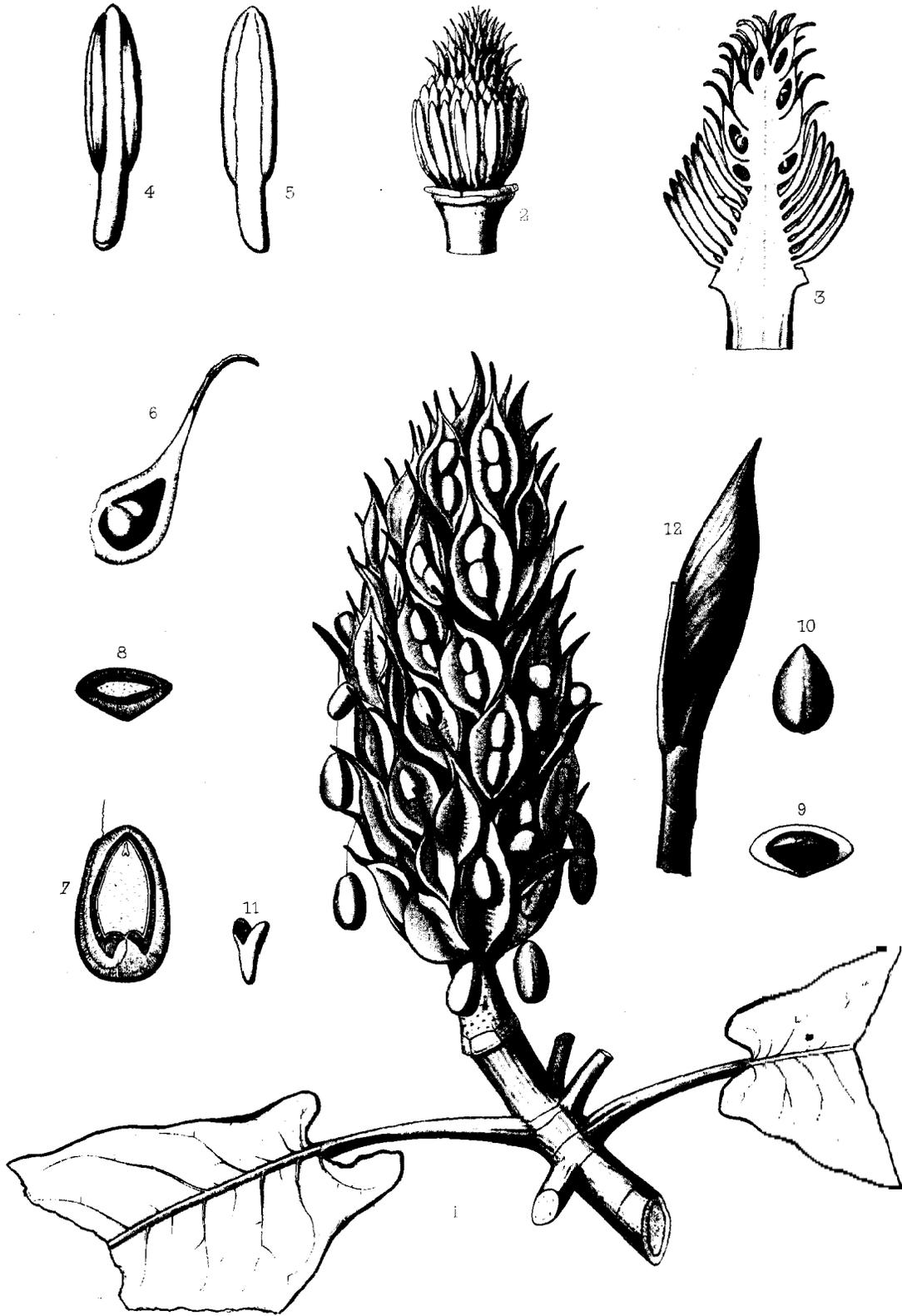
HABITAT: Valleys of streams of Southern Appalachian Mountains.

DISTINGUISHING CHARACTERISTICS: Leaves fall in autumn without change of color; mature carpels with long subulate persistent tips; leaves auriculate at base.

DISTRIBUTION IN ALABAMA: Reported from northern part of the state.

EXPLANATION OF PLATE

- | | |
|--|---|
| 1. A fruit | 9. A seed, the base of the pulpy portion of the testa removed, showing the stony interior portion |
| 2. A flower, the calyx and corolla removed | 10. A seed, the fleshy part of the testa removed, showing the grooved stony portion |
| 3. Vertical section of the same | 11. An embryo |
| 4. A stamen, posterior view | 12. A winter bud |
| 5. A stamen, anterior view | |
| 6. Vertical section of a carpel | |
| 7. Vertical section of a seed | |
| 8. Cross section of a seed | |



Magnolia fraseri Walt.

SOUTHERN MAGNOLIA

Magnolia grandiflora L.

OTHER COMMON NAMES: Bull-bay, Evergreen magnolia, Magnolia, Laurel-leaved magnolia.

FORM: Pyramidal habit; 60-100 or rarely 120-125 feet high, tall straight trunk 2-3 feet in diameter, occasionally 4-4 1/2 feet in diameter, rather small spreading branches.

BARK: 1/2-3/4 inch thick, gray or light brown, covered with appressed scales.

TWIGS: At first hoary-tomentose, second year slightly tomentose and much roughened by elevated leaf scars.

LEAVES: Alternate, simple, elliptic to oblong-obovate or ovate, acute and bluntly pointed or acuminate at apex, cuneate at base, green and shining above, lower side more or less coated with rusty tomentum, 5-8 inches long, 2-3 inches wide, deciduous in the spring of their second year.

FLOWERS: Appear from April or May until July or August, perfect, fragrant, borne on stout hoary-tomentose pedicels 1/2-1 inch long, 7-8 inches across, sepals petaloid, petals 6, sometimes 9 or 12.

FRUIT: Rusty-tomentose, 3-4 inches long, 1 1/2-2 1/2 inches thick, seeds obovoid or triangular obovoid, more or less flattened, 1/2 inch long.

WINTER BUDS: Pale or rusty-tomentose, the terminal 1-2 1/2 inch long.

WOOD: Hard, creamy-white, turns brown soon after exposure, heartwood hardly distinguishable from the sapwood of 60-80 layers of annual growth.

USES: Landscaping. Historical uses: baskets, crates, furniture, veneer.

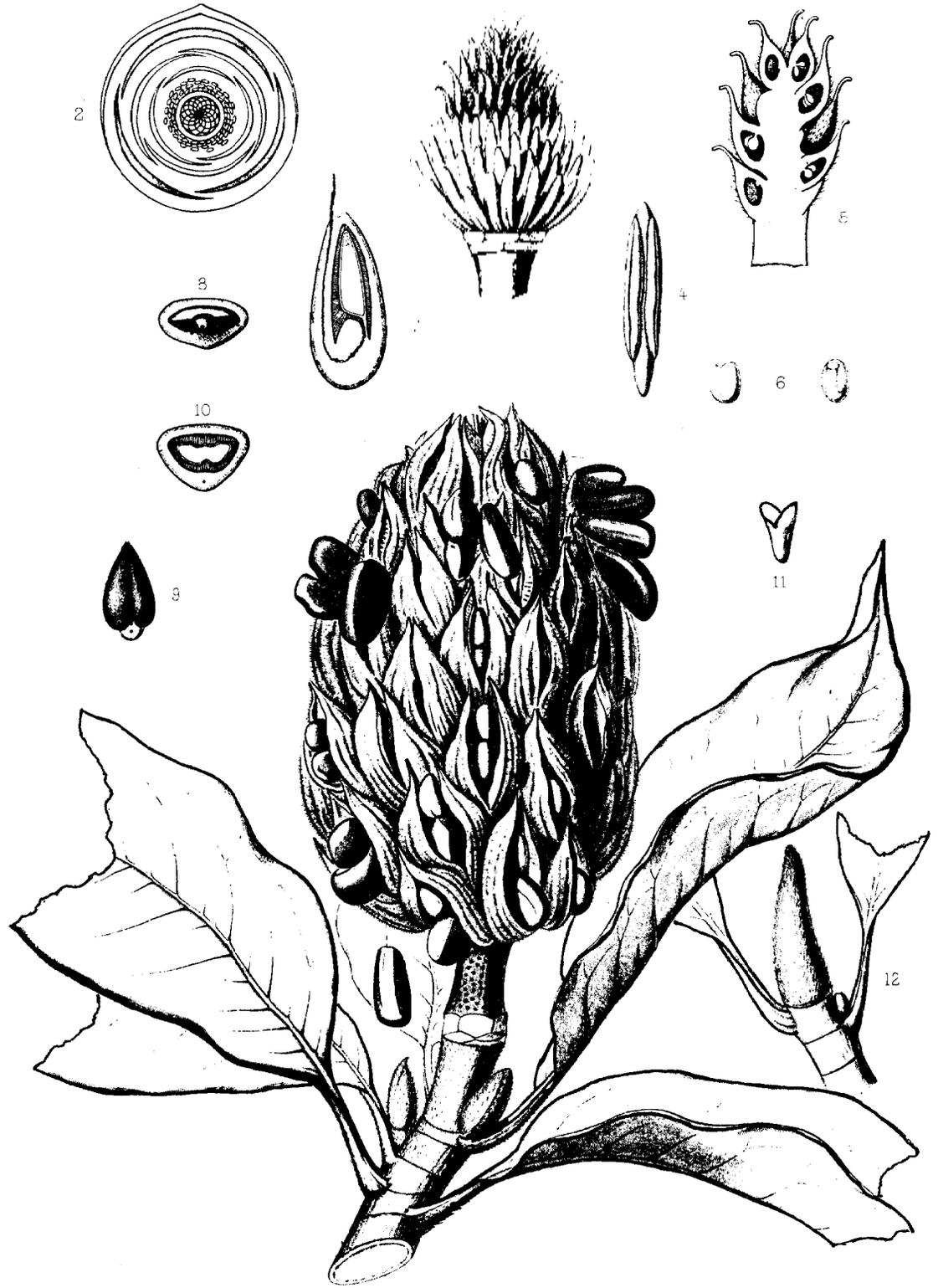
HABITAT: Rich moist soil on borders of streams and pine-barren ponds.

DISTINGUISHING CHARACTERISTICS: An evergreen tree; fruit and branchlets tomentose.

DISTRIBUTION IN ALBAMA: Statewide.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A fruit | 8. A seed, the base of the pulpy portion of the testa removed showing the stony interior portion |
| 2. Diagram of the flower | 9. A seed, the fleshy part of the testa removed, showing the grooved stony portion |
| 3. A flower, the calyx and corolla removed | 10. Cross section of a seed, enlarged |
| 4. A stamen | 11. An embryo, much enlarged |
| 5. Vertical section of the gynoecium | 12. A winter-bud, natural size |
| 6. An ovule | |
| 7. Vertical section of a seed | |



Magnolia grandiflora L.

BIGLEAF MAGNOLIA

Magnolia macrophylla Michx.

OTHER COMMON NAMES: Large- leaf magnolia, Great-leaved cucumber tree, Great-leaved magnolia, Large-leaved umbrella-tree, Cucumber-tree, Cowcumber tree.

FORM: 30-50 feet high, straight trunk 18-20 inches in diameter, stout, wide spreading branches forming a broad symmetrical round-topped head.

BAK: Generally less than 1/4 inch thick, smooth, light gray, divided on the surface into minute scales.

TWIGS: At first hoary-tomentose, light green, pubescent, marked with large irregular leaf scars the first winter, reddish-brown their second season, later gray.

LEAVES: Alternate, simple, obovate or oblong, acute or often abruptly narrowed and acute or rounded at apex, narrowed and cordate at base, bright green and glabrous above, lower side silvery-gray and pubescent, 20-30 inches long, 8-10 inches wide.

FLOWERS: On stout hoary-tomentose pedicels 1-1 1/2 inch long, fragrant, 10-12 inches across, perfect, sepals much narrower than the 6 creamy-white petals with a rose-colored blotch at base.

FRUIT: Bright rose color, ovoid to nearly globose, pubescent, 2 1/2-3 inches long; seeds obovoid, compressed, 2/3 inch long.

WINTER BUDS: Terminal bud bluntly pointed, with a thick coat of snowy-white tomentum, 1 3/4-2 inches long, lateral, brownish, pubescent, 1/8-1/4 inch long.

WOOD: Hard, close-grained, light, not strong, light brown, thick light yellow sapwood of about 40 layers of annual growth.

USES: Occasionally planted as an ornamental.

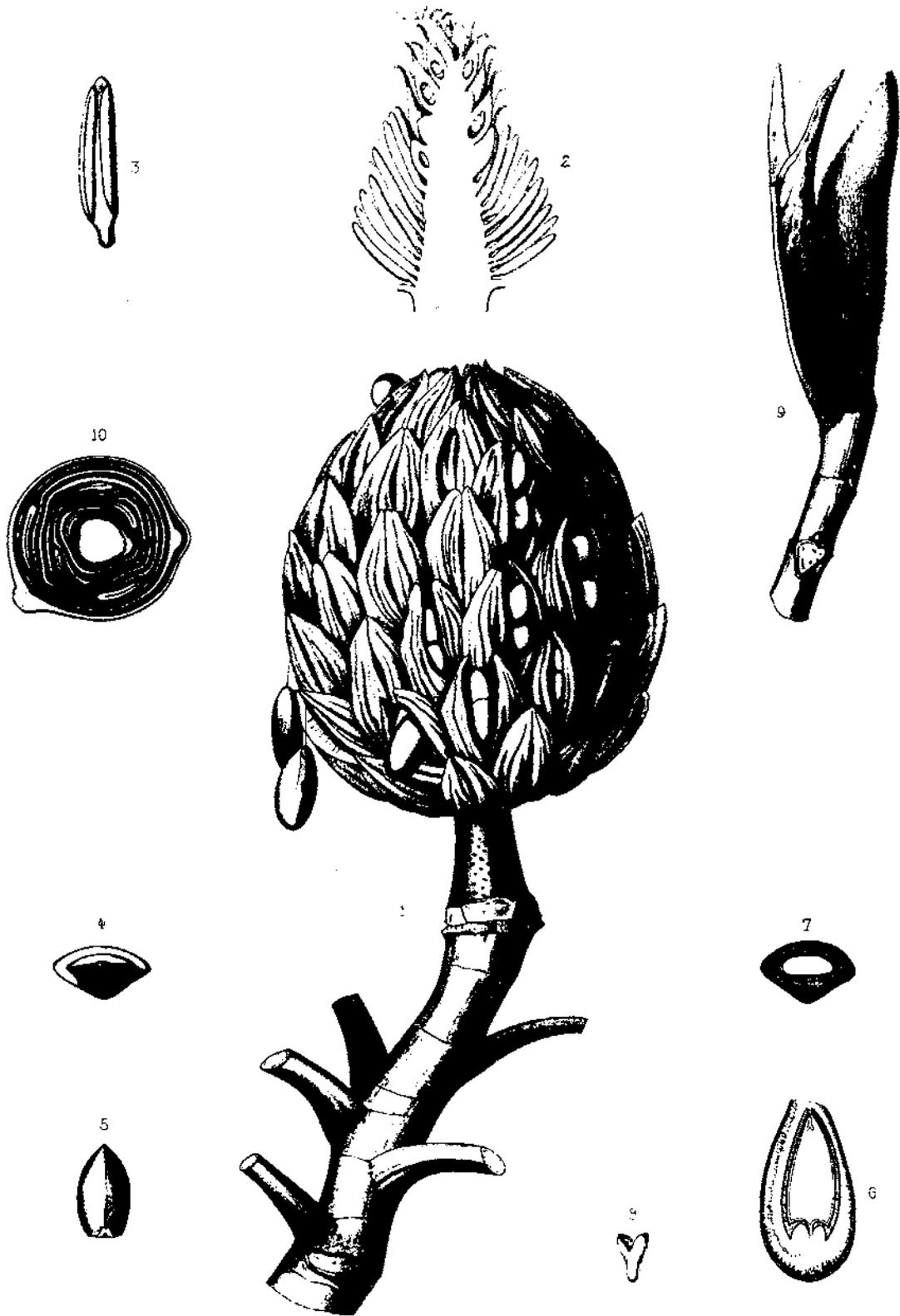
HABITAT: Sheltered valleys in deep rich soil.

DISTINGUISHING CHARACTERISTICS: The flowers and leaves are larger and more conspicuous than those of any other tree in the North American forests.

DISTRIBUTION IN ALABAMA: Statewide, most common on west side of state.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. A fruit | 6. Vertical section of a seed |
| 2. Vertical section of the gynoecium | 7. Cross section of a seed |
| 3. A stigma | 8. An embryo |
| 4. A seed, the base of the pulpy portion of the testa removed, showing the stony interior portion | 9. A winter bud, the outer scale expanded |
| 5. A seed, the fleshy part of the removed | 10. Cross section of a winter bud |



Magnolia macrophylla Michx.

SWEETBAY

Magnolia virginiana L.

OTHER COMMON NAMES: Sweetbaymagnolia, Swampbay, Laurel magnolia, Swamp magnolia.

FORM: Slender tree, 20-30 feet high, not more than 15-18 inches in diameter, with small, mostly erect, ultimately spreading branches.

BARK: 3/8-1/2 inch thick, light brown, covered with thin appressed scales, smooth on young trunks.

TWIGS: At first bright green, hoary-pubescent; soon glabrous, become bright red the second year.

LEAVES: Alternate, simple, oblong or elliptic and obtuse or oblong-lanceolate, upper surface bright green, glabrous, pale or nearly white on lower surface, in the north, the leaves fall in November and early winter, in the South they remain on the branches until spring, 4-6 inches long, 1 1/2-3 inches wide.

FLOWERS: Flowers perfect, on glabrous pedicels 1/2-3/4 inch long, creamy-white, fragrant, globular, 2-3 inches across.

FRUIT: Ellipsoidal, dark red, glabrous, 2 inches long, 1/2 inch thick; seeds obovoid, oval or suborbicular, flat, 1/4 inch long.

WINTER BUDS: Finely silky pubescent; terminal bud 1/2-3/4 inch long.

WOOD: Soft, light brown tinged with red, creamy-white sapwood, 90-100 layers of annual growth.

USES: Pulp, lumber, plywood veneer. Historical uses: broom handles, woodenware, furniture.

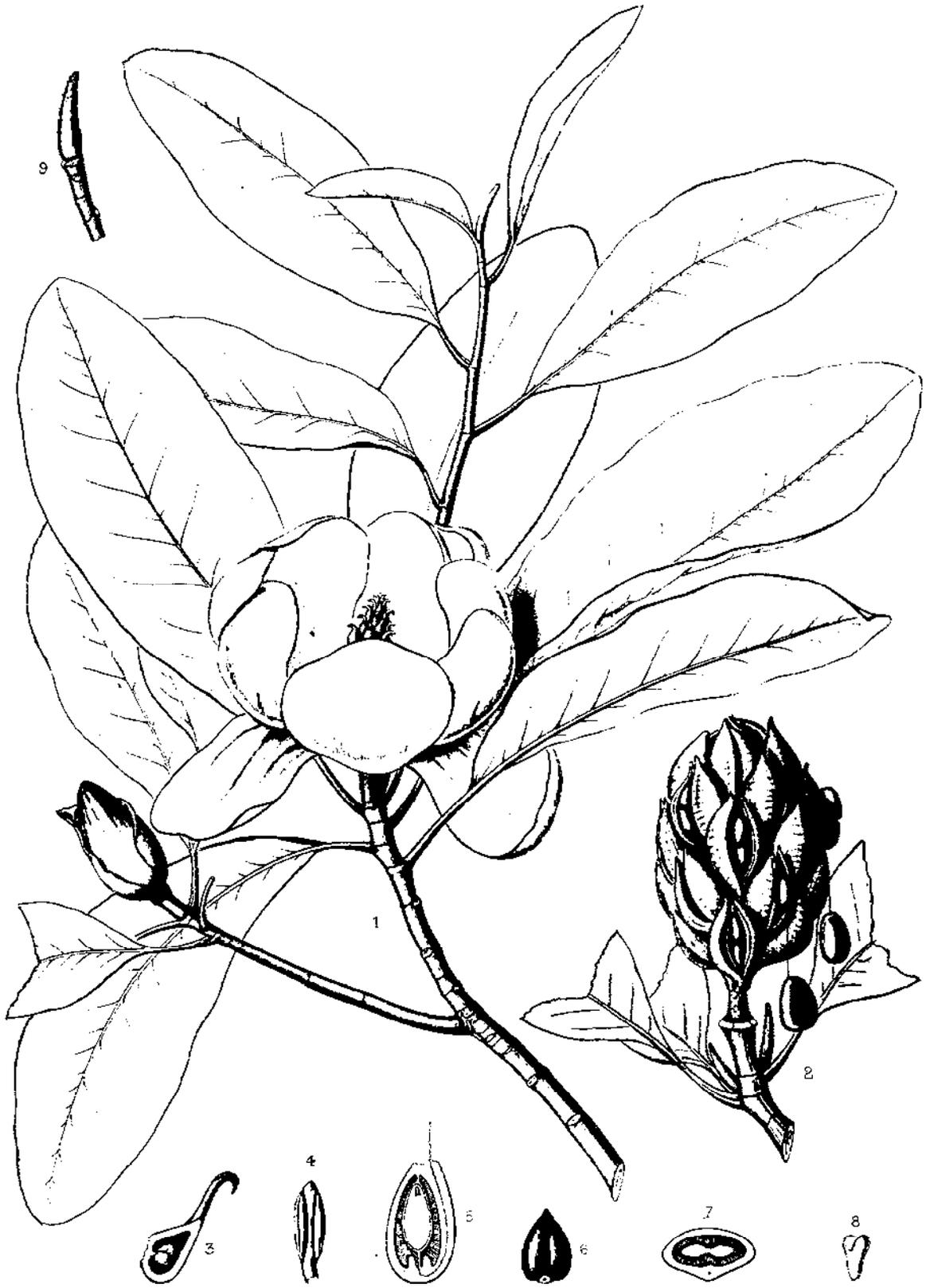
HABITAT: Borders of pine-barren swamps, shallow swamps and on rich hummocks.

DISTINGUISHING CHARACTERISTICS: Leaves semipersistent and scattered along the branches; shape and size of the leaves; creamy-white fragrant flowers.

DISTRIBUTION IN ALABAMA: Quite general over the state.

EXPLANATION OF PLATE

- | | |
|-------------------------------|---|
| 1. A flowering branch | 6. A seed, the fleshy part of the testaremoved, showing the grooved stony portion |
| 2. A fruit | 7. Cross section of a seed |
| 3. Vertical section of a | 8. An embryo |
| 4. A stamen | 9. A winter bud |
| 5. Vertical section of a seed | |



Magnolia virginiana L.

REDBAY

Persea borbonia (L) Spreng.

OTHER COMMON NAMES: Red bay persea, Swampbay persea, Swampbay.

FORM: 60-70 feet high with trunk 2 1/2-3 feet in diameter, stout, erect branches forming a dense shapely head, thick, fleshy yellow roots.

BARK: 1/2-3/4 inch thick, dark red, irregularly divided into broad, flat ridges, surface separating into thick appressed scales.

TWIGS: At first, many-angled, light brown, glabrous, or coated with pale rufous pubescence; in second year, terete, green, and smaller.

LEAVES: Alternate, simple, oblong to oblong-lanceolate, entire, may be contracted into a long rounded point at apex, become thick and coriaceous, bright green and lustrous above, pale and glaucous below, 3-4 inches long, 3/4-1 1/2 inch wide, with thick revolute margins.

FLOWERS: Peduncles glabrous, 1/2-1 inch long; calyx pale yellow or creamy-white, about 1/8 inch long with thin lobes, ciliate on the margin.

FRUIT: A berry 1/2 inch long, dark blue or nearly black, very lustrous, flesh dry; seed ovoid, slightly pointed.

WINTER BUDS: 1/4 inch long, coated with rufous tomentum.

WOOD: Heavy, hard, very strong, rather brittle, close-grained, bright red, lighter sapwood of 4-5 layers.

USES: Pulp, rough lumber. Historical uses: cabinet-making, interior finish, shipbuilding.

HABITAT: Prefers rich soil, borders of streams and swamps, occasionally in dry sandy loam.

DISTINGUISHING CHARACTERISTICS: Dark red bark and bright red wood; dark green and thick coriaceous leaves with thick revolute margins; small winter buds coated with thick rufous tomentum.

DISTRIBUTION IN ALABAMA: Reported from Montgomery, Dallas, Pike, Monroe, Conecuh, Mobile, Baldwin, and Escambia Counties.

EXPLANATION OF PLATE

- | | |
|---|---|
| 1. A flowering branch | 7. A stamen of the third series, showing basal glands, front view |
| 2. Diagram of a flower | 8. An ovule |
| 3. A flower | 9. A fruiting branch |
| 4. Vertical section of a flower | 10. Vertical section of a fruit |
| 5. A stamen of the outer series, front view | 11. An embryo |
| 6. A staminodium, front view | |



Pet-sea borbonia (L.) Spreng.

SASSAFRAS

Sassafras albidum (Nutt) Nees.

OTHER COMMON NAMES: Common sassafras, Saxifrax, Sassafras.

