

CURRENT TRENDS IN RESEARCH ON WILLOWS AT LONG ASHTON

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The post of Willows Officer was created in 1922 to conduct research and give advice on basket willow growing and was located at Long Ashton to be near the main basket willow growing area in Somerset. In the 1930s, H. P. Hutchinson also began to study cricket bat willows. I inherited both interests on appointment in 1949 and from the mid 1950s became more interested in the use of tree willows for paper pulp, windbreaks and land reclamation. Until recently the amenity value of this large and fascinating genus was relatively neglected. Now willows are being used increasingly for all kinds of amenity planting and it is important that those associated with propagation and the nursery trade should be aware of future requirements for propagating material, rooted plants and standard trees, and particularly of the Long Ashton Willows Collection as a source of reliable propagating material.

LONG ASHTON WILLOW COLLECTION

In the 1930s collecting began in order to establish a comprehensive selection of basket willows from all the European centres of production. Hence cultivars of *Salix triandra*, *S. purpurea* and *S. viminalis* predominate. Clones of cricket bat willow (*S. alba* var. *calva*, syn.: *S. alba* 'Coerulea') were acquired to support investigations on cricket bat willow culture and timber quality. From 1955, tree willows, selections of naturally occurring clones or hybrids of *S. alba* (white willow), have been acquired from Europe and New Zealand to supplement our native selections. Whilst all sections will be enlarged, the main aim now is to increase our holding of ornamental willows.

The collection was last replanted in 1971 and was re-grouped into species beds. The 250 kinds and their location are listed in an article in the Long Ashton Report for that year. We now have over 300 different willows; 12 stools of each kind are maintained and coppiced annually.

The collection is valuable for scientific reference and allows the comparison of a range of characteristics within a single genus. For example, it has been used to study variations in leaf shape, the distribution of particular plant constituents, or the preferences of individual pests and diseases. It is also a unique source of propagating material and increasingly meets demands for willows suitable for a range of purposes. Selec-

tions have been supplied to some 25 nurseries so that in future, most requests can be met from trade sources.

TRENDS IN THE USE OF WILLOWS

Basket willow growing in Britain declined from 1967 following the import of cheap willows and baskets but recently interest in the home production of both products has increased, allied to similar trends in many craft industries. Cricket bat willow growing remained steady but now as the game is growing in popularity worldwide, demand exceeds supply and new plantings are being made in most areas of lowland England in addition to East Anglia, the traditional centre. However, the increase in the number of plants required for basket or cricket bats is small compared with the demand for willow for amenity planting — where orders for 10,000 plants are common.

The requirement is for trees that are cheap to produce, easy to establish, hardy, quick growing, relatively vandal proof, and capable of growing in a range of indifferent environments. Willows are well suited to meet these requirements, being easily propagated vegetatively. Their growth is rapid and as willow shoots are very difficult to break, vandals soon get discouraged. The existence of a wide range of species, hybrids and clones ensures that a willow suited to most soils can be found that will produce a shrub or a bush, or a large tree with one or more interesting features.

Three new situations where willows have much to offer are described below with an indication of a few of the most appropriate kinds.

1. Ornamental willows for general landscape and amenity planting

a) *Winter Bark Colour*

One of the best contributions willows can make in amenity planting is to enhance winter colour. If coppiced on a three-year rotation the shoots of many willows are strikingly coloured. The bark can be yellow, orange, red, chestnut brown, black or, as in *S. daphnoides*, a blue waxy bloom gives the stems a purple or turquoise appearance. Much more could be made of these hardy trees for large scale ornamental plantings.

b) *Catkins*

Many willows have showy male or female catkins. Those of *S. caprea* — goat willow and its hybrids are often very large. *S. daphnoides* and its allies flower early and have long silvery hairs which glisten in the January sunshine. There are smaller, shrubby willows like *S. hastata* 'Wehrhanii' (Syn.: *S. wehrhanii*), *S. aegyptiaca* (*S. medemii*) and *S. fargesii* which only grow to 1 m and have especially attractive catkins.

c) Summer Foliage

The cricket bat willows and other selections of *S. alba* have shimmering silvery foliage; others like *S. lapponum* are even more densely clothed in hairs and therefore appear silvery white. *S. pentandra* has glossy shiny leaves and those of *S. eleagnos* (*S. incana*) look like lavender.

d) Habit

The most common ornamental tree sold is the golden weeping willow *S. alba* var. *tristis*, but *Salix matsudana* 'Tortuosa' has a most unusual twisted habit, and grows into a medium sized tree. The *S. triandra* hybrids, 'Rouge D'Orleans' and *S. triandra* × *S. purpurea* 'Kerksii' both make spreading bushes with fine feathery foliage.

2. Difficult environments — reclamation and amelioration

A new development is the use of willows for the reclamation or amelioration of difficult environments — such as motorways, spoil tips, etc. Here willows are acting as pioneers either to improve the environment by their abundant leaf fall and extensive root system or to protect and shelter other, more delicate species. On these difficult sites with a high failure rate the cheapness of willows is a great advantage.

