



Grower Summary

PO/BOF 002a

The National Cut-flower Trials
Centre Programme for 2013 -
2017

Annual 2013

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Grower Summary

Headline

- Reduce column stock losses from Fusarium wilt by eliminating susceptible varieties.
- Consider using the 'Anytime' series of column stocks for late production.
- For a novel outdoor cut-flower species with high-quality stems, the various *Sedum* varieties examined have proven successful.
- For hardy foliage production the *Hypericum* and *Symphoricarpos* varieties evaluated at CFC have generated interest.
- In lily growing, reduce costs by using a 1:1 mix of peat and quality checked 'green-compost'.
- For specialist projects, consider 'Breanthus' and 'Solomio' carnations, *Eryngium* cultivars and the 'Benary's Giant' series of *Zinnia*.

Background

The UK traditionally had a relatively low *per capita* consumption of cut-flowers compared with other western European countries, but between the late-1980s and early-2000s its imports of cut-flowers rose from some £125 m to around £550 m. Over the same period the value of UK-grown cut-flowers remained static at around £50 m, the bulk made up of glasshouse crops (including forced bulbs) and field-grown daffodil, but including some £5 m to £10 m annually of outdoor crops such as natural-season chrysanthemum, sunflower and peony.

In the 1990s the advent of relatively cheap Spanish tunnels, the increasing UK market for cut-flowers and environmental demands to cut 'air-miles', should have provided UK cut-flower growers with an opportunity to expand production. That this did not happen is anecdotally ascribed to (a) a lack of 'know-how' and (b) a culture of buying-in from 'across the water'.

To provide information on alternative or 'new' cut-flowers for production outdoors or under Spanish tunnels in the UK, a cut-flower trials project was proposed by industry representatives and funded by the HDC, starting in 2007. The longer-term aim was to stimulate UK cut-flower growers to develop and commercialise new products and new markets.

The current funding package provided by the HDC has enabled the Centre to enhance its role by taking on a 'crop association' role and developing a cohesive voice for the R&D

needs of the UK cut-flower industry. It has also extended its role beyond new product development to develop and facilitate trials on mainstream and bulb crops.

Summary

Information gathering

A database of companies supplying seeds and planting material for cut-flower production was compiled. Research on new cut-flower crops and programmes of cut-flower trials worldwide were reviewed. Internet sources of information on cut-flower production are compiled, along with statistics of production levels and trends in the cut-flower trade. This information was used to build a programme of new crop testing and has been placed on the Centre's website <http://www.thecutflowercentre.co.uk/>

Novel crops

Six new cut-flower crops were selected for testing in 2013: basil, cosmos, *Leonotis*, lupin, *Trachelium caeruleum* and *Zinnia*. Work on three further crops was prioritised for 2014: cut-flower gentians (*Gentiana asclepiadeum* and others), *Dicentra spectabilis* (bleeding hearts) and *Helleborus* species (hellebores).

Basil (*Ocimum basilicum*) can contribute a fragrant filler to mixed bunches and bouquets, and four cultivars, 'Dark Red Opal', 'Floral Spires Lavender', 'Floral Spires White' and 'Sweet Dani Lemon', were grown in a Spanish tunnel and an outside bed. The plants produced dense foliage, perhaps too soft, but flowering stems taken for vase-life testing had an unacceptably short vase-life.

Cosmos (*Cosmos bipinnatus*) are well known garden plants that may appear too wispy to be adapted as a cut-flower, but have been widely trialled in the USA. Cultivars from the 'Piped Piper', 'Razzmatazz', 'Sensation' and 'Sonata', series, and the cultivar 'Antiquity' were grown in a Spanish tunnel and in outside beds. Growth was vigorous and unruly and might require controlling through cultural or chemical means, but flowering was prolific with a good range of colours and forms. Cut-flower cosmos could be seen in the context of 'monthly bouquets' (bouquets in which variety is introduced regularly by changing the fillers), if grown cheaply as an outside, drilled crop picked over a short season.

