GROWTH HABITS OF FIVE CULTIVARS OF GLEDITSIA TRIACANTHOS[1]

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Abstract. Honeylocust are environmentally tolerant trees with good branch structure and open branching. Branching structure and habit enable an informed observer to identify 3 of 5 cultivars studied. The remaining 2 cultivars have fairly similar outlines. Foliage density is open for honeylocust, which allows a greater selection of plants to be grown under the foliage canopy of honeylocust. Graphic representations are presented for each cultivar for both summer and winter character. Drawings are to scale and allow comparison of the 5 cultivars at the common chronological age of 15 years.

Have you ever wondered what is the real difference between all those honeylocust cultivars? The myriad of shapes and sizes the cultivar names and descriptions claim, seemingly all distinct in print, are confusing at best.

Except to the well-trained eye, honeylocust cultivars are virtually impossible to distinguish. As the young trees mature, each cultivar's distinct shape and form emerges, establishing its individuality from other honeylocust cultivars. Even upon close inspection, however, the differences sometimes seem very slight. Surprisingly, very few comparative studies have been conducted concerning size and shape differentiation of various cultivars at the same age.

Fall color can be a clear yellow but in most years the leaves turn color and abscise individually, resulting in an ineffective foliage display. Good fall color of honeylocust in Ohio appears to occur about once every 5 years.

The open shade cast by honeylocust allows turf to be grown easily beneath its canopy. Shade density is about 50% of full sun (5). Most other underplantings also grow better because of this high light availability, when compared to other tree species.

Honeylocust will tolerate the stress of urban sites. They were planted in such numbers during the late 1960's and early 1970's that a number of cosmetic insect pests have caused concern. None of the insect pests is life threatening in Ohio, but they do cause a loss of ornamental value. Diseases are also of no great concern in areas of the plant's natural range.

Materials and Methods

We conducted a study of 5 cultivars of *Gleditsia triacanthos* at the common chronological age of 15 years. Fifteen years was chosen because it is considered a relatively mature landscape tree when cultivar growth habits have been established.

The honeylocust cultivars studied were: 'Imperial', 'Moraine', 'Shademaster', 'Skyline', and 'Sunburst'. The following published descriptions are combinations from various wholesale catalogs and textbooks. They are not specific to any one source. (1,2,3,4).

For evaluation, we utilized the cultivar specimens growing at the Ohio Agricultural Research and Development Center (O.A.R.D.C.) located in Wooster, Ohio. Approximately 15 year old specimens are growing side by side and do not receive as much fertilizer, pruning, or spraying as some arboretums might provide. They simulate conditions a plant growing in a lawn panel might encounter.

Slides of 4 or more plants of each cultivar were taken. One slide of each cultivar was selected as representative and used as a model for the line drawings. The use of a projector, mirror and glass

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plate enabled accurate reproduction of branch angle and crotch location. Computerized data of yearly plant growth allowed for accurate projections of tree growth where necessary or subtractions of growth to make the drawings as accurate as possible. Finally, a field inspection of the specimens was made to check the accuracy of the drawings.

Branch density was obtained by counting the number of primary and secondary branches with a diameter over 1/2 inch in the first 5 feet of the crown above the lowest branch on 4 trees of each of the cultivars studies.

The number of narrow or weak crotches was obtained by counting the representative branches above 1 inch diameter. Crotch angles were considered undesirable and potentially unsound if they had less than a 25 degree angle of attachment. This definition was established after evaluating branches to determine when necrosis began to appear between the two.

Several of the growth patterns were found to contradict published cultivar descriptions. Therefore, both published descriptions and this report's findings are included for a comparison. Hopefully, this study will shed some light on the shapes and sizes of cultivars of this well known species. Differences between cultivars will also be considered. This study should enable you to become more confident in your ability to distinguish between these cultivars upon personal inspection. Hopefully, the accompanying drawings, with and without leaf, shall help support and explain the written text. Most of the descriptions