FORM: Commonly 40-50 feet high, trunk diameter 1-3 feet; shrubby at its northern limits; occasionally 100 feet tall in the South; trunk short, stout, soon breaking up into many more or less spreading and contorted branches forming a flat-topped, or a rounded-oblong, bushy crown.

BARK: Mature bark thick, reddish-brown, with deep furrows and flat-topped ridges crossed by horizontal cracks.

TWIGS: At first light yellow-green, pubescent, become glabrous, bright green, ultimately reddish-brown.

LEAVES: Alternate, simple, ovate or obovate, 4-6 inches long, 2-4 inches wide, entire, and acute at apex or 2-3 lobed, lobes broadly ovate, acute, with broad rounded sinuses, may vary on the same tree; thin, dull green above, paler and glabrous or pubescent below.

FLOWERS: Appear with the leaves; dioecious; borne in lax, pilose, few-flowered drooping racemes from the axils of large obovate bud scales, flowers are greenish-yellow in color.

FRUIT: A dark blue shiny drupe $2/5$ - $3/5$ inch in diameter, borne on a bright red club-shaped, fleshy stem terminated by the enlarged calyx in which the drupe sits.

WINTER BUDS: $1/4$ - $3/8$ inch long, terminal bud ovate, acute, green, lateral buds divergent.

WOOD: Soft, brittle, coarse-grained, aromatic, dull orange-brown with pale yellow sapwood.

USES: Pulp. Historical uses: fence posts, barrel staves, oil.

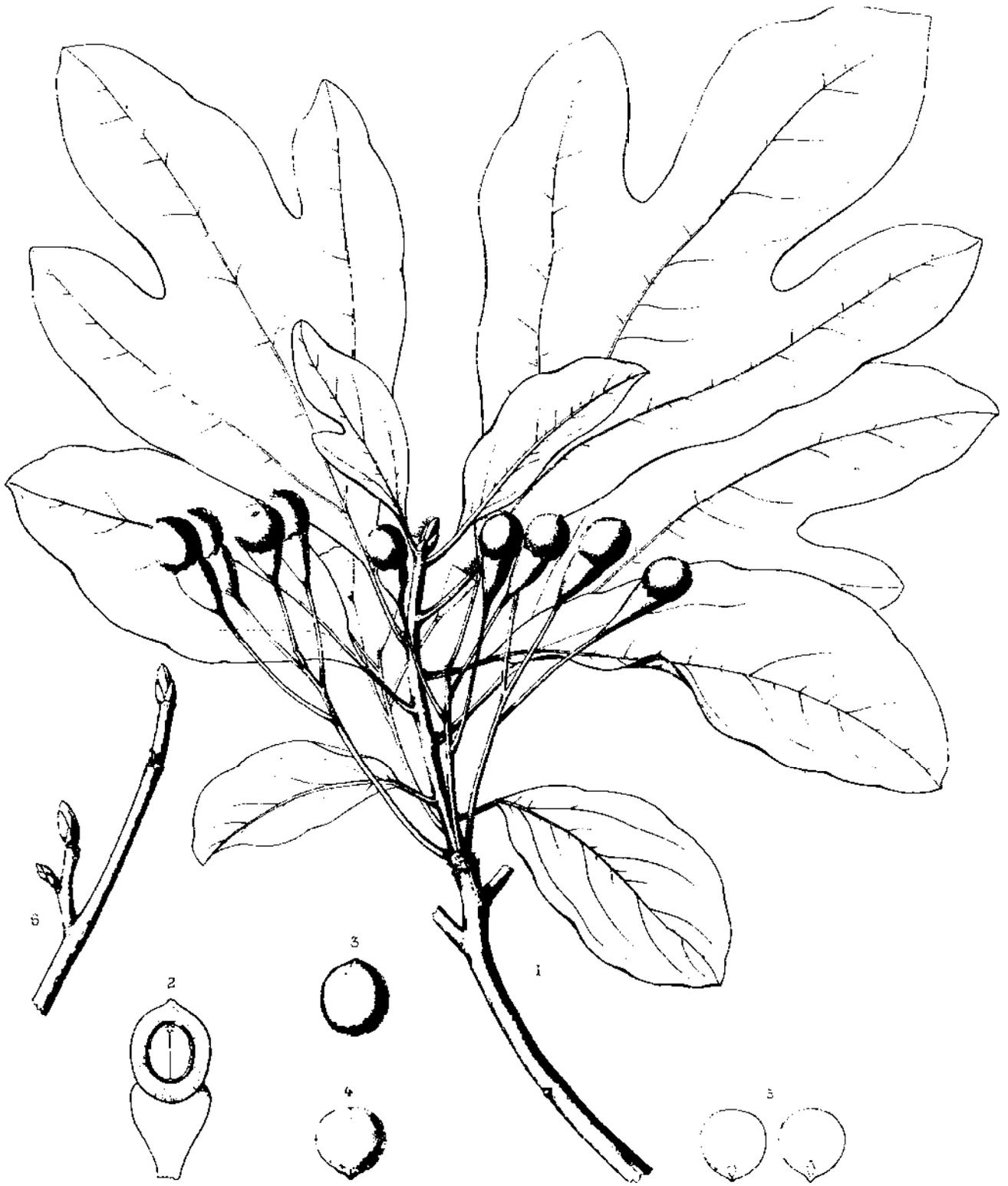
HABITAT: Prefers rich sandy loam, but thrives in a variety of sites.

DISTINGUISHING CHARACTERISTICS: Twigs glossy, aromatic, brittle; leaves entire or may be 2-5 lobed; a single bundle scar in each leaf scar; fruit borne on a club-shaped fleshy stem.

DISTRIBUTION IN ALABAMA: Seems to be widely distributed north of the Black Belt; south of the Black Belt, it seems to have escaped cultivation.

EXPLANATION OF PLATE

- | | |
|--------------------------------|--------------------------|
| 1. A fruiting branch | 4. An embryo |
| 2. Vertical section of a fruit | 5. Sections of an embryo |
| 3. A seed | 6. A winter branchlet |



Sassafras albidum (Nutt.) Nees.

WITCH-HAZEL

Hamamelis virginiana L.

OTHER COMMON NAMES: Southern witch-hazel.

FORM: Slightly aromatic shrub or small tree with a broad, open crown of spreading branches reaching heights of 20-30 feet and diameters of 4-8".

LEAVES: Alternate, simple, deciduous, broadly elliptical; 4-6" long, 2-3" wide; apex, pointed or rounded; base, blunt to notched and unequal; broadest and wavy-lobed beyond the middle; with 5-7 straight veins on each side; dull, dark green and glabrous above, paler below with hair on the mid-rib and principle veins.

BARK: Thin, light brown, relatively smooth or scaly, the inner bark purplish.

TWIGS: Slender; more or less zigzag; orange-brown to reddish brown or tawny; usually with numerous inconspicuous lenticels.

WINTER BUDS: Terminal buds stalked, naked, hairy, tawny, about 1/2" long; lateral buds, similar but smaller.

FLOWERS: Perfect, opening from September to December; usually in 3-flowered terminal clusters; each flower with 4 bright yellow, twisted, thread-like petals.

FRUIT: A 2-beaked, woody capsule; at maturity, splitting open along 2 lines of suture and forcibly ejecting the black seeds.

Found on the banks of streams, ponds, swamps and on moist, forest soils where it occurs as an understory species in mixed upland hardwood stands.

DISTINGUISHING CHARACTERISTICS: Most noticeable in the summer because of its low, spreading habit; in the late fall and early winter most interesting because of its bright yellow flowers.

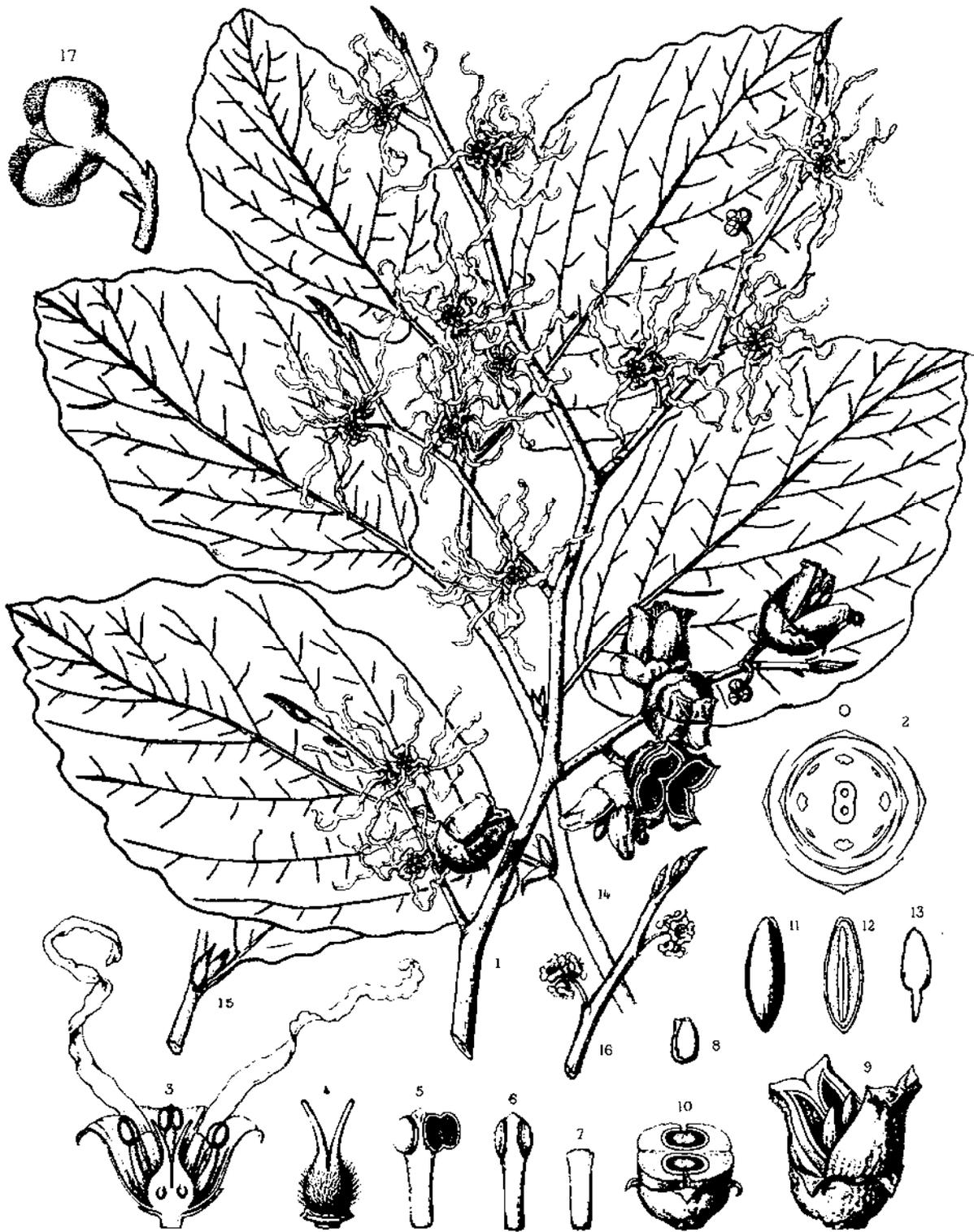
WOOD: No recorded data found because not commercially valuable.

USES: Limited landscape use. Historical: inner bark used to produce healing salves, most famous as water-witching sticks.

DISTRIBUTION IN ALABAMA: Reported to occur statewide.

EXPLANATION OF PLATE

- | | |
|---------------------------------|------------------------------|
| 1. A flowering/fruitle branch | 10. Cross section of fruit |
| 2. Diagram of a flower | 11. A seed |
| 3. Vertical section of a flower | 12. Vertical section of seed |
| 4. A pistil, enlarged | 13. An embryo |
| 5. A stamen, front view | 14. A leafy branch |
| 6. A stamen, rear view | 15. Leaf base with stipules |
| 7. A rudimentary stamen | 16. Flowers in the winter |
| 8. An ovule, much magnified | 17. A cluster of flower buds |
| 9. An open fruit | |



Hamamelis virginiana L.

SWEETGUM

Liquidambar styraciflua L.

OTHER COMMON NAMES: American sweetgum, Liquidambar, Redgum, Delta red gum.

FORM: Usually 40-80 feet high, 2-3 feet in diameter, sometimes 150 feet tall, trunk 4-5 feet through; in the forest, tall, clean, tapering into the crown, which is first pyramidal, later narrowly oblong.

BARK: Grayish-brown on old trunks, 1-1 1/2 inches thick, deeply furrowed into broad scaly ridges, on young trees thin and dark gray.

TWIGS: At first obscurely angular, rusty hairy, light brown to dark-reddish-brown, roughened by raised leaf scars; after the second season often corky winged projections of the bark.

LEAVES: Alternate, simple, slightly heart-shaped at base, deeply 5-7 lobed divisions pointed, finely serrate with rounded appressed teeth; bright green, smooth above, paler below; 3-6 inches in diameter, petioles 5-6 inches long.

FLOWERS: Monoecious, borne in capitate heads; staminate heads about 1/4 inch in diameter, borne in terminal racemes, green; pistillate heads green, about half an inch in diameter, borne solitary on long peduncles in axils of the upper leaves.

FRUIT: A long-stalked spherical head made up of many capsules which have a spiny appearance, about 1-1 1/2 inch in diameter, persist far into the winter; individual capsules often filled with sawdust-like material which consists of abortive seeds, fertile seeds angular, winged, seldom more than one in a capsule.

WINTER BUDS: Ovate to conical, obtuse or acute, shiny, orange-brown, 1/4-1/2 inch in length, fragrant when crushed.

WOOD: Medium hard, rather heavy, straight close-grained, dark reddish-brown and streaked; sapwood thin, nearly white.

USES: Pulp, lumber, veneer, railroad ties, furniture. Historical uses: boxes, crates, woodenware, barrel staves.

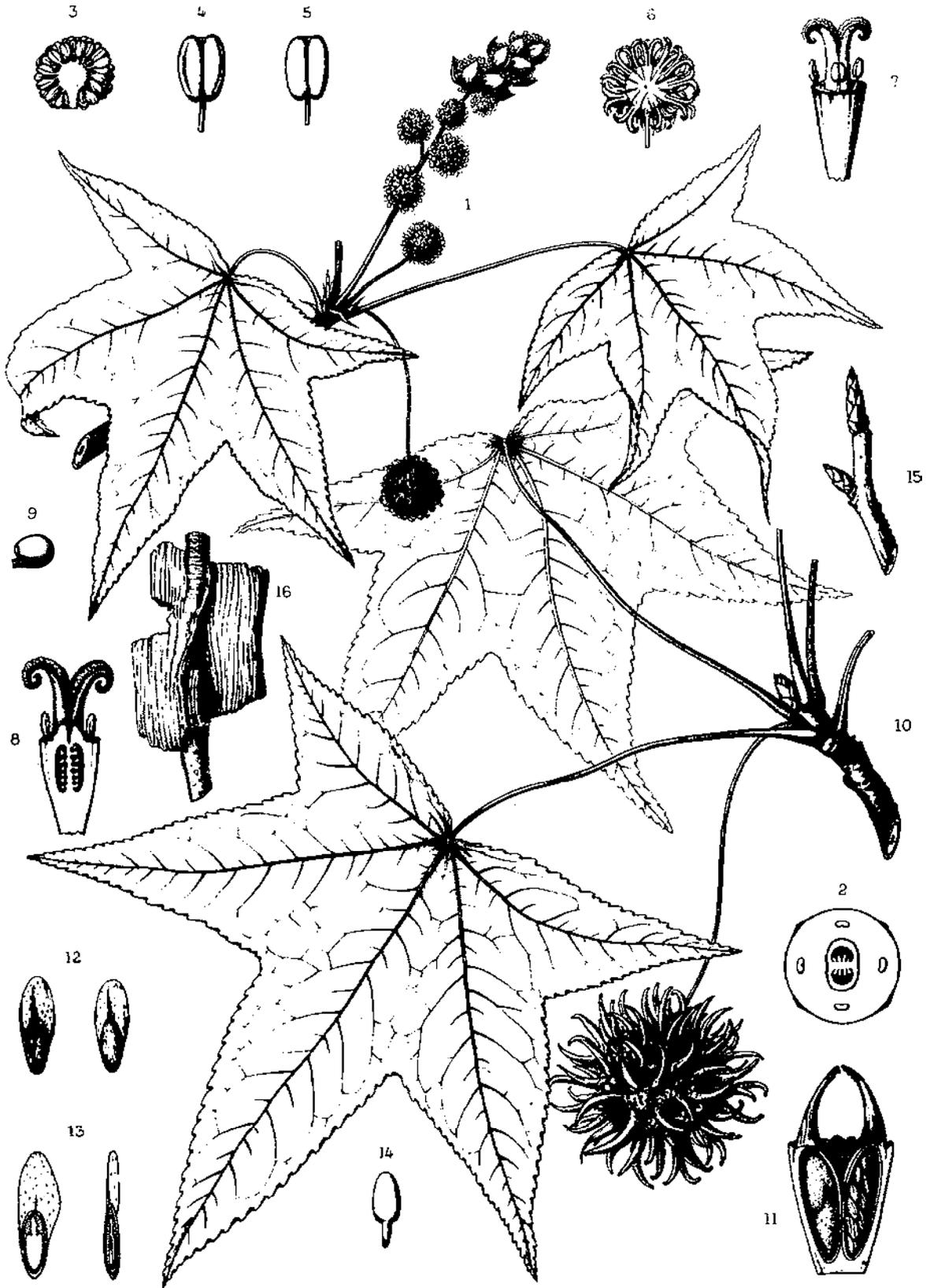
HABITAT: Prefers deep rich moist soils of river flats, borders of swamps, also on higher fairly moist ground.

DISTINGUISHING CHARACTERISTICS: Fruit a spine-like head on a long stalk; corky wing-like projections on the bark of branches; the star-shaped leaves.

DISTRIBUTION IN ALABAMA: In every county of the state.

EXPLANATION OF PLATE

- | | | | |
|------|--|-----|--|
| 1. | A flowering branch | 10. | A fruiting branch |
| 2. | Diagram of a pistillate flower | 11. | Vertical section of a capsule showing in one cell a perfect seed and in the other a mass of undeveloped ovules |
| 3. | Vertical section of a head of stamens | 12. | A seed |
| 4&5. | Front and rear views of a stamen | 13. | Vertical section of a seed |
| 6. | Vertical section of a head of pistillate flowers | 14. | An embryo |
| 7. | A pistillate flower | 15. | A winter bud |
| 8. | Vertical section of a pistillate flower | 16. | Part of a young branch with wings |
| 9. | An ovule | | |



Liquidambar styraciflua L.

AMERICAN SYCAMORE

Platanus occidentalis L.

OTHER COMMON NAMES: American planetree, Buttonball-tree, Buttonwood: Planetree.

FORM: Most massive tree of Eastern North America, commonly 50-100 feet tall, diameter of trunk 3-8 feet, may reach height 150-170 feet, with diameter of trunk 11 feet, trunk erect or often declined, tapering, continuous through the oblong head or soon breaking up near the ground into several large, massive limbs to form a broad, rounded, irregular crown.

BARK: At the base on old trunks, 2-3 inches thick, dark brown, deeply furrowed with broad ridges which peel off as dark brown scales; on young trunks and large limbs, the bark is much thinner, flakes off during the early summer in large plates, exposing a whitish, yellowish, or greenish inner bark.

TWIGS: Rather stout, zigzag, at first green and pubescent, later brownish to gray.

FLOWERS: Appear on the growth of the season when the leaves are about 1/4 developed, monoecious, borne in capitate heads, staminate and pistillate flower heads on different stalks; staminate are axillary and dark red; pistillate terminal, greenish, often tinged with red.

LEAVES: Alternate, simple, broadly ovate, 3-5 lobed, toothed on the margin, 4-10 inches across, bright green above, pale green and white woolly below; petioles about 2 inches long with enlarged hollow bases; conspicuous stipules encircle the twig.

FRUIT: Usually in a single brown head about 1 inch in diameter, suspended from a slender stalk, heads composed of many hairy achenes about 3/4 inch long.

WINTER BUDS: Alternate, terminal bud absent, ovate to conical, obtuse or acute, lustrous, orange-brown 1/8-3/8 inch long, surrounded by base of the leaf stalk or leaf scars.

WOOD: Hard, heavy, straight, close-grained, weak, reddish-brown with light to yellowish sapwood.

USES: Lumber, pulp, furniture. Historical uses: veneer, boxes, crates, woodenware, interior finish.

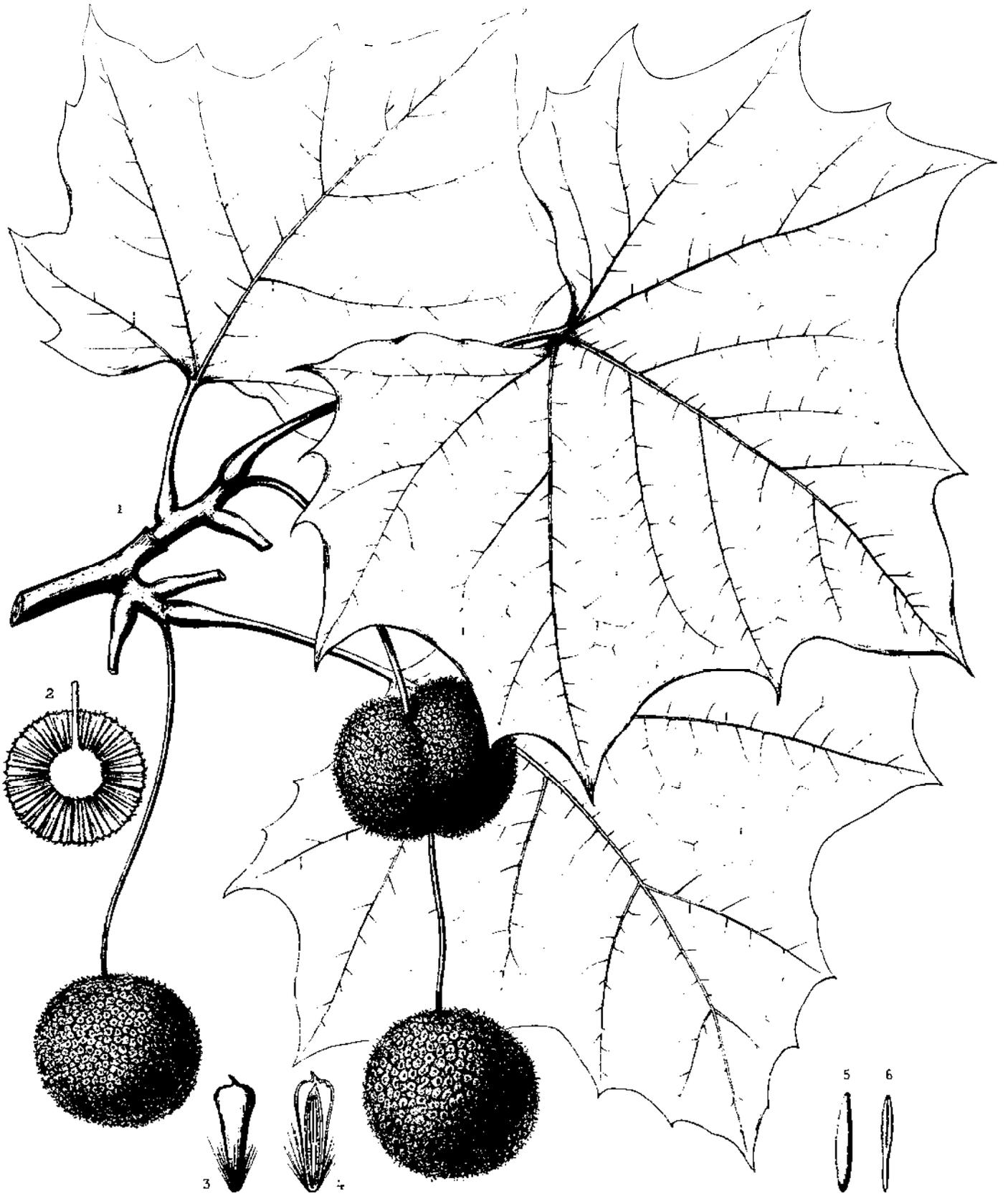
HABITAT: Prefers deep, rich, moist soils of creek and river flats, around borders of swamps and lakes.

DISTINGUISHING CHARACTERISTICS: Whitish, yellowish or greenish bark of the upper branches which at times covered with large scales of outer bark; large leaves with hollow base petioles; buds covered with a single scale; fruit a more or less spherical head usually borne single.

DISTRIBUTION IN ALABAMA: Seems to be widely distributed over the state outside the regions of longleaf pine.

EXPLANATION OF PLATE

- | | |
|--------------------------------------|----------------------------------|
| 1. A fruiting branch | 4. Vertical section of an achene |
| 2. Vertical section of head of fruit | 5. A seed |
| 3. An achene | 6. An embryo |



***Platanus occidentalis* L.**

DOWNY SERVICEBERRY

Amelanchier arborea (Michx. F.) Fern.

OTHER COMMON NAMES: Shadbush, Juneberry, Shadblow.

FORM: A shrub or small tree 30-50 feet tall and 8-12" in diameter; with slender spreading branches forming a narrow rounded head.