Leonotis leonurus is a South African plant being introduced to cultivation, having attractive orange flowers, an aromatic scent and apparently easy to grow in various regions. *Leonotis* 'Staircase' was grown in a Spanish tunnel, growing vigorously and flowering late in summer. In this form *Leonotis* would be difficult to handle, but the plants have been cut-back to grow on next year, which research suggests may lead to more manageable growth. Shorter

species, such as *L. mollis*, will be evaluated in 2014. *Lupinus harvardii* and *L. densifolius* are natives of Texas producing attractive, tall blue flowers with potential as a new specialty cut-flower, and some improved selections have been made. However, it was not practical to obtain material of these new introductions, perhaps because of commercial sensitivity. As an interim measure, cultivars of the 'Gallery' and 'Russell' series of *Lupinus polyphyllus* were grown in a Spanish tunnel and in outside beds. The plants established well and produced good numbers of stems over a long period. Their full potential as cut-flowers will be assessed in 2014.

Trachelium caeruleum is not well known in the UK though widely grown in the Netherlands. Seed of several cultivars was sown but failed to germinate, despite no special requirements being apparent. Therefore plug-plants of cultivar 'Corine Purple', were grown in a Spanish tunnel; these grew well and producing an attractive display. With its colour and form, *Trachelium* may have potential for UK production, and the trial will be repeated in 2014 using plug-plants.

Unlike the other species in this 'new crops' section, *Zinnia* (*Zinnia elegans*) has been grown previously at the Centre, when the industry was enthusiastic about the flowers with their wide range of cheerful colours, though vase-life was poor due to the hollow stems which collapse and bend in the neck. However, in some trials in the USA *Zinnia* such as 'Benary's Giant Lime' were rated as most dependable. Several cultivars of the 'Oklahoma' and 'Benary's Giant' series were grown in a Spanish tunnel and in outside beds. When the plants were only a few inches high premature buds became visible on all plants; after pinching-out the buds the plants grew away vigorously. The 'Benary's Giant' varieties were stronger and attracted more interest than 'Oklahoma', but even the latter were considered far superior to the *Zinnia* cultivars previously grown at the Centre. Samples of 'Benary's Giant' varieties were used for vase-life testing and showed markedly less stem bending than the earlier cultivars, and vase-life appeared amenable to improvement by using other conditioning solutions immediately after picking.

Crop improvement: 1. Aster, September-flowering (*Aster ericoides*)

Aster ericoides are currently imported as a relatively cheap filler using the single-flowered 'Monte Casino' types. But the introduction of new double-flowering breeding lines has the potential to open up a new market. Previous trials had generated market interest in *A. ericoides* grown as a pinched, tunnel grown crop for September/October flowering, possibly augmented by seasonal extension. Floral initiation can be delayed by blacking-out the crop for part of the day, and plots planted in 2012 and left *in situ* in a Spanish tunnel and outside

beds were used in 2013 to investigate the use of blackout covers. The cultivars were 'Blue Tail', 'Capetown', 'Cassandra', 'Cassy', 'Chicago', 'Cirina Dark', 'Double Fun Blue', 'Double Fun Pink Dark', 'Double Fun White', 'Linda' and 'Pretty Wendy'. Blackout covers were placed over the plots for 13 hours a day from week 22 to week 31. By this time good-sized buds were present and about to show colour. Overall flowering was later than expected (mainly weeks 32 and 33), but the quality was superb. The second flush (early-November) was too short to be marketable. This experiment will be continued in 2014, with the blackout treatment beginning when the shoots are shorter (40 to 50cm-long).