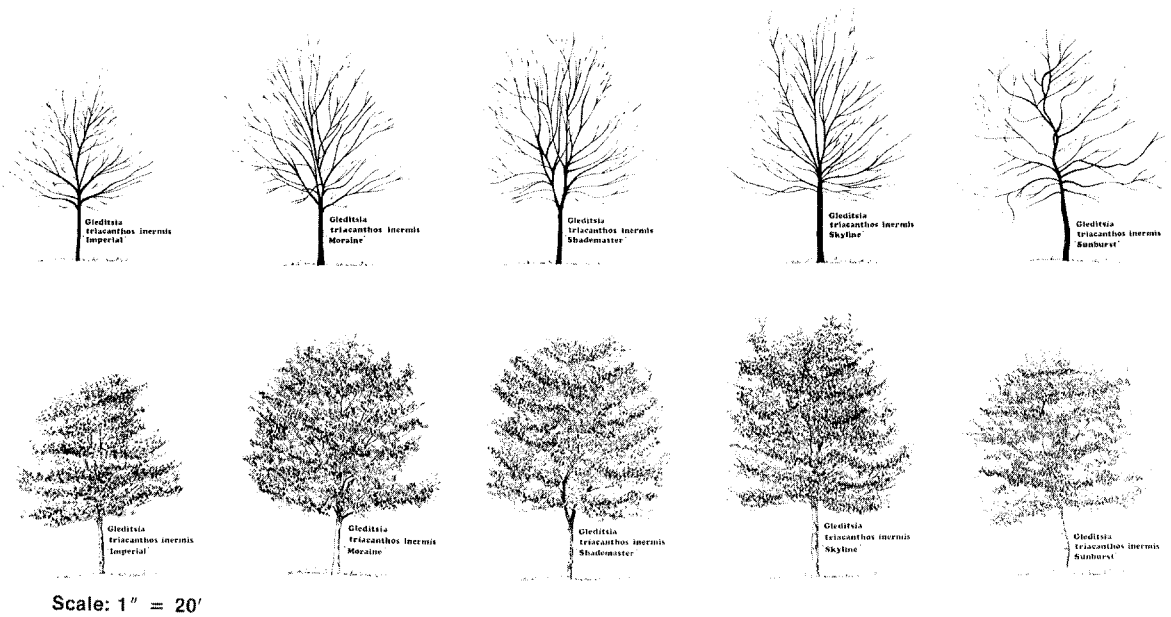

Fig. 1 Growth characteristics of summer and winter of five honeylocust cultivars at 15 years from budding.

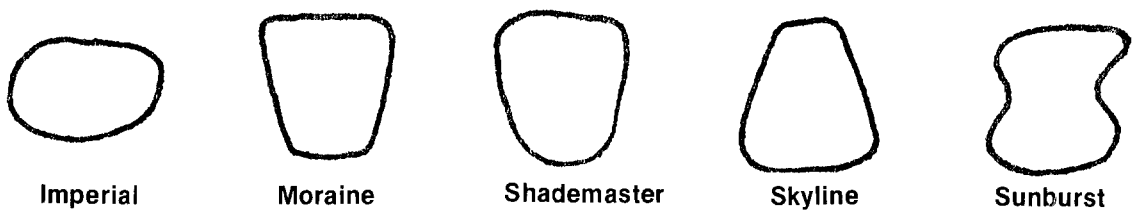

Table 1. An abstract impression of the crown shape of honeylocust.

are taken from winter character focusing on branching habit.

Results and Discussion

In general, honeylocust had 12 branches in the first 5 feet of crown, which contributed to its rather light, airy appearance (Table 2). Honeylocust also has less than 1 bad crotch angle per plant, resulting in a structurally sound plant (Table 2).

Cultivar	Height (ft.)		Width (ft.)		Average twig growth (in.)	Number narrow crotches	Number lower branches
	15 yr.	annual	15 yr.	annual			
Imperial	25.1 ± 3.5*	1.6 ± 0.8	24.0 ± 4.1	2.0 ± 1.1	15.2 ± 2.5	0.0 ± 0.0	12.2 ± 2.4
Moraine	31.8 ± 2.9	2.2 ± 1.4	27.9 ± 3.2	2.2 ± 0.9	14.0 ± 3.1	0.3 ± 0.5	14.3 ± 3.3
Shademaster	31.6 ± 4.5	2.0 ± 0.3	25.1 ± 3.1	2.2 ± 0.4	13.5 ± 2.3	0.8 ± 1.5	12.3 ± 2.6
Skyline	35.0 ± 4.1	3.3 ± 1.7	26.1 ± 3.1	3.5 ± 0.8	11.9 ± 1.4	0.3 ± 0.5	10.5 ± 2.4
Sunburst	32.3 ± 3.4	2.3 ± 1.1	24.0 ± 2.6	2.1 ± 0.9	11.7 ± 2.2	0.0 ± 0.0	12.0 ± 2.4
Mean	31.2 ± 3.7	2.0 ± 1.1	25.2 ± 3.2	2.4 ± 0.8	13.3 ± 2.3	0.3 ± 0.5	12.3 ± 2.6

* Standard deviation.

Table 2. Comparison of growth characteristics of five cultivars of honeylocust at 15 years of age.

IMPERIAL

Published Description: An exceptional gracefully spreading variety that forms a more regular and compact tree. Branches emerge from the trunk at 90° angles and are symmetrically arranged. Dainty and refined, fast and straight growing.

Project Description. 'Imperial' characteristically has much finer branches and a finer texture (Fig. 1). Its branching is not quite as angular and abrupt as the typical honeylocust. Its overall shape is a globe with relatively straight branches and small flower buds (Table 1). The bottom branches have a characteristic graceful swooping downward and then upward pattern. This cultivar has good branch structure without weak crotches. Its most distinguishing trait, however, is its globe or rounded shape. At 25 ft. it was the shortest of the cultivars studied (Table 2). The 24 ft. width was similar to other cultivars (Table 2). This selection could be used where vertical height was limiting and still obtain width for patio shade (Table 2).

