Tree of the Year: *Carya ovata*, Part I

Susyn Andrews
With contributions from Mark Flanagan.

> "The genus *Carya* remains something of an enigma, surprisingly little known in Britain even by discerning horticulturists."
>
> (Flanagan 1987)

Introduction

Carya Nutt. is one of nine genera that comprise the Juglandaceae (Stone 1997). This small family of deciduous trees includes such well-known members as *Juglans* or walnuts, *Carya* the hickories and *Pterocarya* the wing-nuts. They occur in the Western Hemisphere and Eurasia. Stevens (2006) places Juglandaceae within the Fagales and closely related to Myricaceae and Rhoipteleaceae.

The distinguishing characters of *Carya* are: a fissured/stripping bark, branchlets with solid pith and well developed bud scales, male catkins in drooping or sessile bundles of 3, stamens 3-10(-15) per flower, fruits with husks that completely or nearly split into 4 sections, nuts smooth, verrucose or slightly wrinkled.

There are 17 species of *Carya* and they are distributed in eastern North America, north-eastern Mexico and eastern Asia. The genus is divided into three main sections:

Sect. *Apocarya* C. DC.: leaflets 7-17, serrate, usually sickle-shaped; terminal bud scales 4-6+, touching but not overlapping. Contains six species from North America, Mexico and Asia. All are diploid, $2n = 32$. [A]

Sect. *Carya*: leaflets 6-12, serrate, not sickle-shaped; terminal bud scales 6-12, overlapping. Contains seven species from North America and Mexico. These are tetraploid, $2n = 64$, except for *C. ovata* and *C. laciniosa*, which are diploid. [C]

Sect. *Sinocarya* Cheng & R.H. Chang: this is a relatively newly described section which differs in its naked terminal buds (Chang & Lu 1979); leaflets 7-11. It contains four species from southeastern Asia. $2n = 32$, $2n = 48$. [S]

Of these, 11 species occur in North America: *C. aquatica* (Michx. f.) Nutt. [A], water hickory; *C. cordiformis* (Wangenh.) K. Koch [A], bitternut hickory; *C. floridana* Sarg. [C], scrub hickory; *C. glabra* (Mill.) Sweet (= *C. ovalis* (Wangenh.) Sarg. [C], red hickory), pignut hickory; *C. illinoinensis* (Wangenh.) K. Koch [A], pecan; *C. laciniosa* (Michx. f.) Loud. [C], shellbark hickory; *C. myristiciformis* (Michx. f.) Nutt. [A], nutmeg hickory; *C. ovata* (Mill.) K. Koch [C], shagbark hickory; *C. pallida* (Ashe) Engl. & Graebn. [C], sand hickory; *C. texana* Buckley [C], black hickory and *C. tomentosa* (Poir.) Nutt. (= *C. alba* misapplied) [C], mockernut hickory. In Mexico four taxa occur: *C. illinoinensis, C. myristiciformis, C. ovata* var. *mexicana* (Hemsl.) W.E. Manning and *C. palmeri* W.E. Manning [A].

The remaining species occur in eastern Asia: *C. cathayensis* Sarg. [S], China (Anhui, S. Guizhou, Jiangxi and Zhejiang); *C. hunanensis* W.C. Cheng & R.H. Chang ex Chang & Lu [S], China (Guangxi, Guizhou and Hunan); *C. kweichowensis* Kuang & A.M. Lu ex Chang & Lu [S], China (SW Guizhou); *C. tonkinensis* Lecomte [S], China (Guangxi, NW to S. Yunnan), India (Assam), North Vietnam; *C. poilanei* (A. Chev.) Leroy [?A], North Vietnam and Laos.

It should also be noted that *C. sinensis* Dode is now recognised under *Annamocarya sinensis* (Dode) Leroy (Kwang & Lu 1979, Lu, Stone & Grauke 1999). Other synonyms include *C. integrifolialata* (Kuang) Hjelmq. and *C. tsiangii* Chun. It occurs in China (Yunnan, Guizhou) and North Vietnam. This monospecific genus has been placed in a number of different genera in the past, but the following characters, e.g. prominent buttresses, entire leaflets and male catkins in clusters of 5 to 8 warrant recognition at generic rank. However, recent work by Manos & Stone (2001) is less supportive of this, but a much wider sampling of the south-east Asian taxa is necessary before such a decision is confirmed.

