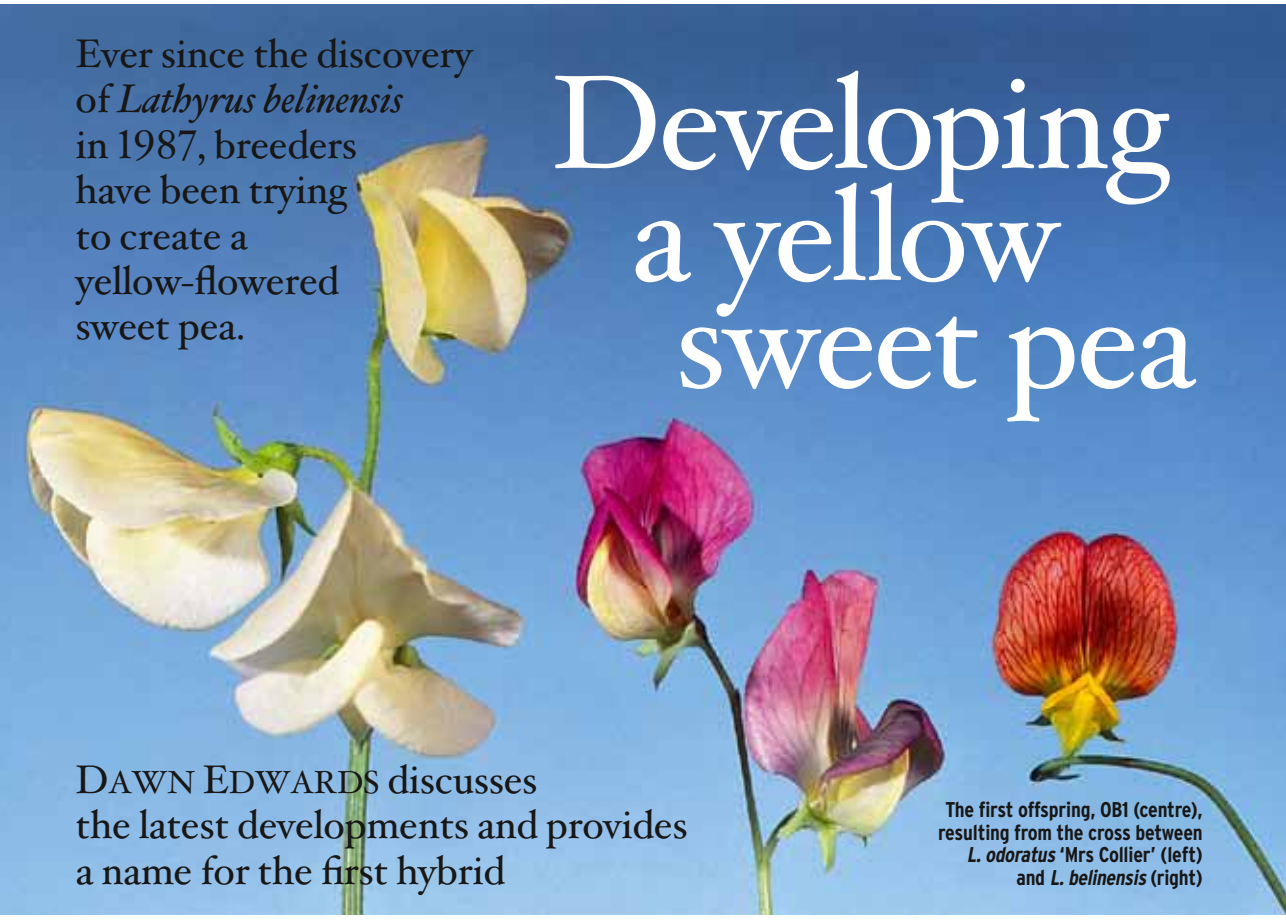
Developing a yellow sweet pea

Ever since the discovery of *Lathyrus belinensis* in 1987, breeders have been trying to create a yellow-flowered sweet pea.

DAWN EDWARDS discusses the latest developments and provides a name for the first hybrid



The first offspring, OB1 (centre), resulting from the cross between *L. odoratus* 'Mrs Collier' (left) and *L. belinensis* (right)

SINCE ITS INTRODUCTION into cultivation in the 17th century from Sicily, intraspecific breeding of *Lathyrus odoratus* (sweet pea) has yielded a vast number of cultivars. These range in flower colour from white through shades of cream, pink, orange, red, blue and mauve, to dark purple. Conspicuously missing from this palette, and much desired by gardeners, is yellow.

This is not for a lack of trying by breeders, but traditional breeding methods are unlikely to lead to a yellow-flowered sweet pea. Attempts have been made to cross *L. odoratus* with other species of *Lathyrus* that have yellow flowers, but hybridization mostly failed or did not result in yellow-flowered progeny.

Promising new species

However, the discovery in 1987 of a new annual species, *L. belinensis*, in Antalya, Turkey (Maxted & Goyder 1988) has given new hope to breeders. This species has yellow pigment in its flowers, with red-veined, orange-yellow standards and yellow wing and keel petals. Also, morphologically it is the closest relative of *L. odoratus*, with few vegetative characters separating the two species.

Most noticeably, *L. odoratus* has an indumentum of prominently tuberculate hairs, whereas *L. belinensis* is glabrous or glabrescent on the stem with inconspicuously tuberculate hairs on its side shoots and fruit. Hammett *et al*. (1994) also found that seedling leaflets of *L. belinensis* have a red pigment spot at their base which is not present in *L. odoratus*, and that *L. belinensis* has membranous, indehiscent fruit, whereas in *L. odoratus* the fruit is dehiscent.

