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clusters produced in the autumn are only moderately showy. The evergreen has a texture that is somewhat more coarse than most of our evergreen shrubs. The deeply set veins give the leaves a three-dimensional appearance. Apparently this plant is not difficult to culture, but on poor and shaded sites it develops into a sparse, leggy specimen.

Yucca filamentosa L., Adam's Needle. A subshrub that spreads from the base by short stolons and reaches a maximum height of about 3 feet. The large linear leaves give this plant a rigid, coarse texture. Very large flower stalks with waxy white flowers are produced in early summer. This easily cultivated and hardy yucca is widely grown for its showy flower stalks and unusual rigid foliage.

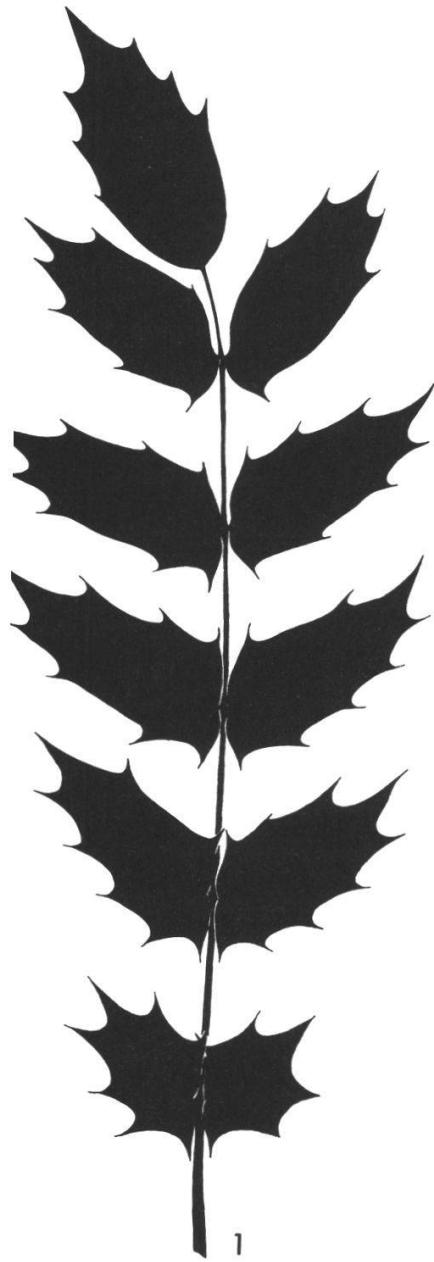
7. The hollies

A very large number of the known 300 or more species of the genus *Ilex* L. are cultivated in the warmer temperate regions of the world. Because hollies are so well-adapted and so commonly grown in our area, this section is completely dedicated to the locally grown species and hybrids of holly. The University of North Carolina has an excellent holly collection in the University plantings; however, many additional species, selections and hybrids could be successfully added. The cultivated forms of this genus are probably our single most important group of evergreen shrubs and small trees.

Ilex cornuta Lindl., Chinese Holly. A large shrub with a moderate to moderately rapid growth rate that may eventually mature into a small tree about 25 feet in height. The tree is dense and develops a broadly rounded top in time. The normal form of the glossy, deep green leaves has five or more major spines, but spine number varies from one to many in the cultivated selections of this species. The lustrous evergreen foliage gives this plant

Fig. 5b. Typical leaves of broad leaf evergreen shrubs listed in chapter 6
(continued from Figure 5a)

1. <i>Mahonia bealei</i>	3. <i>Viburnum rhytidophyllum</i>
2. <i>Nandina domestica</i>	4. <i>Yucca filamentosa</i>



1 inch

Table 6. Parameters of cultivation of *Ilex* species grown in North Carolina

Species	Date brought into cultivation	Place of origin	Frequency of cultivation
<i>Ilex cornuta</i>	1846	China	common
'Burfordii'	1895	U.S.A. cultivation	very common
<i>I. crenata</i>	1864	Japan	common
'Convexa'	1919	U.S.A. cultivation	common
'Helleri'	1936	U.S.A. cultivation	very common
<i>I. decidua</i>	native	Southeast U.S.A.	occasional
<i>I. latifolia</i>	1840	Japan	very rare
<i>I. opaca</i>	native	Eastern U.S.A.	occasional
The following clones are probably derived from hybridization events between <i>I. opaca</i> and <i>I. cassine</i> .			
'East Palatka'	1926	selected from wild state	occasional
'Hume No. 2'	1909	cultivation U.S.A.	occasional
'Savannah'	-	cultivation U.S.A.	common
<i>I. pernyi</i>	1900	China	rare
<i>I. vomitoria</i>	native	Southeastern U.S.A.	occasional