LEAVES: Alternate, simple, deciduous, oval to oblong or occasionally lance-shaped; 2-4" long, 1-2" wide; pointed at tip, notched at base; margin, finely saw-toothed; with woolly, soft, silvery hairs when young, especially underneath; with 11-17 straight veins on each side; dull yellow-green above, paler below; petiole, slender 1-2" long.

BARK: Thin, smooth, silvery gray to gray-brown when young; then turning nearly black and becoming scaly with age.

TWIGS: Red-brown; slender and occasionally somewhat zigzag; covered with white hairs when young, then becoming glabrous.

WINTER BUDS: Terminal buds, up to 3/4 long, conical, the scales overlapping, greenish brown to reddish brown in color; lateral buds similar but smaller.

FLOWERS: Perfect; 1 & 1/4 wide; with 5 narrow white petals; on slender stalks in terminal clusters; in spring before leaves.

FRUIT: A nearly globular, reddish-purple, dry pome up to 1/2 in diameter; like a small apple; edible but mostly dry and tasteless; with several seeds; appears in early summer.

HABITAT: Found most commonly on moist soils in mixed upland hardwood forest stands; also found on some drier hillside and ridge sites as well as at sandy loam riverbanks and swamps.

DISTINGUISHING CHARACTERISTICS: Showy white blossoms are some of the first signs of spring on upland sites taking place at about the time of red maple seed production and shad spawning activity.

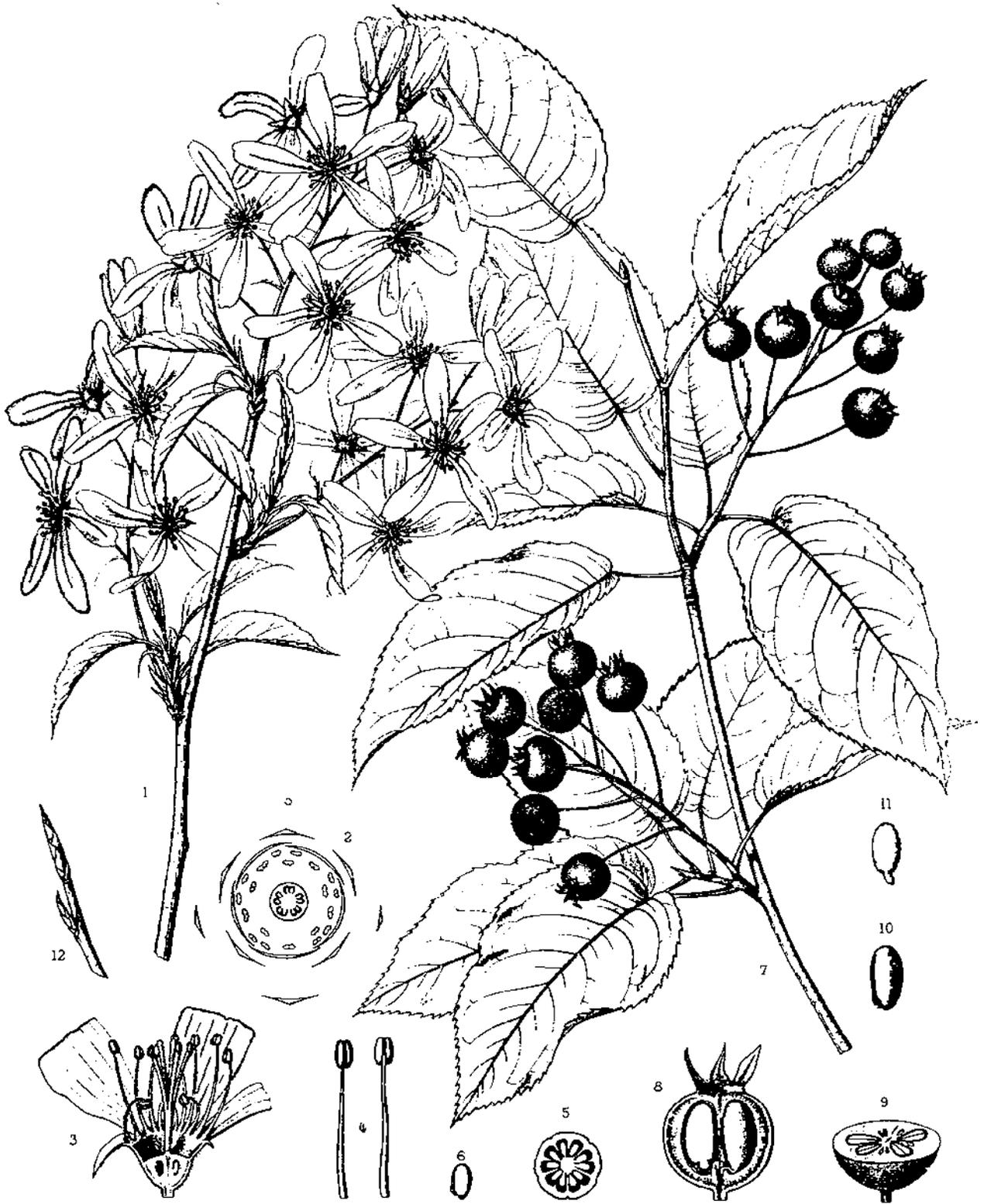
WOOD: Dried wood is very tough and durable.

USES: Landscaping, firewood. Historical uses: tool handles.

DISTRIBUTION IN ALABAMA: Audubon field guide shows statewide.

EXPLANATION OF PLATE

- | | |
|---------------------------------------|------------------------------|
| 1. A flowering branch | 7. A fruiting branch |
| 2. Diagram of a flower | 8. Vertical section of fruit |
| 3. Vertical section of a flower | 9. Cross section of fruit |
| 4. Front and rear view of a flower | 10. A seed, enlarged |
| 5. Cross section of an ovary | 11. An embryo |
| 6. An ovule, much magnified branchlet | 12. End of winter |



***Amelanchier arborea* (Michx. F.) Fern.**

BLACK CHERRY

Prunus serotina Ehrh.

OTHER COMMON NAMES: Wild cherry, Wild black cherry, Rum **cherry**, Cherry,

FORM: Commonly 50-75 feet high, trunk diameter 2-3 feet, may attain a height of 110 feet, diameter 5 feet; in the forest the bole is long, clean, with little taper, while in the open the trunk is usually short and the crown irregularly oblong.

BARK: Mature bark thin, dark reddish-brown, reticulately fissured into small, scaly, persistent plates with upraised edges.

TWIGS: Slender, glabrous, reddish or grayish-brown, often covered with a film-like coating that easily rubs off.

LEAVES: Alternate, simple, oblong-lanceolate or lance-obovate, 2-5 inches long, 1-1 1/2 inches wide, apex acuminate, cuneate or rounded at the base, margin glandular-serrate with incurved teeth, glabrous, dark green above, paler below.

FLOWERS: Appear when the leaves are nearly grown, perfect, 1/4-1/3 inch broad, borne on short pedicels in many-flowered racemes, which are 3-6 inches long.

FRUIT: A globose, dark red or black lustrous drupe, 1/4-1/3 inch in diameter, born in drooping racemose clusters; stone ridged on one side.

WINTER BUDS: Ovate, acute, somewhat lustrous, chestnut-brown, flattened, 1/8-1/6 inch long.

WOOD: Rather hard, light, strong, close-grained, light brown or red, with thin yellow sapwood.

USES: Pulp, lumber, furniture. Historical uses: cabinet making, interior finish.

DISTINGUISHING CHARACTERISTICS: Rough scaly bark on old trunks; fruit a purplish-black juicy drupe; petioles slender; one or more red glands at very base of leaf; bruised twigs have the odor and taste of bitter almonds.

DISTRIBUTION IN ALABAMA: Reported as native of the following counties: Colbert, Walker, Tuscaloosa, Clay, Coosa, Chilton, Montgomery, Hale, and Geneva.

EXPLANATION OF PLATE

- | | |
|---------------------------------|---|
| 1. A flowering branch | 5. Cross section of a fruit |
| 2. Vertical section of a flower | 6. A stone |
| 3. A fruiting branch | 7. Portion of leafy branch showing stipules |
| 4. Vertical section of a fruit | 8. A winter branchlet |



Prunus serotina Ehrh.

EASTERN REDBUD

Cercis canadensis L.

OTHER COMMON NAMES: Judas-tree

FORM: A small tree, up to 40 feet in height with a trunk of up to 12" in diameter, branching 10-15 feet above the ground to form a narrow, erect or spreading, flattened or rounded crown.

LEAVES: Alternate, deciduous, simple; 3-5" in diameter; heart-shaped; apex is a broad, sharp point; base is cordate or flattened; margin, entire; dull green above, paler and somewhat hairy beneath; petiole, slender, 2-5" long, swollen at base.

BARK: Smooth, dark gray or brown; becoming darker and furrowed into scaly plates with age.

TWIGS: Slender and brown with a definite zigzag shape.

WINTER BUDS: Terminal buds are absent; lateral buds are small, blunt, red; accessory buds (mostly for blossoms) are common.

FLOWERS: Perfect, irregular, lavender blossoms appear in early spring before the leaves in clusters of 4 to 8; 1/2" long on 1/2" long stalks; often found on the trunks as well as the branches of trees.

FRUIT: Flat, narrowly oblong pods; 2-3 & 1/2" long; pointed at ends; pink, turning blackish; mature and fall in late autumn or through the winter; pods split open on one side releasing seeds.

HABITAT: Moist, soils of valleys and slopes; often in open, mixed hardwood stands; can form thickets after timber harvests.

DISTINGUISHING CHARACTERISTICS: The showy blossoms are a harbinger of spring; the leaves are attractive in summer and fall.

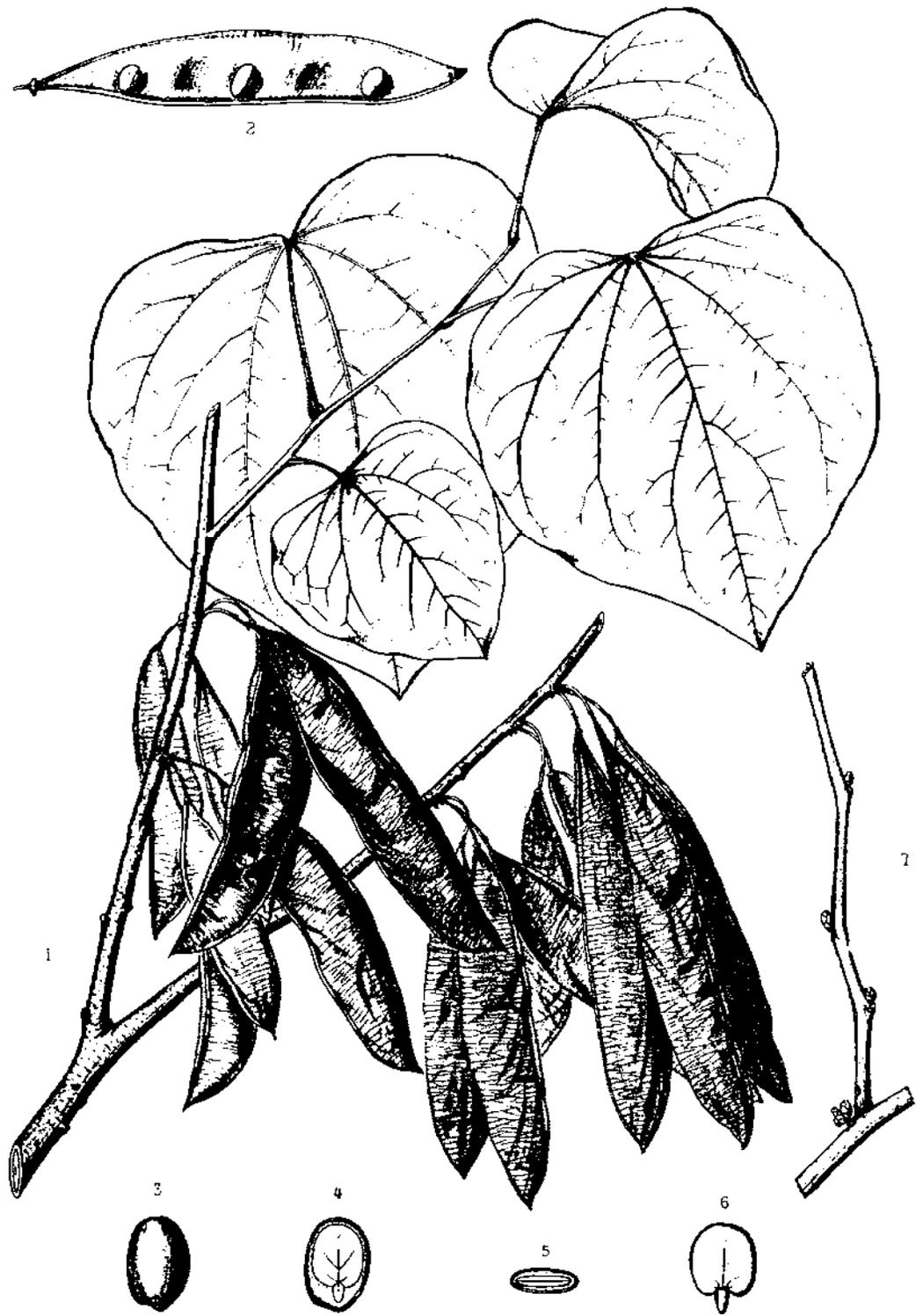
WOOD: Qualities are unknown; not a commercial timber species.

USES: A valuable ornamental, landscaping species.

DISTRIBUTION IN ALABAMA: Statewide except lower coastal plain.

EXPLANATION OF PLATE

- | | |
|-------------------------------|------------------------|
| 1. A fruiting branch | 5. X-section of a seed |
| 2. A legume | 6. An embryo |
| 3. A seed | 7. A winter branchlet |
| 4. Vertical section of a seed | |



Cercis canadensis L.

HONEY LOCUST

Gleditsia triacanthos L.

OTHER COMMON NAMES: Three-thorned acacia, Thorntree, Honeyshucks, Locust.

FORM: 40-50 feet high, diameter 1-2 feet, may reach a height of 110 feet, diameter 4-6 feet, trunk usually short in the open; in closed stands rather clean and long; crown broad, round-topped, lateral branches drooping.

BARK: On old trunks grayish-brown to almost black, sometimes smooth, usually roughened by a few fissures and thick, firm, broad ridges; bark on trunks often covered with many thorns.

TWIGS: Rather stout, zigzag, smooth, glossy, with enlarged nodes, later greenish-red to brown; twigs bear thorns that are often branched.

LEAVES: Alternate, 7-8 inches long, singly or doubly compound with 18-28 leaflets, when doubly compound 8-14 pinnae, each with 18-20 leaflets, leaflets 1 1/2-2 inches long, rounded at the apex and base.

FLOWERS: Polygamous, borne in lax racemes from the axils of the leaves of the season or of preceding seasons; staminate racemes often clustered, densely flowered; pistillate racemes slender, few-flowered, solitary.

FRUIT: A more or less twisted, flat and reddish-brown pod which does not split open.

WINTER BUDS: Alternate, usually 3-5 at a node placed one above another; upper ones scaly, lowest ones not scaly, visible as a dot.

WOOD: Hard, strong, heavy; heartwood bright reddish-brown with thin pale sapwood.

USES: Landscaping. Historical uses: fence posts, wheel hubs, furniture.

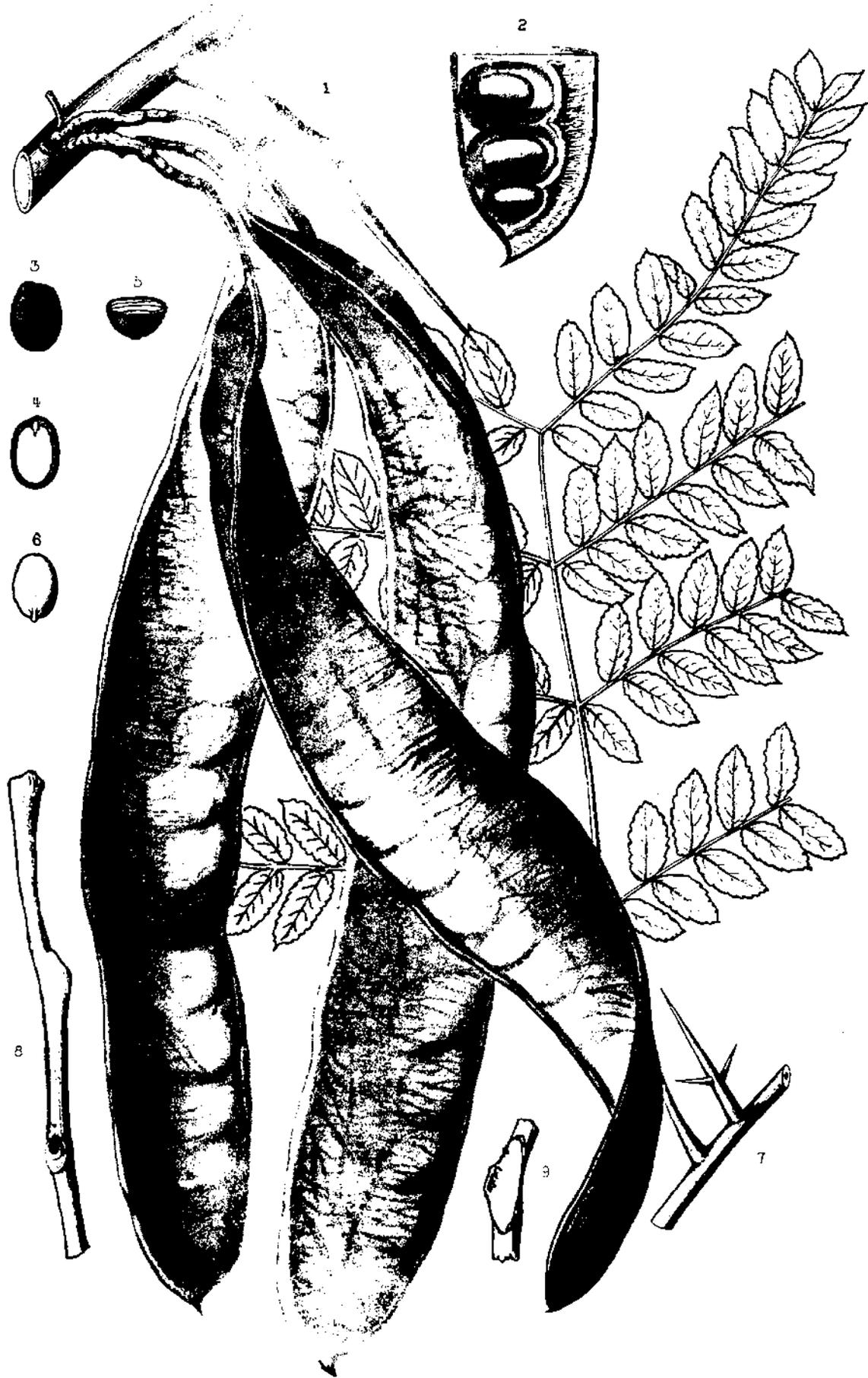
HABITAT: Prefers rich soil along streams, will grow in any fertile soil, if not too wet; demands plenty of light.

DISTINGUISHING CHARACTERISTICS: Large branched thorns; leathery fruit-pod; once compound, sometimes twice compound, leaves.

DISTRIBUTION IN ALABAMA: Throughout the state, more common in the northern part of the state.

EXPLANATION OF PLATE

- | | |
|--|---|
| 1. A cluster of fruit and a spine | 6. An embryo |
| 2. Vertical section of a portion of a legume | 7. A doubly pinnate leaf |
| 3. A seed | 8. A winter branchlet |
| 4. Vertical section of a seed | 9. Vertical section of a part of a branch showing the position of the buds. |
| 5. Cross section of a seed | |



Cleiditsia triacanthos L.

BLACK LOCUST

Robinia pseudacacia L.

OTHER COMMON NAMES: Yellow locust, Locust, Acacia.

FORM: 70-80 feet high, trunk 3-4 feet in diameter, bole divides a few feet above ground into a number of stout ascending branches, forming a narrow, oblong, open crown; in the forest, bole may be free of branches three-fourths of its length.

BARK: Mature bark 1-1 1/2 inch thick, reddish or yellowish-brown, deeply furrowed into rounded ridges covered with squarish persistent scales.

TWIGS: Slender or rather stout on vigorous growth, brittle, more or less zigzag, terete, or angular in cross section, often two stipular thorns at a node.

LEAVES: Alternate, odd-pinnately compound, 8-14 inches long, consisting of 7-19 sub-opposite or alternate leaflets arranged on a rachis swollen at the base, leaflets ovate-oblong to elliptical, 1 1/2-2 inches long, mucronate or retuse at apex, rounded at base, entire, dark blue-green and glabrous.

FLOWERS: Appear when the leaves are nearly full grown, perfect, irregular, white, fragrant, about 1 inch long, borne on slender pedicels in drooping racemes 4-5 inches long.

FRUIT: A dark brown, thin pod, 2-4 inches long, about 1/2 inch wide, usually containing 4-8 small orange-brown, mottled seeds about 3/16 of an inch long.

WINTER BUDS: Terminal bud absent; lateral buds small, 3-4 at a node, superposed, imbedded in the twig under the leaf scar.

WOOD: Very hard, heavy, strong, very durable, brown or greenish-yellow, pale yellow sapwood.

USES: Historical uses: Posts, insulator pins, tree nails, railroad ties, ship building, tool handles.

HABITAT: Moist, fertile soil, especially rich bottom-lands, along stream courses in rocky, gravelly, or alluvial soils.

DISTINGUISHING CHARACTERISTICS: Its odd-pinnate compound leaves; twigs with two spines at a node; winter buds superposed, imbedded in the twig; drooping raceme of white, irregular flowers; yellow color and disagreeable odor of the roots.

DISTRIBUTION IN ALABAMA: Its natural range seems to be from the northernmost counties southward into Autauga County; black locust has been planted as an ornamental rather widely in Alabama and has escaped cultivation; hence, the range of the species is not well known.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A fruiting branch | 5. A portion of a branch, the petiole removed and the bud covering laid open, showing the superposed naked buds, with a portion of a branchlet developed from a supra-axillary bud |
| 2. A legume with one of the valves removed | 6. A winter branchlet |
| 3. Vertical section of a seed | |
| 4. An embryo | |



Robinia pseudacacia L.

AMERICAN SMOKE-TREE

Cotinus obovatus Raf.

OTHER COMMON NAMES: Chittamwood, Smoketree, Yellow-wood.

FORM: 25-35 feet high, with a straight trunk 12-14 inches in diameter, usually divides up 12-14 feet from the ground into several erect stems, separating into wide-spreading often pendulous branches.

BARK: 1/8 inch thick, light gray, furrowed and broken on the surface into thin oblong scales.

TWIGS: Purple when they first appear, soon become green, bright red-brown, dark orange-colored the second year.

LEAVES: Alternate, simple, oval or obovate, rounded or sometimes slightly emarginate at the apex, gradually contracted at the base, entire with slightly wavy margins, dark green on the upper surface when mature, pale below.

FLOWERS: Dioecious; on pedicels 1/2-3/4 inch long, usually 3-4 grouped together in loose umbels near the end of the principal branches of long-branched few-flowered panicles that are 5-6 inches long, 2 1/2-3 inches broad.

FRUIT: Produced very sparingly, about 1/8 inch long, on stems 2-3 inches long; the sterile pedicels 1 1/2-2 inches long at maturity, covered with short inconspicuous pale purple or brown hairs; seed kidney-shaped, pale brown, about 1/16 inch long.

WINTER BUDS: 1/8 inch long, covered with thin dark red-brown scales.

WOOD: Light, soft rather coarse-grained, bright clear rich orange color, thin white sapwood.

USES: Fence posts, clear orange-colored dye.

DISTINGUISHING CHARACTERISTICS: Flowers borne on the ends of the principal branches of slender long-branched few-flowered panicles 5-6 inches long; staminate and pistillate flowers on different individuals; wood orange color.

DISTRIBUTION IN ALABAMA: Reported from Madison and Morgan Counties, but may be more widely distributed naturally, and as an escape from cultivation.

EXPLANATIONS OF PLATE

- | | |
|--------------------------------|-----------------------|
| 1. A fruiting branch | 5. A seed |
| 2. A fruit | 6. An embryo |
| 3. Vertical section of a fruit | 7. A winter branchlet |
| 4. Cross section of a fruit | |



Cotinus obovatus Raf.

AMERICAN HOLLY

Ilex opaca Ait.

OTHER COMMON NAMES: Holly: White holly.

FORM: Height 20-30 feet, diameter 6-18 inches, sometimes 50 feet high, trunk 3 feet in diameter, continuous through the crown; crown compact, conical, consisting of slender horizontal or slightly drooping branches bearing evergreen leaves.

BARK: Close, white or grayish-brown or yellowish-brown, up to 1/2 inch thick, rough with age.

TWIGS: Rather slender, at first rusty hairy, finally smooth and light brown.

LEAVES: Alternate, simple, thick, elliptical to obovate-oblong, with wavy margin and spiny teeth, dull dark green, glabrous and centrally grooved above, paler and smooth below, 2-4 inches long, persist on the twig about 3 years.

