Modern Cherry Production and Some Problems for British Growers

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Traditional commercial cherry production ceased in the UK and elsewhere in the early 1960s, for economic reasons. This demise stimulated research and as a result a whole new industry has developed world-wide using new rootstocks, new varieties, (cultivars), and new techniques. Several innovations since 1970 have re-vitalised profitable cherry production, now expanding and developing in over forty countries.

Firstly, a self-fertile, cultivar of *Prunus avium*, 'Stella', was released in 1970 by K.O. Lapins, at Summerland Research Station in British Columbia (BC). From a cross between 'Lambert', a variety from California, and the self-fertile 'John Innes seedling 2420' this cultivar, has been used extensively in breeding programmes and a number of new self-fertile cultivars are now available derived from the single original 'Stella'.

Secondly, there has been the introduction of dwarf and early-fruiting root-stocks from hybrids of the three main cherry rootstocks, *Prunus avium*, *P. mahaleb* and *P. cerasus*. The first was 'Colt', (*P. avium* X *P. pseudocerasus*), a semi-dwarf stock with which virtually all scions are compatible, introduced by A. D. Webster at East Malling in 1980. A programme of trials, over many years, at Justus-Liebig-University, Giessen, (north of Frankfurt A.M. Germany), resulted in the introduction of a series of dwarf stocks, 'GiSelA', mostly *P. cerasus* X *P. canescens*, in 1985. Other dwarfing stocks are derived from crosses with *P. cerasus* X Landrace cultivars. 'Gisela 5' and GiSelA 6' seem most widely used, but not all varieties 'take' on the dwarf stocks and results vary with soils and climate.

A further stimulus was the 1996 publication of a comprehensive review of cherry biology and production by A. D. Webster of East Malling and N. E. Looney of Summerland BC. With this impetus, scientific research and commercial development with both sweet and sour cherry production world-wide has increased steadily over the past thirty years generating a substantial literature. Between 1991 and 2004, 230 new sweet cherry cultivars were introduced; 116 from Europe, 71 from North America and 33 from Asia. However, the genetic base used to produce the new varieties, especially the self-fertile ones, is extremely limited.

Most countries producing cherries now have their own research and breeding programmes, (at least 50 world-wide), and many have collections of cultivars to conserve Prunus genotypes. Field collections are expensive to manage and are exposed to pests and diseases so there is need for backup collections and in-vitro cryogenic storage. Many synonyms and the complex taxonomy of Prunus add further confusion. Maintaining the genetic integrity of specific genotypes, such as old landrace cultivars is difficult. The varieties need their characteristic identities distinguished with standardized fingerprinting.

Cherry Blossom, Bliss Gate. Rosemary Winnall

As the genetic control of more characters is revealed and 'genetic markers' identified, many features of the trees and fruits can be developed. So far research has focused on increasing fruit size; skin thickness, affecting transport and storage; resistance to splitting; resistance to bacterial canker: no doubt flavour will be a consideration in due course.

Parallel with the above developments, new horticultural techniques of cherry orchard management have been introduced. Smaller trees allow high density planting, earlier yields and less labour. In wetter or other adverse conditions, trees can be grown in polythene tunnels, protecting blossom and fruit. In consequence, new research is necessary to understand more fully canopy management, plant water relations, nutrient uptake and many other aspects of cherry tree and fruit physiology.

Noble, a variety introduced by John Tradescant in 1611, now growing at Far Forest Brian Stephens

Further research will be required to support responses to climate change with an expected impact on water and nutrient availability, temperatures, flowering times, chilling requirements and more extreme climatic events. With international trade, the spread of disease and exotic species is a problem. An example is the Asian fruit fly, *Drosophila suzukii*, which has, since

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2008, rapidly become established world-wide, laying its eggs inside ripening, soft-skinned fruits, spoiling their value, (Review 2019, pp59-60). Thus, much work is necessary at an international level by co-operation among scientists.

So, what help do local growers need to produce cherries in the completely new conditions? A number of enterprising fruit producers are growing cherries using polythene tunnels, teaching themselves, by personal communication with colleagues, private study tours to America and Europe and trial and error, at their own expense. Much of the foreign research must be adapted to apply to British circumstances. What thrives in Turkey or California may not be successful in Worcestershire. Before they invest, growers need guidance as to how varieties perform and the best techniques.

There is need for trials of new and old varieties grown on dwarf stocks to select those most suitable. There is need to understand the best soil conditions, composts and nutrient regimes. Under polythene, watering can be controlled, but how much and when needs to be established. As well as cultivars, rootstocks are variable. The wide range of stocks now available, perform differently in different soils and climates. These need to be tested.

Geneticists and growers might hope that self-sterility will be eliminated from fruit growing, but meanwhile pollination is a problem, especially under cover and with declining bee populations. Recent research has shown an increased fruit yield of 10% by introducing wild-flowers and insects within the enclosed orchard. Extending the fruiting season is another commercial objective and trialling and selection of cultivars is required, as well as more fundamental study of the genetical and physiological basis of flowering, fruit set and ripening. Again, with the new conditions, disease problems become intensified. Bacterial Canker is a world-wide problem with all the stone fruits and much research continues on this and other diseases.

British research on fruit has been world-leading and remains so. Since its establishment in 1913, East Malling Research Station in Kent, (EMR) has been the main centre. Work on cherries began in the 1920s and continues today. But public support for fruit research was withdrawn in 2010 and studies are now privately funded from the 'trade' and other sources.

With suitable long-term support additional academic and commercial institutions could undertake research to meet these issues and help increase production. At present the British crop in season is about five to ten percent of demand; the remainder is imported. The new methods of cultivation permit cherry growing anywhere, not just in the regional localized microclimates such as northern Kent or north Worcestershire. Production could be increased considerably.

The fundamental resource for development is the germplasm of the traditional land-race cultivars. It is important to rescue and maintain these old varieties to permit future adaptations with a more extensive gene pool. To address the wide range of problems outlined above, a well-planned and coordinated scientific programme, supported by scientists, growers and retailers is desirable, which could attract investment. Over the years concentrated effort has improved crops such as tomatoes and soft fruit. Similar concerted effort is needed for cherries. For sweet cherries, the traditional English grass orchard with sheep grazing beneath large standard trees, is no longer a commercial reality. Nevertheless, we could look forward to improved fruit, in greater quantities, exploiting the full potential of the profitable and nutritious sweet cherry.

Cherry Trees, Heightington — Rosemary Winnall