

GROWTH HABITS OF FIVE CULTIVARS OF *PYRUS CALLERYANA*¹

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Abstract. Callery pears are upright trees with 3 bad crotch angles and 36 branches in the first 5 feet of the crown. High branch density and narrow crotch angles make this plant very prone to storm damage. The cultivar 'Aristocrat' has fewer crotches and a lower branch density, which suggests that this plant may have fewer problems as the plant matures in the landscape. Graphic representations for 5 cultivars are presented and are drawn to scale to allow direct comparison between cultivars for height, width, and habit.

Cultivars of Callery pears were introduced to the nursery and landscape trade in 1963. Whitehouse, Creech and Seaton introduced the first cultivar, 'Bradford' (7). Since this plant's introduction, it has become extremely popular. While all plants have some flaws, time has been generally kind to this cultivar. The plant has proven to be an environmentally tolerant tree, which will grow in urban sites as severe as sidewalk cuts or tree pits. Trees of 30 to 40 feet are not uncommon. The plant's mature height is thought to be less than 50 feet under good growing conditions.

The Callery pear species is said to be thorny, however, the seed of the popular varieties of Callery pear produce thornless offspring. All named cultivars are also thornless selections of Callery pear.

The flowering of various Callery pear cultivars is similar. There are slight differences in the color of the flower buds, which were judged so slight that no attempt was made to quantify them. Flowering occurs in mid to late April in Ohio and is a yearly occurrence.

Fall color of all cultivars was similar and reached its peak about 1 month later than the peak of fall color for central Ohio. Fall color ranges from a clear red to maroon and appears to depend on climate conditions in a given year rather than genetics.

The outline of most Callery pears is regular

because of its characteristic branching habit. This makes young plants attractive but results in a storm-prone canopy as the tree ages. Trees over 15-20 years old are damaged in storms (5). The dense branching is an attractant for nesting birds. The excrement is unsightly and has caused people to slip and fall (6).

The fruiting of Callery pear can be quite heavy some years. The fruit is relished by birds and is usually eaten before the fruit falls in late autumn. The small pears also attract birds. Early flowering can result in frost damage to the ovary and thus poor or non-existent fruiting in some years. Alternate fruiting has not been observed.

Callery pears are noted for their tolerance of the environmental stresses characteristic of urban sites. Ornamental features and stress tolerance make these trees particularly popular for urban redevelopment projects in Ohio and many other areas of the United States.

Severe insect and disease problems have not been noticed in Ohio. Fire-blight has been an insignificant problem under Ohio conditions for all cultivars tested, even when a severe fireblight infestation was located within 100' in the Shade Tree Evaluation Project.

Materials and Methods

Eight trees each of 'Aristocrat,' 'Bradford,' 'Chanticleer,' 'Fauriei' and 'Rancho' Callery pears were planted in a random pattern in the shade tree evaluation plot in Wooster, Ohio. Height, crown spread, and diameter measurements were taken in late 1978 and again in late 1981 to determine the growth over this three year period. Height and crown spread were measured in feet and diameter was measured at breast height (4.5 ft.) with a steel tape in inches.

Slides were taken of four plants of each of the

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cultivars. Plants were selected as being representative of that particular cultivar. After comparing the various slides, the plant which most accurately represented the height and width as measured earlier was selected as a model on which drawings were made. Based on the plant's current height, its rate of growth between 1978 and 1981 and its current age, the plant's height at 15 years was calculated. Each slide was then projected to accurately reproduce actual angles, location of branch attachments, branch density, and form. All trees were then drawn to scale to represent a plant at 15 years old.

Branch density was calculated by counting the number of primary and secondary branches which occurred in the first five feet of the tree canopy. Branch density measurements were taken from four plants of each cultivar.

Four trees of each cultivar were also selected at random to count the number of primary and secondary branches which had an angle of attachment of less than 25 degrees. Branches with less than a 25 degree angle of attachment often had necrosis associated with the crotch, and it was thus defined as a narrow crotch. This definition is not based on a critical evaluation of the inherent

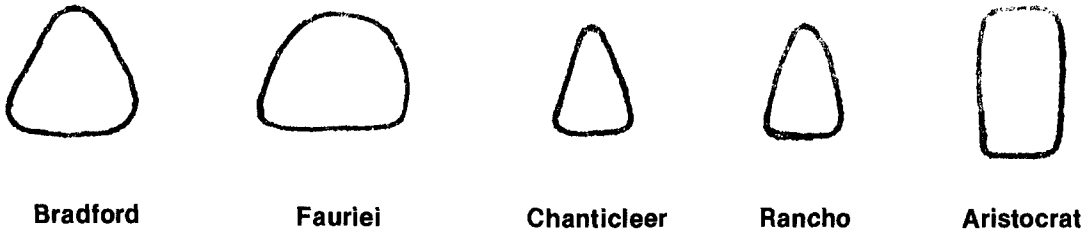


Table 1. An abstract impression of the crown shape of Callery pear cultivars.

