CHECKLIST OF CULTIVATED GINKGO

by Frank S. Santamour, Jr., Shan-an He, and Alice Jacot McArdle

Even though it is not "probably the most esteemed street tree in this country" as stated by Li (3), *Ginkgo biloba* L. has proved to be a reasonably useful tree for planting in urban areas of the United States. Its reputation as a "trouble-free" tree is based more on the myth that this classical monotypic "living fossil" should have no pests than on valid scientific observation. While there are no dramatic defoliations, wilts, or blights that befall ginkgo, there must be reasons for the breakage of main trunks and premature tree death that have been observed.

Ginkgo is native to eastern China, most likely in an area of southern Anhui and northern Zhejiang provinces just north of the 30th parallel (3). Whether any truly "wild" trees have existed in the past 100 years is a matter of debate. It is, however, a fallacy that the preservation of the species was the result of its significance in the Buddhist religion (3).

Ginkgo was probably introduced to Japan more than a thousand years ago, and, in fact, the name "ginkgo" is of Japanese origin. The tree was introduced into Europe about 1730, to England in 1754, and to the United States, from England, in 1784.

Ginkgo is generally considered to be dioecious, with individual trees being either male or female. Monoecious trees, having flowers of both sexes, have been reported (5), and our own study of sex expression in ginkgo will be the subject of a separate paper. The production of fruit and viable seed by isolated "female" trees has also been noted (4).

The pulp of the fruit of ginkgo produces an odor, mainly from butyric acid, that may be considered disagreeable or obnoxious. Therefore, male cultivars have been selected for planting in Western countries. In the Orient, however, particularly in the People's Republic of China, the seed of the ginkgo is a prized food delicacy, and female cultivars have been selected for larger seed and abundant fruit production.

The translation of the Chinese name for ginkgo (yinxing) is "silver apricot" and the seeds are indeed edible. In China, the fruits are harvested by beating them down with a bamboo pole in October or November, when they have become brownish yellow. They are kept in a container or piled in some cool place outdoors until the pulp ferments. It is best to wear plastic or rubber gloves when handling the fruit at this stage, since the pulp contains a skin irritant not unlike that in poison ivy. The seeds are removed from the pulp by stirring or agitating in water and washing them clean of pulp. The cleaned seeds are what is sold in the market as food.

Ginkgo seeds must be cooked, boiled or roasted, before they are eaten. The outer seed coat is first cracked and removed and the thin paper-like inner layer can be peeled after a brief soaking in hot water. After peeling, the seed may be boiled for 10 or 15 minutes or roasted, with oil, in a pan. Ginkgo seeds are usually used in desserts, especially in sweet soups with Chinese dates (*Zizyphus jujuba* Mill.).

Maunsell Van Rensselaer, Director (1951-1966) of the Saratoga Horticultural Foundation, Saratoga, California, was a champion of ginkgo in the United States. Many of the cultivars in this checklist were only known from the test plots of that Foundation, although some plants did "escape" into arboreta, and many names were contained in a survey made by the American Horticultural Society. We are indebted to Mr. Barrie D. Coate, Director of Horticulture at the Foundation, for data on these cultivars. The Saratoga Horticultural Foundation does not propagate or sell any ginkgo cultivars at the present time.

The U.S. National Arboretum, as temporary International Registration Authority for unassigned genera of woody plants, has assumed the responsibility of preparing authoritative cultivar checklists of important landscape tree genera in accordance with the provisions of the International Code of Nomenclature for Cultivated Plants (1). Cultivars selected and grown for fruit production in the People's Republic of China are listed in a separate

section and, we believe, are published here for the first time in any language other than Chinese pictographs.

Although *Ginkgo biloba* L. is currently the accepted scientific name for this species, the English botanist J.E. Smith considered the name "uncouth and barbarous" and renamed it *Salisburia adiantifolia* in 1797. Some of the earliest ginkgo cultivars were selected and named under this botanical epithet.

It is of great interest that there are virtually no ginkgo cultivars presently in the nursery trade that exhibit well-formed open crowns with evenly spaced branches. Such trees do exist, and some nurseries have attempted their propagation. However, trees propagated from lateral branches or branch buds often continue to develop as branches rather than assume an upright habit. Until we can solve these propagation problems, we will not be able to utilize the best germplasm in this species.

As in previous checklists (6, and others), **VALID CULTIVAR** names are given in boldface capitals and INVALID CULTIVAR names in lightface capitals.