FLOWERS: Appear in the spring, small, dioecious, axillary on slender pedicels; staminate in 3-9 flowered cymes; the pistillate singly or 2 or 3 together, petals greenish-white, about 1/6 inch long.

FRUIT: A bright red drupe, occasionally yellow, about 1/4 inch in diameter, containing a light brown nutlet, usually with 4 ribs.

WINTER BUDS: Alternate, short, the terminal acute; lateral obtuse, somewhat downy.

WOOD: Hard, tough, rather weak, close-grained, ivory-white when first cut, turning brown with exposure.

USES: Landscaping. Historical uses: sprays of evergreen leaves and bright berries used for holiday decorations; wood used for umbrella handles, turnery of various sorts, souvenirs.

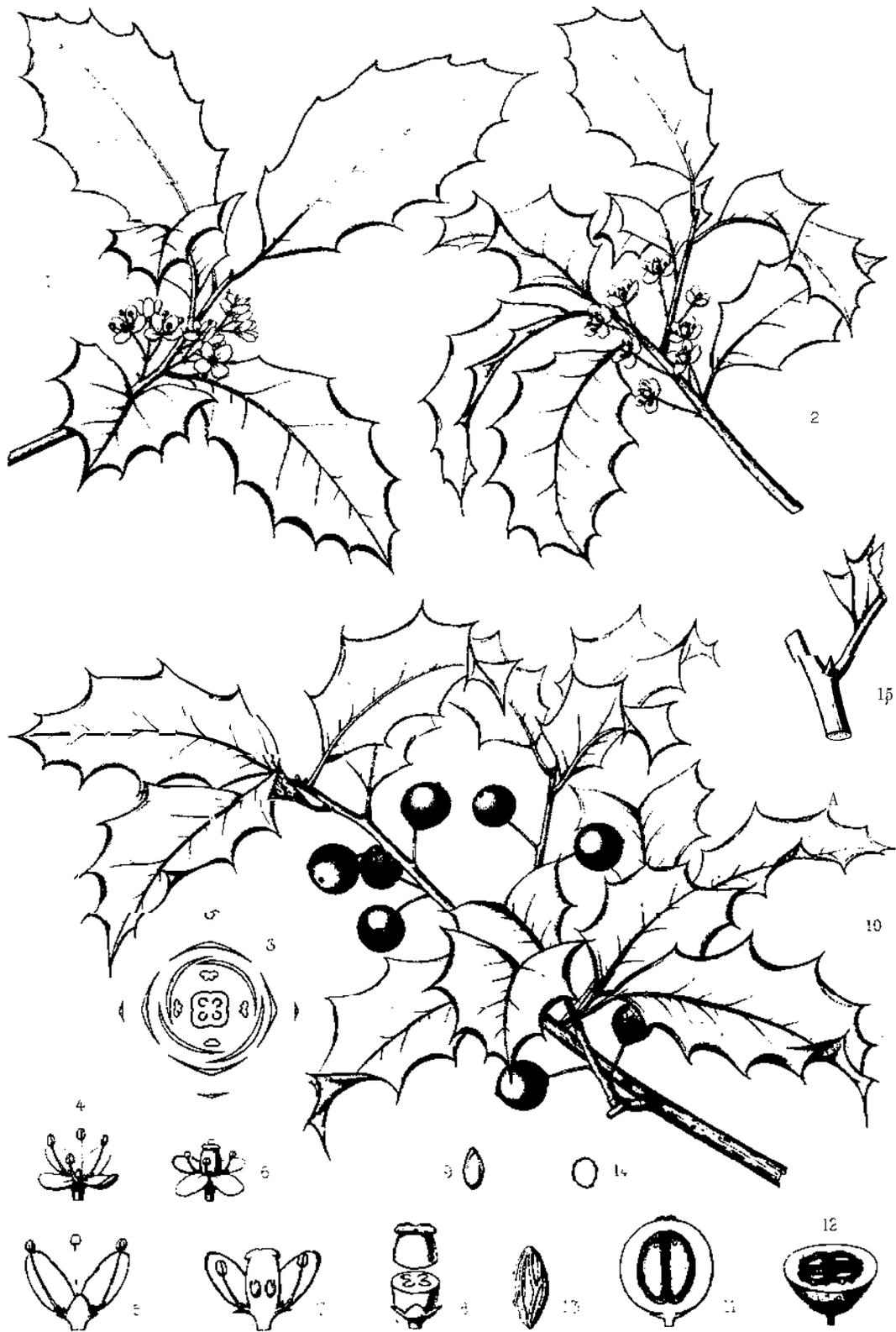
HABITAT: Prefers moist soil near water, rich moist bottom land, drier soils in protected places.

DISTINGUISHING CHARACTERISTICS: Unique evergreen leaves, with spiny teeth; small red fruit, often persisting far into the winter; bole usually continuous throughout the crown.

DISTRIBUTION IN ALABAMA: Common throughout the state.

EXPLANATION OF PLATE

- | | |
|--|-----------------------------------|
| 1. A branch with staminate flowers | 8. Cross section of an ovary |
| 2. A branch with pistillate flowers | 9. An ovule |
| 3. Diagram of a flower | 10. A fruiting branch |
| 4. A staminate flower | 11. Vertical section of a fruit |
| 5. Vertical section of a staminate flower | 12. Cross section of a fruit |
| 6. A pistillate flower | 13. A nutlet |
| 7. Vertical section of a pistillate flower | 14. An embryo |
| | 15. Part of a leaf with a stipule |



Ilex opaca Ait.

BOXELDER

Acer negundo L.

OTHER COMMON NAMES: Ash-leaved maple, Negundo maple, Three-leaved maple.

FORM: 50-70 feet high, with trunk 2-4 feet in diameter, usually divides near the ground into a number of wide-spreading and erect branches and slender pale green smooth branchlets.

BAK: 1/4-1/2 inch thick, pale gray or light brown, deeply divided into broad rounded ridges separating on the surface into short thick scales.

TWIG: At first pale green and smooth or slightly hairy, in their first winter bright green and shiny or sometimes pale purple, and covered with smooth, fissured bark,

LEAVES: Compound, opposite, and consist of 3-5 leaflets that are ovate or oval, above the middle; their margins are coarsely toothed or serrate, and sometimes three-lobed, 2-4 inches long, and 2-3 inches broad, prominently veined, light bright green on the upper surface, and paler beneath.

FLOWERS: Appear with or before the leaves on the growth of the preceding season, yellowish-green, dioecious; staminate in fascicles with pendulous pedicels, 1-2 inches long; the pistillate in narrow, drooping racemes.

FRUIT: The winged seeds are attached to a central fruiting stalk and are borne in clusters that may be 6-8 inches in length; the seed are 1 1/2-2 inches long; the nutlets are narrowed at each end, bright red-brown and 1/2 inch long.

WINTER BUDS: Terminal sharp-pointed, 1/8 inch long and somewhat longer than the lateral buds, the scales with a dense covering of short soft hairs.

WOOD: Light, soft, creamy-yellow to yellow-gray, hard, and not durable.

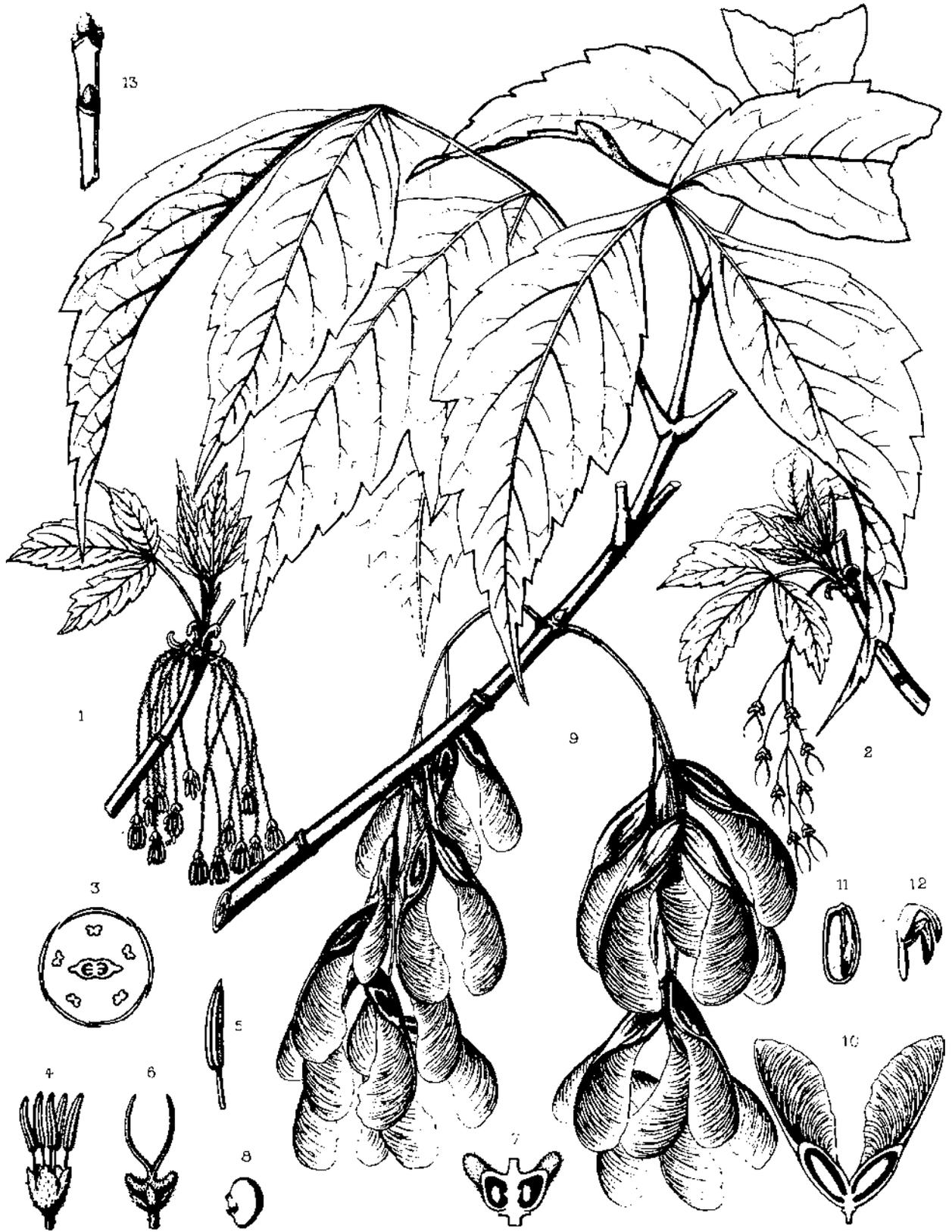
USES: Pulp. Historical uses: furniture, woodenware, barrel staves.

DISTINGUISHING CHARACTERISTICS: Bark light brown or pale gray, deeply divided into broad rounded ridges separating on the surface into thick scales; leaves compound composed of 3-5 leaflets; seed borne in clusters that may be 6-8 inches in length.

DISTRIBUTION IN ALBAMA: In rich woods, widely distributed.

EXPLANATION OF PLATE

- | | |
|--|---------------------------------|
| 1. A flowering branch of the staminate tree | 7. Vertical section of an ovary |
| 2. A flowering branch of the pistillate tree | 8. An ovule |
| 3. Diagram of a flower | 9. A fruiting branch |
| 4. A staminate flower | 10. Vertical section of a fruit |
| 5. A stamen | 11. Vertical section of a seed |
| 6. A pistillate flower | 12. An embryo |
| | 13. A winter branchlet |



Acer negundo L.

RED MAPLE

Acer rubrum L.

OTHER COMMON NAMES: Swamp maple, Soft maple, Water maple, White maple.

FORM: Usually about 50 feet high with a diameter 1-2 feet, may become 100 feet high with a diameter of 4 feet; in the open the trunk usually 6-10 feet long and branches low down and forms a dense low crown; upper branches are rather upright; lower branches tend to be horizontal and slightly turned upwards at the end.

BARK: On branches and young trunks smooth and gray; on old trunks very dark gray, 1/4-1/2 inch thick, shaggy, roughened into long ridges which peel off in long plates.

TWIGS: Rather slender, bright or dark red, odorless when bruised, lenticels numerous, conspicuous.

LEAVES: Opposite, simple, 3-5 lobed, coarsely toothed, sinuses sharply cut, lobes more or less sharply pointed; mature leaves light green and smooth above, greenish-white and smooth below, 2-6 inches long.

FLOWERS: Appear in advance of the leaves in dense axillary clusters on the growth of the preceding season, scarlet or yellowish-red; the staminate and pistillate in separate clusters on the same or on different trees, calyx deeply five-lobed, petals present.

FRUIT: Matures early; seeds borne in clusters on slender drooping pedicels, wings 1/2-1 inch long; seeds usually sprout soon after falling to the ground.

WINTER BUDS: Red, blunt-pointed, short-stalked, about 1/5 inch long, bud scales rounded, somewhat hairy on the margins.

WOOD: Rather soft, not strong, close-grained; heartwood light brown, with wide light colored sapwood.

USES: Lumber, pulp, firewood, landscaping. Historical uses: furniture, woodenware, turnery.

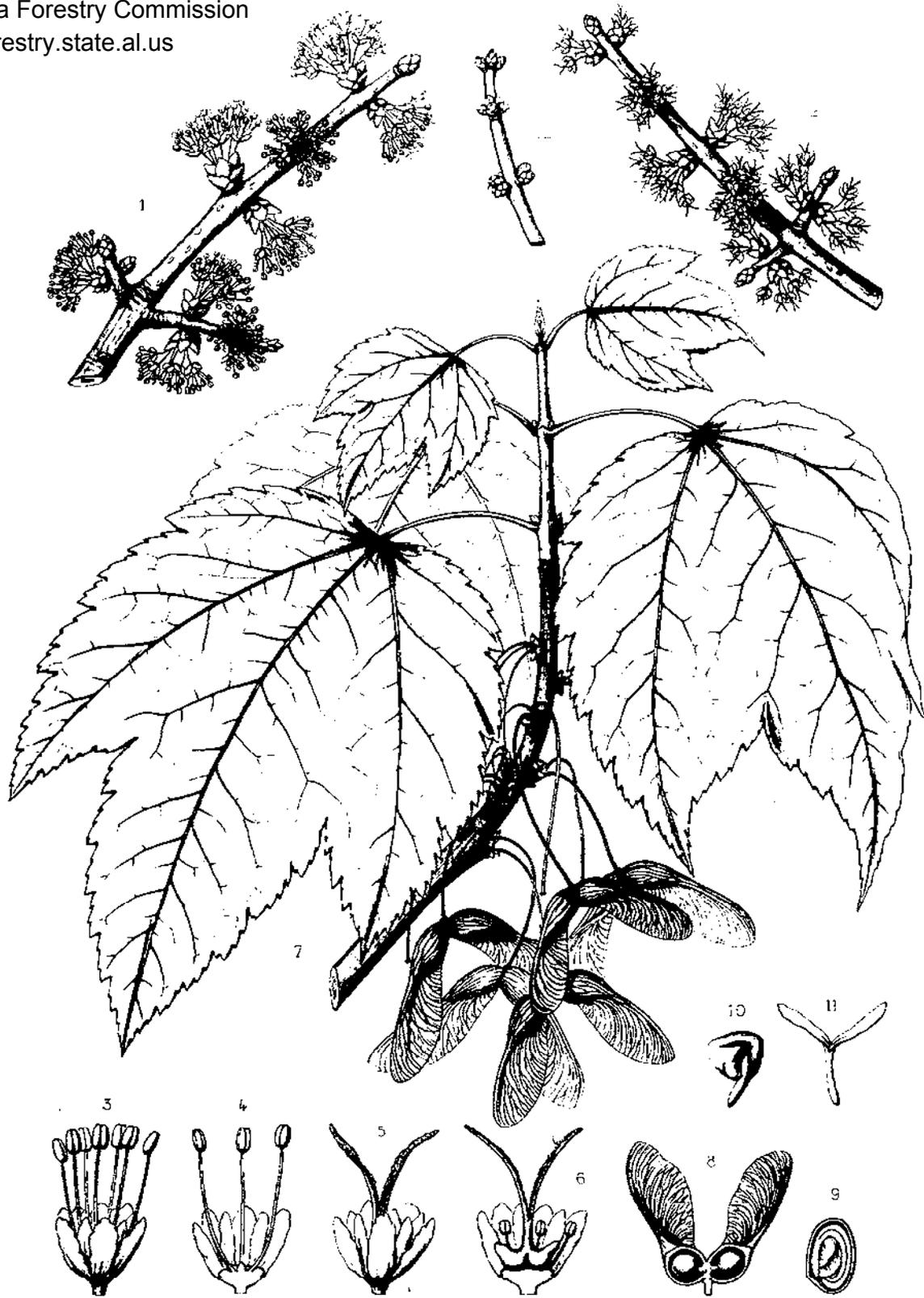
HABITAT: Wet soil along streams and in swamps, also on high ground and hilly areas.

DISTINGUISHING CHARACTERISTICS: Leaves 3-5 lobed and coarsely toothed, rarely silvery-white on the underside; red lustrous twigs and lack of pungent odor when bruised; bark of mature trees somewhat shaggy.

DISTRIBUTION IN ALABAMA: On shady slopes and wet woods throughout the state.

EXPLANATION OF PLATE

- | | |
|--|--------------------------------|
| 1. A branch with staminate flowers | 7. A fruiting branch |
| 2. A branch with pistillate flowers | 8. Vertical section of a fruit |
| 3. A staminate flower | 9. Vertical section of a seed |
| 4. Vertical section of a staminate flower | 10. An embryo |
| 5. A pistillate flower | 11. An embryo displayed |
| 6. Vertical section of a pistillate flower | 12. A winter branchlet |



***Acer rubrum* L.**

SILVER MAPLE

Acer saccharinum L.

OTHER COMMON NAMES: Soft maple, River maple, White maple, Silverleaf maple.

FORM: A tree usually 50-80 feet high, may attain a height of 120 feet with a diameter of 3-4 1/2 feet, trunk usually short, dividing 10-15 feet above the ground into stout ascending branches which divide freely, ultimately forming a broad rounded crown, lateral branches usually have a pronounced droop, with an upward curve at the end.

BARK: On branches and trunks of small trees smooth and gray; on old trunks brown with somewhat furrowed surface which separates into flakes which are attached at the center and loose at both ends.

TWIGS: Somewhat slender, at first green, later chestnut-brown and covered with numerous lenticels.

LEAVES: Opposite, simple, almost circular in outline, deeply 5-lobed, coarsely toothed, upper surface bright green, lower silvery-white; borne on slender drooping petioles 4-5 inches long; leaves 6-7 inches and nearly as broad.

FLOWERS: Appear before the leaves in dense axillary clusters on the growth of the preceding season; the staminate and pistillate in separate clusters on the same tree or on different trees, calyx tubular in the staminate flower; urn-shaped in the pistillate flower, corolla lacking.

FRUIT: With 2 widely divergent wings, borne on slender drooping stalks; wings 1-2 inches long, straight or curved; seeds 1/2 inch long with a pale reddish-brown coat; they sprout soon after falling to the ground.

WINTER BUDS: Opposite, red, blunt-pointed, may be short-stalked.

WOOD: Hard, close-grained, brittle, easily worked, heartwood pale brown, sapwood white.

USES: Landscaping. Historical uses: Cheap furniture, flooring.

HABITAT: Prefers a moist, deep soil such as found along streams.

DISTINGUISHING CHARACTERISTICS: Leaves with lower surface silvery-white; broken twigs have a pungent odor; the outer branches have a pronounced droop and an upward curve; bark somewhat furrowed and separates into thin flakes that are loose at both ends.

DISTRIBUTION IN ALABAMA: Throughout the state.

EXPLANATION OF PLATE

- | | |
|--|---------------------------------|
| 1. A branch with staminate flowers | 7. A fruiting branch |
| 2. A branch with pistillate flowers | 8. Vertical section of a samara |
| 3. A staminate flower | 9. Vertical section of a seed |
| 4. A pistillate flower | 10. An embryo |
| 5. A pistil | 11. An embryo displayed |
| 6. Vertical section of a pistillate flower | 12. A winter branchlet |



Acer saccharinum L.

SUGAR MAPLE

Acer saccharum Marsh.

OTHER COMMON NAMES: Hard maple, Rock maple, Sugar-tree, Sweet maple:

FORM: May attain a height of 120 feet with a diameter of 5 feet; in the open trees have short trunks with rather stiff erect branches which often form a spreading, egg-shaped crown; in closed stands they have long, straight, clean trunks with round crowns.

BARK: On branches and trunks of young trees, smooth and light brown; on older trunks brown, deeply furrowed into long irregular plates or flakes.

TWIGS: Slender, shining reddish-brown to buff tinged with orange, smooth.

LEAVES: Opposite, simple, usually 5-lobed with a sparsely toothed margin, sinuses rounded at the base, leaves rounded or heart-shaped at the base; mature leaves thin, smooth, dark green above, paler and smooth below, 3-5 inches long, 4-5 inches in diameter.

FLOWERS: Appear with the leaves, in drooping corymbs from the terminal mixed buds and lateral flower buds; staminate and pistillate in the same or different clusters on the same or different trees; calyx hairy without, 5-lobed, corolla lacking.

FRUIT: Clustered, borne on drooping stalks with broad divergent wings 1/2-1 inch long; seeds bright red-brown, 1/4 inch long.

WINTER BUDS: Conical or oval, sharp-pointed, reddish-brown, rather downy, especially toward the tip; terminal bud about twice as large as the lateral buds.

WOOD: Heavy, hard, strong, close-grained, tough, heartwood light brown, tinged with red.

USES: Lumber, pulp, furniture, flooring, interior finish. Historical uses: Maple sugar and syrup.

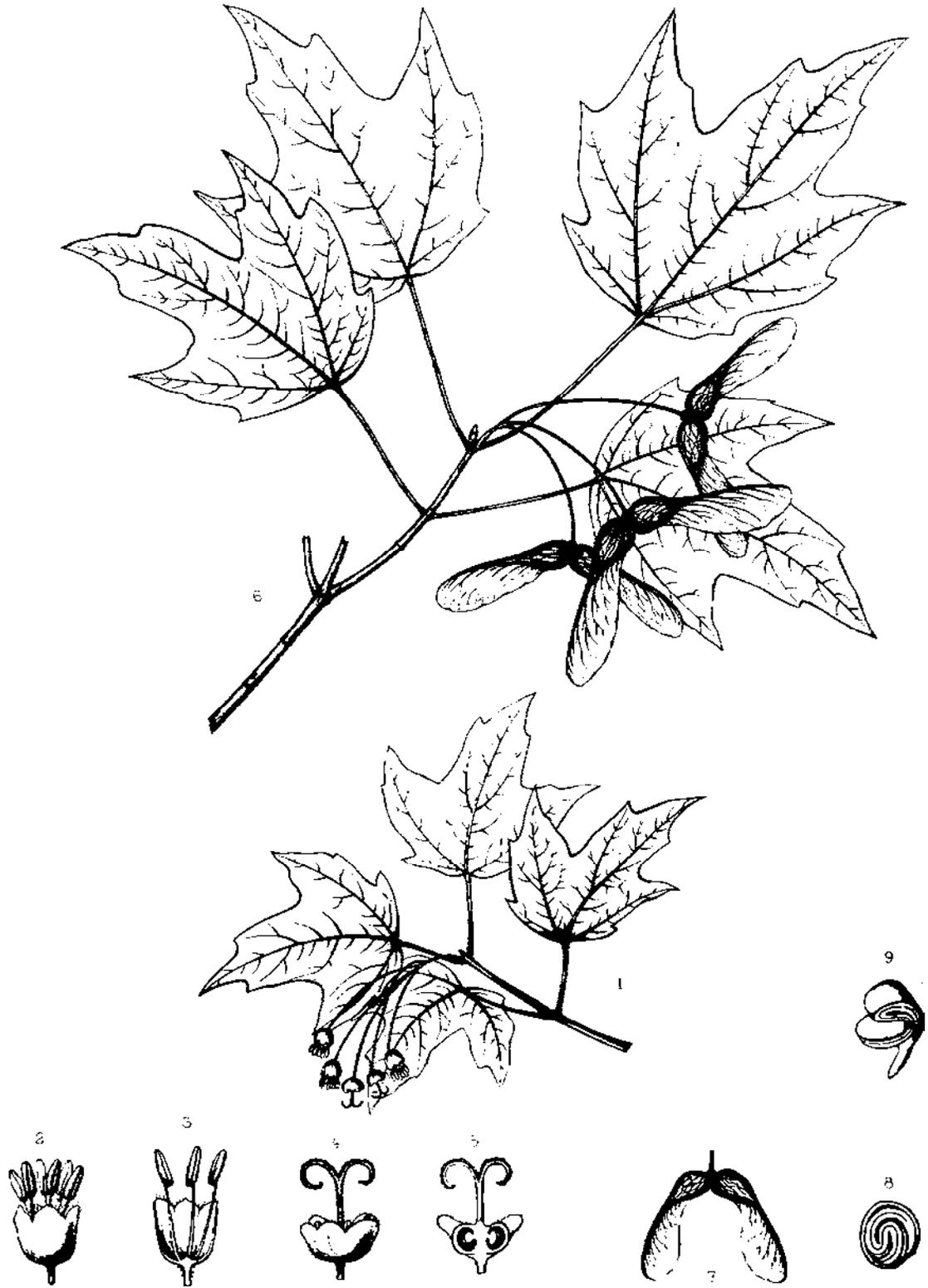
HABITAT: Prefers rich, well-drained, rocky soils of slopes and ridges, thrives on sites underlaid with limestone.

