

CELTIS

The 'Hackberries' or 'Nettle Trees' are a group of deciduous trees and shrubs which constitute a section of the genus Celtis. This is a relatively large genus of fast growing, but ornamentally undistinguished, trees and shrubs from the family Ulmaceae. They are closely allied to Pteroceltis and Aphananthe, and are related with less affinity to Ulmus (the Elms), Hemiptelea and Zelkova. The genus contains eighty or so species and these have a wide distribution throughout the tropics, subtropics and temperate regions.

This group of trees, consisting of thirty or so species, is distributed widely throughout the temperate regions of the Northern Hemisphere, with outliers also occurring in the temperate regions of Southern Africa. They constitute the subgenus Euceltis and are, for the main part, deciduous. All of this group of species are remarkably similar in habit and leaf form, and in general are difficult to distinguish from one another, particularly when in the vegetative condition. The differentiation between each of the species is based, primarily, on such leaf characters as size, texture, the pattern of veining, pubescence and the degree of marginal serration; and secondarily, when fruit is available, the colour and size of the drupes. The colour and surface condition of the seeds are also useful diagnostic features.

The evergreen species are limited to a tropical and subtropical distribution.

No major taxonomic survey or revision of the genus has been undertaken and any identification of the less common species is thus unreliable. A scan of the relevant literature reveals little information, or even interest concerning the ornamental characters, the cultivation requirements or the horticultural value of the group. Most of the species have rarely been recommended or regarded as worthy of cultivation. In general they have been damned by faint praise! However, the genus does contain a number of species which do have merit and which will develop as reliably green foliaged, well shaped specimens in otherwise unlikely locations and hostile environments.

Many of the species have demonstrated a capability to withstand considerable levels of stress and will survive in hot dry locations where many other deciduous, "soft" leaved subjects falter; several are capable of surviving summer heat, drought and hot, drying winds; as well as concurrently tolerating soil salinity and alkalinity.

Despite the fact that the deciduous, arborescent species have not generally been regarded as being in the front rank of ornamental trees, they are nevertheless capable of developing into elegant and shapely specimens even if they do not exhibit any other particularly noteworthy individual features. The combination of this formal quality with an ability to maintain good green foliage in a difficult environment, has permitted certain species to be used extensively in some mediterranean climatic areas as shade and street trees. The value of these trees therefore lies in their ability to

tolerate a wide range of hostile climatic and soil conditions, a variable water supply and, to a certain extent, pollution. They are also in general free of any major pest and disease problem - the exceptions being the North American species, which do not however appear to transfer these problems to alien species--more especially the genus is not susceptible to Dutch Elm Disease (or at least the vector) and may therefore fill a useful niche where Elms cannot be used.

As trees, they develop into light airy specimens with clear well spaced heads and they all have clean, hard textured, light green foliage which develops simple--but otherwise unremarkable--clear, yellow, autumnal colours. The leaves are, individually, relatively small and cause few problems when they fall. The leafless period varies considerably from species to species, some exhibiting quite a short period between leaf fall and bud break. The bark on mature trees of many of the larger species is smooth and grey and is not unlike that of a Beech.

There is not outstanding flowering season with these subjects as the unisexual flowers, which are both carried on the same tree, are inconspicuous, small and yellowish green in colour. The fruit is a small, one-seeded drupe--a character which readily distinguishes this genus from Ulmus and the more closely related and morphologically similar Pteroceltis.

Many of the species will develop a tree habit of medium size, and assuming that they possess a relevant hardiness, may offer potential as satisfactory subjects in some of the less hospitable

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situations in California. In general they possess strong wood and the branches are well anchored in the main trunk so that crotch angles are not necessarily an important feature in assessing weaknesses in relation to wind or when otherwise loaded.

The potential for the future use of the tree species from this genus in California will depend on the selection of forms with superior structural characteristics and shape, coupled with the possession of an adequate degree of hardiness, so that their performance in the landscape can be assured.

Such a program would entail the surveying of existing populations or the establishment of sufficient plantings for future assessment. It would be relevant to obtain such material from as wide a variety of provenances as possible in order to provide a sufficient spectrum of variation in all the required characteristics - not only tree shape, size and structure but also hardiness, tolerances of soil, salinity, water status etc.

