Hypericum x *inodorum* 'Arcadia'

Photographs: Applied Plant Research

Working for an organisation that needs to fund its breeding from plant royalties presents some stiff challenges. Margareth Hop describes the allure of breeding plants that might end up selling 100,000 units a year

Margareth Hop

Imagining, making and marketing

GENETICS WAS MY FAVOURITE SUBJECT in high school biology classes. Combining that with a life-long interest in plants and gardening made me realise a career in plant breeding would be just the thing for me.

I studied Plant Breeding at Wageningen University and got an MSc in horticultural breeding. In 1992 I was hired as a breeder by the Research Station for Nursery Stock in Boskoop. It is now called Applied Plant Research (APR), and is located in Lisse, the Netherlands, and is part of Wageningen University and Research Centre.

A long tradition

I was not the first breeder to work there. APR started in 1899 as an experimental garden for identification, trials and propagation of garden plants. In the 1950s and 1960s Cees Broertjes and Frits Schneider ran breeding programmes, producing a steady flow of new woody cultivars. Their breeding concentrated on *Rhododendron*, *Cytisus*, *Erica* and *Calluna*. Many of their raisings and introductions are still grown, including *Cytisus* 'Hollandia' (1955), *C.* 'Zeelandia' (1955), *C.* 'Dukaat' (1967),

Rhododendron 'Persil' (1960), *R.* 'Silvester' (1964), *Ilex aquifolium* 'Atlas' (1961) and *Amelanchier* x *grandiflora* 'Ballerina' (1980).

In the 1970s and 1980s the focus shifted to *Clematis*, *Buddleja* and *Pieris*, bred by Ans Heytink and later by Sofieke Bouma, assisted by Leo Slingerland. Compact *Pieris* 'Debutante' (1980) and *P.* 'Cupido' (1985) suited the trend for container plants, and are still being grown in large numbers today. The *Buddleja davidii* programme yielded several compact plants, such as 'Nanho Purple', 'Pink Spread' and tiny 'White Ball'. But the biggest success was the hybrid *B.* 'Pink Delight' (1986), with very large inflorescences, which is still considered to be one of the best pink buddlejas.

A very successful introduction was *Salix integra* 'Hakuro-nishiki' (1984). This was introduced by former colleague Harry van de Laar after a trip to Japan, where it was grown as a garden plant on its own roots. At first the judging committee did not foresee a big future for this plant – the white and pink leaf markings are not to everyone's taste. But that changed after growers put it on a rootstock and presented it as a small specimen tree. Customers loved it. Compared to other pink standard plants, such as *Prunus triloba*, it is easy to maintain and you can enjoy the pink colour for a long time. Now, more than 200,000 plants of 'Hakuro-nishiki' are being sold annually through the Dutch flower auctions alone. In some Dutch streets, there is one in nearly every garden.

Breeding techniques

Most of these plants were made using conventional breeding techniques such as crossing and selecting from seedlings. But other techniques were becoming available as well, such as colchicine treatment in the 1950s, and gamma irradiation in the 1980s to create flower colour mutations.

I still use the above techniques in my breeding programmes: crossing, selection and some mutation breeding. Newer techniques are available, but the costs are often high and they sometimes require knowledge of the genetics of the particular plants which we do not have. But for many goals, classical breeding techniques suffice.

For some genera I have been involved with crosses over several generations. A cross between *Cytisus* 'Burkwoodii' and *C. praecox* in the 1940s produced *C.* 'Hollandia' and *C.* 'Zeelandia'. The F_2 generation produced *C.* 'Frisia', and out of the F_3 came *C.* 'Boskoop Ruby' and *C.* 'Dukaat'. I took the crosses into their fourth and fifth generations and F_4 and F_5 plants are now being tested by nurserymen to see whether they have commercial value.

In 1996 the very compact *Lonicera* 'Honey Baby' was introduced, a hybrid between *L. japonica* 'Halliana' and *L. periclymenum* 'Belgica Select' raised by Sofieke Bouma. It is an excellent container plant with an abundance of scented flowers, and can be sold in flower by Mother's Day. This cultivar gave me my first experience with European Plant Breeders' Rights (PBR) applications.