ADIANTIFOLIA (F. Tobler, Ber. Deutsch. Bot. Ges. 58: 363-369, 1940) — as a form incorrectly ascribed to A. Sprecher, Le *Ginkgo biloba* L., Thesis, Univ. Geneva, Switzerland, 1907, 207 p. Sprecher only used this epithet as a species name as *Salisburia adiantifolia*.

AUREA (J.N. Nelson, Pinaceae, 1866, p. 164) — as *Pterophyllus Salisburiensis aurea*, leaves golden-yellow.

AUREO-VARIEGATA (A. Seneclauze, Les Coniferes, Paris, 1867, p. 81) — large leaves with broad yellow bands; referenced to C.S., which is probably Catalog Seneclauze. The 'Aureovariegata' of J. Ohwi (Flora of Japan, Smithsonian Inst., Wash., D.C., 1965, p. 109, English translation edited by F.G. Meyer and E.H. Walker) is most likely a different cultivar, but that name is invalid because it duplicates the earlier name and is in Latin form after January 1, 1959.

AUTUMN GLORY (Nelson Nursery, San Leandro, California, Price List, January 1959, p. 6) — without description.

AUTUMN GOLD (M. Van Rensselaer, Jour. Calif. Hort. Soc. 17: 100-101, 1956) — oval upright crown, staminate tree, selected in 1951 and introduced in 1955. Original tree near corner of El Abra Way and Lincoln Ave., San Jose, California.

BELL — Name found in records of the Plant Sciences Data Center of the American Horticultural Society. Original tree at the home of James Bell, Atherton, California and propagated under this name by the Saratoga Horticultural Foundation, Saratoga, California, until 1959, when the name 'Canopy' was assigned to it.

CANOPY — Name found in records of the Plant Sciences Data Center of the American Horticultural Society. Formerly known as 'Bell' and propagated by the Saratoga Horticultural Foundation, Saratoga, California. Trees growing at four major arboreta, but the cultivar has never been described or commercially available.

CLEVELAND — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Propagated from a fastigiate tree in Cleveland, Ohio by the Saratoga Horticultural Foundation, Saratoga, California and tested under this name. Tree at Los Angeles State and County Arboretum, Arcadia, California, although the cultivar has not been described or commercially available.

CUTLEAF (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = **LACINIATA.**

DISSECTA (C. Hochstetter, Coniferze, 1882, p. 101) = **LACINIATA** according to A. Rehder, Bibliography of cultivated trees and shrubs, Arnold Arboretum of Harvard University, 1949, 825 p.

EPIPHYLLA (J. Ohwi, Flora of Japan, Smithsonian Inst., Wash., D.C., 1965, p. 109, English translation edited by F.G. Meyer and E.H. Walker) — no cultivars were given in the original 1953 Japanese version of Ohwi's work, but the extended English translation listed 'Epiphylla', which must be considered invalid because of the use of Latin form after 1959. Japanese equivalent given as **OHATSUKI.**

EL ABRA — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Original tree on Sierra Street, San Jose, California and propagated and tested under this name by the Saratoga Horticultural Foundation, Saratoga, California. The cultivar has never been described or commercially available.

FAIRMOUNT (Saratoga Horticultural Foundation, Saratoga, California, Wholesale price List, October 15, 1962, p. 1, Trade-marked) — without description. Propagated from a male grafted tree planted in 1876, during the Centennial Exposition in Philadelphia, Pennsylvania, at the site of the Horticultural Hall in Fairmount Park. Mature tree has dense, upright pyramidal crown; younger trees have a horizontal branching habit. Validated here for the first time.

FASTIGIATA (Kew Hand-List of Coniferae, Ed. 1, 1896, p. 19) — without description. Branches ascending, forming a columnar head, according to A. Rehder, Manual of cultivated trees and shrubs, Macmillan, 1940, 996 p.

KEW — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Propagated from a fastigiate male tree in the Royal Botanic Garden (Kew Gardens), England, by the Saratoga Horticultural Foundation, Saratoga, California, and tested under this name. The cultivar has never been described or commercially available.

LACINIATA (E.-A. Carriere, Rev. Horticole, 1854, p. 412) — leaves deeply laciniated, wavy at the margins. Raised by Reynier of Avignon (France) in 1840 and put into commerce by Seneclauze's nursery.

LAKEVIEW (Shade Tree Selection Committee of the National Shade Tree Conference, Trees Mag. 15(3): 10-11, 1955) — male, pyramidal. Illus. E.H. Scanlon & Assoc., Olmsted Falls, Ohio, Advert., Trees Mag. 19(2): 2, 1959, broadly pyramidal.