According to Stone (1997), the genus was widespread throughout the Tertiary. Fossils have been reported from Colorado and Washington states in the USA, as well as from Japan, China, Europe and western Siberia.

The name *Carya* came from the Greek word *karya*, meaning a walnut tree. Its fruit was known as *karyon*, a word applied to other nuts. Legend has it that Carya, the daughter of the King of Laconia, was changed into a walnut tree by Bacchus (Smith 1971). As for hickory, this is a shortened version of *pokahickory* from the Algonquian Indian *pawcohiccora* and refers to, milk from pounded hickory nuts (see also p. 15 below). This word was first recorded by Captain John Smith (1580-1631), who settled in Virginia (Grigson 1974).

Carya ovata (Mill.) K. Koch

(*Juglans ovata* Mill., *Hicoria ovata* (Mill.) Britt., *C. alba* Nutt.)
Common names: shagbark hickory, shellbark hickory, noyer tendre, caryer ovale (Stone 1997); little shellbark hickory, eastern shellbark, scalybark hickory, upland hickory (Jacobson 1996)

Description: Tree to 46 m, c. 30 m in UK. **Bark light grey, fissured or exfoliating, separating freely into long strips or broad plates that persist, ends often curling away from trunk, rarely smooth.** Twigs greenish, reddish or orangish-brown, retaining colour or turning black on drying, stout or slender, hirsute or glabrous; base of new growth has a dense ring/s of hairs. Terminal buds tan to dark brown to black, ovoid, 6-18 mm, tomentose or nearly glabrous; bud scales overlapping, **the outer pair narrow triangular, hirsute, dark brown**; axillary buds protected by bracteoles fused into a hood. Leaves 30-60 cm; petiole 4-13 cm, petiole and rachis (main axis of compound leaf) hirsute or mainly glabrous. **Leaflets (3-)5(-7)**, lateral petiolules (stalk of a leaflet of a compound leaf) 0-1 mm, terminal petiolules 3-17 mm; blades ovate, obovate, oblanceolate, or elliptic, not falcate, 4-26 x 1-14 cm, **margins finely to coarsely serrate, with tufts of hairs in axils of proximal veins or serrations, often weathered to only a few in autumn,** apex acute to acuminate; undersides of blades hirsute with unicellar and 2-4 rayed bunched hairs, occasionally restricted to midrib and major veins or essentially without hairs, with few to many large peltate (shield-shaped) scales and small round, irregular, and 4-lobed peltate scales. **Male catkins in 3s, slender, pedunculate, to 13 cm, stalks and bracts without hairs; anthers hirsute. Fruits in pairs or solitary,** brown to reddish-brown, **spherical to depressed-spherical**,

not flattened, 2.5-4 x 2.5-4 cm; **husks rough, 4-15 mm thick, dehiscing to base**, sutures smooth; nuts tan, ovoid, obovoid or ellipsoid, flattened, 4-angled, slightly wrinkled; shells thick. Seeds sweet (partly *fide* Stone 1997).

Key to *Carya ovata* varieties (*fide* Stone (1997) and Manning (1949))

1. Twigs stout, hirsute, rarely turning black on drying; terminal buds tan to dark brown, tomentose; undersides of leaflets hirsute, with conspicuous peltate scales *C. ovata* var. *ovata*
1. Twigs slender, glabrous, turning black on drying; terminal buds reddish-brown, mainly glabrous; undersides of leaflets essentially glabrous, with few peltate scales *C. ovata* var. *australis*
1. Twigs quite slender, pubescent, retaining natural colour on drying; terminal buds dark brown, pubescent; undersides of leaflets hirsute with abundant peltate scales *C. ovata* var. *mexicana*

var. *ovata*

(C. ovata var. *fraxinifolia* Sarg., *C. ovata* var. *nuttallii* Sarg., *C. ovata* var. *pubescens* Sarg.)