Celtis africana has been little used in the Northern Hemisphere but is extensively used in Cape Town (RSA) and in New Zealand as a street tree. Its use and value in Northern California would probably be limited by its hardiness; however it might be possible that selections could be made from a wider variety of provenances--as it is known to have a wide geographical distribution throughout Southern Africa and can be found growing from elevations of 6,000 ft. down to sea level, in a relatively wide spectrum of mediterranean climates.

Celtis australis has been used extensively, in its native areas of Southern Europe, as a street tree; many streets in the cities of Italy and Yugoslavia have impressive avenues of this subject. In California it has not achieved the wide use which might have been expected although some fine plantings do exist--most notably in two, such diverse, environments as the cities of Palo Alto and Davis. This subject develops into a medium to large tree of stately proportions (to sixty feet or so) with an ascending branching habit which causes the tree to produce a rounded head, in street situations this can readily be limbed up to produce a vase shaped and open lower profile with a high canopy. It will develop a bole of significant proportions with a smooth and ornamental, pewter grey bark resembling that of a European Beech. The leaves are small, coarse and hard textured which produce little or no litter problem and the fruits although they do fall are usually dry and insignificant by this stage.

Celtis sinensis is a small growing, somewhat variable, tree (perhaps to about thirty feet) developing into a round headed tree with a light, airy and twiggy structure. It can be seen on the UC Davis campus where it has been used extensively to line the streets and where it exhibits, despite a late season marginal chlorosis a remarkable tolerance of high boron levels of the irrigation water. It has been reported as being subject to aphid attack but this does not appear to be a major problem. The variation of seedling populations can also be seen on the south side of Interstate 180 between the main Davis off ramp and the Mace Blvd. exit.

There are several species (the 'Hackberries') which are endemic to North America: -

C. laevigata

C. reticulata

+ C. douglassi

C. occidentalis

+ C. pumila

C. lindheimeri .

C. pallida

C. tenuifolia

although there appears to be a continuing debate as to the taxonomic position of many of the species cited above--more especially as to whether C. laevigata and C. occidentalis constitutes one species in the transition across the range. Many of these can and have been used successfully in the more hostile environments of the prairie areas but in C. occidentalis, the Hackberry, at least, growth and development is often marred and disfigured by a range of pests and diseases--the most obvious of which is the 'Witches Broom' caused by Powdery Mildew (Sphaerotheca phytophylla) and/or an eriophyd mite; nipple galls on the leaves can also be a major disfigurement when infestations are heavy.

In addition to C. australis the following species:-

C. caucasica

C. glabrata

C. tournefortii

are all native within the region comprising SE Europe and W Asia - the area comprising Asia Minor, the Caucasus and thence into Mesopotamia. C. caucasica is documented as being both hardy and tolerant of arid summer conditions and, provided a good tree sized form could be obtained, would be worth trialling.

It is probable that further study of this genus in the field will determine that some of these western Asiatic species extend eastward and intergrade with the species described from the Far East but in the absence of such a field based monographic treatment the conventional view is taken as to the determination of the species.

The greatest variety of species occur in the Orient and in addition to C. sinensis includes:-

C. biondii

C. bungeana

C. cerasifera

C. jessoensis

C. julianae

C. koraiensis

C. labilis

most of these will grow into elegant, small trees which maintain an excellent foliage condition throughout the season. How they will perform in an arid summer environment is a moot point but it is probable that some would demonstrate the same tolerances as C. sinensis and it would be a valuable exercise to trial the less well known species. Wyman on very limited evidence from the Arnold Arboretum rated C. bungeana as a potentially useful tree with

elegant growth habit. C. koraiensis is noted for its particularly large leaves and fruit. Dirr backs C. jessoensis as a tree with a good, if limited, track record. All in all, available information emphasizes the general lack of information, and the need to evaluate virtually all this group.

Propagation

All the species can readily be produced from seed, which for the more southerly distributed does not require germination pretreatments: however as a general rule it would be prudent to chill seeds for 56 days prior to subjecting to conditions for germination.

Vegetative propagation can certainly be achieved by various forms of grafting and there is no doubt that stem cutting propagation would be successful if the technique was refined, as yet little observational work has been undertaken.

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