LARGELEAF (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = 'Macrophylla' =

LACINIATA.

LONGIFOLIA (L. Henry, Rev. Horticole 11: 80-84, 1911) = **LACINIATA.**

MACROPHYLLA (E.-A. Carriere, Traite Gen. Conif., Paris, 1855, p. 504) — as a synonym for **LACINIATA,** and referenced to Cat. Senecl., 1854, p. 40.

MACROPHYLLA INCISA (L. Beissner, Handbuch der Nadelholzkunde, Ed. 1, 1891, p. 192) = **LACINIATA.**

MAYFIELD (E.H. Scanlon, Plant Prop. Soc. Proc. 1: 20-32, 1951, illus. with leaves. p. 28) — male, pyramidal, very narrow, strictly fastigiate and "Lombardy-like" in outline. Also in E.H. Scanlon & Assoc., Olmsted Falls, Ohio, Advert., Trees Mag. 19(2): 2, 1959, illus. without leaves.

MORAINE — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Plant obtained from The Siebenthaler Co., Dayton, Ohio and grown at the Saratoga Horticultural Foundation, Saratoga, California. Cultivar never commercially available.

OHATSUKI (J. Ohwi, Flora of Japan, Smithsonian Inst., Wash., D.C., 1965, p. 109, English translation edited by F.G. Meyer and E.H. Walker) — as Ohatsuki-icho ("icho" means ginkgo) with peduncles of the fruit becoming broad and winglike and adnate to the leaf petiole. Similar fruit illus. in M. Miyoshi, Mitt. Deutsch. Dendr. Ges. 43: 21-22, 1931.

OHAZUKI (USDA Plant Inventory No. 169, P.I. 274262, p. 136, 1967) — introduced from The Netherlands, plants presented by H. Veendorp, Curator, Hortus Botanicus, Leiden, Rcd. April 26, 1961. Plant at Longwood Gardens, Kennett Square, Pennsylvania according to listing of Plant Sciences Data Center of the American Horticultural Society, = **OHATSUKI.**

OVERLOOK — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Propagated from a tree selected by E.H. Scanlon, Olmsted Falls, Ohio, on Mt. Overlook Ave., Cleveland, Ohio by the Saratoga Horticultural Foundation, Saratoga, California and tested under this name. The cultivar has never been described or commercially available.

PALO ALTO (Shade Tree Selection Committee of the National Shade Tree Conference, Trees Mag. 15(3): 10-11, 1955) — male. Illus. E.H. Scanlon & Assoc., Olmsted Falls, Ohio, Advert., Trees Mag. 19(2): 2, 1959, as nicely formed specimen representing the species.

PENDULA (A. Van Geert Nurs., Belgium, Cat. 1862, p. 62) — branches pendulous.

PRAGENSIS (J.P. Krouman, Gard. Chron. 166(14): 14-15, 1969) — low, spreading, parasol-shaped crowns, two trees in Prague, Czechoslovakia. This is not the same cultivar as 'Pendula' of British gardens, M. Hadfield, Gard. Chron. 166(18): 6, 1969. Name invalid because in Latin form after 1959.

PRINCETON GOLD — Name found in records of the Plant Sciences Data Center of the American Horticultural Society. Trees at the Morton Arboretum, Lisle, Illinois and Longwood Gardens, Kennett Square, Pennsylvania. A selection of Princeton Nurs., Princeton, New Jersey, as a male with a strong central leader and perfect regularity of branching habit. Plant Patent No. 2675, October 4, 1966. This cultivar was never advertised by Princeton Nurs. and was discontinued because of propagation difficulties.

PRINCETON SENTRY (Princeton Nurs., Princeton, New Jersey, Wholesale Price List, Fall 1972-Spring 1973, p. 32) — upright growing, male. Illus. in Wholesale Price List, Fall 1973-Spring 1974, p. 33 as new columnar tree with a unique narrow head similar to Lombardy poplar. Plant Patent No. 2726, March 7, 1967.

PYRAMIDAL (E.H. Scanlon, Plant Prop. Soc. Proc. 1: 20-32, 1951, illus. p. 27) — male. Not intended as a cultivar name.

PYRAMIDALIS (John Vermeulen & Son, Inc., Neshanic Station, New Jersey, Cat. Spring 1963, p. 7) — male, from cuttings. Tree of this cultivar growing at Holden Arboretum, Mentor, Ohio. Name invalid because in Latin form after 1959.