DISTINGUISHING CHARACTERISTICS: Lobes of the leaves coarsely toothed; flowers appear with the leaves; fruit does not ripen until fall; winter buds conical, sharp-pointed; bark on old trunks broken into deep longitudinal furrows, the light gray surface separating into small plate-like scales.

DISTRIBUTION IN ALABAMA: Seems to be limited to the northern part of the state; reported from Colbert, Jackson, Madison, Morgan, Blount, Franklin, Cullman, Walker, Fayette, St. Clair, Jefferson, and Bibb Counties.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A branch with staminate flowers and pistillate flowers | 5. Vertical section of a pistillate flower |
| 2. A staminate flower | 6. A fruiting branch |
| 3. Vertical section of a staminate flower | 7. Vertical section of a fruit |
| A pistillate flower | 8. Vertical section of a seed |
| | 9. An embryo |



Acer saccharum Marsh.

OHIO BUCKEYE

Aesculus glabra Willd.

OTHER COMMON NAMES: Buckeye, Fetid buckeye, Stinking buckeye, American horse chestnut.

FORM: Usually not over 40 feet in height with a diameter of 12 inches, may reach a height of 90 feet with a diameter of 24 inches, crown broad, round-topped.

BARK: On young stems and branches; dark brown and scaly; on old trees ashy-gray, furrowed, broken into thick plates, the surface of which is scaly.

TWIGS: Stout, at first downy and brown, later smooth, reddish-brown to ashy-gray, fetid odor when bruised.

LEAVES: Opposite, digitately compound with 5, sometimes 7, leaflets 3-6 inches long, more or less oval, usually long-pointed at the apex and narrowed at the base, irregularly and finely toothed on the margin, mature leaflets smooth, yellowish-green above, lower surface paler; foliage ill-smelling when bruised.

FLOWERS: Small, yellowish or greenish with 4 upright petals, borne in more or less downy terminal panicles about 5-6 inches long and 2-3 inches broad, panicles 4-6 flowered; stamens project beyond the yellow corolla.

FRUIT: A thick, more or less rounded, prickly capsule, an inch or more in diameter, borne on a stout stalk, containing at least one rounded lustrous brown nut.

WINTER BUDS: 2/3 inch long, sharp-pointed, resinous; outer bud scales, reddish-brown, finely hairy on the margin, inner bud scales yellowish-green.

WOOD: Light, soft, close-grained, not strong, heartwood nearly white, often blemished by dark lines of decay.

USES: Landscaping. Historical uses: Artificial limbs, chip hats, woodenware.

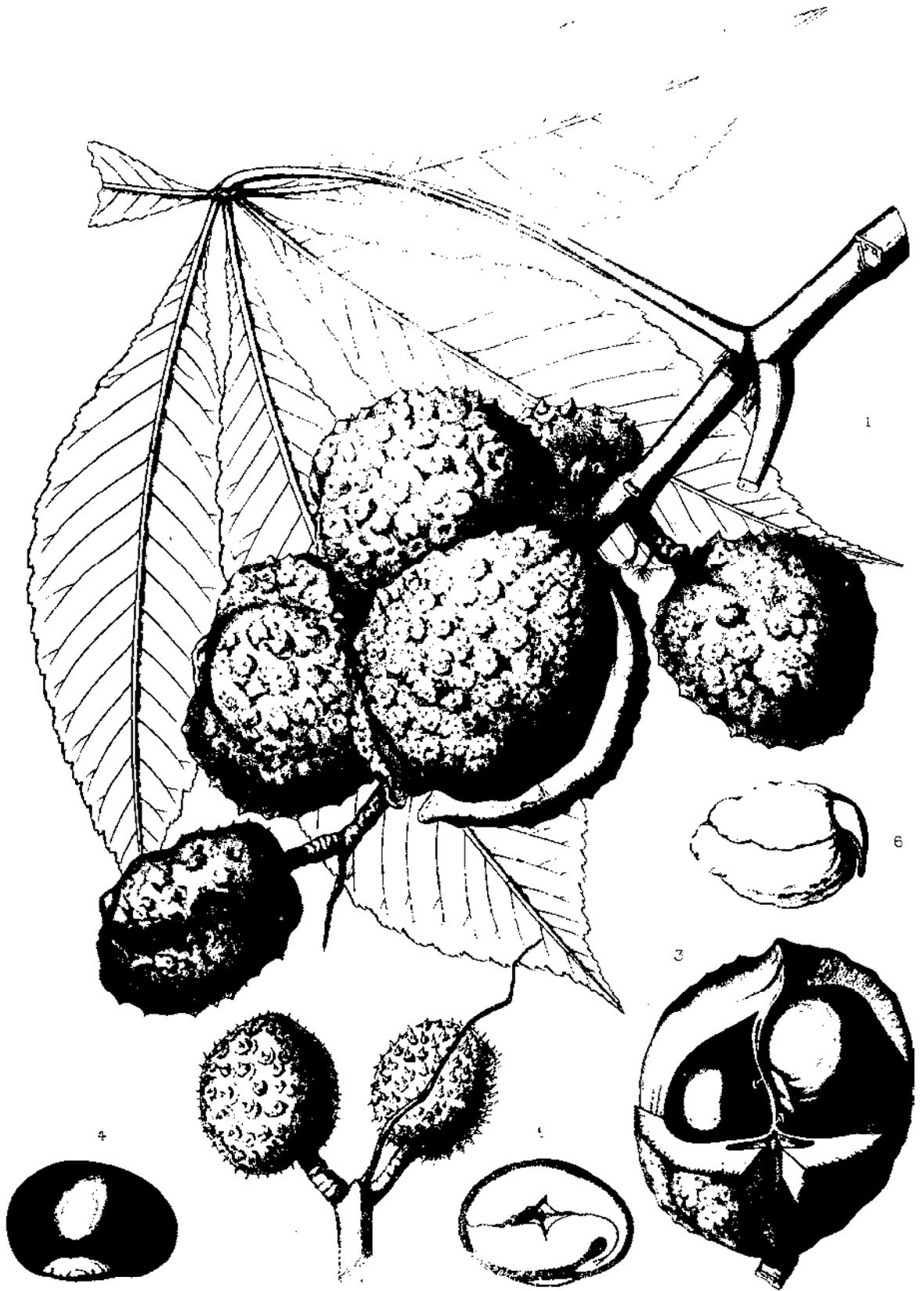
HABITAT: Prefers moist soil along banks of streams, ravines and similar situations.

DISTINGUISHING CHARACTERISTICS: Capsule leathery, spiny, contains 1-3 shining seeds; leaves opposite, digitately compound; leaves and stems ill-smelling when bruised.

DISTRIBUTION IN ALABAMA: Reported from Colbert, Madison, Blount, Morgan, Winston, and Greene Counties.

EXPLANATION OF PLATE

- | | |
|--|-------------------------------|
| 1. A fruiting branch | 4. A seed |
| 2. A half-grown fruit | 5. Vertical section of a seed |
| 3. A fruit with a portion of two of the valves removed | 6. An embryo |



Aesculus glabra Willd.

YELLOW BUCKEYE

Aesculus octandra Marsh.

OTHER COMMON NAMES: Buckeye, Sweet buckeye, Large buckeye.

FORM: Usually less than 60 feet in height, but may reach a height of 90 feet with a tall straight trunk 2 1/2-3 feet in diameter and with rather small pendulous branches.

BARK: Of the trunk 3/4 inch thick, light brown to grayish-brown, divided by shallow fissures, the surface separating into small scales.

TWIGS: Stout, at first hairy, later becoming smooth, reddish-brown to ashy-gray, slightly ill-smelling when bruised.

LEAVES: Opposite; digitately compound with 5, occasionally 7, more or less stalked leaflets that are nearly oval, 4-10 inches long, finely toothed on the margin, long-pointed at apex, narrowed at the base, dark green and smooth on the upper surface when mature, yellowish-green and somewhat hairy on under surface.

FLOWERS: Small, yellow or purplish, with 4 connivent petals, borne in finely hairy terminal panicles about 4-12 inches long, stamens are included in the yellow corolla.

FRUIT: A capsule 2-3 inches long, generally 2 or more seeded; seeds small reddish-brown lustrous, 3/4-1 1/2 inch broad, valves of the capsule thin, pale brown, not spiny or warty.

WINTER BUDS: Opposite, about 4/5-2 inches long, non-resinous, blunt-pointed; bud scales nearly triangular, outer bud scales reddish-brown with a thin bluish bloom; inner bud scales yellowish-green.

WOOD: Similar to that of the Ohio buckeye, but lighter in weight.

USES: Landscaping. Historical uses: artificial limbs, woodenware.

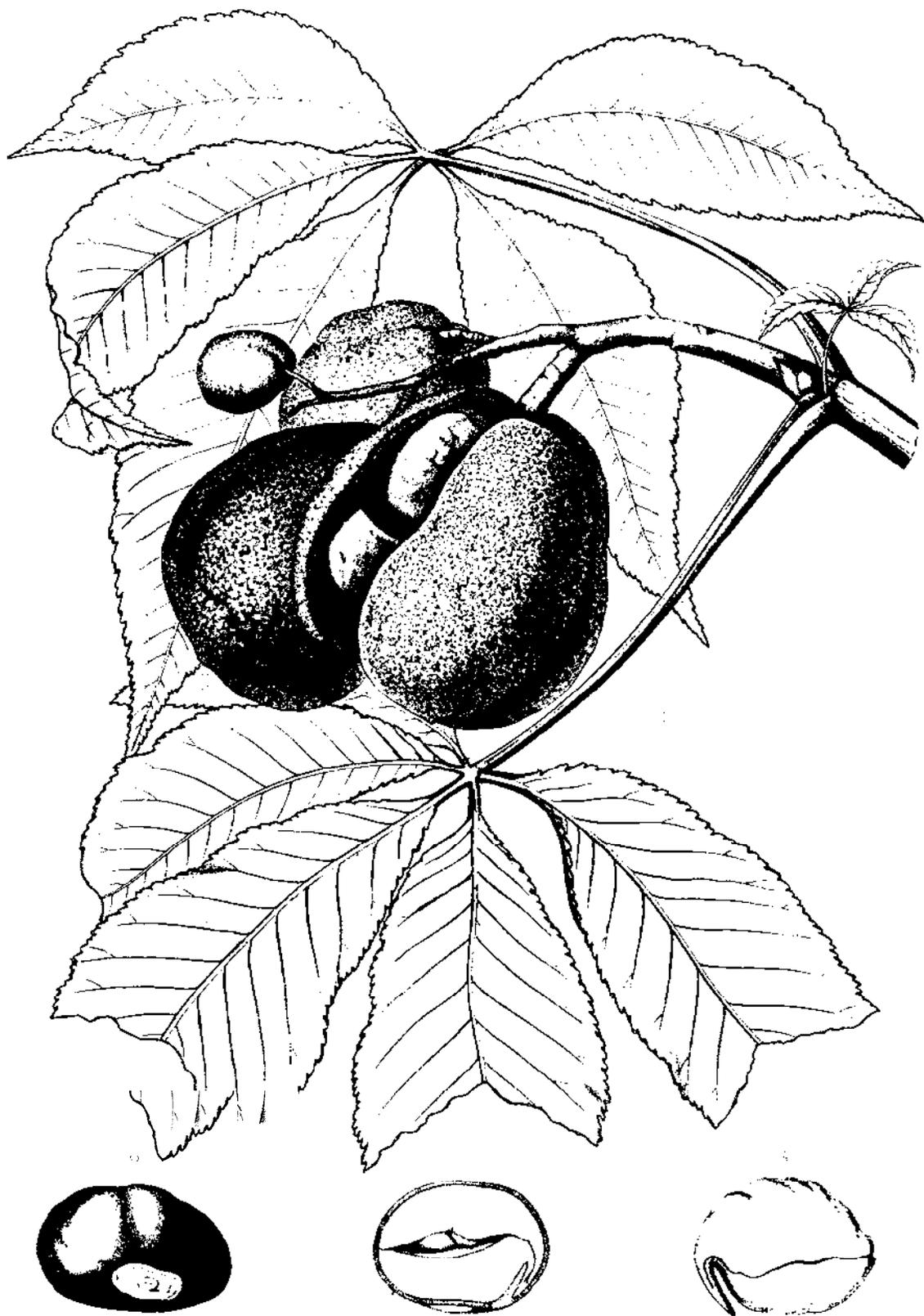
Prefers rich bottom-lands, common along or near streams, usually in mixture with hardwoods.

DISTINGUISHING CHARACTERISTICS: Valves of the capsule are smooth; two or more seed in a capsule; buds are non-resinous.

DISTRIBUTION IN ALABAMA: Reported from Madison and Jackson Counties, probably in other northern counties.

EXPLANATION OF PLATE

- | | |
|----------------------|-------------------------------|
| 1. A fruiting branch | 3. Vertical section of a seed |
| 2. A seed | 4. An embryo |



Aesculus octandra Marsh.

WHITE BASSWOOD

Tilia heterophylla Vent.

OTHER COMMON NAMES: Beetreelinden, Linn, White linn.

FORM: 50-60 feet high, trunk 3-4 feet in diameter with slender branches forming, generally, a narrow pyramidal head.

BARK: 1/2 inch thick, furrowed, the surface broken into short thin light brown scales.

TWIGS: Green or red the first year, later brown with many oblong wart-like excrescences.

LEAVES: Alternate, simple, obliquely truncate or cordate at base, apex contracted into a short point, serrate with rather remote glandular teeth, 6-7 inches long, 4-5 inches wide, bright green, glabrous above, lower surface pale, often silvery-white, covered with a short fine pubescence.

FLOWERS: Appear in early summer, perfect, fragrant, yellowish-white, in 10-20 drooping cymose clusters, free portion of peduncle 1/12-1/6 inch long, its bract narrowed and rounded at apex, unsymmetrically cuneate at base, 4-7 inches long, 1-1 1/2 inch wide.

FRUIT: An ellipsoid woody-like drupe, apiculate at apex, covered with rusty-brown tomentum, 1/3 inch long; borne in cymose clusters on a long stalk attached at the base to the persistent leafy bract.

WINTER BUDS: Broadly ovate, flattened, bright red, with a slight glaucous bloom.

WOOD: Resembles other American lindens; sapwood much thinner, may consist of only 5-6 annual rings.

USES: Historical uses: crating, furniture, wood carving, bee keeper's supplies, honey/slide boxes, picture frames.

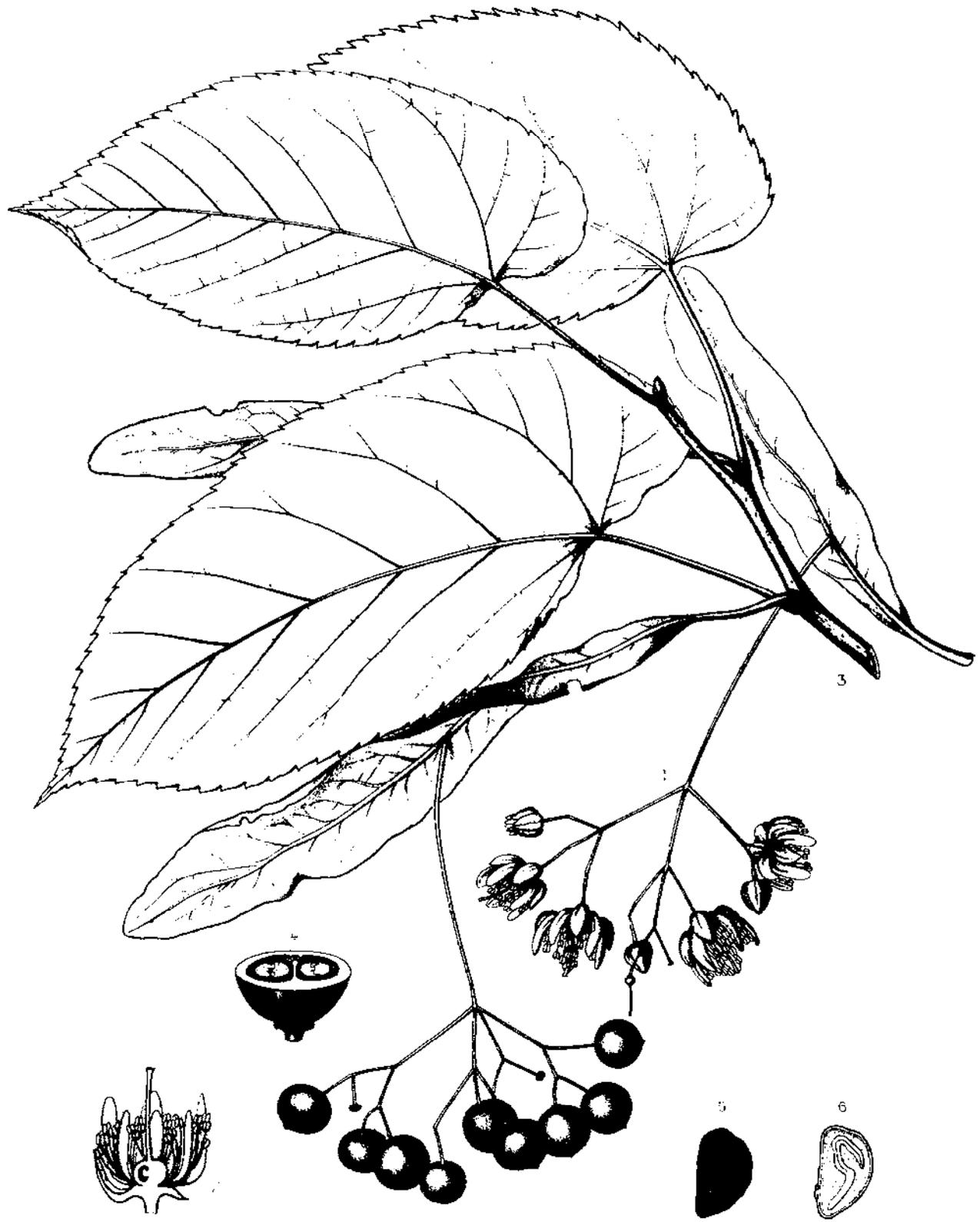
HABITAT: Rich wooded slopes in rather moist soil or near banks of streams or on limestone soil.

DISTINGUISHING CHARACTERISTICS: Flowers somewhat larger than those of other American species; the large size of the bract attached on the cymose cluster of flowers and fruit; the shape, size, and margin of the leaves; leaves often silvery-white and pubescent on the lower surface.

DISTRIBUTION IN ALABAMA: Reported from Lawrence, Winston, DeKalb, Coosa, and Dallas Counties.

EXPLANATION OF PLATE

1. A cluster of flowers, with its pedunculate bract
2. Vertical section of a flower
3. A fruiting branch
4. Cross section of a fruit, with two seeds developed
5. A seed enlarged
6. Vertical section of a seed



***Tilia heterophylla* Vent.**

LOBLOLLY-BAY

Gordonia lasianthus (L.) Ellis

OTHER COMMON NAMES: Tan bay, Black laurel.

FORM: 60-75 feet high with a tall straight trunk 18-20 inches in diameter, small branches grow upward at first, finally spreading into a narrow compact crown.

BARK: Nearly 1 inch thick on a mature trunk, divided into regular parallel ridges, their surface dark brown, scaly, broken into shallow furrows.

TWIGS: Dark brown, rugose, marked during several years by the horizontal slightly raised leaf scars.

LEAVES: Alternate, simple, leathery, lanceolate to oblong, acute at the apex, narrowed to the cuneate base, finely or remotely crenately serrate usually above the middle, dark green, lustrous, 4-5 inches long, 1 1/2-2 inches wide.

FLOWERS: White, pungently fragrant, about 2 1/2 inches in diameter, expanding in July and continuing to open successfully during two or three months, on stout red pedicels, 2 1/2-3 inches long.

FRUIT: A capsule, ovoid, acute, pubescent, 3/4 inch long, 1/2 inch in diameter; seed winged, nearly square, rugose, dotted with small pale brown excrescences, nearly 1/16 inch long, wing pointed or rounded at the apex.

WINTER BUDS: 1/4-1/3 inch long, covered with a pale lustrous pubescence.

WOOD: Light, soft, close-grained, not durable, light red with lighter colored sapwood of 40-50 annual rings.

USES: Pulp.

HABITAT: Shallow swamps and moist depressions.

DISINGUISHING CHARACTERISTICS: Tree with watery juice; leaves persistent and coriaceous; seeds winged; axillary buds naked.

DISTRIBUTION IN ALABAMA: Reported from Mobile and Geneva Counties.

EXPLANATION OF PLATE

- | | |
|---------------------------------|----------------------------------|
| 1. A flowering branch | 7. Vertical section of an ovary |
| 2. A fruiting branch | 8. An ovule |
| 3. Diagram of a flower | 9. Vertical section of a capsule |
| 4. Vertical section of a flower | 10. Vertical section of a seed |
| 5. An anther, posterior view | 11. An embryo |
| 6. An anther, anterior view | 12. Cross section of an embryo |



Gordonia lasianthus (L.) Ellis

FLOWERING DOGWOOD

Cornus florida L.

OTHER COMMON NAMES: Dogwood, Boxwood, Flowering cornel, Arrow-wood.

FORM: Low bushy tree 15-30 feet high, trunk diameter 6-10 inches, occasionally 35-40 feet tall with trunk diameter 12-18 inches, trunk short with little taper up to the first branches and then practically disappear into the branches with a broad, low, flat-topped crown.

BARK: Bark on old trunks dark brown to black, broken into quadrangular scales suggestive of alligator leather.

TWIGS: Usually red, may be tinged with green, smooth, glossy, often covered with a glaucous bloom, few small lenticels.

LEAVES: Opposite, simple, clustered toward ends of branches, ovate, 3-5 inches long, 2-3 inches wide, acute at apex, cuneate at the base, entire or wavy on margin, bright dark green above, pale below.

FLOWERS: Appear when the leaves are about half grown, perfect, greenish, arranged in dense heads surrounded by an involucre of 4 large, petal-like white or pinkish, obovate, notched bracts.

FRUIT: Bright scarlet drupe, $\frac{3}{5}$ inch long, crowned with persistent calyx and style, containing a grooved stone or pit.

WINTER BUDS: Lateral buds, minute, covered by persistent bases of leaf stalks; terminal leaf buds flattened, conical, red, covered by a pair of opposite pointed scales joined below for $\frac{1}{2}$ their length.

WOOD: Heavy, hard, strong, close-grained, light reddish-brown, with wide pale sapwood.

USES: Pulp, landscaping. Historical uses: shuttles, turnery, tool handles.

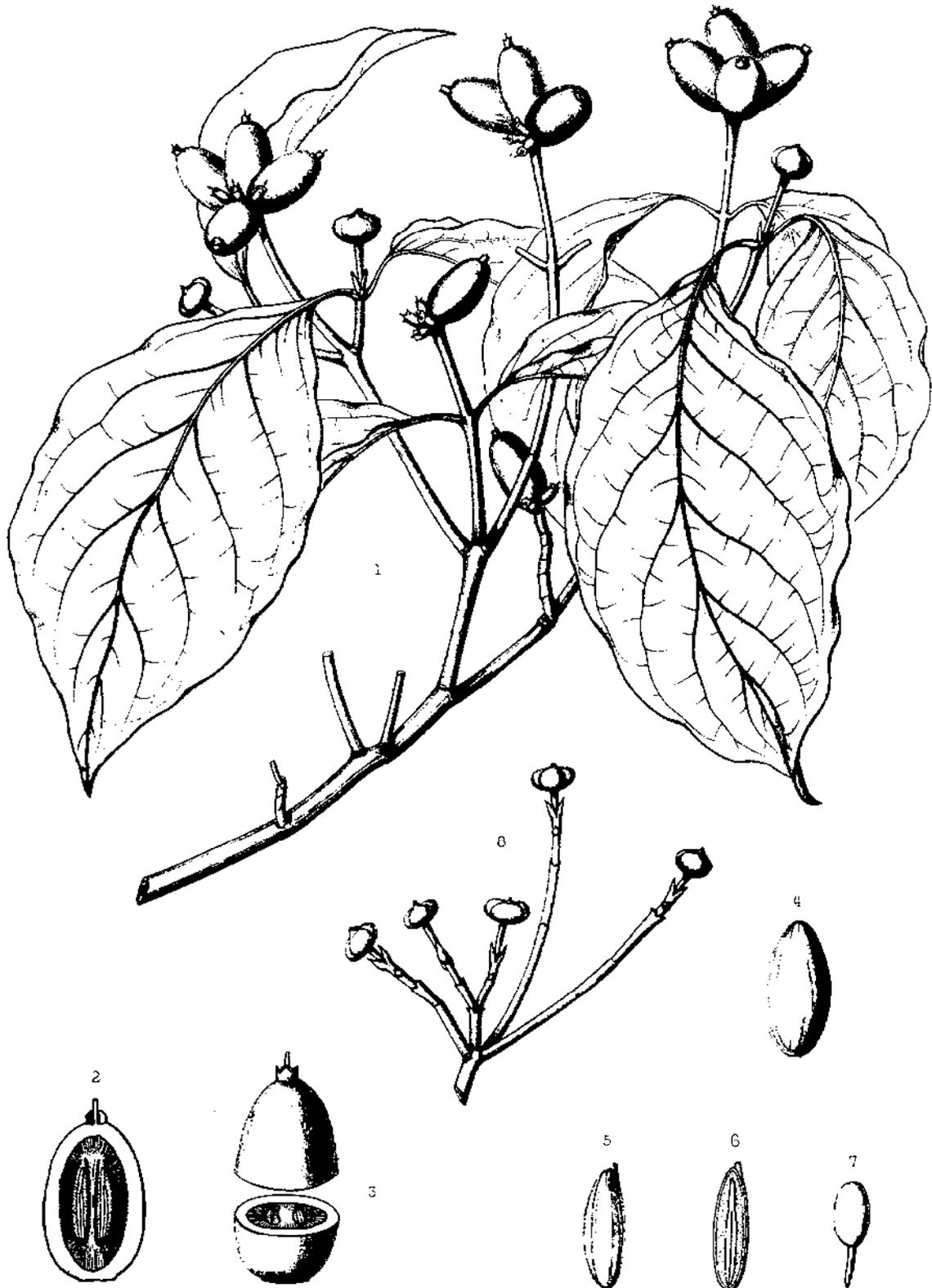
HABITAT: Prefers rich well-drained soils, on moist slopes, generally in the shade of other species.