2. Annual (or China) aster (*Callistephus chinensis*) ('bloom asters')

Annual asters are a mainstay of the UK outdoor summer cut-flower market, dominated by the 'Matsumoto' spray type. However, new series of large-headed China asters with vibrantly coloured blooms, the 'Krallen' and 'Gala' series, were introduced in Germany and became available in 2007, when demonstrations were planted at the Centre. They generated strong interest from growers and there appeared to be potential for commercialising them in the UK. This work opened up a new market for this alternative, large-headed, 'bloom' type of aster for summer production. As a result 'Krallen' cultivars were grown by local producers in quantity in 2009 and 2010, with 'Karthäuser' and 'Perser' in great demand by supermarkets. Their vase-life consistently met or exceeded the guarantee of five days, but a severe petal-spotting problem occurred on the commercial plantings resulting in severe losses. Despite samples being submitted to numerous laboratories, the cause could not be determined and as a result 'Krallen' is unlikely to be grown again on any scale until this issue is remedied. Since then, trials have been carried out to find an alternative to 'Krallen'. Cultivars from the 'Beautiful Day', 'Harlequin', 'Jewel', 'Lady Coral' and 'Meteor' series were grown in Spanish tunnels, with two planting dates. The main cropping period for the early planting was week 32 to 34. Cultivars of the 'Meteor' and 'Harlequin' series gave taller plants, the remaining cultivars were shorter. For the later planting the main cropping period was week 39 to 41. All the cultivars had shorter stems than the earlier planting. Cultivars of the 'Harlequin' and 'Jewel' series gave taller plants, while the 'Beautiful Day' and 'Lady Coral' cultivars were shorter. Many of the cultivars tested had stem and flower attributes showing promise for greater use in the UK, and they were free of petal disorders. However, none was considered as outstanding or likely to provide an alternative for the favoured 'Krallen' varieties. The vigour of some types suggested that chemical growth regulator treatments might be beneficial, and they will be tested. No progress has been reported on the prevention of petal disorders in 'Krallen'.

3. Dianthus, annual (*Dianthus barbatus*), 'Breanthus' range

Annual dianthus are already available to the UK market, the main varieties being 'Amazon' and 'Sweet'. 'Breanthus' was introduced in 2012, with robust, voluminous flowers that stand out through their uniformity and spherical flower heads. In 2013 plants of 'Baron', 'Duke', 'Earl', 'Elmo', 'Findus' and 'Lord' 'Breanthus' were grown in a Spanish tunnel with two planting dates. One half of each plot was pinched two weeks after planting. A few premature buds occurred in mid-May. The first flowers were harvested mid-June and flowering started in earnest in week 26. The crop did not flush in the true sense, but provided a steady supply of stems over the whole period. There were significant effects of cultivar, with 'Baron' consistently high-yielding and 'Elmo' low-yielding. Both later planting and pinching considerably reducing yield, but this was exacerbated as a result of having to remove the tunnel covers at the onset of bad weather, which meant that not all of the later stems could be harvested. This may not be an issue under cold glass. Stem weight was very variable. These improved cultivars generated keen interest from packers and supermarkets, but it is thought a grower might struggle to make adequate returns, and consequently there has been little or no commercial uptake. For 'Breanthus' to achieve commercial viability, it needs to be perceived as a high-quality product, quite distinct from seed raised sweet william.

4. Dianthus, spray (*Dianthus caryophyllus*), 'Solomio' and 'Star'

Spray carnations are a supermarket staple, most being cheap imports from Africa and South America. 'Solomio' and 'Star' are new ranges of carnations, and with their unusual flower form could give UK growers the opportunity to produce a premium product not competing with imports. Earlier demonstrations received positive market feedback from the industry. Branded accordingly, these novel cultivars might be marketed at a more developed stage than the traditional spray carnation. In 2013 cuttings of several of the 'Solomio' series, and of 'Star Cherry Tessino', were grown in a Spanish tunnel with two planting dates. All plants were pinched two weeks after transplanting. Cropping started in mid-July and continued until the plants were cut down in late-October, when there were still immature stems from the first flush. Overall they produced good quality, strong stems, but there was an issue with bud abortion in some varieties, especially 'Edo' (the central bud dried-up, but the stem was still marketable if the aborted bud was removed manually). Among the 'Solomio' cultivars the yield of stems per m² varied from 141 to 197 for the earlier planting, and from 108 to 144 for the later planting. As in the case of 'Breanthus', 'Solomio' and 'Star' generated definite interest from packers and supermarkets. However, once again, a grower might struggle to make adequate returns, so they need to be sold as a premium product that is distinct from the standard imported stem. 'Breanthus' yields would need to be boosted by a productive

second flush of flowers, which their breeder's state should be obtained through scheduled plantings. The productivity of the tunnel plants will be assessed in 2014.