a medium texture. The pale yellow flower clusters are produced in early April but are rather inconspicuous. The red berry clusters are very attractive and may persist from the autumn throughout the winter (depending on whether or not the resident birds favor the berries). Cultivars that produce orange or yellow fruits are also available. The Chinese holly is one of our most widely planted landscape plants, and while it is a handsome shrub that is capable of fruiting while its size is contained by pruning, it rapidly becomes a small tree. Once overgrown, recovery from heavy pruning is slow. Many forms of this holly are grown, but the one most common in our area is the 'Buffordii' clone which normally only has a single terminal spine on the leaves.

Ilex crenata Thunb., Japanese Holly. A very small to large shrub, 2 to 15 feet in height at maturity, with a moderate to moderately rapid growth rate depending on environmental conditions. It is often more spreading than erect in habit, but the habit varies considerably from clone to clone. Small,

evergreen, more or less ovate leaves give this shrub a fine texture. Neither the bloom nor the purple-black fruits are effective in the landscape. Since the clones of this species are easily propagated, grown and well-adapted here, the Japanese holly has replaced boxwood in many landscape plantings. Despite its usefulness, this species has been over-planted in our area. It has few pests but is only moderately drought resistant. *Ilex crenata* can be controlled by pruning, but the best control is the selection of the proper clone for the area in which it is to be used.

Some common cultivars:

'Convexa' - A very fine-textured shrub which reaches a maximum height of about 6 feet, and has leaves with a convex shape.

'Helleri' - A dwarf, compact form, which is suitable for low hedges or ground covers.

'Rotundifolia' - A slightly more coarse form that makes large, rounded shrub in time.

Ilex decidua Walter, Possumhaw, Deciduous Holly. A large shrub or small tree, often with several trunks, that has a moderate growth rate and reaches about 30 feet in height. It is broadly topped at maturity, but the habit usually remains taller than broad. Small, spatulate-oblong leaves produce a fine texture. The deciduous autumn foliage is only a pale yellow, but when it is in heavy fruit, the effect of red berries on bare branches is striking. The bloom is inconspicuous. This is a handsome small tree that can produce a fine winter show (dioecious). As with most deciduous plants, pruning ruins the winter appearance. This native species is quite comfortable in a variety of local habitats.

A similar, somewhat more shrubby species, *I. verticillata* (L.) Gray, Winterberry, is the most widely planted of our native deciduous hollies, particularly further north. It is often noted that the dependable fruiting characteristic of the winterberry is an advantage; however, in our area both species are good, though *I. decidua* is the larger plant.

Ilex latifolia Thunb., Tarajo. A large shrub of moderate growth rate eventually becoming a large tree up to a height of about 70 feet. In youth it has an erect, columnar or pyramidal habit, but a mature specimen has not been observed. Large, thick, evergreen, more or less oblong, serrate leaves

produce a very coarse texture. Clusters of small pale yellow flowers are produced in late autumn or in early winter, followed by dense berry clusters on the female trees which are very effective in the autumn and winter landscape. Although rarely planted, *I. latifolia* is a grand coarse tree. There seem to be no cultural difficulties, but adequate space is often not available for proper development.