***Lonicera* 'Honey Baby'**

'If a cultivar is a huge success initially, over-production can kill the market potential'

Making money

Since then the number of cultivars I have raised that are PBR protected has risen to eight, with some still in the pipeline. The increased focus on protecting plants has much to do with the way this type of work is funded. The Dutch government and the Product Board for Horticulture each used to pay for half of the breeding work done at APR. The government stopped financing all agricultural breeding in 1990. For many branches of agriculture this caused few problems, because commercial breeding answered their needs. But that was not the case for nursery stock, because there are few professional breeding companies for woody plants, except for the big crops such as roses. The Product Board for Horticulture agreed to finance breeding at APR for a further few years. This is allowing us to build up a portfolio of protected cultivars and finance the breeding work from the royalties. Nursery stock breeding is slow work, but in 2010 we hope this funding solution will finally become reality.

Marketing

For many years the breeding work has been on the back burner, while we concentrate on marketing the plants in our portfolio. That is one of the things I learned from our first attempts to make money from our plants: even excellent plants do not sell themselves. If a cultivar is a huge success initially, overproduction can kill the market potential it could have had in the long term. And the long term is what you are aiming for: woody cultivars take a long time to breed, but fortunately they usually have a long life span too. For good marketing you need some control over the production volume. For a research institute that is not as simple as it is for a production company, the latter being able to keep propagation and production in its own hand.

We also want to ensure the first-class quality of the plants during the crucial first few years of conquering the market. That is why we usually give selected growers some time to get to know the ins and outs of the cultivar before it is presented to the world. Fortunately, in the new millennium, royalty administration bureaus started expanding their activities to nursery stock. We now cooperate with several bureaus ➤

Solidago 'Ducky'

– they take care of the contacts with growers, the advertising and the licence administration. We are not the only ones that have profited from this. Many growers who breed as a hobby have become more interested in applying for PBR, now they can leave the administrative hassle to a bureau.

New names

When a new cultivar is ready for release, I usually get to choose the cultivar name. I am not keen on technical and descriptive names like 'Blue Dwarf', because I think these will not give the plant extra appeal to the (usually female) customers in garden centres. I try to find a word that does not describe the plant, but just evokes some of its properties. A *Solidago* I bred which is compact, yellow and looks fluffy is now called 'Ducky'.

We always take time to check which name is the most suitable, by asking several people for their favourite from a list of suggestions. I know several cultivar names in trade that could have done with a more thorough final check, *Skimmia japonica* 'Rubella' or *Chamaecyparis lawsoniana* 'Dik's Weeping' being good examples. Some names have a shorter life span than their plant, such as *Potentilla fruticosa* 'Floppy Disc', which is still going strong, unlike its computer namesake.

Naming complexities

You might notice that all our plants only have a cultivar name, and no trade designations (selling names) or trademarks. This is a deliberate choice. Every five years APR publishes the *List of Names of Woody Plants*, the European standard for nursery plant names. We therefore know the extent of confusion that is created by giving plants two (or more) names. In my opinion, the best way to protect good cultivars is to apply for PBR or Plant Patent. That makes sure the plant itself is protected, and not just its name.

If you give a plant an internationally appealing cultivar name, it needs no extra names and every customer can be sure about the product they are buying. But, as we all know, this is not the situation we see in the trade. Especially in the big genera, many plants have a code-style cultivar name, one or more trade designations, and any number of trademarks applied. Marketing conventions may suggest that all this is necessary, and if the trade designations are used well they stimulate sales and do not cause confusion about the plant identity. However, some breeding companies are secretive about the cultivar names they use for their plants and just use brand names. This is because it is cheaper to protect a brand name than to get PBR. This discourages other growers from propagating the plants, which they could legally do. But without the true cultivar name customers do not know what they are buying, and could buy the same plant twice if it is presented under another brand name.

Some other problems arise because the rules and laws for trademarks and cultivar names sometimes clash. The organisations that register trademarks only check if a word is already being used as a trademark, but not if it is already in use as a cultivar name. We have seen an example of a grower registering an old cultivar name as a trademark, and then trying to claim money from other nurseries for the use of the name. There are laws for trademarks, and the *International Code of Nomenclature for Cultivated Plants* regulates cultivar names, but it would be great if these could be further harmonised.

Those who market plants tell us the garden plant market is changing from a supplier's market to one where the customers

Pieris japonica 'Passion'

are more dominant. Maybe that will change the demand for product information. I would like to see the cultivar name on every plant label, even if only in small print beside a prominent trade name.