5. *Eryngium* (Sea Holly) (*Eryngium* cultivars)

Eryngium are an expensive cut-flower, and responding to grower requests small demonstration plots have been grown at the Centre previously. In 2011 a small selection of new cultivars ('Arabian Dawn', 'Blue Bell', 'Deep Blue', 'Magical Blue Falls', 'Magical Cloud', 'Magical Purple Falls' and 'Marbella') were grown in plots in a Spanish tunnel and outside to assess their potential in the UK. Few flowers were produced in 2011 and the plants were grown-on for assessment in 2012, when some marketable stems were produced, but owing to plant losses in the cold winter of 2011/2012 and the wet summer and autumn of 2012, these yields were not considered meaningful. By 2013, the *Eryngium* in the tunnel had become over-vigorous and were grubbed-up, while the outside planting produced variable numbers of stems in 2013, again many of these did not survive the severe winter of 2012/2013. The outstanding cultivars were 'Blue Bell' and 'Deep Blue', which appeared nearly fully hardy and produced 56 and 113 stems per m², respectively. In the remaining five cultivars the percentage of plant survival (to 2013) was between 43 and 71% . In 2013 necrotic, black lesions appeared on the foliage, devastating 'Arabian Dawn' and 'Marbella', and was identified as being due to *Alternaria*. Despite the disappointing results so far, samples sent to packers and supermarkets generated considerable interest - the form of the flower-head is consistently regarded as appealing. There is considerable variability in winter hardiness of the crop, but they may be too vigorous in tunnels. It is planned to continue the trial of *Eryngium* to 2014, with the aims of identifying the best hardy cultivars and finding out how they can be grown to produce reliable, consistent stems.

6. Lily (*Lilium* cultivars)

In the last 20 years lilies have become a major phenomenon of the UK cut-flower trade, with large quantities grown in the UK from imported bulbs, in addition to the stems imported. Factors involved in this success include dynamic hybridisation programmes in the Netherlands, the relative rapidity of bulking-up new cultivars, and the avoidance of soil-borne diseases through the successful development of growing lilies in crates of soil-less media. Bulbs of newer cultivars were evaluated in 2013: 'Adelante', 'Beau Soleil', 'Burlesca', 'Carolyn', 'Castelle', 'Crystal Bianca', 'Fiction', 'Hacienda', 'Hypnose', 'Mandaró', 'Oberto', 'Ovatie', , , 'Pintado', 'Profundo' 'Sambuca and 'Tupelo'. '. The variety trial was combined with growing in a standard peat mix, green-compost, or a 50:50 mixture of the two. In week 17 the bulbs were planted in crates and either moved to a Spanish tunnel, or cold-stored at 9°C and moved to the tunnel four weeks later. With minor exceptions, stem length was longest in

plants grown in peat and shortest grown in green-compost. However, it must be pointed out that there could have been a slight edge effect to these results but experienced lily growers who viewed the trial were of the opinion that the effect was too large to be just down to an edge effect and must therefore have been a result of the treatment.. Housing date did not have a significant effect on stem length. The quality of the stems was superb. The trial was successful in stimulating debate amongst the industry as to the need for alternative growing media, and showed that it was possible to produce good quality stems whether grown in peat, green-compost or a mix of the two, although growing in peat did produce the longest stems. Further alternative growing media trials will be undertaken in 2014 on a commercial nursery with established varieties.