Trees to 46 m. Twigs greenish, reddish or greyish-brown, colour usually retained on drying, stout, hirsute. Terminal buds tan to dark brown, 9-18 mm, tomentose. Leaves 30-60 cm; petiole 5-13 cm, hirsute. Leaflets 6-26 x 3-14 cm, terminal petiolules 5-17 mm; undersides of blades hirsute with conspicuous small, irregular, round and 4-lobed peltate scales. Male catkins to 13 cm long. Fruits 3.5-4 x 3.5-4 cm; husks 4-15 mm thick. $2n = 32$ (*fide Stone 1997).*

Found in wet bottomlands, rocky hillsides and limestone outcrops; 0-1400 m. Occurs in: Canada: Ontario, Quebec; United States: Alabama, Arkansas, Connecticut, Delaware, District of Colombia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, West Virginia and Wisconsin.

var. *australis* (Ashe) Little

(C. australis Ashe, *C. carolinae-septentrionalis* (Ashe) Engl. & Graebn.)

Common names: Carolina hickory (Stone 1997), southern shagbark hickory (Elias 1972)

Trees to 39 m. Twigs reddish-brown, often turning black by autumn or upon drying, slender, glabrous. Terminal buds reddish-brown to black, 6-15 mm, mainly glabrous. Leaves 20-30 cm; petiole 4-12 cm, mainly glabrous. Leaflets 4-19 x 1-6.5 cm, terminal petiolules 3-12 mm; undersides of blades with few hairs and few small 2- and 4-lobed peltate scales. Staminate catkins to 6 cm long. Fruits 2.5-3 x 2.5-3 cm; husks 5-8 mm thick. $2n = 32$ (*fide* Stone 1997).

Found in wet bottomlands, rocky hillsides and limestone outcrops; 150-200 m. Occurs in United States: Alabama, Georgia, Mississippi, North Carolina, South Carolina and Tennessee.

The only specimen at Kew is sterile: *P. Wilson* 202 collected east of Pigeon Mountain, Walker County, Georgia on 3/8/1900, see p.13.

var. *mexicana* (Hemsl.) W. E. Manning

(C. mexicana Engelm. ex Hemsl.)

Common names: Nogalillo de San Luis Potosi, nogal motudo, nogal Rayado (Manning 1949); nogal cimarrón (Narave Flores 1983)

Trees 15-20 m. Twigs reddish-brown or dark grey; colour retained on drying, quite slender, pubescent. Terminal buds dark brown, 8-9(-15) mm, pubescent. Leaves **5**, 20-35 cm; petiole 5-9.5 cm, nearly glabrous to hirsute. Leaflets 10.5-17.5(-25) **×** 4-9 cm, terminal petiolules 5-10 mm; undersides of blades hirsute, with abundant small, round peltate scales. Husks (1.5-)3-6.5 mm thick. [Description based on *W.E. Manning & M.S. Manning* 53332b (see p. 16) and *C.C. Palmer & E. Palmer* 834½ [holotype], both sterile specimens at 'K' & Manning (1949)].

Found in montane mesic forests and tablelands; 810-1200 m. Occurs in NW Mexico: Nuevo León, Tamaulipas, San Luis Potosí, Querétaro, Hidalgo, Puebla and Vera Cruz.

In his account of Juglandaceae for the *Flora of North America*, Stone (1997) recognises this taxon as a good variety.

Hybrids of *Carya ovata*

Carya ovata has hybridised with *C. cordiformis* to produce *C.* **×** *laneyi* Sarg.

Sargent (1913) described this natural hybrid, which was found at the Riverview Cemetery Rochester, New York in 1912. It is said to resemble *C. ovata* but has dark grey bark, not grooved; the terminal bud is 1 cm long, with glabrous outer scales, abcising, the inner ones lepidote (covered with small, scurfy, bright yellow scales); leaflets 5, lanceolate to oblanceolate; fruit ovate; nut flattened, somewhat obovoid, husk thin, kernal large, sweet (*fide* Krüssmann 1976). Sargent (1913) named this hybrid after C.C. Laney, the Superintendent of Parks at Rochester.