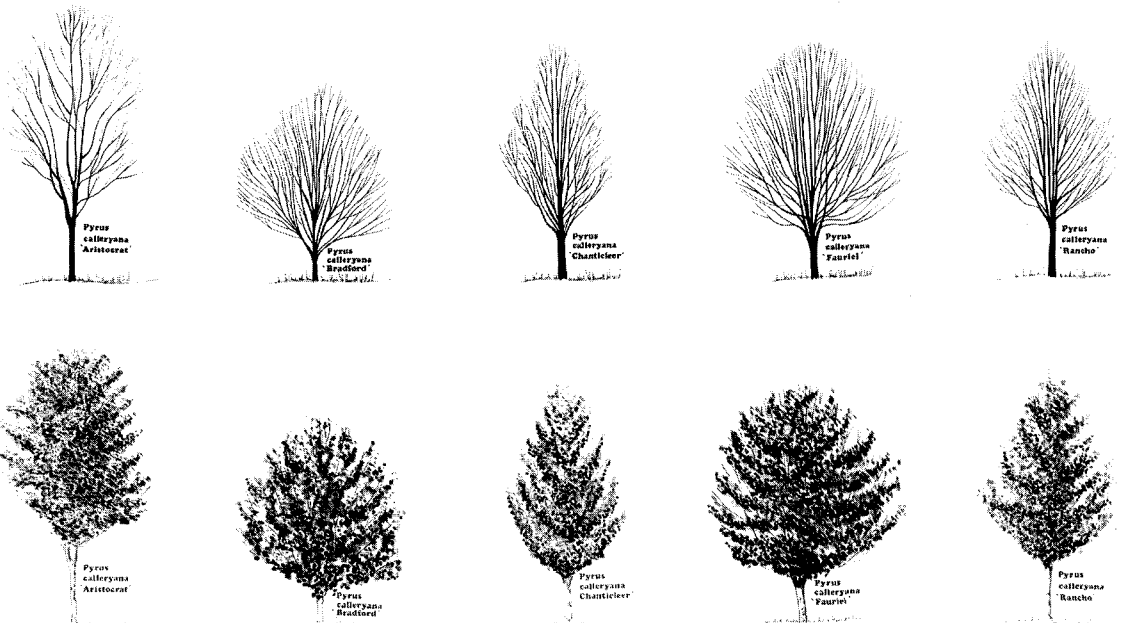


Figure 1. Growth characteristics of summer and winter of 5 Callery pear cultivars at 15 years from budding.

Table 2. Comparison of growth characteristics of five cultivars of Callery pear after 15 years in the landscape.

Cultivar	Height (ft.)		Width (ft.)		Average twig growth (in.)	Number narrow crotches	Number lower branches
	15 yr.	annual	15 yr.	annual			
Aristocrat	36.2 ± 1.6*	2.9 ± 0.6	15.7 ± 2.3	0.6 ± 0.5	16.7 ± 2.5	1.5 ± 1.0	27.3 ± 7.2
Bradford	25.0 ± 3.0	2.2 ± 0.3	15.6 ± 4.0	1.8 ± 0.9	10.9 ± 1.7	4.3 ± 0.5	50.3 ± 8.4
Chanticleer	31.2 ± 2.4	1.7 ± 1.9	14.9 ± 1.8	1.4 ± 0.3	10.4 ± 2.3	2.8 ± 1.0	45.8 ± 7.5
Fauriei	31.6 ± 2.3	1.7 ± 1.4	25.0 ± 2.8	2.7 ± 0.8	16.3 ± 1.3	3.3 ± 1.3	32.0 ± 8.5
Rancho	31.2 ± 3.4	2.5 ± 0.9	15.0 ± 1.9	2.2 ± 0.5	10.8 ± 1.6	2.5 ± 0.6	26.0 ± 6.6
Mean	31.0 ± 2.5	2.2 ± 1.0	17.2 ± 2.6	1.7 ± 0.6	13.0 ± 1.9	2.9 ± 0.9	36.3 ± 7.6

* Standard deviation.

strength of various angles of attachment.

Twig extension was calculated by averaging the twig extension for the years 1974 to 1978 of three branches on the sunny side of each of four trees.

A composite description was produced using various sources of information (1,2,3,4). This description serves as a published description for comparing results of the Shade Tree Evaluation Project with published information.

Results and Discussion

ARISTOCRAT

Published Description. Strong upcurved branches. Broad and less dense than 'Bradford.' More horizontal branches. Leaves are longer than normal, with a wavy leaf margin.