DISTINGUISHING CHARACTERISTICS: Flowers arranged in dense heads surrounded by 4 large white or pinkish involucre bracts, notched at the tip; lateral buds covered by bases of leaf stalks; head of flower buds appear during the summer.

DISTRIBUTION IN ALABAMA: In every section of the state except the Mobile Delta.

EXPLANATION OF PLATE

- | | |
|--------------------------------|---|
| 1. A fruiting branch | 5. A seed |
| 2. Vertical section of a fruit | 6. Vertical section of a seed |
| 3. A fruit cut crosswise | 7. An embryo |
| 4. A | 8. A winter branchlet with flower buds. |



***Cornus florida* L.**

WATER TUPELO

Nyssa aquatica L.

OTHER COMMON NAMES: Cotton-gum, Sour-gum, Tupelo, Swamp tupelo, Tupelo-gum.

FORM: 80-100 feet high, diameter of trunk 3-4 feet above greatly enlarged tapering base, comparatively small spreading branches forming a narrow oblong or pyramidal head.

BARK: About 1/4 inch thick, dark brown, longitudinally furrowed, roughened on surface by small scales.

TWIGS: Dark red, coated with pale tomentum when they first appear, soon glabrous, marked by pale lenticels and conspicuous leaf scars.

LEAVES: Oblong-ovate, acute or acuminate, often long-pointed at apex, cuneate, rounded or subcordate at base, margin entire or remotely and irregularly angular toothed, teeth often with a sharp point; thick, firm, dark green, and lustrous on upper surface; pale, more or less downy-pubescent on lower surface, 5-7 inches long, 2-4 inches wide.

FLOWERS: Appear on a long slender hairy peduncle from the axil of an inner scale of the terminal bud; staminate in dense capitate clusters, calyx-tube cup-shaped, obscurely 5-toothed; pistillate solitary, surrounded by 2-4 strap-shaped, scarious ciliate bractlets, more or less united below into an involucre cup.

FRUIT: A drupe, 1 inch long, oblong or slightly obovoid, dark purple, marked by conspicuous pale dots, with tough skin, thin acid flesh; stone obovoid, rounded at apex, pointed at base, flattened, light brown or nearly white, about 10-ridged, ridged indistinct, acute and wing-like.

WINTER BUDS: Terminal bud nearly globose with broad light chestnut-brown scales, keeled on the back, rounded and apiculate at apex; axillary buds minute, obtuse, nearly imbedded in the bark.

WOOD: Light, soft, not strong, close-grained, difficult to split, light brown, or nearly white, sapwood may be composed of more than 100 annual rings.

USES: Pulp, wood carving. Historical uses: Woodenware, broom handles, wooden shoes, fruit and vegetable crates, veneer, furniture.

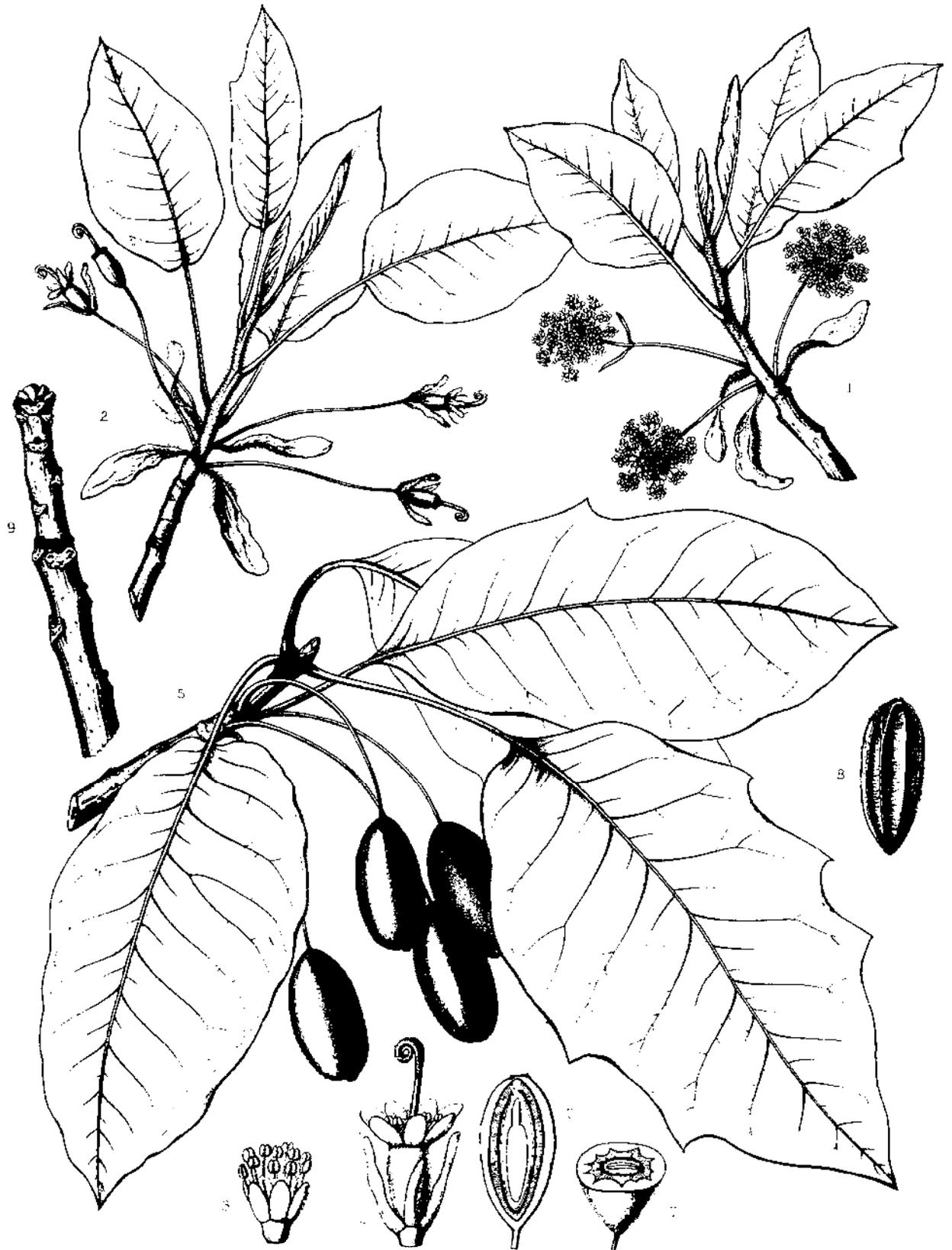
HABITAT: Deep swamps inundated a part of every year.

DISTINGUISHING CHARACTERISTICS: Seed indistinctly ribbed; large fruit; a swamp dweller.

DISTRIBUTION IN ALABAMA: More or less throughout the state.

EXPLANATION OF PLATE

- | | |
|---|--------------------------------|
| 1. A flowering branch of the sterile tree | 4. A pistillate flower |
| 2. A flowering branch of the fertile tree | 5. A fruiting branch |
| 3. A staminate flower | 6. Vertical section of a fruit |
| | 7. Cross section of a fruit |
| | 8. A stone |
| | 9. A winter branchlet |



Nyssa aquatica L.

BLACKGUM

Nyssa sylvatica Marsh.

OTHER COMMON NAMES: Pepperidge, Sour-gum, Tupelo, Tupelo-gum.

FORM: Medium sized, 40-70 feet high, trunk diameter 1-3 feet, in the South may reach a height of 100 feet, trunk straight, continuous into the crown, many lateral horizontal branches, some of the lower may be drooping, upper ascending; crown variable, may be short, cylindrical, flat-topped, conical, inversely conical.

BARK: Mature bark thick, grayish, divided by deep fissures, ridges interrupted into quadrangular and hexagonal blocks, resembling alligator skin.

TWIGS: At first green to orange color, in their first winter nearly glabrous or rufous-pubescent, light red-brown, later becoming darker, and developing short spur branchlets.

LEAVES: Alternate, simple, oval to obovate, 2-5 inches long, acute at apex, cuneate at base, entire or coarsely dentate, slightly thickened on margin, dark green and shiny above, often hairy below.

FLOWERS: Appear on long slender somewhat downy stalks; staminate and pistillate separate; staminate occur in dense many-flowered heads; pistillate in open few-flowered clusters.

FRUIT: An ovoid, dark blue drupe, 1/3-2/3 inch long, borne on long slender peduncles, 1-3 in a cluster; stone ovoid with 10-12 longitudinal ribs.

WINTER BUDS: Ovate, acute, smooth, reddish-brown, about 1/4 inch long with 3-5 visible scales; lateral buds sometimes superposed, close to leaf scars and sometimes protrude into them.

WOOD: Growth rings usually indistinct, coarse-grained, difficult to split, heavy, soft, strong, not durable, difficult to season, pale yellow or nearly white, with thick, paler

USES: Pulp. Historical uses: wheel hubs, egg and fruit crates, rolling pins, chopping bowls, excelsior, broom handles.

HABITAT: Widely disseminated by birds; grows in a wide variety of habitats, burned over areas, old fields and pastures, dry slopes; reaches best development along stream courses and about the margins of ponds.

DISTINGUISHED CHARACTERISTICS: Alligator bark when old; reddish-brown twigs, with conspicuous leaf scars; buds diverge very much from the twigs; horizontal position of branches on young trees.

DISTRIBUTION IN ALABAMA: Common throughout the State.

EXPLANATION OF PLATE

- | | |
|---|--|
| 1. A flowering branch of the sterile tree | 6. Vertical section of a pistillate flower |
| 2. Flowering branch of the fertile tree | 7. A fruiting branchlet |
| 3. A staminate flower | 8. Vertical section of a fruit |
| 4. Vertical section of a staminate flower | 9. A fruit cut crosswise |
| 5. A pistillate flower | 10. A stone |
| | 11. An embryo |
| | 12. A winter branchlet |



Nyssa sylvatica Marsh.

SWAMP TUPELO

Nyssa sylvatica var. *biflora* (Walt.) Sarg.

OTHER COMMON NAMES: Blackgum, swamp blackgum.

FORM: A tree, rarely more than 30 feet tall, with a slender trunk gradually tapering upward from a swollen and enlarged base, small spreading branches forming a narrow pyramidal head, branchlets slightly villose when they first appear, soon glabrous, bright reddish brown in their first winter, becoming darker the following year, and numerous erect thick roots rising above the surface of the water.

BARK: About 1 inch thick, deeply furrowed, gray to very dark reddish brown,

TWIGS: Moderately stout, reddish brown, lateral buds smaller than terminal; 3 bundle scars; pith, white.

LEAVES: Oblanceolate, oblong, elliptic **or** rarely ovate, acute or acuminate or occasionally rounded at the narrow apex, cuneate or rounded at the gradually narrowed base, and entire, when they unfold silky-villose above and hoary-tomentose beneath, soon becoming glabrous, dark yellow-green and lustrous on the upper surface, paler and sometimes glaucous on the lower surface, 2"-4" long and 3/4"-1" wide, with a prominent midrib and numerous slender veins; petioles stout, 1/4"-1/2" in length.

FLOWERS: Appearing when the leaves are nearly fully grown; staminate or slender villose pedicels, in many-flowered loose clusters on slender hairy peduncles 1"-1-1/2" in length, pistillate in pairs rather stouter peduncles usually about 1" long; calyx of the staminate flower depressed and circular; petals oblong-ovate, rounded at apex, white erect or slightly spreading, early deciduous.

FRUIT: Solitary or in pairs, on peduncles 1"-1 1/2" in length, oval or ellipsoid, dark blue, lustrous, about 1/3" long, with acrid pulp; stone oval and prominently ribbed.

WINTER BUDS: Acute, dark red-brown, puberulous, and about 1/8 inch long, the inner scales hoary-tomentose.

WOOD: Moderately heavy and hard, difficult to split, shrinks considerably, tends to warp and twist, without characteristic odor or taste.

USES: Pulp, lumber. Historical uses: Veneer, plywood, barrel staves, railroad ties, furniture.

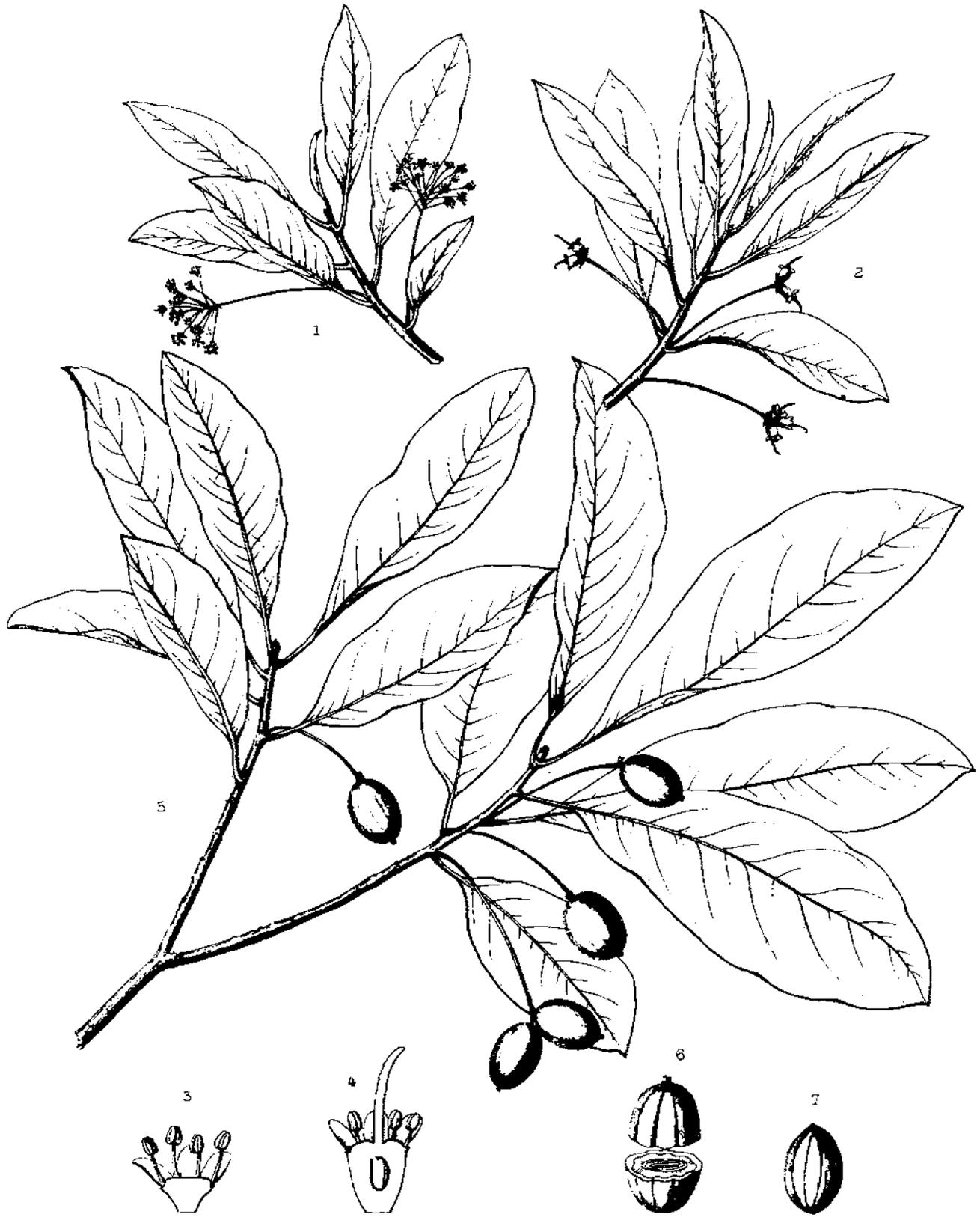
HABITAT: Seed disseminated by birds, best development along streams where periodic flooding occurs.

DISTINGUISHING CHARACTERISTICS: Fruit pits are featured by prominent, longitudinal ridges or ribs.

DISTRIBUTION IN ALABAMA: On the wetter sites of South and Central Alabama, often in association with black tupelo.

EXPLANATION OF PLATE

- | | |
|--|--|
| 1. A flowering branch of the sterile tree. | 4. Vertical section of fertile flower. |
| 2. A flowering branch of the fertile tree. | 5. A fruiting branch, natural size. |
| 3. Vertical section of a sterile flower. | 6. A fruit cut crosswise, enlarged. |
| | 7. A stone, enlarged. |



***Nyssa sylvatica* var. *biflora* (Walt.) Sarg.**

SOURWOOD

Oxydendrum arboreum (L.) DC.

OTHER COMMON NAMES: Sorrel-tree, Sour gum, Lily of the valley tree.

FORM: Usually about 25 feet tall, trunk 8 inches in diameter, may reach height 50-60 feet, diameter of 20 inches, trunk usually straight, slender, bears narrow-topped crown.

BARK: Rather thick, roughened by fissures separating rounded ridges covered with thin scales, on old trunks grayish tinged with red.

TWIGS: Rather slender, first yellowish-green, later orange-colored and reddish-brown, lenticels numerous, oblong, elevated.

LEAVES: Alternate, simple, oblong, stalked, acute at apex, wedge-shaped at base, margin serrate, 5-7 inches long, 1 1/2-2 1/2 inches wide, smooth.

FLOWERS: Appear about late July or early August; white, perfect, about 1/3 inch long, with cylindrical corolla and borne in racemes 6-8 inches long.

FRUIT: A 5-sided, 5-valved capsule, terminated by a persistent style; capsules often persistent in clusters that may be a foot in length.

WINTER BUDS: Alternate, axillary, small, partly imbedded in the bark, acute at apex, scales dark red; terminal bud absent.

WOOD: Hard, heavy, compact, reddish-brown with lighter-colored

USES: Pulp. Historical uses: Tool handles.

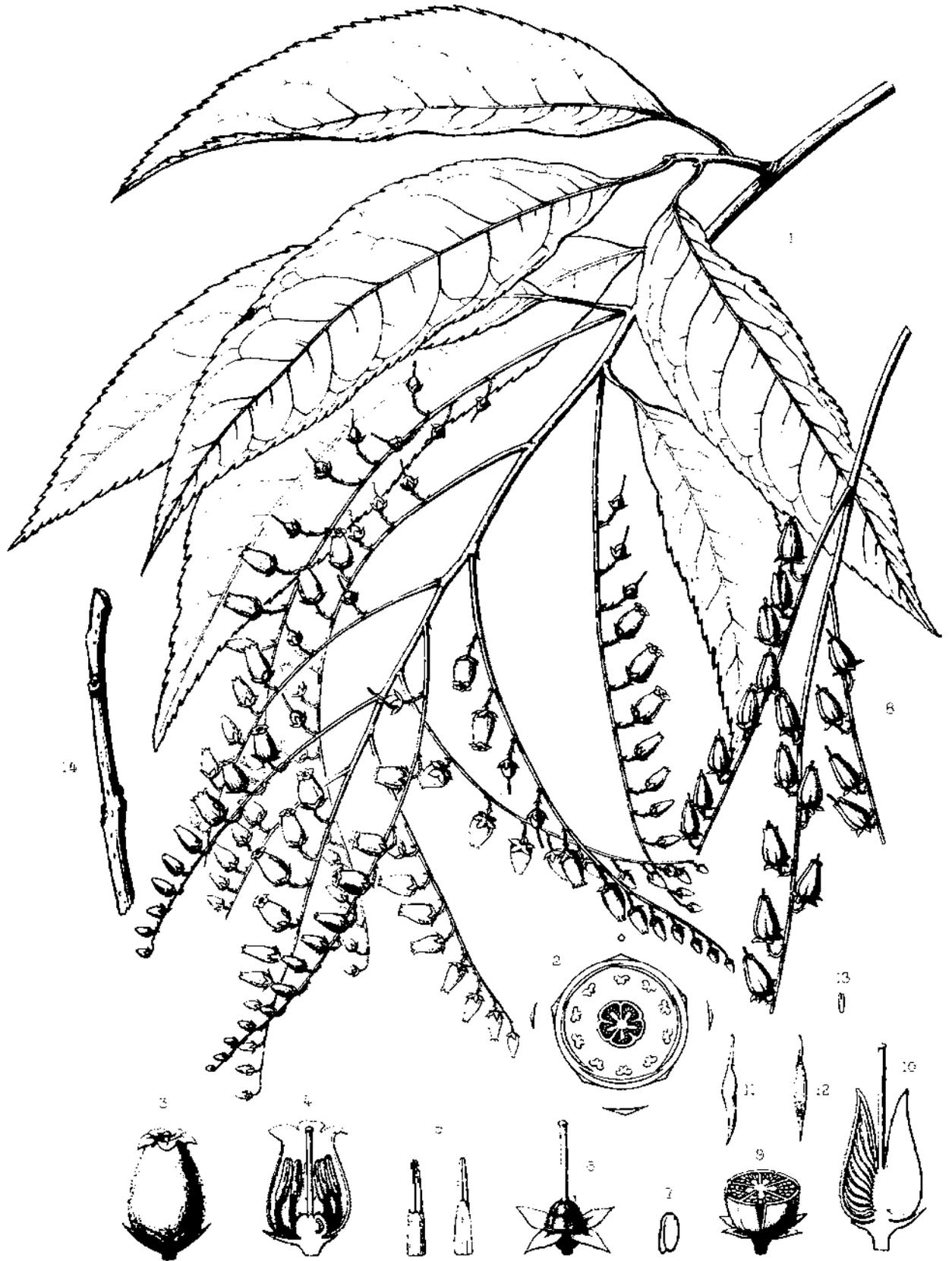
HABITAT: Well-drained soils, common on hillsides, seldom along streams.

DISTINGUISHING CHARACTERISTICS: White bell-shaped flowers arranged in racemes resembling lily-of-the-valley; the bitter leaves resemble the peach leaf; bark of older trees resembles that of black gum; winter buds dark red, partly imbedded in the bark.

DISTRIBUTION IN ALABAMA: Very widely distributed over the state.

EXPLANATION OF PLATE

- | | |
|-----------------------------------|---------------------------------|
| 1. A flowering branch | 8. A portion of a fruit |
| 2. Diagram of a flower | 9. Cross section of a fruit |
| 3. A flower | 10. Vertical section of a fruit |
| 4. Vertical section of a flower | 11. A seed enlarged |
| 5. A stamen, front and rear views | 12. Vertical section of a seed |
| 6. A flower, the corolla removed | 13. An ovule |
| 7. An ovule | 14. A winter branchlet |



Oxydendrum arboreum (L.) DC.

COMMON PERSIMMON

Diospyros virginiana L.

OTHER COMMON NAMES: Persimmon, Eastern persimmon, Date plum, Simmon.

FORM: Usually 25-50 feet tall, 12-20 inches in diameter, occasionally 100 feet high with diameter 2 feet, trunk usually short and slender with spreading, often pendulous, branches forming a broad or narrow round-topped head.

BARK: On old trunks 3/4-1 inch thick, dark brown tinged with red, or dark gray, deeply divided into thick square plates broken into thin persistent scales.

TWIGS: Slender, bitter, grayish to reddish-brown, become darker the second year.

LEAVES: Alternate, simple, oval, acute at apex, margin entire, cuneate or cordate at the base, 4-6 inches long, 2-3 inches wide, thick, dark green and lustrous above, paler below.

FLOWERS: Appear when the leaves are more than half grown, on branchlets of the year from March in the extreme South to June in the North, staminate and pistillate occur separately; staminate in 2-3 flowered cymes; pistillate, solitary, on short-recurved pedicels, 3/4 inch long with greenish-yellow or creamy-white corolla, nearly 1/2 inch broad.

FRUIT: A juicy, spherical, orange-colored or red-cheek berry, with remnants of the style persisting and seated in the enlarged calyx, usually contains 4-6 seeds.

