Breeding and Selection of Hardy Woody Plants in Bavaria

Donnchadh Mac Cárthaigh
Fachhochschule Weihenstephan, 8050 Freising 12, Germany

INTRODUCTION

Weihenstephan, in Freising near Munich, is probably the biggest centre of agricultural education and research in Europe, and is known as the Green Centre of Weihenstephan. Plant breeding and selection work is being carried out on most agricultural and horticultural crops and the Institute of Pomology at the Technical University is the leader in the area of woody plants. This paper is a short description of the most important introductions in recent years.

IMPORTANT INTRODUCTIONS IN RECENT YEARS

Weiroot (Weihenstephan root) Sweet Cherry Rootstocks. Since the early 1960s there has been intensive research to develop dwarfing rootstocks for cherries. Eighteen selections of a less vigorous *Prunus cerasus* provenance from Landau in southern Germany were collected in the wild. Clone 11 showed the best compatibility with sweet cherries and was used for further breeding work. It had the disadvantage of having too many suckers. The clones 10 and 13 are still available but most promising seems to be the newer clone 158. There are plant breeders' rights on this clone which is being sold by the Nurseries Herr in Meckenheim and Hofmann in Langensendelbach. Experience to date with the Weiroot clones is that they have proved to be excellent in the Frankonian cherry growing area where they were trialed originally. However, there are occasional reports that they are not always as successful in other areas. Unfortunately, there have been too few proper trials done on these rootstocks and not a wide enough range of grafting combinations in other areas to date. Clone 72 is the most dwarfing and can be compared to M 2 in apple. Grafted plants need a stake. In general the weaker growing the rootstock the more difficulties it presents in the nursery, and afterwards in the orchard.

Plum Rootstocks Number 6 and 226 from *Prunus tomentosa*. These two selections from *P. tomentosa* have proved to be most promising as dwarfing rootstocks for plums. There are practically no incompatibility problems (the exception is 'Ontario'). Plant breeders' rights have been applied for. Plants are already on the market and can be obtained from the above mentioned nurseries.

'Weiki' (Weihenstephan Kiwi) from *Actinidia arguta*. This must surely have been one of the most successful introductions in Germany. After years of selection work the most cold-hardy clones were selected, three in all. They have survived the difficult climate of Upper Bavaria where temperatures can go down to -30°C. Interestingly, they start into growth early in the season but even if all the new shoots and flowers have been killed, new buds develop from nodes that have not yet shown signs of growth. These buds also have flowers so that a crop of kiwis is

assured. Over the past 12 years there has never been a year where there were not some fruit in Weihenstephan. Individual plants bear about 10 kg of fruit although in one exceptional case 30 kg were collected. Most plants sold are micropropagated. They are, however, very easy to root by conventional means. Cuttings can be taken practically the whole year round from rooted cuttings growing in glasshouses with supplementary light. In the first year after planting they must be protected from frost if they do not have a sufficiently hardened base. It is not true that Weiki is capable of self-pollination; male plants must also be purchased. The fruits are very tasty and are about the size of a gooseberry. They do not have to be peeled because they are hairless. There are no breeders' rights on 'Weiki'; only the name 'Weiki' is protected in Germany. Plants are sold through Hofmann, Langensendelbach.

In the Institute of Pomology, successful crosses between *A. arguta* (hardiness and hairlessness) and *A. deliciosa* [syn. *A. chinensis*] (size) have been carried out. They will be field tested in the coming years. So far no flowers have appeared.

Raspberries Resistant to *Phytophthora*. Growing raspberries has been called into question because of the rapid spread of a root disease in nearly all cultivars derived from the European form of *Rubus idaeus*. The American (var. *strigosus*) form is resistant. Therefore, the American cultivar Latham was used in a breeding programme in Weihenstephan. Plant breeders' rights have been applied for on a very promising selection which has excellent flavour, is easy to pick, and is high yielding. It does not appear to be susceptible to other diseases. The Technical University wishes to keep the plant breeders' rights for Germany.

Selection Programme for the Service Tree (*Sorbus domestica*). The service tree is enjoying a renaissance for two reason. Firstly, it is an endangered species in Central Europe. In the whole of Germany only about 3,500 to 4,500 older trees survive. Foresters have therefore decided to plant the service tree in increasing numbers, although there is no real market for the timber because so little is available for sale. Secondly, there is an interest in fruit production. The fruit juice acts as a natural preservative and it improves the taste of apple wine. The so-called Speierling (service tree) apple wine in Frankfurt may only have about 1% juice extract because it is so rare. Prof. Kausch von Schmeling—Germany's leading expert on this species—identified 60 trees which he thought to be promising for fruit production. These trees are growing throughout Central Europe and produce regular crops of larger than normal fruit. After examining the biochemical properties of all clones, 30 clones were chosen for propagating in the Fachhochschule Weihenstephan using *S. domestica* as the rootstock. A major problem has been the rejuvenation of the propagation material. Cutting back severely and growing under high temperature regimes in a glasshouse, as well as regrafting onto seedlings, seems to be working reasonably well. It will take many years to identify a number of promising new cultivars. These should be the first clones available for commercial exploitation.