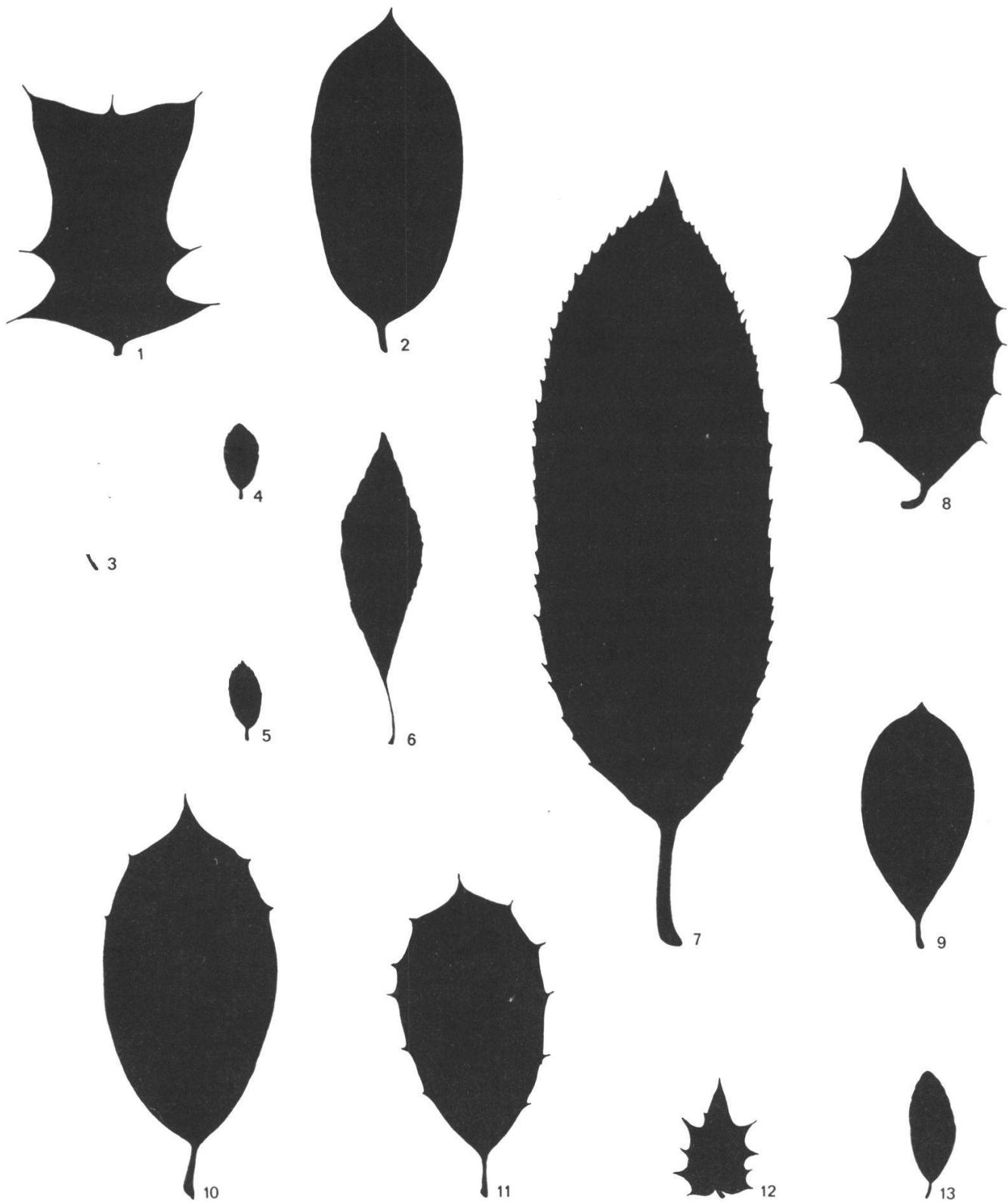
Ilex opaca Aiton, American Holly. A large shrub that grows moderately slowly (or moderately under favorable conditions) to a medium size tree that may become 50 or more feet in height. The habit is pyramidal in youth, but it becomes an erect columnar tree with a rounded head in time. The evergreen leaves are moderately large, mostly elliptic in shape with spine-tipped situations which give this tree a medium to medium-coarse texture. Yellowish-white flowers are borne in early April, but they are not conspicuous. The very effective bright red fruits persist throughout the winter. Orange and yellow-fruited selections are occasionally grown. The American holly is a common native tree here and in most of the milder portions of the eastern United States. It is a widely planted ornamental, and its fruiting branches are popular Christmas decorations. Like most of the hollies it is dioecious, and this must be taken into consideration in landscape planting. Native hollies vary greatly in leaf shape, fruitfulness and plant form. A large number of very ornamental forms have been selected which usually fruit more dependably than trees selected at random from the wild state. Two examples are mentioned below:

'Croonenberg' (selected by Thrasher) - A selection of American holly which fruits dependably and which has a good growth form and foliage.

'Foster' - This is a finer texture than standard *I. opaca*, but the leaves differ from the standard form only in that they are somewhat smaller.

Figure 6. Typical leaves of *Ilex* species and cultivars listed in chapter 7.