ROBIN — Name found in records of Plant Sciences Data Center of the American Horticultural Society. Tree at Holden Arboretum, Mentor, Ohio obtained from Cole Nursery Co. in 1968. Male tree selected in southern Ohio as a most well-formed ginkgo, with crown characteristics similar to *Tilia cordata*. Propagated and evaluated under this cultivar name by Cole Nursery Co., Circleville, Ohio. Cultivar never commercially available.

ROOSEVELT — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Propagated from a tree on Roosevelt Boulevard, Philadelphia, Pennsylvania, by the Saratoga Horticultural Foundation, Saratoga, California, and tested under this name. The cultivar has never been described or commercially available.

ST. CLOUD (F.G. Meyer, Baileya 9: 127-133, 1961) — branches at right angles to the trunk or slightly ascending, rarely with secondary branches, densely leafy. Original tree at Jardin Kahn, St. Cloud-sur-Seine, Bois de Boulogne, Paris, France. Introduced as P.I. 242018.

SANTA CRUZ (E.H. Scanlon & Assoc., Olmsted Falls, Ohio, advert., Trees Mag. 19(2): 2, 1959, illus.) — umbrella form, low and spreading, illustration same as for UMBRELLA.

SAN JOSE GOLD — Name found in the records of the Plant Sciences Data Center of the American Horticultural Society. Trees at Holden Arboretum, Mentor, Ohio, received from J. Clarke Nurs., San Jose, California, in 1969.

SARATOGA (Calif. Assoc. Nurserymen, Peninsula Chapter Bull., March 1976, p. 2), — originated at the Saratoga Horticultural Foundation, Saratoga, California, first introduced in 1975, notable for its dense, compact habit with ascending branches, distinct central leader, and moderately slow growth rate. Saratoga Horticultural Foundation, Price and Availability List, February 15, 1977, p. 2 listed tree as "male," with some further description.

SENTRY (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = **FASTIGIATA.** Name may also be mistakenly used for **PRINCETON SENTRY** or refer to a fastigiate tree propagated and tested under the name "Sentry" by the Saratoga Horticultural Foundation, Saratoga, California.

SINCLAIR (The Siebenthaler Co., Dayton, Ohio, Trade List Fall 1977, p. 19) — without description. A male, well-branched selection of Princeton Nurs., Princeton, New Jersey, but never advertised by them because of propagation difficulties. Name validated here for the first time.

SLIM JIM — Name found in records of Plant Sciences Data Center of the American Horticultural Society. Tree at Holden Arboretum, Mentor, Ohio, obtained from Cole Nursery Co. in 1968. Male, fastigiate tree selected by M.W. Staples in Kent, Ohio and propagated and evaluated under this cultivar name by Cole Nursery Co., Circleville, Ohio. Cultivar never commercially available.

STERILE — Name used by the Siebenthaler Co., Dayton, Ohio to denote males obtained from various sources.

TRILOBA (H.J. Elwes and A. Henry, Trees of Great Britain and Ireland 1: 58, 1906) — "scarce worthy of recognition, as the leaves in all ginkgo trees are exceedingly variable in lobing." May = **LACINIATA.**

UMBRACULIFERA (Shade Tree Selection Committee of the National Shade Tree Conference, Trees Mag. 15(3): 10-11, 1955) — umbrella shaped. Name also found in records of Plant Sciences Data Center of the American Horticultural Society, plants growing at the Saratoga Horticultural Foundation, Saratoga, California, original tree in Santa Cruz, California, = **SANTA CRUZ.**

UMBRELLA (E.H. Scanlon, Plant Prop. Soc. Proc. 1: 20-32, 1951, illus. p. 29) — male umbrella shaped ginko (sic), Trees Mag. 12(3): 12, 1952, illus. and mentioned as "sent to us by Maunsell Van Rensselaer" (Saratoga Horticultural Foundation, Saratoga, California) = **SANTA CRUZ.**

VARIEGATA (E.-A. Carriere, Rev. Horticole, 1854, p. 412) — leaves variegated yellow.

VARIEGATED (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = **VARIEGATA.**

WEEPING (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = **PENDULA.**

YELLOWLEAF (H.P. Kelsey and W.A. Dayton, Standardized Plant Names, 1942, p. 274) = **AUREA.**

Chinese Cultivars

M.C. Tsen in 1935 (7) was perhaps the first Chinese botanist to attempt a scientific classification of the various cultivated types of ginkgo. He proposed three botanical varieties, under which the cultivated types could be categorized: (a) var. *typica,* the Meihe-Yinxing group or plum-stone shaped ginkgo, with round fruit; (b) var. *huana,* the Fushon-Yinxing group or finger citron ginkgo, with elliptic or oblong fruit; and (c) var. *apiculata,* the Maling-Yinxing or horse's-bell shaped ginkgo, with a fruit shape intermediate between the other two, and with a small apicula on the top of the fruit.