Of particular interest were the nuts, as they combined the thin husks of *C. cordiformis* and the large sweet kernals of *C. ovata*. The latter were greatly increased in size due to the thinness of the former.

Wijnands (1989) mistakenly confused *C. illinoinensis* for *C. cordiformis* as a parent for the above hybrid.

Trees that were considered a variant of the above hybrid, as they had the foliage of *C. cordiformis* but with larger fruits, thicker involucres [whorls of bracts subtending a fruit or cluster of them] and the kernals of *C. ovata* occurred near the mouth of the Chateaugay River, in Quebec Province and at Summertown, Ontario in Canada. Discovered in 1884, they were described as var. *chateaugayensis* Sarg. (Sargent 1913). Today, they are considered under *C.* **×** *laneyi*. *Fr. Marie-Victorin* 28630 collected on 22/9/1928 (see p.17) and

Carya ovata var. *australis P. Wilson* 202

J.G. Jack s.n. on 1/8/ 1933 can be seen in the Kew Herbarium (see p. 21), as well as *J.G. Jack* 3990 collected at the Arnold Arboretum on 7/6/1920.

Carya ovata has also crossed with *C. illinoinensis* and Manning (1962) noted the first record for var. *mexicana* × *C. illinoinensis* in the State of San Luis Potosí in 1953. *W.E Manning & M.S. Manning* 53552 (K!) was collected near Ciudad del Maiz at 1158 m on 23/7/1953 on a "Rocky hillside with only a few mesquite-like trees, otherwise barren."

Several trees intermediate in character between *C. ovata* and *C. laciniosa* were found growing on the bottoms of the Genesee River, Golah, Monroe County and Mount Morris, Livingston County in New York in 1911. They were discovered by John Dunbar, the Assistant Superintendent of Parks for Rochester. Sargent (1918) described them as *C.* × *dunbarii* Sarg.

> "These trees, which have at different times been considered both *C. lacinosa* and *C. ovata*, vary among themselves in the color and pubescence of the branchlets, in the size of the buds, and in the size and shape of the fruit and nuts. The leaves have the 7 or 9 leaflets of *C. laciniosa*, but the leaflets are usually narrower than those of that species and less pubescent."
>
> "..... There is so much variation in these trees that their hybrid origin seems probable. The most remarkable things about them are the red glabrous lustrous branchlets of some of the trees; these are entirely unlike those of either of the supposed parents and suggest that one of the forms of *C. ovalis* or *C. glabra* [now *C. glabra* (= *C. ovalis*)] might have had some influence on them. If they are hybrids in large part between *C. laciniosa* and *C. ovata* ....."
>
> "In the case of other hybrids of *Carya* only a single tree or single trees in different locations have been noticed. The hickory trees in western New York, however, have been more carefully examined by Mr. Dunbar and his associates than the hickories in any other part of the United States."

There is no herbarium material of *C.* × *dunbarii* at Kew. None of the above appear to be readily available within the nursery trade in Europe.

Cultivars

According to Lyle (2006), there are more named cultivars of *C. ovata* than any other hickory. Some are recorded as hybrids with *C. catheyensis* or *C. illinoinensis*. However, little information was found concerning the individual cultivars.

'Abundance' – a thin-shelled nut, up to *c.* 7 g. Produces an annual crop; grafted trees often produce a crop in the second year of growth.

'Bridgewater' – a very large nut, up to 8.5 g. Recommended for growing in the far north of the USA, as it is susceptible to scab when growing in the south. Recommended as a pollinator for 'Weschcke'.

'Campbell's CES 26' – listed in Staff of the Andersen Horticultural Library (2000).

'Cedar Rapids' – a large nut, up to 6.9 g, which matures early. Produces a good crop but suffers from scab when grown in the south.