7. Stocks, column (*Matthiola incana*)

Column stocks are one of the mainstays of UK protected cut-flower production, and there has been a series of trials at the Centre, either in response to specific industry problems, or as investigations of new varieties. Column stocks are prone to failing or abnormal flower initiation when grown at summer temperatures, but the 'Katz' series was bred for resilience to high temperatures. In the latest variety trial, in 2013, several 'Katz' varieties, 'Apricot', 'Bright Rose', 'Cherry Blossom', 'Lavender Blue', 'Light Lavender', 'Pink', 'White' and 'Yellow', were planted in a Spanish tunnel in week 24. The plants grew well, though their stem strength was not as good as in previous years, possibly due to hot weather throughout most of the life of the crop. However, their quality was far superior to some commercial crops, which were sometimes unmarketable because of weak stems. Cropping was from week 30 to week 32. Another trial showed that 'Katz' might be suitable as a late tunnel crop.

There has been increasing concern among growers about the poor establishment and growth, and lack of flower uniformity, in column stocks. No single factor had been identified as responsible for these unsatisfactory results, but *Fusarium* wilt has been implicated. A full range of cultivars was planted in a commercial glasshouse that had a history of *Fusarium* wilt, for testing for susceptibility. The trial followed a commercial crop of column stocks and the soil was not sterilised before the trial was planted. Of the Combinations varieties the resilient and productive ones were Avalanche White' 'Fantasy Red ', 'Fantasy Red Imp', ', 'Phantom Cream Imp' and 'Phantom Red'; amongst the Florensis varieties, many more fell into this category: 'Anytime' varieties 'Apple Blossom', 'Pink', 'Red', 'Sea Blue', 'White' and 'Yellow', Figaro Lavender', 'Katz' varieties 'Bright Rose', 'Cherry Blossom', 'Light Lavender', 'Pink' and 'Yellow', 'along with some of the coded lines, 'T0681P', 'T0311P' and 'T6340P'. The resilience and productivity of the 'Katz' and 'Anytime' series were confirmed, while 'Opera' varieties did not perform well under summer stress conditions..

8. Sunflower (*Helianthus annuus*)

Sunflowers became a fashionable cut-flower in the early-2000s, and significant quantities are now field-grown in the UK. Sunflowers have been included in several of the Centre's trials since 2010, the main needs being to reduce the resources needed in their harvest and handling, and this includes evaluating new dwarf cultivars and using plant growth regulators on standard cultivars. In 2013 seeds of cultivars 'Galilee Adami', 'Galilee Miracle', 'Galilee Orange', 'Helios Flame', 'Tanya', 'Tavor Flash Bicolour', 'Tavor Joy' and 'Tavor Lemon', and of five numbered lines (CF 100, 639, 652 and 654, and KB 198) were sown by hand into outdoor beds (weeks 15 and 23) and into beds in a Spanish tunnel (week 30). Despite the dry weather of 2013, some cultivars started to produce marketable stems from mid-June onwards, with the second planting coming into flowering in early August. Outdoors, the majority of the cultivars were 120 to 160 cm-tall and large-headed. 'Galilee Miracle' and 'Tavor Lemon' were shorter (80 to 100 cm), though with normal-sized flower-heads, while 'Tanya' was short (about 100 cm) and had smaller (3.5 cm-diameter) flower-heads. Overall, growing in the tunnel produced much taller plants. Almost without exception, flower-head diameters were smaller in the tunnel than outside.

9. Herbaceous perennial cut-flowers

Dahlia (*Dahlia hybrida*) has a poor vase-life, and the 'Karma' series was developed as a *Dahlia* with a longer vase-life. Crops of 18 'Karma' cultivars had previously been trialled at the Centre, but, although growing vigorously and attracting much admiration for their striking blooms, the results of vase-life tests were disappointing. Although supermarket interest in sourcing *Dahlias* as a cut-flower has been confirmed, this is being resisted until the vase-life issues are resolved. Further vase-life tests on 'Karma' varieties grown at the Centre were carried out in 2013, but did not identify any better conditioning or vase treatments than those already tried.

The inclusion of *Rudbeckia* (*Rudbeckia hirta*) in trials was suggested by a supermarket representative. Initial demonstrations with seed-raised annuals showed that the stems were too vigorous and unruly to be suitable for commercial growing. Trials in 2012–2013 with more robust perennial varieties of *R. laciniata* also showed they were far too vigorous, producing stems that were unmanageable.

