SEARCHING FOR DWARFING ROOTSTOCKS FOR SWEET CHERRIES

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PRODUCTION DECLINE IN CHERRIES AND ITS CAUSES

Throughout the world fewer and fewer sweet cherries are being grown. Only a few countries are more or less maintaining their output, notably Germany, Italy, and the United States; the rest produce far less than they did. In ten years, English production has declined some 50 per cent — the Netherlands even more. Yet the demand for dessert sweet cherries remains high and is, apparently, insatiable. Then, why is not production not only maintained but increased? There are two main reasons, depredation by birds and high cost of picking. There are other contributing factors, such as delayed onset of cropping, diseases and pests; e.g. bacterial canker in cool climates and cherry fruit fly in others, splitting of fruit due to rain, and short storage life of the fruit. However, these contributory factors, whilst important, are all present subjects for research and may eventually prove solvable.

PROBLEMS OF TREE GROWTH

Hitherto, sweet cherries have been grown as large or very large forest-like trees, either on mazzard (*Prunus avium*) rootstocks or upon the St. Lucie cherry (*P mahaleb*), the former succeeds well on the deeper moisture-holding soils and the latter on stony or rocky soils in warm and rather drier areas. Any marked reduction in vigour of sweet cherries on *P. mahaleb* is usually due to soil conditions, or so-called delayed incompatibility. Large trees are not only costly to pick but almost impossible to protect from birds, and this has stimulated a keen interest throughout the world in the production of much smaller trees both for orchards and gardens.

ROOTSTOCK CONTROL

When, in 1925, East Malling Research Station (6) reported upon the behaviour of selected mazzard rootstock clones, they were able to show considerable differences in vigour of growth among unworked mazzard trees and it was then hoped that such differences would be passed to the scion, as they had been in apples, but such hopes were largely disappointing. There is, indeed, considerable evidence of scion dominance by sweet cherry over a wide range of cherry species, some of the dwarf shrubby species and hybrids producing large trees when worked with scions of the sweet cultivars, at least in the early years (4).

But selections from certain of the species have exerted a considerable dwarfing effect on the scion, notably *P fruticosa* (1, 2, 8), *P dropmoreana* (4), *P canescens* and *P. mugus* (5). A number of clonal selections from *P. incisa* (3) are in field trials in the Netherlands and have yet to be reported upon.

Having in mind the good anchorage and erect habit of the mazzard rootstock, also the dwarf nature and ready propagation of certain shrubby species, Tydeman of East Malling raised a number of hybrids (9). Some of these hybrids, notably *P avium* x *P pseudocerasus*, of which he obtained fifty or so, exhibited a wide range of vigour; moreover they proved to be very readily propagated by both hard and softwood cuttings and by layering. Present field trials indicate that certain selections of this hybrid are influencing sweet cherry cultivars in the direction of compactness and early cropping. Tydeman also intercrossed selected clonal mazzards such as 'Malling F12/1' and 'F1/3'; the latter he also selfed and obtained one uniquely dwarfed mazzard which appears to have a vigour controlling effect on sweet cherry. Unfortunately it is a shy propagator.

The John Innes Institute, England, has long been interested in the possible use of 'genetic dwarf' *P. avium* as dwarfing rootstocks (7, 10). These are seedlings from sweet cherry cultivars, some of which yield over 25 per cent of dwarfs. These dwarfs are recognised by their crimped leaves when in the seedbed. They certainly have a distinctly dwarfing effect on the scion but, so far, they have been difficult to propagate vegetatively and the seedlings themselves are slow to reach budding size.

FUTURE PROSPECTS

In cherry rootstocks, a dwarfing influence and ease of vegetative propagation are the priorities. The potential is enormous and breeders and propagators still have a great field to explore. Hybridisation clearly offers immense opportunities of combining the desirable features of graft compatibility, growth and form, ready propagation and resistance to disease. Work so far has indicated some promising species and hybrids (Table 1) but the work should be extended and developed. It behoves the plants breeder, the propagator, the pruner and chemical-control enthusiast to get together to make a concerted attack upon cherry growth-control problems, but it is the tree raiser who must provide the vital built-in basic dwarfing character by combining suitable rootstocks and scions in his nurseries. Incidentally, dwarfed trees will be planted more closely than vigorous and the nurseryman will have to provide many more trees than before to fill the orchard area. Instead of planting less than 30 trees per acre at 40 feet square, well over 400 trees will be needed at a spacing of 10 feet.

Table 1. *Prunus* species and hybrids of promise as dwarfing rootstocks for sweet cherries

Rootstock	References	Comment
P avium E M 4/158	4, 9	Distinctly dwarfing Somewhat difficult to multiply vegetatively
P avium J I genetic dwarfs	7, 10	Distinctly dwarfing. Seedlings Difficult to propagate vegetatively. Slow to attain size for bud-grafting
P avium x *P pseudocerasus*	9	Very easy to propagate. Selected clones induce compact early-cropping trees Indications of higher resistance to disease
P canescens	5	Somewhat dwarfing Mist propagated
P dropmoreana	4	Some selections may prove dwarfing. Readily rooted under mist
P fruticosa	1, 2, 8	Distinctly dwarfing Propagated by layering and also under mist
P incisa	3	Somewhat dwarfing. Readily rooted under mist.
P mugus	5	Dwarfing Young softwood cuttings taken early will root under mist

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