'CES-8' – listed in Staff of the Andersen Horticultural Library (2000).
'Davis' – a vigorous tree. Produces a medium-sized nut which ripens early. Has very good cracking quality. Produces a plump kernel of high quality.
'Etter' – listed in Staff of the Andersen Horticultural Library (2000).
'Fat Boy' – listed in Staff of the Andersen Horticultural Library (2000).
'Fayette' – thin-shelled nut; a *C.* **x** *dunbarii* cultivar.
'Felger' – listed in Staff of the Andersen Horticultural Library (2000).
'Fox' – listed in Staff of the Andersen Horticultural Library (2000).
'Grainger' – a seedling. Available in the UK.
'Henry' – a very large nut; a *C.* **x** *dunbarii* cultivar.
'Holden' – a narrow tree with an attractive drooping habit. Discovered by W.A. Strong, a landscape architect of the Holden Arboretum in Hudson, Ohio in 1966. Named in 1970 (Jacobson, 1996).
'J. Yoder No. 1' ('Yoder no 1') – recommened for nut production. A heavy cropper producing early, thin-shelled nuts. Nuts very large, up to 8.5 g, the flavour of the kernal is very good. Available in the UK.
'Neilson' – a seedling. Available in the UK.
'Porter' – a large, thin-shelled nut, which has a high % of kernal and excellent qualities.
'Retzer' – listed in Staff of the Andersen Horticultural Library (2000).
'Roof' – listed in Staff of the Andersen Horticultural Library (2000).
'Russell' – listed in Staff of the Andersen Horticultural Library (2000).
'Sauber' – listed in Staff of the Andersen Horticultural Library (2000).
'Silvis 303' – listed in Staff of the Andersen Horticultural Library (2000).
'Wescheke' – a regular and heavy cropper. Nuts with very thin shells, full, rich kernals, which crack out well into halves. Available in the UK.
'Wilcox' – an excellent early producer. Nuts medium-sized, up to 4.9 g, with a good flavour and excellent cracking quality. Stores well.
'Wilmoth' – listed in Staff of the Andersen Horticultural Library (2000).
'Wurth' – listed in Staff of the Andersen Horticultural Library (2000).

Economic uses

The nuts are good when eaten fresh or cooked. The Native Americans cultivated small plantations of *C. ovata* and used the nuts extensively for food as well as for a potent liquor called *pawcockhickoria*.

> "They pound them to pieces and then cast them into boiling water, which after passing through fine strainers, preserves the most oily part of the liquid; this they call by a name which signifies hiccory milk; it is as sweet and rich as fresh cream, and it is an ingredient in most of their cookery, especially homony and corn cakes."
>
> (William Bartram in Peattie 1991)

They also used the plant medicinally, as decoctions of the bark were taken for arthritis and applied as a poultice. Compound infusions of the bark was used as a gynecological aid, as well as for general debility, while a compound decotion with white from the inside bark was taken to kill worms in adults (Moerman 1986).

Carya ovata var. *mexicana W. E. Manning & M. S. Manning* 53332b

Carya x *laneyi Fr. Marie-Victorin* 28630

The shagbark is rated one of the best North American hardwoods as is used for:

> "furniture, toolhandles, skies, gymnastic bars, flooring, piano construction, interior trim, dowels and ladder rungs. It is famous for smoking meats and cheeses. The shells can be used for driveways, for mulch around plants and for fuel."
>
> (Lyle 2006)

Other uses were detailed by Peattie (1991). According to Flanagan (1987), the wood has the highest fuel value per unit volume of any other American wood. Vast amounts were burnt by the early pioneers to heat their log cabins, while the subtle flavour of the green wood is considered essential for the preparation of smoked hams (Peattie 1991).

Although, very valuable for its nuts in North America, where they are known as the hickory nuts of commerce; this is not the case in the UK, where the weather is not warm enough to produce them in any quantity. Any comments from our mainland European members for its performance over there would be welcome, please.

Carya ovata in cultivation and the difficulties of identification

The genus *Carya* is considered by many to be a frustrating genus to come to grips with. Having recently tried to tackle some 38 hickories at Westonbirt Arboretum, as well as odd plants at RBG Kew and RBG Wakehurst Place, I can fully sympathise and I am still struggling with several plants!

