

## **PYRUS IN THE WAITE ARBORETUM**

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The genus *Pyrus* stretches from north Africa through southern Eurasia to Japan. It does not extend to the Scandinavian or Siberian levels nor to India and S. E. Asia. This suggests it likes some cold in its life. Virtually all species are small or large deciduous trees with a few nearly evergreen in the Mediterranean. An important fact for both horticulture and taxonomy is that they are largely self sterile and need outcrossing.

I know of no comprehensive revision of the genus. Although standard taxonomy is, in these days of molecular biology, considered 'old hat', 'not quite with it' or 'boring' it provides the words we use to name things and without that we do not know what we are talking about.

There are regional accounts of *Pyrus* from the Flora Europaea, Russian Flora, Turkish Flora, Iranian Flora to Chinese and Japanese Floras. These include a great many overlapping names. There is also a problem: the individual flowers of *Pyrus* species are not very distinctive but the fruits are helpful and getting flowering and fruiting specimens from the same tree is much rarer than you might expect. As the genus is outcrossing it is highly heterozygous and provides a huge array of variants – useful for horticultural selection but a nightmare for taxonomy.

A good effort at the whole genus was one by Challice and Westwood in 1973. Challice was at Long Ashton Research Station, University of Bristol, U.K. and Westwood at the Department of Horticulture, Oregon State University, U.S.A.

Both had access to large living collections. They started with a working set of 22 species broken down to five mainly geographical groups. Five Asian pea pears – all small fruited e.g. *calleryana*; five Asian medium or large fruited e.g. *pyrifolia*; and six West Asian species – a more varied lot, rarely edible but include *salicifolia*, *amygdaliformis*, *syriaca*; three North African species *gharbiana*, *mamorensis*; and three European species e.g. *communis* and *nivalis*.

May I remind you that *pyrifolia* (Nashi) and *communis* common pear both have long histories of domestication – verging on 3,000 years with an infinite number of cultivars, back crosses and feral forms.

The basic chromosome number is 17 and apart from a few oddities in cultivation no wild pears are polyploids.

*Pyrus* and *Malus* are closely related, though hybrids are difficult. Pears usually have a short central stalk to the flower cluster (i.e. a short raceme) while apples are more closely an umbel (i.e. no short stalk). Pears usually have stone-cells (grit cells) in the fruit that are absent from apples.

Challice and Westwood applied both chemical and morphological analysis to 244 living specimens thought to cover the range of species. Computer programmes were used (early by current standards). Even so, five species were dropped because of 'missing values' (*gharbiana*, *mamorensis*, *regelii*, *syriaca*, *glabra*). Leaf phenols and 10 flavone glycosides were used with morphological characters, a total of 51.

The results were as follows:

- 1) A group of European and West Asian species *communis*, *salicifolia*, *elaegrifolia*, *amygdaliformis*, *nivalis*
- 2) A group of large fruited Asian: *pashia*, *pyriformis*, *hondoensis*, *ussuriensis*, Kansu pear
- 3) Asian pea pears: *calleryana*, *koehnei*, *dimorphophylla* and *fauriei*
- 4) A connecting group of *longipes*, *betulifolia*, *cordata*.

The Africans missed out.

Now all this more or less supports the grouping they started with, but alas, it was not followed by a taxonomic account.

Where do all the other names fit in? They gave no key to the species they did separate. So a disappointing conclusion to a promising start, and great problems of taxonomy remain. Where do *kawakamii*, *phaeocarpa*, *tadshikistanica* and numerous other Asian names fit in? Are they 'good species'? I can only commend to you G. Krussmann 'Manual of Cultivated Broad-leaved Trees and Shrubs' Vol III, 1986, Batsford, London.

### **The Waite collection**

The Waite collection started with a single *calleryana* which grew and flowered well, and as Adelaide is short of good spring flowering deciduous trees it was decided to explore the genus further. It was as simple as that. We got bud wood from several research stations and botanic gardens – put onto *calleryana* stocks.