Pieris japonica 'Passion'

At the moment I am working on the marketing of *Pieris japonica* 'Passion'. Its breeding process started in 1980 following a collecting trip to Japan that resulted in the introduction of seed to Europe of a very compact *P. japonica*. From this, *P. japonica* 'Debutante' and *P. japonica* 'Cupido' were selected. Most seedlings had upright inflorescences. This is a highly desirable trait, because normally the green calyces are prominent when you look at the hanging flowers, instead of the colourful corollas. Several crosses were made by a previous breeder at APR to combine compactness and upright inflorescences with red flower colour. One of these was *P. japonica* 'Cupido'

Pieris japonica 'Bonfire'

x *P. japonica* 'Valley Rose'.

In 1988 the F_1 seedlings of this cross were finally large enough to flower and be judged (*Pieris* seedlings take 7 years to mature!). In that generation there were no red-flowered plants, but there were plants with attractive red flower buds held in upright inflorescences. One of these was later released as *P. japonica* 'Bonfire'. The F_1 was crossed with *P. japonica* 'Valley Valentine' and in the F_2 generation the red flower colour came back – a classic case of a recessive gene.

The plants were then tested for several years to find the one with the best health and production properties. The best was named *P. japonica* 'Passion' and has the same deep pink flowers as 'Valley Valentine', but it branches much better to form a full, compact shrub. The flowers are held above the leaves, so the attractive flower colour is much more apparent. Growers are also pleased that the success rate for rooting cuttings is much higher than for *P. japonica* 'Valley Valentine'. It is now available in Europe and the USA.

Hypericum

Hypericum x *inodorum* was one of the first breeding programmes I completed from start to finish. This hybrid suddenly became very popular as a cut branch with berries in the 1990s. In less than a decade it went from an obscure garden plant to the top 10 of cut flowers. It has one problem though, that we hoped breeding might solve: it is very susceptible to rust.

We started testing many seed accessions for rust resistance, and fortunately we found a few. These were crossed with the most popular cultivar at the time, *H. androsaemum* 'Excellent Flair'. To make sure we could see differences in rust resistance we planted rows of infected plants in our selection field and did not use fungicides. Out of 3,500 seedlings we finally kept only one, which had remained healthy for three years in a heavily infected field.

We had been commissioned to develop showy container plants, not cut branches, so we chose a compact plant with very large maroon berries. It makes an excellent garden and landscape plant and we named it *H.* x *inodorum* 'Arcadia' to reflect this. The life span of a resistance is notoriously unpredictable, because the fungus can evolve. But after 10 years, 'Arcadia' is still rust free.

Skimmia

Skimmia japonica is a popular garden plant and is usually dioecious. The male plants have large scented inflorescences, and the females can produce attractive red berries. *Skimmia japonica* subsp. *reevesiana* can self-pollinate, but it is not easy to grow and its berries are dark red. In 1989 crosses were made between many *S. japonica* cultivars, and their progeny was screened for monoecious plants that would self-pollinate.

After nine years those plants were selected for a good habit, healthy growth and prolific berry production. At that point I took over the breeding programme. The chosen plants were propagated and evaluated for their performance in containers in nursery conditions. In 2005 the best one was named *S. japonica* 'Temptation', for its abundant scarlet berries. It can be used in the same way as *S. japonica* subsp. *reevesiana*, but it is quicker and easier to grow. Sales will start in 2010, but it has already won the Best Novelty in Show award at the trade show Groot Groen, in October 2008.

***Crataegus succulenta* 'Jubilee'**

***Skimmia japonica* 'Temptation'**

Future breeding

We are now starting new breeding programmes financed by the royalties on our cultivars. The raising of compact new plants for containers and gardens is our first goal, but I hope we can do some resistance breeding too. One of the plants we still have to market is *Crataegus succulenta* 'Jubilee' – it is resistant to fireblight and is therefore a substitute for *C. persimilis* 'Prunifolia' which is susceptible to this disease.

We are also helping nurserymen start their own breeding programmes. They already know how to propagate and cultivate plants, and know their market. With a little technical assistance and some basic knowledge of breeding they can start producing their own cultivars. By offering courses, techniques and facilities, we hope to make more people enthusiastic about breeding garden plants.

After 17 years I have completed the full breeding cycle for several plants, from first imagining it, to making it and marketing it. Seeing one of my cultivars for sale in garden centres is certainly an inspiration to try and produce many more. After telling them what I do, several visitors have asked me, 'Are you sure this is a job, not a hobby?'. Sometimes I'm not so sure myself.

Margareth Hop is a plant breeder and cultivar trials officer at Applied Plant Research, Wageningen University and Research Centre, The Netherlands