1. <i>Ilex cornuta</i>	8. <i>I. opaca</i>
2. 'Burfordii'	9. 'East Palatka'
3. <i>I. crenata</i>	10. 'Hume No. 2'
4. 'Convexa'	11. 'Savannah'
5. 'Helleri'	12. <i>I. pernyi</i>
6. <i>I. decidua</i>	13. <i>I. vomitoria</i>
7. <i>I. latifolia</i>	



1 inch

Without pruning, this fruitful selection develops a rather open habit and exposes its pale gray trunk.

Ilex opaca X *I. cassine* hybrids (or advanced generation segregates). The coastal plain holly, *I. cassine* L., which is not satisfactorily hardy in the central piedmont, sometimes hybridizes naturally with *I. opaca* in the zone where the two species are sympatric. A number of these hybrids have been selected and distributed by horticulturists and deserve the excellent reputation they have gained. They are easily grown and hardy in central North Carolina, but they cannot be grown satisfactorily in more northerly zones where pure *I. opaca* is common grown. Three of these clones are as follows:

'East Palatka' (selected by Hume) - The small leathery leaves usually have a single terminal spine. The texture is slightly finer than pure *I. opaca*, but it is otherwise similar. This is considered by Hume to be almost unsurpassed in fruitfulness.

'Hume No. 2' (selected by Hume) - The leaves are glossy, and the spine number is variable but usually less than in *I. opaca*. This clone normally bears a prolific load of fruit and has excellent plant form with medium texture. Some holly experts consider this the best in this hybrid grouping.

'Savannah' (selected by Robertson) - The rather dull thin leaves are similar in shape to *I. opaca*. It is very fruitful, and it has a distinctly columnar habit similar to *I. opaca*. Note: It is impossible to comment on the final adult habit of these three clones of holly because they have not been cultivated long enough to form adult specimens; however, the form of younger specimens seems to be mostly columnar to pyramidal.

Ilex pernyi Franchet, Perny Holly, Veitchii. An open, erect-growing shrub to small tree of slow to moderately slow growth that may reach a height of about 25 feet. The five long triangular spines give the leathery, evergreen leaves a rather quadrangular shape. The texture of this shrub is medium-fine. Small pale yellow flowers are produced in the spring, followed in the autumn by conspicuous, four-segmented red berries that persist into the winter. An unusual, but easily grown, large shrub that deserves to be more widely used. A number of handsome hybrids between this species and *I. cornuta* are now available that combine the finer texture of *I. pernyi* with the vigor and fruitfulness of *I. cornuta*.

Ilex vomitoria Aiton, Yaupon. A large shrub to small tree of moderate growth rate that usually has a columnar habit and may reach a height of about 30 feet. Small, evergreen, elliptic leaves with crenate margins give this plant a fine texture. The inconspicuous bloom is followed by a noticeable fruit load that can be effective in the landscape in the autumn and early winter, but which does not rival the show produced by the selected clones of *I. opaca*. This is an easily cultured, small native tree that is very useful for hedges and large screens because of its fine texture and dense branch structure, and several dwarf clones are available with even finer texture and slower growth rate. It is a good substitute for the more difficult to culture boxwood, and in fact, the yaupon may even be superior to *I. crenata* for this purpose.

8. The conifers

In nature and in cultivation, the conifers range from prostrate shrubs to very large trees. Indeed, the species in this group represent some of the largest and longest-lived trees in the world. In cultivation, some of these species reach great size and longevity; however, the forest heights are almost never achieved under conditions of domestication. In central North Carolina the native pines are probably our most common shade trees, but a large number of less frequently grown conifers offer a variety of forms and textures in the local landscape.

Calocedrus decurrens (Torr.) Florin, Incense Cedar (*Libocedrus*). A large tree of narrowly pyramidal habit, broadening slightly with age, with a slow to moderate growth rate. The tallest tree of this species observed in North Carolina is about 70 feet, but it may reach heights of 200 feet in its native habitat. The evergreen leaves are tiny scales which remain appressed to the thin twigs, giving the tree a very fine texture. Tiny cones are visible in the autumn. The incense cedar is rarely grown in the East, but in good sites it develops into a large, narrowly pyramidal tree. It remains a deep green color in the winter which makes it a striking addition to the winter landscape. At middle elevations in the southern California and Sierra