

Working for a major seed company such as Thompson & Morgan means that plant breeding programs cover a wide range of genera - from hanging basket *Bidens* to obscure *Impatiens* species



All photographs: Thompson & Morgan

Impatiens namchabarwensis Blue Sky 'Thomimblue'

Charles Valin

Breeding with passion



Carolina Dominiquez

BREEDING NEW PLANTS for Thompson & Morgan is an exciting challenge!

I am responsible for various breeding programs covering about 35 genera and at the moment our company is focussing on *Helleborus* and *Laurentia* (syn. *Isotoma*).

Many gardeners, and particularly professional growers, are always in search of novelty. We respond to this by trying to create new characteristics, particularly in plant habit (such as compactness or trailing) and foliage, as well as flower colour, shape, texture and fragrance. All these aspects

ultimately broaden the range of plant uses for the garden. Just as important are traits such as earliness and length of flowering which ensure new plants will flower for a considerable period of time. New cultivars also require good overall impact, uniformity, and resistance to weather, pests and diseases: these are key indicators of a plant's future performance.

At Thompson & Morgan we make sure that candidate cultivars are tested at our breeding station, trial grounds and by key customers worldwide. Following these steps

ensures that a new plant performs all along the chain. It should be easy and economical to raise for the grower, in flower at the point of sale, and continue its display in the garden. Consumers, although last in the chain, need to come first: it isn't all about shelf height on Danish trolleys.

To achieve all these aims the breeding process is highly planned: from sowing to planting, selecting, crossing and harvesting, right up to the next generation. I use a computer database to keep detailed records and pedigrees. Once a new cultivar is stable and uniform the production process starts. Small-scale production tests are followed by full scale production tests throughout the world. Quality, uniformity and germination are checked, and only then can the new cultivar or range be launched.

Names are proposed by all employees and the most popular is chosen. I do not get involved with marketing and commercialisation, although I do propose some ideas.

Regulatory challenges

Sometimes there are obstacles on the way to seeing a vision come true. Species that I might wish to introduce to a breeding program can sometimes prove impossible to source. One example is *Bidens gardneri* native to Brazil and Paraguay, an orange-flowered relative of *B. ferulifolia* used in hanging baskets. When I asked for it from botanic gardens or local sources they declined, invoking the Convention on Biological Diversity (CBD).

The CBD was rightly created to defend biodiversity and share any eventual sales benefits of a species, or material derived from it, with the country of origin. When I proposed to establish a Material Transfer Agreement (MTA) and agree financial arrangements from eventual sales, like the CBD stipulates, the answer was still negative. The reasons given were the complexity of the paperwork or, surprisingly, the commercial purpose of my request – the very reason why these rules were set up.

We are all aware that some species might become extinct because of habitat destruction or lack of funds to conserve

them in botanic gardens. Introducing species to wider cultivation, as long as the impact of any selection or hybridisation is understood, can be an effective way to save them. It is urgent to simplify and review the effect of CBD in practice. Ready access to wild species, land races and old or improved cultivars is vital for plant breeding progress.

Technical difficulties

Hurdles in the breeding process can also be encountered, particularly self- or cross-incompatibility. Interspecific hybrids,



Laurentia 'Avant-Garde Pink'

'It is urgent to simplify and review the effect of CBD in practice'

in *Laurentia*, for example, can be difficult to raise, and when this is achieved they are often sterile, preventing any further breeding. Sometimes parent lines are very difficult or slow to propagate, as with *Helleborus*. The hybrid might be spectacular, but if you can not multiply the parents successfully then large scale production is not viable.

There are now technologies to overcome all these problems; they include *in vitro* micropropagation, embryo rescue and chromosome doubling. We work in

association with universities, colleges and private companies to use these techniques.

When all goes according to plan our breeding programs produce very fine cultivars and series. The following are some examples.

Recent successes

***Impatiens namchabarwensis* Blue Sky 'Thomimblue'**. I have always been looking for species to fill the colour gap in busy lizzies; bluish shades were present in *I. arguta*, *I. decipiens* or *I. puberula*, but these were never a convincing blue.

In 2005 I heard of a real blue species that had recently been discovered, in August 2003, in the deepest canyon in the world: the Namchabarwa gorge. It was collected only once in this inaccessible remote valley in Mêdog county, Tibet. I started to source *I. namchabarwensis* from various places and Ray Morgan, National Plant Collection holder of *Impatiens*, kindly supplied most of the seeds and cuttings. I was able to screen a relatively large population in 2006 and I self-pollinated the best plants. Germination was not reliable, but among the offspring one plant stood out as being more compact, more branched and with shorter internodes than the typical straggly species. This is the first commercial blue *Impatiens* and should be hardy in most British gardens.