Project Description. Much more open in habit with a form very much different from the other Callery pears (Table 1). Overall, the shape is a rectangular to a rectangular oval (Fig. 1). Some branches are horizontal at the trunk with no upward sweeping. This was the tallest of the cultivars studied and reached a height of 36.2 feet at 15 years.

Branching density was less than 'Bradford,' 'Fauriei' and 'Chanticleer.' In our judgement, corrective pruning and nesting of birds would be less for this selection. This characteristic may make it the cultivar of choice. Where the plant is being planted to attract wildlife, another selection may be desired.

Fruiting of this cultivar appears to be heavier than for other cultivars. An objective evaluation of this characteristic is planned.

This cultivar is not so attractive as a young plant due to its more open habit of growth. Retail sales lots will find that other cultivars are preferred for impulse sales. Long term satisfaction may, however, be better for 'Aristocrat.'

This plant also has fewer bad crotches than 'Bradford' and 'Fauriei.' Only 1.5 bad crotches were noted per plant (Table 2). Corrective pruning would thus be reduced. Even without corrective pruning this plant is likely to be more resistant to storm loading than 'Bradford' and 'Fauriei.'

Aristocrat has a faster than average twig extension (Table 2), which may be desirable in many situations.

BRADFORD

Published Description: A vigorous medium sized dense headed tree. Pyramidal in youth becoming a broad oval shape with age. Symmetrical branching.

Project Description. 'Bradford' plants are quite variable. Characteristically, they are very low branched if not pruned up. Branches form an oval to conical shape (Fig. 1). This is one of the widest cultivars studied, thus storm damage is sometimes a problem (Table 2). In a city location, 'Bradford' tends to attract too many birds because of its dense branching pattern. Consequently, it can frequently be identified by the whitewashed sidewalk surrounding its base. Some cities may choose to ban this tree because of this problem and its tendency to break up in storms. This would be a mistake.

This cultivar is the oldest of the five and was introduced to the nursery trade in the early 1960's. A number of unscrupulous nurseries are reported to be selling 'Bradford' seedlings as 'Bradford.' This could account for much of the variability in the nursery trade for what should be a clone.

CHANTICLEER

Published Description. Similar to 'Bradford.' cone shaped -evenly branched.

Project Description. 'Chanticleer' has a very tight pyramidal upright form. All branches are ascending and are much tighter and more pyramidal in shape than 'Bradford's' rounded conical shape. The habit is a tight pyramid with a uniform and thickly branched top, which is very formal in appearance. This cultivar is very similar to 'Rancho,' but has more branching (Fig. 1).

The more upright habit may make this plant more storm resis-

tant than wider selections such as 'Fauriei' and 'Bradford' (Table 2). The sail effect of the crown would be lessened.

This plant has been sold under a variety of names, including 'Select' and 'Cleveland Select.' This resulted when the patent holder did not retain control of the propagules or the parent plant which is growing on public property in Cleveland, Ohio.

This plant may be preferred to 'Bradford' and other broader cultivars where a more upright form is needed (Table 1). Restricted lateral space or a need for a more formal outline would suggest use of this cultivar.

FAURIEI

Published Description. Slower growing and wider than 'Bradford' forming a sturdy medium sized tree. A shapely tree smaller than other selections with a rounded head and all the excellent qualities but in a smaller package.

Project Description. Fauriei is a much more open tree than Bradford. It is the fastest growing and the widest of the cultivars studied (Table 2). Its broad oval shape resembles a small Norway or red maple. Lower branches are long with a characteristic downward and then upward swoop.

It is easily identified by its broad open appearance and rounded top. Storm damage may be a problem because of its open habit and the large number of narrow or V-shaped crotches. Corrective pruning is necessary when young to eliminate the narrow crotch angles, which may be highly susceptible to wind damage.

The more open branching may make this plant less desirable for nesting birds. Reduced nesting and reduced corrective pruning would be very important assets for a municipality where budgets are tight.

Rapid growth and a uniform outline make it attractive as a young plant. This plant offers good serviceability if corrective pruning is done when the plant is about 2" in diameter and again when the plant is about 4" in diameter.

This tree is certainly not a draft at 32' in 15 years. Perhaps the parent tree at Morton Arboretum was growing in a poor site, which reduced the plant's stature.

RANCHO

Catalog Description. An evenly branched, formal pyramidal tree.

Project Description. Upright pyramid, very formal, and similar to 'Chanticleer' (Table 1). The branches are upright and not as numerous as 'Chanticleer.' Overall, 'Rancho' is a typically narrow, formal, and pyramidal tree (Fig. 1)

This tree's more open branching should make it more desirable where birds are a problem or where labor and budgets for corrective pruning are limited. The number of poor crotches is high (Table 2).

This plant can be grown in more limited lateral space than selections such as 'Bradford,' 'Fauriei' and 'Aristocrat.' This more upright form means less sail and is expected to have a lower risk of storm damage than 'Bradford.'

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