Rapid twig extension of 15.2 inches per year reflects its spreading habit (Table 2). 'Imperial' shows a major branch density in the lower 5 ft. of the crown similar to other honeylocust cultivars.

MORAINE

Catalog Description. A broad graceful upright outline. One of the finest cultivars produced.

Project Description. 'Moraine' has an overall V-shaped crown appearance (Table 1). It is relatively flat-topped and all crotches are broad, giving it its characteristic shape and identity. Crotch angles are generally greater than 25 degrees (Table 2). There are characteristically 2 central leaders from the first major division in the trunk. It is densely branched at the top — all branches originating from V-shaped crotches (Fig. 1). A dominate vase-shaped branching habit identifies this cultivar both summer and winter.

The growth rate of this cultivar is similar to the species, including height and spread growth (Table 2). Twig extension growth of 14 inches per year characterize this cultivar and is normal for this species (Table 2). Branch density and the occurrence of narrow crotch angles is also average for this cultivar (Table 2).

SHADEMASTER

Catalog Description. Ascending branches. A typically upright vase-shaped tree with dark green foliage.

Project Description. 'Shademaster' has a pyramidal to rectangular pyramidal shape (Table 1). Upon closer inspection one notices differences between 'Skyline' and 'Shademaster'. 'Shademaster' has an even finer branching habit than 'Skyline', resulting in its name. It also has a flatter top, with many more broadly V-shaped crotches and 3 or 4 equal central leaders (Fig. 1). Overall, it has a structurally sound appearance (Table 2). Its bottom branches are straight or angled upwards, not gently swooping like 'Skyline.'

The height and width of 'Shademaster' is normal for this species (Table 2), as is the twig extension of 13.5 inches per year (Table 2). Branching density of this cultivar does not differ from the species (Table 2).

SKYLINE

Published Description. A distinctive pyramidal form with ascending branches at an approximate 60-90 degree angle. A stately variety developing an exceptionally strong, sturdy trunk and shapely crown. Branches are uniformly spaced, resulting in a well filled tree of rather formal appearance. Leaves more closely spaced contribute to a compact appearance of the crown.

Project Description. An open tree with a distinctive pyramidal to square pyramidal shape (Table 1.) The terminal portion of the tree has a typically coarse, densely branched growth which contributes to its square topped appearance (Fig. 1). 'Skyline' has one or two large, dominant leaders. Secondary branching is uniform without a dominant leader. The heavy branching characteristic was not noted. Its top is somewhat rounded to flat, but definitely not pointed, as it was when it was smaller. Flower buds appear more numerous on this cultivar. Lower branches have a characteristic downward and then upward swooping pattern. Its most characteristic trait is its rectangular pyramidal shape, which is very similar to 'Shademaster', but very different from 'Imperial', 'Sunburst' and 'Moraine'. 'Skyline' was the tallest of the cultivars studied, 35 feet after 15 years in the landscape (Table 2).

Branching density and the number of narrow crotch angles was average for the species (Table 2). Lateral twig extension of 11.7 inches per year is less than Imperial and may account for 'Skyline's' more upright habit (Table 2).

SUNBURST

Catalog Description. A striking medium-sized tree having thornless stems and bright yellow young leaves. Gold tipped foliage is especially prominent in the early part of the growing season and outlines the broad pyramidal head.

Project Description. 'Sunburst' is an unusual cultivar selected for its yellow tipped foliage, and not for its shape, which is unlike other honeylocust cultivars (Table 1). This is clearly evident in its irregular growth pattern (Fig. 1). No two 'Sunburst' cultivars are alike. Branching is unpredictable and has a definite winding pattern. Both angular and 90° crotches are evident and storm damage seems to be a problem, as many trees have major leaders bent and distorted but not broken by high winds. Overall, the tree has a coarser branch texture than the other honeylocusts. Sunburst has fewer tertiary branches and large, bunchy flower buds which are prominent all winter. Branching is noticably crossed and irregular, however, lower major branches are characteristically upright. One distinguishing characteristic is a single prominent V-crotch part way up the trunk or central leader of the tree. This was common to all the 'Sunburst' plants studied.

Twig extension is not rapid for this species (Table 2). The number of 25° crotch angles and branch density are similar to the mean of the species (Table 2).

Summary

The form of three cultivars are easily distinguishable at 15 years. 'Imperial' is smaller with a globe shaped crown. 'Moraine' has strong, structurally sound, V-shaped crotches, which give the major structural branches a vase-shaped appearance. 'Sunburst' has a very irregular habit, which is easily identified with, of course, the gold tipped new foliage.

'Skyline' and 'Shademaster' are quite similar in habit. In a landscape situation, environmental factors might well override the characteristics of these plants that allow them to be identified as 15 year old, open grown specimens.

Branch structure and branch densities of the various honeylocust cultivars are not greatly different. Storm tolerance of these plants should be satisfactory in most situations.

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