Laurentia Avant-Garde Series. Since Thompson & Morgan introduced *Laurentia* 'Blue Stars' about 15 years ago, this has become a successful genus of ornamental plants. To make further improvements, we took early-flowering parent lines and crossed pairs of them until suitable parents were found. This enabled us to create a series in blue, pink and white that flowers up to five weeks earlier than 'Blue Stars'. This is the first F1 hybrid series in *Laurentia* and we called it Avant-Garde. The high hybrid vigour of the plants enables them to flower throughout the summer, even in subtropical parts of Japan. The blue and pink colours won the Fleuroselect Gold Medal.

Helleborus x hybridus Queen Series. When hellebore breeder Elizabeth Strangman, retired we inherited much of her work ➤

and she still visits us every year to help with selection. We have been able to introduce eight different single F1 colours that she developed. This is still the only hellebore series on the market where we can guarantee that nearly 100% of the young plants we sell are true to colour before they flower. With the Double Queen Series, customers can be confident that 100% of the plants will be double-flowered, with absolutely no singles or semi-doubles. We can even offer seed in limited quantity with the same guarantee.

***Gaillardia x grandiflora* Cheyenne Series.**

This series of single flowered gaillardias is raised from cuttings. They are bushy, compact and extremely floriferous and the five colours are named after Amerindian chiefs. I think there is potential for many more colour combinations in this genus.

***Penstemon* Ice Cream Series and Minibird Series.**

The Ice Cream Series consists of compact border penstemons in eight colours. However, the Minibird Series represents a different type of penstemon to the usual border types. This series was developed from the Mexicali hybrids, originally raised by American breeder Bruce Myers by crossing Mexican and US species. From them



***Helleborus x hybridus* Double Queen Series**

‘Breeding new plants ... takes a great deal of time, effort and investment. Not all new plants are successful, but the royalties earned on the stars finance the other ones’

we bred a series of small plants with tiny flowers in three colours: lavender, lilac and pink. They are drought tolerant and grow well in containers and the open ground.

***Bidens humilis* Pirate Series.** Up until now, *Bidens* for containers and hanging baskets were quite unruly and would overgrow everything else. This new series is more compact. ‘Pirate’s Gold’ has the typical single *Bidens* flower, but the plants have a controlled mounding habit. ‘Pirate’s Treasure’ has a unique flower shape: it is semi-double with an extra corolla of spiky

petals inside the flower. The breeding of this involved much laborious petal counting to find the most double plants, but the result really is a treasure of a plant. Also, as a sneak preview of the latest breeding, I can show here the first commercial white-flowered *Bidens*, un-named as yet.

Protecting our work

Breeding new plants is not just about having an idea or being lucky; it takes a great deal of time, effort and investment. Not all new plants are successful, but the royalties



***Gaillardia x grandiflora* ‘Shining Horse’**

earned on the stars finance the other ones. We try our best to ensure that our novelties reach the end consumer with the highest genetic and phytosanitary quality as well as traceability. It would be a shame to see our



on licence agreements are given by the International Association of Horticultural Producers (AIPH) on their checklist. The PVR or patent protection systems need to be enforced in practice and piracy vigorously fought.

There is a common misconception that PVR prevents home gardeners from propagating plants. However, they can do it for their own non-commercial purposes, and even use them to breed new plants. Affordable, fair, harmonised, strong and balanced intellectual property rights all along the horticultural chain will profit the whole industry and guarantee new and genuine good quality plants for our gardens.

Enhancing garden diversity

It is very rewarding to be able to introduce unusual species or new hybrids into wider cultivation. Furthermore, even if the novelty characteristic is only a small colour variation, I am glad to contribute to people's garden diversity and support their enthusiasm to cultivate and combine novel plants. I feel proud when I recognize one of my plants in someone's front garden. I also love how an abstract breeding idea changes and develops into a fully new and real plant.

CHARLES VALIN is Plant Breeder for Thompson & Morgan (UK) Ltd



valued products copied and overproduced, with a high risk of serious quality issues. Protection from unauthorised propagation is necessary, otherwise good plants would quickly end up being cheap, misnamed,

virused, poor quality or counterfeited look-alikes. The whole chain could be damaged, causing disappointment for consumers, profit loss for growers and retailers, tarnishing of the breeder's reputation, and possible loss of many year's work.

There are many ways of protecting plants. Controlling distribution works in the short term, and trademarks can work slightly longer - until the product is sold under a different name. Plant Variety Rights (PVR) and patents are the best system so far, but they are probably still too expensive for independent breeders. The agreement on the royalties to be paid to the PVR holder by the licensees is independent of the PVR itself. A grower and the PVR holder have to make a licence agreement. I believe there should be a simple, standardised license agreement, maybe based on the model of authors' rights for books. Good guidelines