WINTER BUDS: Alternate, broadly ovate, closely pressed against the twig, 1/8 inch long, sharp-pointed, covered by 2 dark brown glossy scales.

WOOD: Hard, heavy, compact, susceptible to a high polish, heartwood brown to black, sapwood paler, yellowish, often streaked with black.

USES: Pulp, lumber, golf club heads. Historical uses: shuttles, shoe lasts, handles.

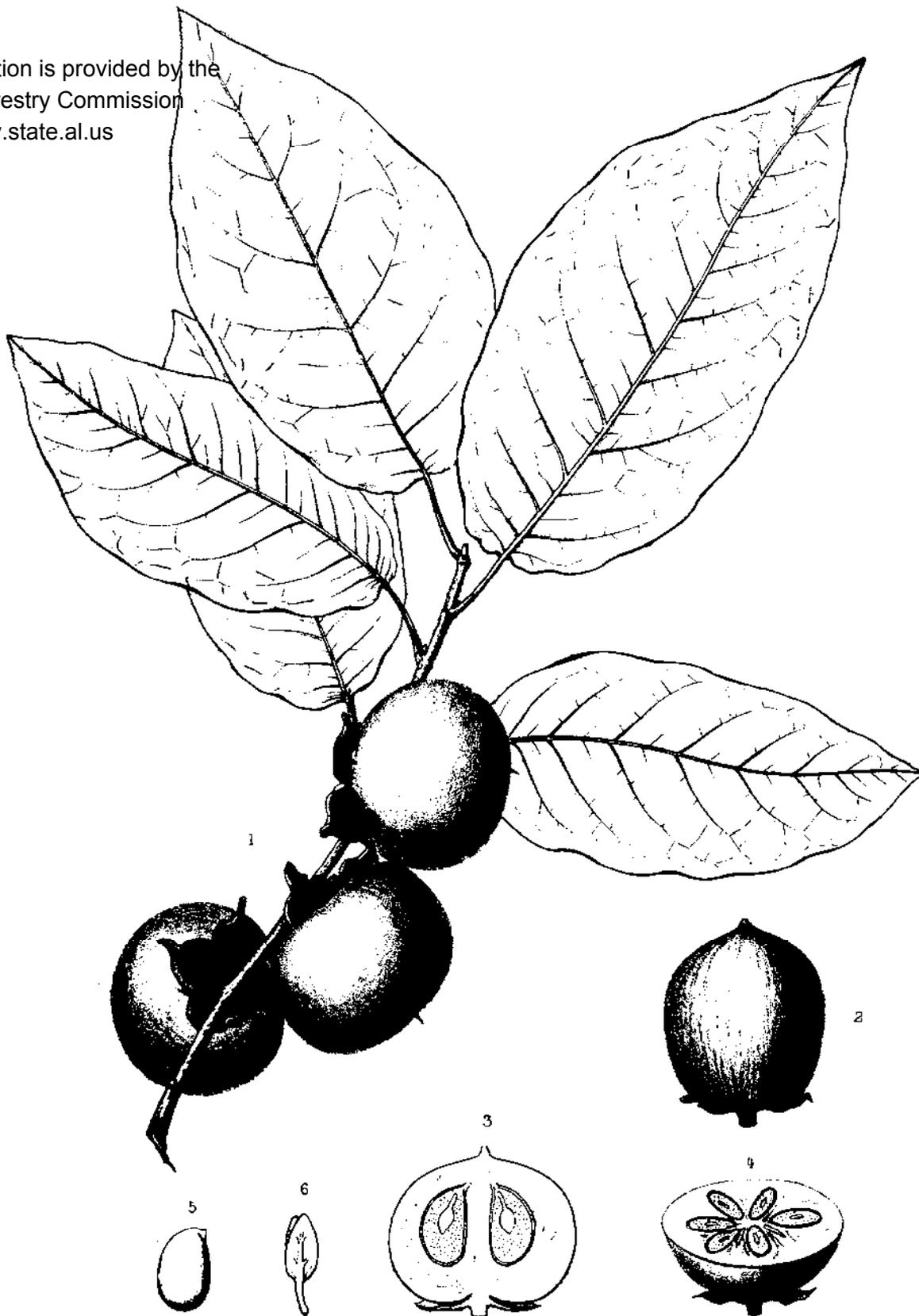
HABITAT: Prefers a light somewhat sandy, well-drained soil, also rich bottom lands,

DISTINGUISHING CHARACTERISTICS: One vascular bundle in the petiole; bark often broken into quadrangular blocks; buds with 2 dark brown scales; leaves simple, margin entire, deep green color.

DISTRIBUTION IN ALABAMA: Common over the state.

EXPLANATION OF PLATE

- | | |
|--------------------------------|-----------------------------|
| 1. A fruiting branch | 4. Cross section of a fruit |
| 2. An oblong fruit | 5. A seed |
| 3. Vertical section of a fruit | 6. An embryo |



Diospyros virginiana L.

CAROLINA SILVERBELL

Halesia Carolina L.

OTHER COMMON NAMES: Opposum-wood, Silverbell, Snow-drop-tree.

FORM: Rarely 40 feet high, short trunk often divided near the ground into several spreading branches, forming a round-headed tree.

BARK: 1/2 inch thick, slightly ridged, reddish-brown, separating into closely appressed scales.

TWIGS: At first glabrous or densely pubescent, later red-brown.

LEAVES: Elliptic to oblong-obovate, abruptly acuminate and long-pointed at apex, rounded or cuneate at base, dentate with small remote callous teeth, yellow-green and glabrous above, pale and glabrous or slightly villous below on the midrib and primary veins, 3-4 inches long, 1 1/2-2 inches wide, 6-7 inches long on the leading shoots.

FLOWERS: About 1/2 inch long, on glabrous or slightly or densely villose pedicels 1/2-3/4 inch in length, from the axils of evanescent bracts, corolla narrowed below into a short tube, white, sometimes tinged with rose.

FRUIT: Oblong to oblong-obovate, 4-winged, 1 1/2 inch long, 1/2-3/4 inch in diameter, usually one-seeded; seed rounded at the narrow ends, 1/4-1/3 inch long.

WINTER BUDS: Ellipsoid to ovoid, 1/8 inch long with thick broad-ovate dark red, acute scales.

WOOD: Light, soft, close-grained, light brown with thick lighter colored sapwood.

USES: Landscaping

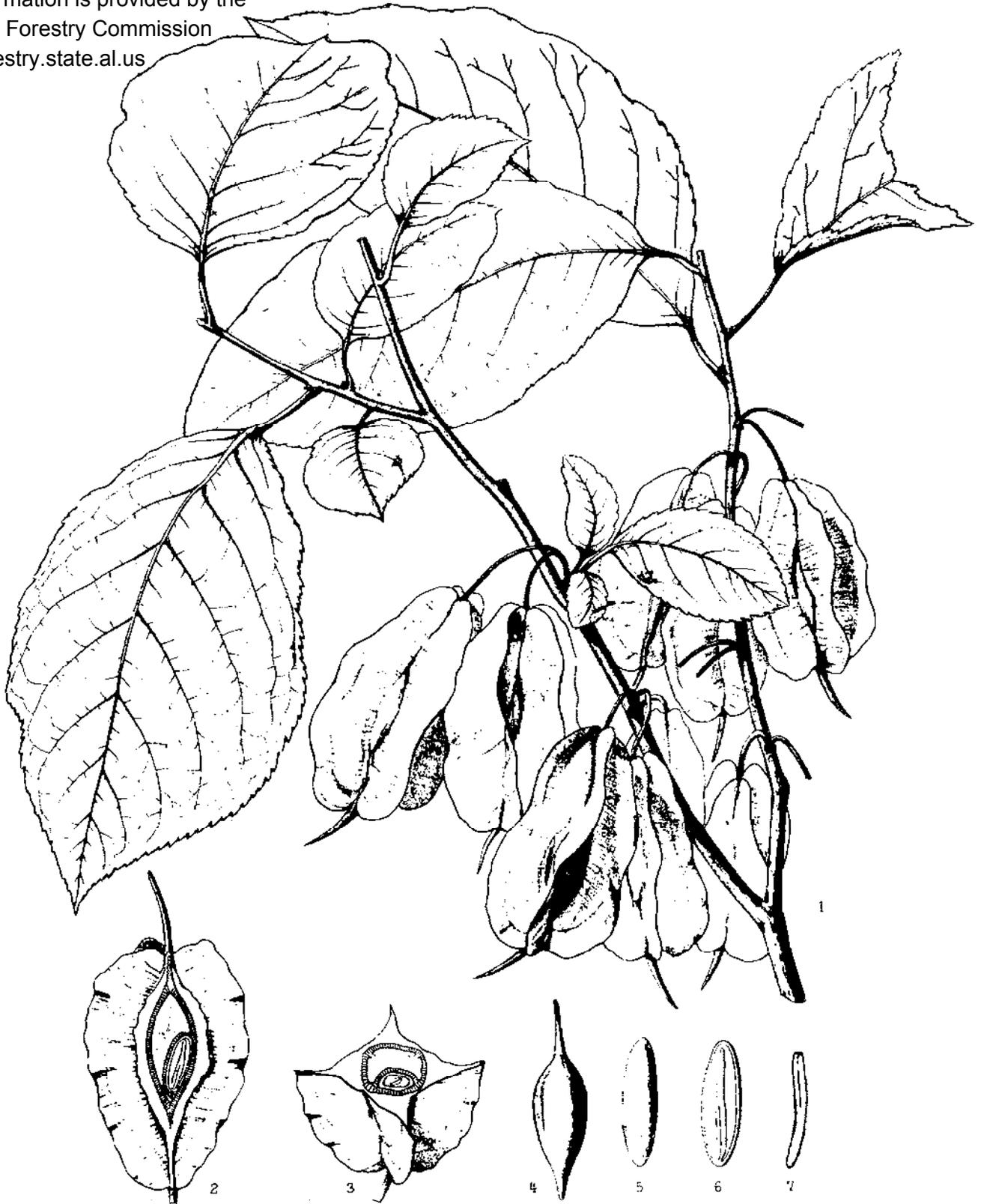
HABITAT: Wooded slopes and banks of streams.

DISTINGUISHING CHARACTERISTICS: Flowers about 1/2 inch long; fruit 1-winged, 1/2 inch long; a round-headed tree, rarely 40 feet high; short trunk, divided near the ground.

DISTRIBUTION IN ALABAMA: Reported from Lauderdale, Colbert, Cullman, Cherokee, Talladega, Coosa, Clay, Elmore, Montgomery, Autauga, Dallas, Coffee, Butler, and Clarke Counties.

EXPLANATION OF PLATE

- | | |
|---|-------------------------------|
| 1. A fruiting branch | 4. A nutlet |
| 2. Vertical section of a fruit
with one seed developed | 5. A seed |
| 3. Cross section of a fruit
with one seed developed | 6. Vertical section of a seed |
| | 7. An embryo |



Halesia Carolina L.

WHITE ASH

Fraxinus americana L.

OTHER COMMON NAMES: Biltmore ash, Biltmore white ash, Smallseed white ash.

FORM: Usual height 70-80 feet, diameter 2-3 feet, may attain a height of 120 feet, diameter 5-6 feet; when grown in the forest, trunk tall, usually clear of branches quite a distance from the ground, bearing a somewhat pyramidal crown; when in the open, the crown is round-topped, and may extend almost to the ground.

BARK: Grayish-brown or tinged with red, rather thick on older trunks, 1-3 inches thick, deeply furrowed by narrow fissures into broad flattened ridges, separating on the surface into thin appressed scales.

TWIGS Opposite, at first dark green or brown tinged with red, covered with pale caducous hairs, soon become orange-colored, ashy-gray, gray or light brown the first winter.

LEAVES: Opposite, about 10 inches long, compound with 5-7, sometimes 9 leaflets that are 3-5 inches long, about 1 1/2 inches broad, slightly serrate on the margin, acute at apex, wedge-shaped to rounded at the base, usually smooth and dark green above, pale below.

FLOWERS: Appear before the leaves; the staminate and pistillate on different trees; staminate in dense purplish-red clusters; pistillate in rather open panicles, corolla lacking.

FRUIT: A samara, borne in dense drooping clusters, 6-8 inches long; individual samara 1-2 inches long, consists of a seed-bearing portion and a winged portion, lanceolate or oblanceolate, the wing pointed or emarginate at apex, terminal or slightly decurrent on the seed.

WINTER BUDS: Opposite, ovate, blunt-pointed, dark brown to almost black; terminal bud larger than the lateral buds, with 2-3 pairs of scales opposite of each other and may be sharp-pointed, usually 2 lateral buds at the base of the terminal bud, resulting in a terminal enlargement of the twig.

WOOD: Hard, very strong, tough, elastic, white to brown in color, with thick lighter colored

USES: Pulp, lumber, tool handles, baseball **bats**, furniture, flooring. Historical uses: barrel staves, boats.

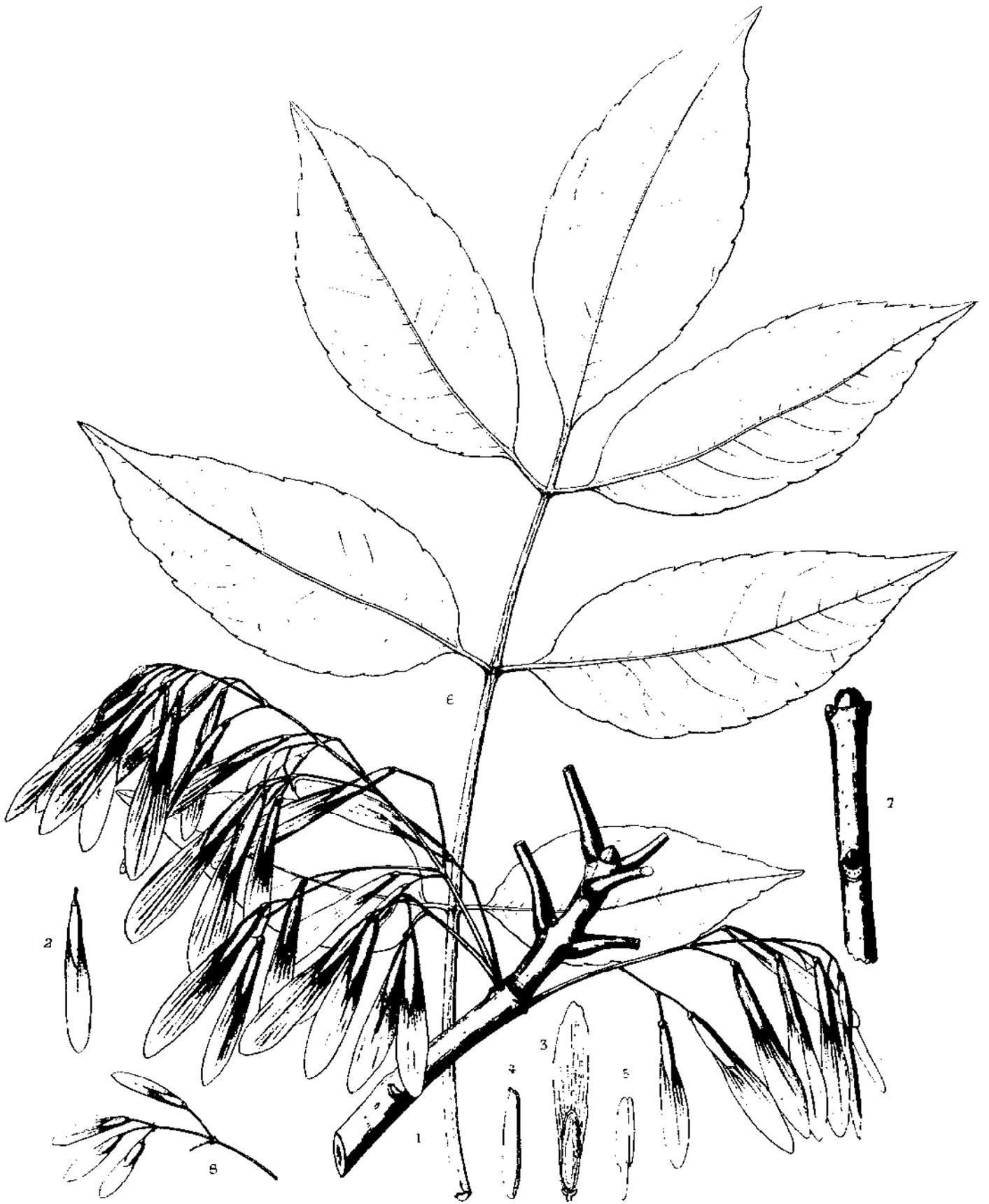
HABITAT: Fertile moist soils, common in rich moist woods along streams; occasionally on dry hillsides.

DISTINGUISHING CHARACTERISTICS: Leaves and twigs smooth or nearly so; leaflets ovate to lanceolate, usually 5-7, abruptly pointed or acuminate, stalked; wing slightly decurrent on the seed.

DISTRIBUTION IN ALABAMA: Widely distributed in the state.

EXPLANATION OF PLATE

- | | |
|--------------------------------|---|
| 1. A fruiting branch | 5. An embryo |
| 2. A fruit | 6. A winter branchlet |
| 3. Vertical section of a fruit | 7. A winter branchlet |
| 4. A seed | 8. A cluster of fruit of the variety microcarpa |



Faxinus americana L.

CAROLINA ASH

Fraxinus caroliniana Mill.

OTHER COMMON NAMES: Florida ash, Pop ash, Swamp ash, Water ash.

FORM: Rarely more than 40 feet high, diameter of trunk sometimes 12 inches, small branches forming a narrow round-topped head.

BARK: 1/16-1/8 inch thick, light gray, more or less marked by large irregularly shaped round patches, separating on the surface into thin appressed scales.

TWIGS: At first terete, light green, glabrous or tomentose, become light brown tinged with red in their first winter, light gray or yellow their second year, marked with large pale lenticels.

LEAVES: Opposite, 7-12 inches long, compound with 5-7 long-stalked leaflets that are ovate to oblong, acute or acuminate, rarely rounded at the apex; cuneate, rounded or subcordate at the base, coarsely serrate with acute incurved teeth or entire, 3-7 inches long, 2-3 inches wide, dark green above, paler below.

FLOWERS: Dioecious, appear before the leaves in short or ultimately elongated panicles; staminate flower with a minute or nearly obsolete calyx; calyx of pistillate flower cup-shaped, deeply divided.

FRUIT: Elliptic to oblong-ovate, frequently 3-winged, 2 inches long, 1/3-3/4 inches wide, often marked on the 2 faces by conspicuous impressed midvein, the wing is many-nerved, occasionally bright violet color, acute, acuminate or rounded and emarginate at apex, surrounds the seed.

WINTER BUDS: Terminal bud 1/8 inch long, with 3 pairs of ovate, acute, chestnut-brown puberulous scales, those of the outer rank shorter than the others.

WOOD: Light, soft, weak, coarse-grained, nearly white, sometimes tinged with yellow, sapwoodthick, the smallest and least valuable of the eastern species of ash.

USES: Not utilized.

HABITAT: Deep river swamps inundated several months of the year, rarely in drier ground.

DISTINGUISHING CHARACTERISTICS: Fruit often 3-winged, long stipitate; the wing surrounds the seed; smallest of eastern ashes.

DISTRIBUTION IN ALABAMA: Reported from St. Clair, Tuscaloosa, Dallas, Russell, Dale, Covington, Butler, Clarke, Conecuh, and Mobile Counties.

EXPLANATION OF PLATE

- | | |
|--------------------------------|-----------------------|
| 1. A fruiting branch | 4. A leaf |
| 2. Vertical section of a fruit | 5. A winter branchlet |
| 3. A seed | |



Fraxinus caroliniana Mill.

GREEN ASH

Fraxinus pennsylvanica Marsh.

OTHER COMMON NAMES: Darlington ash, White ash, Swamp ash, Water ash, Red ash.

FORM: 40-60 feet high, diameter rarely more than 18-20 inches, may reach a height of 70 feet with stout upright branches, forming a compact irregularly shaped crown.

BARK: 1/2-2/3 inch thick, brown, tinged with red, slightly furrowed, surface of the ridges separating into thin appressed scales.

TWIGS: At first terete, with a pale tomentum that may persist until the second or third year or may disappear the first summer, ultimately ashy-gray or light brown tinged with red, marked by pale lenticels.

LEAVES: Opposite, 10-12 inches long, compound with 7-9 oblong-lanceolate, ovate-elliptic or slightly obovate leaflets, that are 3-5 inches long, 1-1 1/2 inches wide, gradually narrowed at apex into a long slender point, slightly toothed on the margin.

FLOWERS: Appear before or with the leaves, dioecious; staminate in dense purplish-red clusters; pistillate greenish-red, in open panicles.

FRUIT: A samara, borne in open panicles; samara 1-2 inches long, the wing-like portion attached along sides of the seed, apex of the wing narrowed, rounded, occasionally emarginate, acute or acuminate or apiculate.

WINTER BUDS: Opposite, terminal, about 1/8 inch long, ovate, brown, covered with brownish scales, 2-3 pairs of which are visible.

WOOD: Heavy, hard, rather strong, light brown, rather wide, and light colored sapwood.

USES: Pulp, lumber, tool handles, baseball bats, furniture, flooring. Historical uses: barrel staves, boats.

HABITAT: Low rich moist soil near banks of streams and lakes.

DISTINGUISHING CHARACTERISTICS: Wing to below middle of the fruit; body of the fruit almost round; requires low rich moist soil.

DISTRIBUTION IN ALABAMA: Range in the state not well known; reported from Jefferson and apparently in Morgan, Bibb, Dallas, and Butler Counties.

EXPLANATION OF PLATE

1. A flowering branch of the staminate tree
2. A flowering branch of the pistillate tree
3. A staminate flower
4. A pistillate flower
5. A fruiting branch
6. Fruits of different forms
7. Vertical section of a fruit
8. Vertical section of a seed
9. An embryo
10. A leaf
11. A winter branchlet



Fraxinus pennsylvanica Marsh.

BLUE ASH

Fraxinus quadrangulata Michx.

OTHER COMMON NAMES: Mountain ash, White ash.

FORM: Usually 60-70 feet high, occasionally 120 feet with a trunk 2-3 feet in diameter, small spreading branches forming a slender head.

BARK: 1/2-2/3 inch thick, irregularly divided into plate-like scales, light gray surface slightly tinged with red separating into thin minute scales.

TWIGS: At first 4-angled, more or less 4-winged at the nodes, dark orange color, covered with short reddish-brown pubescence, in the third year light brown or ashy-gray and then becoming almost round.

LEAVES: Opposite, 8-12 inches long, compound with 5-11 oblong-ovate to lanceolate long-pointed coarsely serrate leaflets, rounded or cuneate at the base, at maturity thick and firm, yellow-green and glabrous above, pale below, 3-5 inches long, 1-2 inches wide.

FLOWERS: Perfect, appearing as the terminal buds begin to expand in loose-branched panicles, corolla lacking, stamens 2, ovary gradually narrows into a short style with two purple stigmatic lobes.

FRUIT: Oblong to oblong-cuneate, 1-2 inches long, 1/3-1/2 inch wide, the wing rounded, emarginate or acute at the apex, surrounding the flat seed.

WINTER BUDS: Terminal 1/4 inch long, reddish-brown, slightly puberulous or hoary-tomentose.

WOOD: Heavy, hard, close-grained, rather brittle, light yellow streaked with brown; thick, light colored sapwood of 80-90 annual rings.

USES: Pulp, lumber, similar to white ash. Historical **uses:** Flooring, carriage building, dye.