OB1, the first hybrid between *L. belinensis* and *L. odoratus*, being grown on in culture after embryo rescue

All photographs by Keith Hammett

First crosses

In anticipation that the close relationship between these two species might enable successful hybridization and lead to a yellow-flowered sweet pea, Dr Keith Hammett, a leading sweet pea breeder, and co-workers undertook a breeding programme. Breeding barriers were encountered and a number of attempted crosses failed, or produced plants that failed to reach maturity.

A successful cross was eventually made using *L. belinensis* as the pollen parent and cream-flowered *L. odoratus* 'Mrs Collier' as the seed parent. This was achieved using embryo rescue technology, a laboratory technique that aids the development of embryos that might otherwise have aborted. The embryo is dissected out of the seed before maturity and grown on in a culture medium.

The resultant hybrid, referred to as OB1 by the breeders, lacked hybrid vigour and was a weak plant, shorter than both parents and with smaller leaves. Intermediacy between the parents was evident in both flower size and scent, with the latter intermediate between the sweet scent of *L. odoratus* 'Mrs Collier' and the sharp scent of *L. belinensis*. In the parents and the offspring the scent was strong. Curiously, however, considering the flower colour of the parents, the hybrid had a pink standard and violet wing petals. It resembled a paler version of wild *L. odoratus*, which has maroon standard and purple wing petals.

Subsequently, the cross was achieved without embryo rescue using *L. belinensis* as the seed parent and orange-flowered *L. odoratus* 'Orange Dragon' as the pollen parent. Known as A18, this second hybrid was more robust than OB1, but again produced pink and violet flowers (K Hammett, pers. comm.).

Both of the initial F_1 hybrids were self-sterile and the plants lasted 19 and 18 months respectively. This is in contrast to the fertile, annual parent species which normally have a 9-month lifespan. The initial F_1 hybrids were partly male-fertile, which enabled backcrossing with both *L. odoratus* and *L. belinensis*. Cultivars resulting from backcrossing with *L. odoratus* are now commercially available.

Variation in the breeding line was initially limited because backcrosses using the F_1 plants could only be achieved with wild *L. odoratus*. However, backcrosses with *L. odoratus* cultivars have now been successful, resulting in robust, fertile seedlings with previously unseen colours, but no yellow yet. Work is ongoing with the *L. belinensis* breeding line in the hope that a yellow sweet pea can be raised.

DESCRIPTION

***Lathyrus* x *hammettii* D. Edw., hybr. nov.**

Garden hybrid between *L. belinensis* Maxted & Goyder and *L. odoratus* L. A small, pubescent, annual plant to 50cm tall, with leaves comprising 1 pair of green leaflets to *c*.2.5cm long, ending in green, 3-branched tendrils. Standard petal pink (186B/55B) fading to cream (1D) at the base, *c*.2.5cm long, reflexed, emarginate; wing petals violet (94B/87A) over cream (1D), becoming yellowish green (145C) at the upper edge, *c*.2cm long; keel petals cream (4D). Scent strong, but neither as sweet as *L. odoratus* nor as sharp as *L. belinensis*. Self-sterile, partly male-fertile. Further variation resulting from backcrossing is described under each cultivar raised to date (pp253–254).

Type: cultivated plant raised by K Hammett, Massey, Auckland, New Zealand, from rescued embryo excised on 28 Dec 1991 (holotype: AK, specimen no. AK212042, 19 Jan 1993).

Colour references are taken from Hammett *et al.* (1994) who used the *RHS Colour Chart* (1966).

A new hybrid

I therefore propose a hybrid epithet for the cross between *L. belinensis* and *L. odoratus*. At the suggestion of garden writer Graham Rice I am naming it *Lathyrus* x *hammettii* in honour of its creator, Dr Keith Hammett, and his contribution to *Lathyrus* breeding.

Hammett, based in New Zealand, works on a number of plants, particularly dahlias and sweet peas. The revival of interest in bicoloured sweet peas resulted from his introduction of these colours into modern cultivars in the second half of the 20th century. He then took this further with the creation of reverse bicoloured flowers. In contrast to bicolours these have wing petals that are darker than the standards. The cultivar 'Erewhon', which belongs to this hybrid, is perhaps the most striking example to date.

The formal description of the hybrid is based on the type specimen. However, intense backcrossing in the quest for yellow-flowered and other gardenworthy cultivars has already led to considerable variation from this description, and is likely to continue to do so.

Lathyrus x *hammettii* cultivars

Six cultivars already released into cultivation are described here.

'Blue Shift' – flowers open mauve, developing to an intense blue.

'Blue Vein' – flowers open ➤

Cultivars of *Lathyrus* x *hammettii* have vivid colours, but no yellow yet; 'Blue Vein' (left), reverse bicolour 'Erewhon' (right) and 'Porlock' (below)

apricot, turning a paler orange, with a strong marbling of dark blue veins. This cultivar was derived from backcrossing of A18.

'Erewhon' – the most strongly contrasting reverse bicolour to date, with pinkish lavender standards set against darker, mauve wings. It was named after *Erewhon*, a novel by Samuel Butler describing a fictitious land where features of life are in reverse.

'Painted Porcelain' (syn. 'Spanish Dancer') – cream petals edged with rosy pink.

'Porlock' – crimson standard and dark mauve wings with marbling caused by prominent dark maroon veins. This cultivar was derived from backcrossing of A18.

'Turquoise Lagoon' – flowers open pale pink, maturing to a vibrant turquoise.

Conclusion

Hammett's breeding programme has already given rise to a number of cultivars with previously unseen colours and colour combinations, and more are in the pipeline. Furthermore, the exciting possibility remains that continued backcrossing involving *L. belinensis* will eventually lead to the coveted yellow-flowered sweet pea.

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REFERENCES

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