The Latin epithets for the botanical varieties erected by Tsen are invalid because Latin diagnoses were not provided, but the Chinese group names for these varieties are very useful and have been followed by subsequent authors. The cultivar names proposed by Tsen and others are hereby validated, according to the Code (1), by transliteration into the Roman alphabet, i.e., Pinyin. The authority for each cultivar name does, however, remain with the first published work.

Because of the very detailed descriptions for valid cultivars that exist in the Chinese literature, our descriptions in the listing that follows will be much abbreviated, or even limited to a translation of the cultivar name.

A. Meihe-Yinxing — plum-stone shaped ginkgo.
- **DAMEIHE** — large plum stone (7, 10, 11).
- **MIANHUAGUO** — cotton-fruit like; often with twin fruit (8, 10).
- **NANHUIWUXIN** — Nanhui inembryonate; fruit without embryos (11).
- **SUANPANGUO** — abacus-bead like (8, 10).
- **TONGZIGUO** — tung-tree fruit like (8, 10).
- **XIMEIHE** — small plum stone (7, 12).
- YUANZHU — round beads. There is some question whether this is a collective name for several cultivars with round fruit. We are considering it a valid group name with the described variations probably derived from this cultivar; **DAYUANZHU** — large round beads, **XIAOYUANZHU** — small round beads, **YAPIGU-YUANZHU** — duck's buttocks (9, 11).

B. Fushon-Yinxing — finger citron shaped ginkgo.
- **CHANGBING-FUSHON** — long petiole finger citron (7, 8, 10, 12).
- **DAFUSHON** — large finger citron (9, 11).
- **DONGTINGHUANG** — King of Dongtingshan Mountain, fruit largest, 500-year-old tree is 16 meters tall (8, 9, 10, 11).
- **FUZI** — Buddha's finger (2, 11).
- **GANLAN-FUSHON** — Chinese olive-like finger citron (8, 10).
- **JIAFUSHON** — domestic finger citron (2, 8, 10) = DAFUZI, large Buddha's finger.
- **JIANCHU** — sharp pestle; poor quality (7).
- **JIANGHO-FUSHON** — sharp-top finger citron (7, 12).
- **JINGUO-FUSHON** — golden-fruited finger citron (7, 8, 10, 12).
- **LUANGUO-FUSHON** — ovate-fruited finger citron (7, 8, 10, 12).
- **XIAO-FUSHON** — small finger citron (9, 11).
- **YUANDI-FUSHON** — round-bottom finger citron; superior type (7, 8, 11, 12).
- **ZAOZI-FUSHON** — Chinese date-like finger citron; name reported (8, 10) but without description.

C. Maling-Yinxing — horse's-bell shaped ginkgo.
- **DAMALING** — large horse's bell (7, 10, 12).
- **LONGYAN** — dragon's eye (2, 11).
- **HUANGPIGUO** — yellow peel fruit (8, 10).
- **QINGPIGUO** — green peel fruit (8, 10).
- **XIMALING** — small horse's bell (7, 12).
- **ZHONGMALING** — medium horse's bell (7, 10, 12).

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ABSTRACT

Hamilton, D.F. 1982. **Control methods for some common midwestern pests.** Am. Nurseryman 156(1): 183-185.

Pine root-collar weevil is a relatively new pest problem on pines in Indiana. It can ultimately kill these plants. The larvae feed in the phloem tissue around the root collar, killing the cambium in the process. The tree is girdled at the ground line. Obscure scale has caused some problems on pin oak. This insect, which produces symptoms similar to iron chlorosis, is very difficult to see, often making control difficult. Bagworm attacks the foliage of both deciduous and evergreen trees and shrubs. The pest is so named, because the caterpillar spends its life inside a silken, spindle-shaped bag adorned with bits of twigs and leaves from the host plant. The young caterpillars immediately spin a bag while continuing to enlarge and grow. There is only one generation per year. Gypsy moth is a very serious pest that attacks a wide range of plants. Oaks suffer from gypsy moth attacks more than other species. Most deciduous trees can withstand one or two consecutive years of defoliation before severe decline or death occurs. Conifers usually die after one complete defoliation.