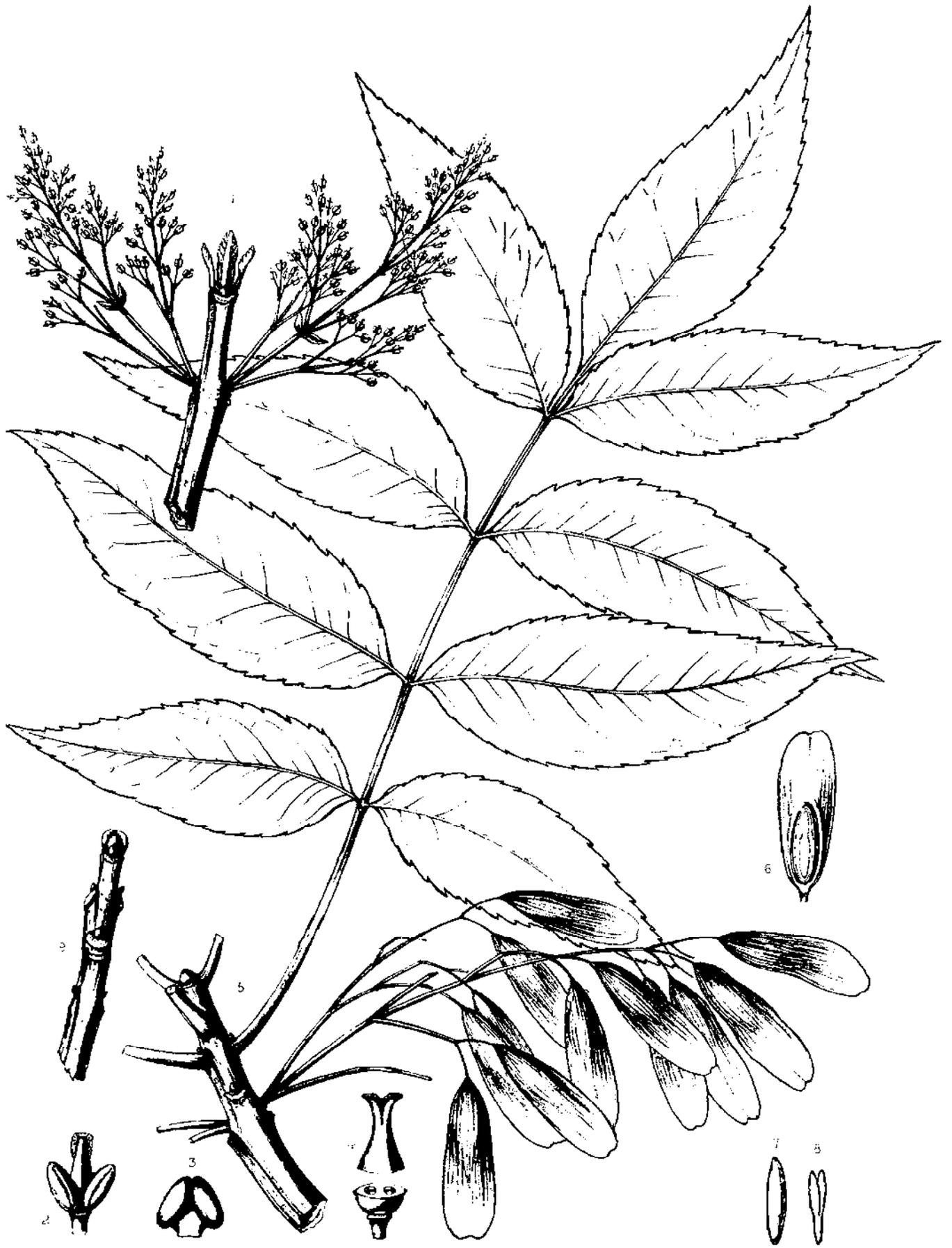
HABITAT: Rich lime-stone hills, occasionally in fertile valleys.

DISTINGUISHING CHARACTERISTICS: The young twigs are quadrangular; the wing surrounds the seed; flowers without a calyx; mainly on rich limestone hills.

DISTRIBUTION JN ALABAMA: Reported from Jackson and Madison Counties.

EXPLANATION OF PLATE

- | | |
|------------------------------|--------------------------------|
| 1. A flowering branch | 6. Vertical section of a fruit |
| 2. A flower | 7. A seed |
| 3. A stamen | 8. An embryo |
| 4. A pistil cut transversely | 9. A winter branchlet |
| 5. A fruiting branch | |



Fraxinus quadrangulata Michx.

SOUTHERN CATALPA

Catalpa bignonioides Walt.

OTHER COMMON NAMES: Common catalpa, Indian-bean, Catawba , Cigar-tree.

FORM: Commonly 25-40 feet high, may reach a height of 60 feet, with a diameter of 3 feet; trunk usually short, crooked, may be angular and unattractive, with long heavy brittle branches forming a broad head.

BARK: 1/4-1/3 inch thick, light brown tinged with red, separating on the surface into large irregular scales.

TWIGS: At first, green shaded with purple; their first winter thickened at the nodes, slightly puberulous, lustrous, light orange color or gray-brown, with a slight glaucous bloom, and with large pale lenticels, ultimately reddish-brown.

LEAVES: Opposite or whorled, broad, ovate, simple, 6-10 inches long, 4-5 inches broad, heart-shaped at base, acute at apex, margin wavy or entire.

FLOWERS: Perfect, showy, borne on slender pedicels in terminal many-flowered compact panicles, 8-10 inches long, corolla white, spotted with purple, nearly 2 inches long.

FRUIT: A pod-like capsule 6-20 inches long, 1/4-1/3 inch thick at the center, tapering toward each end, capsules remain closed in the winter, finally splitting into two concave valves freeing the seed; seed numerous, oblong, compressed, winged, wings entirely surround the seed.

WINTER BUDS: Terminal bud usually absent, lateral buds small, imbedded in the bark, with loosely imbricated scales, usually not more than 1/2 inch long.

WOOD: Light, soft, not strong, coarse-grained, very durable in contact with the soil.

USES: Landscaping.

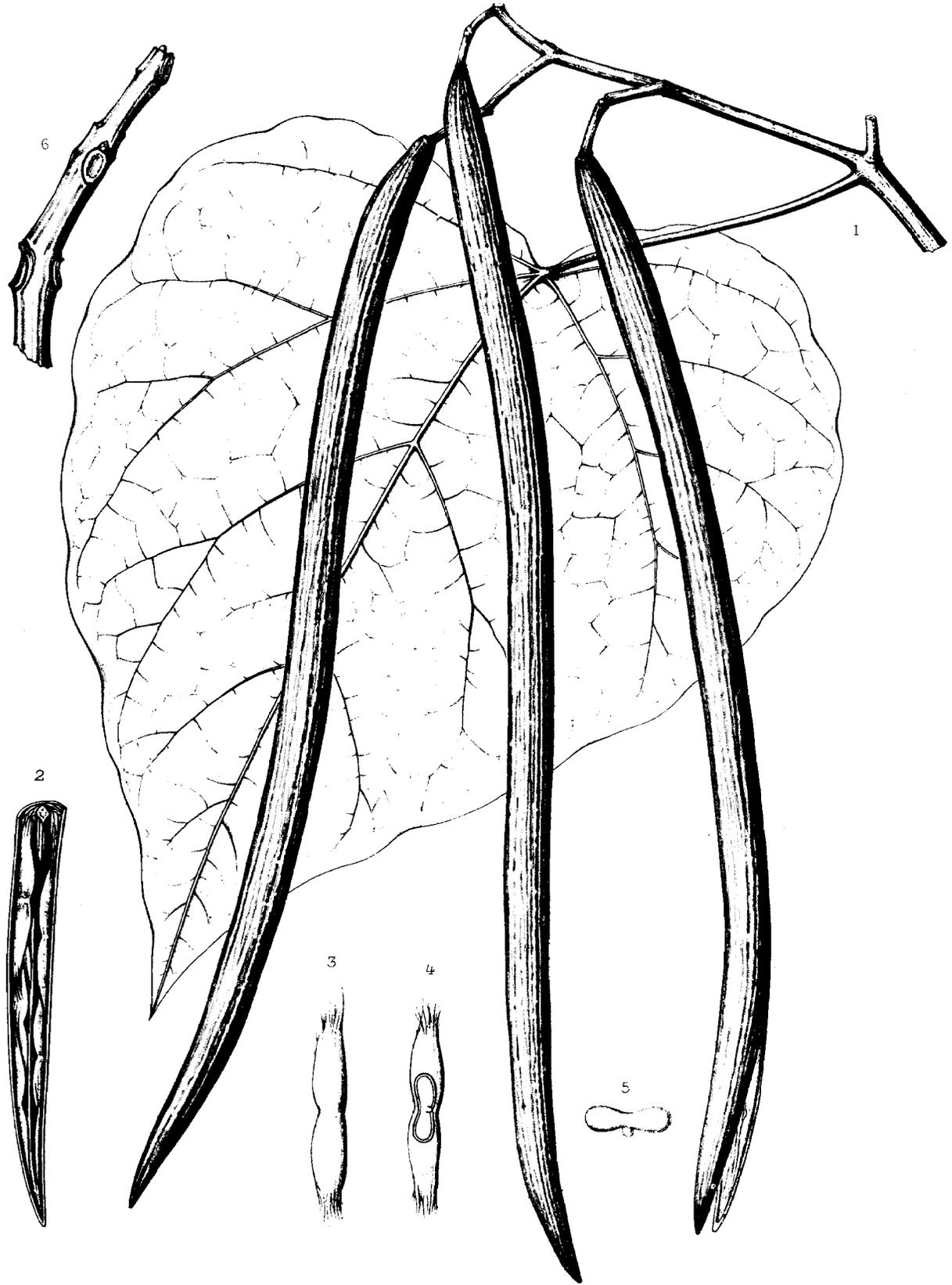
HABITAT: Prefers moist, fertile soil along streams and river banks, also found in drier situations.

DISTINGUISHING CHARACTERISTICS: Large panicles of flowers; cigar or bean-like fruit characteristic in autumn and winter; bundle scars arranged in an ellipse; wings surround seed and are fringed at the ends.

DISTRIBUTION IN ALABAMA: Widely over the state.

EXPLANATION OF PLATE

- | | |
|--|-------------------------------|
| 1. A fruiting branch | 4. Vertical section of a seed |
| 2. The end of a fruit, one of the valves removed | 5. An embryo |
| 3. A seed | 6. A winter branchlet |



Catalpa bignonioides Walt.

Plate 1

GLOSSARY

Abortive. Arrested development; barren, nonfunctioning.

Achene or Akene. A small, hard, dry, one-celled, one-seeded fruit which does not open by valves.

Acicular. Needle-shaped.

Aculeate. Prickly; beset with prickles.

Acuminate. Tapering at the end; long-pointed.

Acorn. Fruit of the oak, consisting of a nut with its base enclosed in a cup of overlapping scales.

Acute. Tapering to a point at an angle less than a right angle.

Adaxilly. Borne on the side nearest the axis, as the upperside of a leaf.

Adnate. Said of unlike parts which grow together.

Alluvial. Relating to the deposits of sand, clay or gravel made by river or stream action.

Alternate. Not opposite to each other on the axis or stem.

Ament. A unisexual spike of flowers with scaly bracts, usually deciduous, in one piece.

Anastomosing. Uniting to form a network.

Androgynous. An inflorescence with staminate and pistillate flowers.

Angiospermous. Plants having their seed borne within a ripened ovary.

Annular. In the form of a ring.

Anther. The pollen-bearing portion of the stamen.

Anthesis. The opening of a flower.

Apex. Tip; top; that portion farthest from the base or the point of attachment.

Apical. At the apex or summit of an organ.

Apiculate. Ending in a short-pointed tip.

Appressed. Lying close and flat against.

Arborescent. Tree-like in growth or general appearance.

Aromatic. Fragrant; spicy.

Attenuate. Slenderly tapering.

Auriculate. Ear-shaped appendages.

Awl-shaped. Tapering from the base to a slender and stiff point.

Awn. A bristle-shaped appendage.

Axil. The upper angle formed by a leaf or branch with the stem.

Axillary. Situated in an axil.

Axis. The central line of an organ or the support of a group of organs.

Berry. A fruit which is fleshy throughout except the seed.

Bi-or-bis. A Latin prefix signifying two or twice.

Bisexual. Having both stamens and pistils.

Blade. The expanded portion of the leaf.

Bole. Stem or trunk of a tree.

Bract. A modified, reduced leaf subtending a pedicel or peduncle or belonging to an inflorescence or occurring at the base of shoots.

Bracteate. Having bracts.

Bracteolate. Furnished with bractlets.

Bractlet. A little bract.

Bundle-scars. The scars within a leaf-scar; the calloused ends of the fibrovascular bundles of a leaf.

Caducous. Falling off very early.

Callous. Hard.

Calyx. The outer envelope of a flower, usually green in color.

Cambium. A thin-walled formative tissue between the bark and the wood.

Campanulate. Bell-shaped.

Canescent. Hoary, usually with gray pubescence.

Capitate. Arranged in a head; Collected into a dense cluster.

Capsule. A dry dehiscent fruit composed of more than one carpel.

Carpel. A simple pistil or a member of a compound pistil. A modified leaf.

Catkin. A scaly-bracted spike of usually unisexual flowers.

Caudate. Furnished with a slender tip or tail-like appendage.

Ciliate. Fringed with hairs on the margin.

Clavate. Club-shaped.

Coherent. Two or more similar parts or organs joined.

Complete. Said of flowers when all parts are present.

Compound Ovary. The base of a pistil composed of more than one carpel.

Cone. An inflorescence or fruit formed of closely overlapping scales.

Conical. Cone-shaped.

Conifer. A cone-bearing gymnosperm.

Connivent. Coming in contact; converging.

Convolute. Rolled up from the sides.

Cordate. Heart-shaped.

Coriaceous. Leathery.

Corolla. The inner, usually bright-colored portion of the floral envelope.

Cortex. Rind; bark.

Corymb. A flat-topped, or convex flower-cluster with the outer flowers opening first.

Cotyledons. First leaves of the embryo as seen in the seed.

Crenate. Scalloped; with rounded teeth.

Crenate-serrate. Scalloped, with teeth directed forward.

Crenulate. Diminutive of crenate.

Crown. The expanded top of a tree or shrub consisting of branches and branchlets.

Cruciate. Cross-shaped.

Cuneate. Wedge-shaped.

Cuspidate. Tipped with a cusp or sharp and rigid point.

Cyme. A broad and flattish flower cluster, the central flowers opening first.

Cymose. Cyme-like or borne in a cyme.

Deciduous. Falling off, usually at the close of the season.

Decurrent. (Leaf). Extending down the stem below the point of insertion.

Decussate. Alternating in pairs at right angles.

Dehiscent. Opening at maturity to free the seed; splitting open.

Deliquescent. Applies to a tree with a broad spreading habit. The branches subdivide until they apparently disappear.

Deltoid. Shaped like an equilateral triangle.

Dentate. Toothed with the teeth directed outward.

Denticulate. Diminutive of dentate.

Depressed. Somewhat flattened from above.

Dichotomous. Forking regularly in pairs.

Didynamous. (Stamens). Two pairs of unequal length.

Digitate. With members arising from one point.

Dioecious. Unisexual with staminate and pistillate flowers on separate plants.

Dissepiment. A partition in an ovary or fruit.

Distichous or Distichously. Said of leaves arranged alternately in two vertical ranks.

Drupaceous. Drup-like or the nature of a drupe.

Drupe. A fleshy fruit with a bony vessel enclosing the seed.

Echinulate. Beset with diminutive prickles.

Ellipsoidal. Of the shape of an ellipse.

Emarginate. With the margin notched; notched at the apex.

Embryo. The rudimentary plant in a seed.

Entire. Without divisions, lobes, or teeth.

Evanescent. Early disappearing.

Excrecence. An outgrowth, such as a wart.

Exfoliate. To come off in layers or scales.

Falcate. Scythe-shaped; curved like a scythe.

Fascicle. A close bundle or cluster.

Fasiculate. Borne in fascicles.

Ferrugineous. Rust-colored.

Filament. The portion of the stamen supporting the anther.

Filiform. Thread-shaped; long, slender and terete.

Fimbriate. Fringed.

Flexuose. Zigzag; bending alternately in opposite directions.

Fluted. With alternate ridges and depressions.

Foliaceous. Leaf-like in texture or appearance, bearing leaves.

Follicle. A dry one-celled seed vessel consisting of a single carpel, and opening only by the ventral suture.

Fringed. Bordered with slender processes or marginal appendages.

Fruit. The seed-bearing portion of a plant.

Fulvous. Tawny; dull yellow.

Funicle. The stalk of a seed.

Gamopetalous. With united petals.

Gamosepalous. With united sepals.

Glabrate. Nearly glabrous or becoming glabrous.

Glabrous. Smooth, without hairs or down.

Glandular. Bearing glands or gland-like.

Glaucous. Covered with a bluish or whitish bloom, waxy.

Granulose. Composed of, or appearing as if covered by, minute grains.

Gymnosperm. Plants whose seeds are not enclosed in a seed vessel.

Gynoecium. The aggregate of carpels in a flower.

Habit. General appearance of the plant.

Habitat. Where the plant grows.

Head. A dense cluster of sessile flowers or the crown of a tree

Heartwood. The mature and usually highly colored dead wood in stems that increase in diameter by the addition of an annual ring of wood on the outside beneath the widening bark.

Hirsute. With rather coarse or stiff hairs.

Hoary. Grayish white, with a fine close pubescence.

Imbricated. Overlapping like shingles on a roof.

Impressed. Sunken as though by pressure.

Incised. Cut sharply, irregularly and more or less deeply.

Incomplete. Said of flowers in which one of the outer parts is wanting.

Indehiscent. Remaining persistently closed and not opening to free the seed.

Indeterminate inflorescence One where the main axis is not terminated by a flower.

Inflorescence Flower-cluster.

Indigenous. Applied to plants that are native to a certain region.

Internode. The portion of a stem between two nodes.

Inversed. Inverted.

Involucre. The whorl of bracts subtending a flower or flower cluster.

Irregular. Said of flowers showing inequality in the size, form, or union of similar parts.

Lacinate. Cut into deep irregular segments or lobes.

Lamina. The blade of a foliage leaf.

Lanceolate. Shaped like a lance, several times longer than wide.

Leaflet. A single division of a compound leaf.

Leaf-scar. The scar left by the falling of a leaf.

Legume. A simple fruit opening along two opposite sutures or lines as in the fruit of the Leguminosae.

Lenticel. A corky excrescence on young or sometimes older bark for providing aeration for the interior of the twig or branch.

Lobed. Said of leaves that have the margin more or less cut or divided.

Lunate. Crescent-shaped.

Lustrous. Glossy, shining, possessed with a sheen.

Lyrate. Cleft or divided with a large terminal lobe, the lower lobes progressively smaller.

Microcarpa Refers to small seeds.

Monoecious. Unisexual with the staminate and pistillate flowers on the same plant.

Mucilaginous Slimy, sticky.

Mucro or Mucronate. With a short and small abrupt tip.

Naked buds. Without scales.

Naval stores. Refers to tar, turpentine, rosin, etc.

Node. The portion of a stem which normally bears one or more leaves, also branches.

Nut: A bony or woody indehiscent fruit resulting from either a simple or compound ovary.

Nutlet. A small nut.

Obcordate. Inverted heart-shaped.

Oblanceolate. Lanceolate but tapering toward the base more than toward the apex.

Oblong. Longer than broad with nearly parallel sides.

Obovate. Ovate with the broader end toward the apex.

Obovoid. Inversely egg-shaped.

Obtuse. Blunt or rounded at the apex.

Ochraceous. Light yellow with a tinge of brown.

Odd-pinnate (leaf). With an odd or an unpaired leaflet at the tip of a compound leaf.

Orbicular. A flat body circular in outline.

Oval. Broad-elliptic, about 1 1/2 times as long as broad and rounded at the ends.

Ovary. The ovule-bearing portion of the pistil.

Ovate. Having the outline of a hen's egg.

Ovoid. Solid ovate, solid oval.

Ovulate. Bearing ovules.

Ovule. The part of the flower which after fertilization becomes a seed.

Palmate. With a number of divisions or lobes which radiate from a point.

Panicle. A compound flower-cluster, the lower branches of which are longest with their flowers blooming first.

Paniculate. Borne in panicles.

Papillose. Bearing minute nipple-shaped projections.

Pedicel. The stalk of a flower in a compound inflorescence or cluster of flowers.

Peduncle. A flower-stalk supporting either a cluster of flowers or a single flower.

Pedunculate. Borne on a peduncle.

Peltate. Descriptive of a plane body attached by its lower surface to the stalk.

Pendulous. Loosely pendant, or loosely hanging.

Perfect flower. Said of a flower with both stamens and pistil.

Perianth. The envelope of a flower; a term usually used when the calyx and corolla are not clearly distinguishable.

Pericarp. The wall of the fruit or seed-vessel.

Petal. A modified leaf, a part of the corolla.

Petaloid. Colored and resembling a petal.

Petiolate. Having a petiole.

Petiole. The stalk of a leaf.

Pilose. Hairy with soft hairs.

Pinna. A single leaflet in a compound leaf.

Pinnate. Compound with the leaflets placed on opposite sides of a common petiole or rachis.

Pinnatifid. Pinnately cleft.

Pistil. The seed-bearing organ of a flower consisting of ovary, stigma, and connecting style when present.

Pistillate. A flower with one or more pistils and usually without fertile stamens.

Pith. The central cellular part of a stem.

Pollen. The fertilizing spores or grains contained in an anther.

Polygamous. Bearing perfect and unisexual flowers on the same plant.

Pome. A fruit of two or more carpels enclosed in thick flesh, like the apple and the pear.

Prickle. A small spine formed as an outgrowth of the bark or rind.

Puberulent. Very slightly pubescent.

Puberulous. Minutely pubescent.

Pubescence. A covering of short and soft hairs.

Pulvinate. Cushion-shaped.

Punctate. Dotted with depressions, or translucent internal glands, or with colored dots.

Raceme. A simple indeterminate flower-cluster with pedicelled flowers on a lengthened axis or rachis.

Racernose. Raceme-like or borne in racemes.

Rachis. The axis of a compound leaf; the axis of a spike or raceme.

Raphe. The part of the funicle that forms a ridge on an ovule.

Receptacle. The terminal portion of an axis (stem) forming a common support on which floral organs, sepals, petals, stamens and pistils or flowers are borne.

Reflexed. Turned or bent abruptly backward.

ReniformKidney-shaped.

Repand. With a slightly wavy or sinuate margin.

Resupinate. Upside down.

Reticulate. Netted; in the form of a network.

Retuse. With a shallow notch at the rounded apex.

Revolute.Rolled back from the margin or apex.

Rhombic. Having the shape of a four-sided figure' with equal sides, but not of right angles.

Rhomboidal. Approaching a rhombic outline.

Rostrate.Narrowed into a slender tip.

RufousReddish-brown.

Rugose. Wrinkled.

Samara. An indehiscent winged fruit.

Scabrous.Rough to the touch.

Scale. A thin scarious body, usually a degenerate leaf, sometimes of epidermal origin.

Scarious. Thin, dry, membranous, not green.

Scurfy. Covered with small bran-like scales.

Seed. The ripened ovule, consisting of the embryo and its proper. coats.

Sepal. One of the modified leaves forming the calyx.

Septate. Divided by partitions.

Serrate. Toothed, with the teeth directed forward.

Serrulate.Serrate with fine teeth.

Sessile. Without a stalk.

Setose. Beset with bristles.

Sinuate. With a strongly wavy margin.

Sinus, The opening between two lobes of a leaf.

Spatulate. Gradually narrowed downward from a rounded summit.

Spicate. Arranged in, or resembling a spike.

Spike. A simple indeterminate flower-cluster with sessile flowers.

Spine. A sharp, woody or rigid outgrowth from the stem.

Spinose, Spiny. Bearing spines.

Stamen. One of the pollen bearing organs of a flower.

Staminate. Provided with stamens and usually in the sense without pistils.

Stellate. Star-shaped.

Stigma. The portion of the pistil which is receptive to the pollen.

Stigmatic. Relating to the stigma.

Stipitate. Having a stipe.

Stipe. The stalk of a pistil or similar organ.

Stipular. Pertaining to stipulus.

Stipule. An appendage at the base of a petiole or each side of its insertion.

Stoma (Pl Stomata). Openings or pores in the epidermis of leaves connecting internal cavities with the external air.

Stomatiferous Bearing stomata.

Strobile. The same as cone.

Style. The part of the pistil between the ovary and the stigma.

Subcordate Slightly cordate.

Subcoriaceous. Somewhat leathery.

Subglobose. Somewhat rounded.

Suborbicular. Somewhat circular or spherical.

Subsessile. Nearly sessile.

Subtend. To be inserted under; to embrace in an axil.

Subulate. Awl-shaped.

Succulent. Juicy, fleshy.

Sulcate. Longitudinally grooved or furrowed.

Syncarp. A fleshy aggregate fruit.

Taper. Gradually narrowing toward one end.

Terete. Circular in cross section.

Testa. The outer coat of a seed, commonly hard and brittle.

Tomentose. Densely pubescent with matted wool or tomentum.

Tomentum. A pubescence composed of matted woolly hairs.

Truncate. Ending abruptly as cut off at the tip.

Tuberculate. Beset with knob-like projections.

Turbinate. Top-shaped; inversely conical.

Undulate. With a wavy margin or surface.

Valvate. Said of buds in which the scales meet without overlapping.

Vascular. Furnished with vessels or ducts.

Veins. Threads of fibro-vascular tissues in a leaf or other organ.

Ventral (Leaf). Pertaining to the lower or abaxial side.

Villose or Villous. With long and soft hairs; hairy.

Viscid. Glutinous, sticky.

Whorled. With three or more leaves or branches at a node.

NATURE MAKES OUR FORESTS, MAN MAKES THE DIFFERENCE!

- Alabama's forests are some of the most **diverse** in the nation largely due to the physiographic diversity in the state, ranging from Appalachian mountain ridges to the shores of the Gulf of Mexico, but also because of the many different ownership objectives of over 214,000 landowners.
- **75%** of forest land in Alabama is privately owned by families and individuals who have rights and responsibilities in managing their land.
- Owners of forest land can realize both **environmental and economic benefits** from their land while providing these same benefits to all of society.
- Consistent application of **good forest management** is the key to obtaining desired results, environmental and economical.
- Forestry is a **professional and technical science**. Foresters who practice in Alabama are licensed for the protection of our landowners.
- Because of man's role in forest management, Alabama's forests have become a **world class resource** following the damage caused during the cut-out, get-out era of the early 1900's.

In each of these points, man clearly has a partnership with nature in determining the outcome of the condition of our forests. The basic elements that have contributed to our forest's success have been private ownership; public programs which provided technical assistance; protection from fire, insects and disease; favorable taxes; and availability of diversified markets for forest goods and services.