About this time 'Bradford' pear was becoming popular in the U. S. A., but that was not the initiative for our collection – it was rather the idea of applying the homoclimate concept and getting southern European material. Then came seed from Greece and Crete with *amygdaliformis* and *pyraster*, the latter either a precursor to the cultivated *communis* or feral forms of it. A row of *calleryana* seedlings was planted in Claremont Avenue, adjacent to the Waite Institute. I have said they are heterozygous and this row demonstrates that. Our excellent early 'Claremont' came from there, as did 'Bryan's Late' so far not developed. A further round of seedlings would undoubtedly extend the range further.

The *amygdaliformis* range from deciduous to semi-evergreen. They flower densely and regularly, fruits have not been a problem, although some like other pears are a bit malodorous; *pyraster* grows and flowers well but produces lots of fruits.

Then came a couple of African species from Westwood, then our first 'Bradford', then seedlings from Iran and later Turkey – at least three or four species amongst those but not yet identified, and lastly the generous gift of some of the American cultivars from Fleming's Nurseries and Lawrys Nursery.

Now two sad stories.

I began to make crosses between some the early flowering species. Seedlings raised and planted out in the two rows in the orchard area (on the side of the new Wine Laboratory). These were about 1 –2 m apart and grown to see what range we got. Well, an early flowering cross between *P. calleryana* and *P. amygdaliformis* showed promise – others were just coming in to flower when instruction came to remove the row as building was going to start. Trees went and only P. 'Prescott' was salvaged. Time and effort lost. About 40 seedlings started and a few marked 'good' in the old record sheets.

When Jennifer came we thought a proper orchard trial of promising trees desirable so a randomised replicated plot of three or four cultivars was set out. They had just started to

flower when the University began charging for every square metre of space used. This was going to run into hundreds if not thousand of dollars per year, so that effort had to be scrapped.

Flowering records have been kept on our collection. Weekly recordings during the flowering and if I say it myself, a remarkable record. Some trees have over 100 notes over many years.

What can we offer you after these years? Firstly a reminder that these results are under Urrbrae rainfall which is at the lower end of *Pyrus* distribution. There is no doubt that there is a future for pears as decorative trees in higher rainfall, in colder areas. I can't answer for tropical areas but I expect some search in Asia would be profitable.

The northern Asian species are struggling here - *bretschneideri*, *boissierana*, *pyrifolia* - unfortunate as some have large attractive flowers. The last is now an established orchard tree.

*P. calleryana* 'Lynington' is now on the go. Doing well, flowering freely, some seasonal colour.

*P. calleryana* 'Claremont' is the earliest flowering of that species, good and regular in the Arboretum and should be made available.

*P.* 'Prescott', the hybrid, another very early flowering cultivar, has been a bit uneven at the Waite. Slow in the Arboretum, but better in the Urrbrae House Sensory Garden. Those at Mt Lofty Botanic Garden have done much better and have really showy early flowers.

*P. amygdaliformis* has done well. Deciduous or evergreen range of flowering times, somewhat dense tree, heavy flowering but a bit malodorous. [We have more specimens from Turkey, but they have not yet flowered.]

*P. pyraster* has done well (wild type pear). It grows and flowers well but has heavy crop of useless fruits.

It is too early to assess the American cultivars though it is intriguing that our 'Bradford' now columnar trees to 4 m high have scarcely produced a flower. Do they need chilling?

Our own selection of an erect form from plants at North Adelaide flowers well and colours well and certainly looks interesting.

I think it is a collection we can be proud of and will have more to offer.

## References

- Challice, J. S. & Westwood, M. N. (1973). Numerical taxonomic studies of the genus *Pyrus* using both chemical and botanical characters. *Bot. J. Linn. Soc.* **67**:121-148.
- Krussmann, G. (1986). Manual of cultivated broad-leaved trees and shrubs. Vol. III. (Timber Press, Portland, Oregon).

### Postscript:

39 specimens of *Pyrus* 'Lynington' in bags will be available for sale at the symposium. These were budded from the trees in the rose garden of Urrbrae House by Freshford Nursery, grown on by Lawrys Nursery and donated. All proceeds will go to support TREENET.