Increasing attention is being paid by local government authorities to reclaiming spoil tips and other eyesores. These schemes usually involve an element of levelling and hence considerable movement of earth. Since the tips are usually relatively infertile, the resulting compacted terrain is often an exceedingly inhospitable medium for plants and this has forced an interest in pioneer species that can at least grow, if not thrive, in these difficult situations.

Experiments have shown that hybrids of *S. purpurea* and of *S. daphnoides* are notably successful, producing a thicket in which eventually other species can be established.

Willows are suitable trees for motorway planting, especially in areas where pollution is high and where soils may be compacted and poorly drained. Several thousand cuttings supplied to the Forestry Commission in the mid-60s are now a noticeable feature along part of the Cheshire/Lancashire section of the M6. The best willows for these situations are vigorous bushy hybrids of *S. caprea*, (goat willow), *S. viminalis* (common osier) and *S. cinerea* (sallow). *S. daphnoides* is useful on sandier soils and *S. purpurea* on heavy clays.

Planting conditions in urban developments and new towns after the builders have left are often little better than motorway embankments, but the risk of vandalism is higher in urban

areas. The bushy willows, often with attractive catkins and bark colour, have much to offer in these difficult situations.

Willows have proved successful in other difficult environments. For example, untrimmed hedges have been used to provide shelter from salt laden winds in Cornwall, and in the Hebrides where *S. caprea* and *S. daphnoides* were established as front line shelter behind which taller growing pines could be established.

3. Windbreaks

With our horticultural interests we, at Long Ashton, have been very much aware in recent years of the value of windbreaks for fruit, vegetables, glasshouses and nursery stock. Usually a windbreak shelters an area downwind to a distance ten times its height, and so it is useful to characterise windbreaks according to height. On top fruit farms the perimeter windbreaks are allowed to grow as high as possible — they may reach 25 m. But within modern intensive orchards it is advisable to have windbreaks at repeated intervals across the holdings trimmed to a top height of 9 m. For vegetables and soft fruit 4 to 5 m will usually suffice. Willows have the advantage that they are cheap, easy to establish, and can survive mechanical trimming (mutilation by flail cutter would be more truly descriptive) and by selecting the right kind, willows can be found that grow naturally to about the required heights. For perimeter windbreaks of 25 m, many of the Dutch selections of *S. alba* and *S. fragilis* are very suitable. 'Liempde' is frequently used in Holland and though 'Tinaarlo' and 'Vries' both grow very fast (1 m/year) we have found that the slightly less fastigate, but more feathery 'Drakenberg' or the cricket bat willow make a more efficient windbreak.

These willows will thrive at a closer spacing than poplars and so produce an effective windbreak more quickly. They do not throw troublesome root suckers and some find their shimmering silver foliage more pleasing than the sombre green of poplars.

The shrub willows, which naturally rarely exceed 9 m, are showing promise for quickly established moderately tall windbreaks where the intention is to lop mechanically up to 9 m. Hybrids of *S. caprea* (goat willow), *S. cinerea* (sallow) and *S. viminalis* (common osier) are suitable. 'Bowles Hybrid,' which is a fastigate selection of *S. viminalis*, is finding increasing favour on the silt soils of the Fens for internal windbreaks among fruit trees, where alders do not seem to thrive.

In addition to the uses described above, willows are used for the protection of riverbanks and revetments; they are very suitable for the production of paper pulp and particle board,

and with the concern for energy supplies we may even find coppiced willows grown for fuel and industrial feed stocks. However, at present the greatest need is for production of specialist nursery material of ornamental willows, willows for reclamation and for windbreaks.

CONCLUSIONS

1) The range of habit, catkins, summer leaf and winter bark exhibited by willows has hardly been exploited for ornamental uses in parks and gardens.

2) There is considerable scope for fast growing cheap, vandal proof bush willows for the rougher type of amenity planting associated with new towns, motorways and other difficult environments where pioneer species are required.

3) Willows are eminently suited for windbreaks required by fruit and vegetable growers.

4) At Long Ashton we have a unique collection of willows which are available in small quantities for trials, for educational purposes and to nurseries who wish to produce new lines in a commercial quantity.

INSTALLING A WARM WATER PROPAGATION FACILITY

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Objective. To install facilities to propagate 50,000 cuttings with relatively low running cost and moderate capital investment. The system to be on high working efficiency with some flexibility to improve the design if necessary at a later date. Cutting basal temperature required: 70°F.

Design. An oil-fired boiler installation was chosen as the source of heat, as 35 second oil is cheaper than electricity by a factor of 2. A polythene tunnel 100' × 17' was already erected on the nursery to a high standard. To accommodate 50,000 cuttings an area of over 1,000 sq. ft. of warmed bed is required. Normally the energy requirement for soil-warmed beds is calculated on the basis of 15 watts of electrical loading per square foot. This is equivalent to 50 BTUs per square foot.

A second-hand 60,000 BTU boiler and a 600-gallon oil tank was purchased cheaply due to the fact that numerous domestic consumers were changing over from oil to natural gas.

Warm water at a temperature of 104°F was fed by a cir-

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