This has been a difficult tree of the year to write up, in relation to assessing what is out there in cultivation. It is not enough to use normal eyesight, a hand-lens or a microscope but more powerful tools are necessary for some characters. In the wild, the species hybridise to a great extent and it is probable that much of the variability in cultivation seen by myself and others is a result of this. Thus, many trees are possibly incorrectly named. Another problem is not having enough of the relevant herbarium material of the plant in all its stages and the great difficulty in marrying what is in cultivation with the wild collected material.

From personal experience, one needs to make repeated visits during all seasons to see the plants concerned. The trees that I have had most difficulty with are *C. ovata, C. laciniosa* and *C. tomentosa* and what I consider their putative hybrids. It is for this reason that I am carrying over my tables on the measurements on *C. ovata* and its possible hybrids for a future *IDS Yearbook*, when I hope I will have sorted out what is what in my own mind. **I would, also, really appreciate feedback from IDS members on how well they have been able to identify these taxa and are they sure that their specimens are correctly named!**

Alan Mitchell (1971) wrote a helpful article on *Carya* identification. In it, he mentioned his own problems with verifying the genus in general as well as with individual trees. Flanagan (1987) went into much more detail overall and provided a useful table of differences for the five main species in cultivation, *C. cordiformis,*

C. glabra, C. laciniosa, C. ovata and *C. tomentosa*. Accompanying this was a figure showing the terminal winter buds of the same taxa. Both of these, however, were based on a relatively small number of plants (M. Flanagan *pers. comm.*).

He pointed out the importance of the terminal winter buds for an initial start to identification, their size and shape as well as the retention or loss of the outer bud scales. In the case of *C. ovata, C. laciniosa* and to a certain extent *C. tomentosa*, the young scales increase quickly in size, to become large and floppy as the foliage emerges.

As for the characteristic bark; this is not as straightforward as one might think. There is a good description of the bark and its behaviour in Peattie (1991) and Vaucher (2003) has some excellent textbook photographs of the trunks of *C. ovata, C. laciniosa* and *C. tomentosa*. But it is not so easy to assess several of the trunks in cultivation. Young plants of *C. ovata* have a smooth bark, but so can some mature trees! Peattie (1991) mentioned that some specimens of *C. ovata* can have a close, rather than a shaggy bark. These were known as bastard hickory by the local lumbermen. Augustine Henry particularly noted one such tree at Kew:

> "Another tree at Kew, which was labelled *Carya alba* [now *C. ovata*], differs from all other specimens which I have seen, as follows:- Branchlets and leaf-rachis almost glabrous, only showing when young a few stellate hairs. Leaflets, five, lanceolate, narrow, long-acuminate, nearly glabrous, with only a few stellate hairs, confined on the upper surface to the midrib, and scattered over the lower surface; margin non-ciliate. Buds, as in the typical form but pointed and smaller. This tree, which is about 30 feet high, has very smooth bark and is growing very vigorously. It is probably a glabrous form of *Carya alba* ....."
>
> (Elwes & Henry 1908)

Other features that Mitchell *et al.* have mentioned as good characters for *C. ovata*, i.e. an oily leaf texture – is not constant; the dense ring of hairs which occurs at the base of the new growth – also occurs in *C. laciniosa* and to a lesser extent in *C. tomentosa* and therefore in most of the putative hybrids; the tufts of hair between the marginal teeth on the lower leaf surface – is very variable and *C. laciniosa* and its hybrids can have similar tufts. Stone (1997) noted various hair types as well as glandular and peltate scales. I have found glandular scales (capitate or head-like glandular) and hairs on the bracts and the stalks and the former on young twigs. Peltate scales have been found on bud scales, the undersides of leaflets, on the stalks of catkins and on young fruits, sometimes densely coated. As for the fruits, we have had two very dry summers and what fruits that have been produced have been atypical and difficult to identify.

Nine photographs of *C. ovata* showing bark, buds, leaves and flowers can be seen on DiversityOfLife.org.image http://132.236.163.186/index.html (see Fagales). There is of course no guarantee that they are correctly named.

The shagbark was introduced into cultivation in 1629 and Loudon (1844) gave a detailed description and mentioned several large specimens in and around the London area at that time. Elwes & Henry (1908) commented that none of them were still alive, thus concluding that it was not a long-lived tree over here. It is also

puzzling that Jacobson (1996) cited *C. ovata* as the most commonly offered hickory in the American nursery trade, yet he stated it had been available only since 1888!! Is that really true, considering that General Andrew Jackson (1767-1845), later the seventh President of the United States, was known as "Old Hickory" and six huge shagbarks tower over his grave (Peattie 1991)? How long-lived are they in North America?

Lyle (2006) noted that *C. ovata* is tolerant of high soil levels of lead, zinc and other heavy metals. More aluminium is taken up by its foliage than any other known plant. It thrives in poor and problematic soils and in disturbed areas. However, it will not tolerate waterlogged soils.

When grown as an ornamental for shade, it is particularly effective in a woodland setting. It also makes a good windbreak. When given enough room to grow, a mature solitary tree will develop a widespreading canopy of majestic appearance. A small group can be equally striking. Flanagan (1987) noted that the genus was more successful in the south east of England, although formerly there were reputable specimens in the north and in Scotland (Elwes & Henry 1908).

Apart from the difficulties of identification and propagation, Flanagan (1987) pointed out that as hickories are rarely in leaf before the middle of June and lose their foliage by the end of October, they are not that popular with the cognoscente. It would be interesting to note if their foliage period has been extended by recent climate changes. Comments welcome, please.

Once seen, never forgotten; the autumn colour of *C. ovata* is absolutely stunning. At its best, it is a most glorious golden-yellow.

Propagation

The propagation of hickories in general has always been problematic and thus the excellent advice by W.J. Bean is reproduced here:

> "Considering their great beauty of foliage and stately habit – ..... this genus is strangely uncommon in gardens. The reason appears to be their dislike of disturbance at the root, which makes them unsuited to ordinary nursery conditions. The frequent transplanting which is practised by good nurseymen to ensure success at the final removal of their stock is, in my experience, worse than useless with hickories. It induces a stunted, ultimately diseased condition, from which, at the best, it takes them long to recover. The great secret with hickories is to get them in their permanent places. ..... Nuts .... should be obtained in autumn from a reliable American seedsman as early as possible after they are ripe. During the winter they should be kept in a box of moist earth, either inside or out-of-doors. In spring the nuts may be placed singly in 6-in. pots, in a slightly heated frame or greenhouse. After they have germinated, all that is necessary is to protect them from frost until they are planted out about the end of May, if sufficient progress has been made. Caryas need a deep, loamy soil if they are to thrive permanently. Previous to planting the seedlings out, the ground should be well worked, and it is wise to put a couple together to anticipate failures, afterwards the weaker one can be removed. To avoid accidents each plant or plants should be enclosed by small-meshed wire-netting.
>
> The object of all this trouble is to avoid the destruction of the tap-root, which is inevitable if ordinary nursery treatment be adopted. A young tree in deep loam, undisturbed, and with its tap-root preserved, will be a better tree in ten years than another treated in the ordinary way will be in twenty. This method, although the best, may not always be practicable. If perforce the seedlings have to be grown on for several years

Carya x *laneyi J.G. Jack* s.n.

before planting in their final positions they should be grown in light soil and transplanted every year or so to induce a fibrous root system. Such trees will be more difficult to establish than they would have been if planted out in their first year of life, but at least are preferable to ones which have not received this attention."

(W.J. Bean 1970)

Flanagan (1987) endorses the above but adds a rider to promote "the use of a water-holding polymer in the backfill and a thick layer of organic mulch or an organic sheet mulch to prevent weed competition and moisture stress."

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References and further reading

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Tree of the Year 2007:

For 2007, the chosen taxon is *Parrotia* in the Hamamelidaceae. *Parrotia persica* (D.C.) C.A. Mey., the Persian ironwood is well known, while *P. subaequalis (H.T. Chang) R.M. Hao & H.T. Wei* has recently been transferred to this genus.

Please send your comments, photographs and any other information to Susyn Andrews, 86 Thompson Avenue, Kew, Richmond, Surrey TW9 4JN to arrive not later than 30 September 2007.