Sedum cultivars were initially planted as a demonstration in outside beds. Growth, once established, was very vigorous, with high stem counts, good stem length and weight, and adequate vase-life almost irrespective of picking stage. Numerous samples have been made

available to the industry and it is known that, as a result, significant commercial plantings have been made, and consequently no further trials are planned.

10. Hardy foliage

A wide range of hardy foliage was planted outside in 2010 and 2011 and has now become established. There was distinct interest from the industry in 2013. It is known that substantial commercial plantings of *Hypericum*, *Symphoricarpos* and other hardy foliage have been made on local nurseries.

Non-crop-specific trials: 1. Green-compost container growing medium

With the increasing availability and interest in green-compost as a growing medium, concerns have been raised, including the potential for herbicide contamination. This was tested using a range of cut-flowers and two 'indicator' species (tomato and field beans, which are sensitive to herbicide residues) grown in peat or green-compost or a 50:50 mixture of each. The test failed to show any sign of herbicide contamination in green-compost. Growers should still exercise caution using green-compost: if in doubt, it may be possible to check batches using a simple biological pot test.

2. Spectral filters

Trials were undertaken with column stocks and bloom chrysanthemums. In the column stocks trial four cultivars were grown under clear polythene film or 'SteriLite SuperThermic', a film that diffuses light, blocks UV and reflects IR. It is claimed that this would produce more growth and that the tunnel would be 10% cooler in summer. Stem lengths were consistently greater under the specialist film than under clear film, but only by a few centimetres.

For one cultivar of bloom chrysanthemum grown under a standard film or a 'Smart Blue' film, the blue film was unsuitable because the stems produced under it were significantly later, shorter and lighter in weight and had a much reduced percentage crop-out (54% compared with 84% under standard film); vase-life was the same with either film. The blue film was chosen because it was claimed that it should reduce stem length, enhance the colour of the blooms and be about 10% cooler in summer.

Summary of the Centre's work

The Centre has now successfully developed its role as an information hub and cohesive voice for the UK cut-flower industry. This has been achieved by holding a number of grower events throughout the year, including a tulip study day, lily and spectral filter study day and an Open Day to look at the CFC trials on both a grower's holding and the main site at

Rookery Farm. The project continues to produce appropriate technical literature, including a review of cut-flower trials worldwide and a summary of the Centre's column stock Fusarium wilt susceptibility trial. A number of crops that had been trialled at the Centre have now been planted commercially, including *Antirrhinum*, *Sedum*, hardy foliage and a summer spot-crop of lisianthus. In addition to the main trials, the Centre, in its role as a crop association, has facilitated additional studies, including trials on herbicides for column stocks and sweet williams, and a review of hydroponic growing for cut-flowers.

Financial Benefits

Since the inception of the CFC, members of the Management Group and the Project Manager have been aware of a number of crops that have been both trialled and grown commercially as a direct result of the programme of trials at the CFC. Examples of some of the crops trialled at the CFC that are known to have been grown on a small scale include the Hilverda annual dianthus, *Aster ericoides*, 'Karma' *Dahlia*, *Phlox*, scented pinks, 'Solomio' carnations and *Zinnia*.

Other crops have been grown on a more commercial scale of which the main ones in 2013 include *Antirrhinum*, a spot crop of lisianthus, and various hardy perennials including *Hypericum*, *Sedum* and *Symphoricarpos* (snowberries). The following is an estimate of the area grown and the farm gate value for these products, with the hardy perennials being included under a single category:

Antirrhinum: amount extra grown in 2013 - approximately 1.0 ha with a farm gate value of £115,000.

Lisianthus: amount extra grown in 2013 - approximately 0.5 ha with a farm gate value of £70,000.

Hardy perennials: amount extra grown in 2013 approximately 2.5 ha with a farm gate value of £78,000 (this value is based on a middle figure for yield which takes into account the fact that these are relatively new plantings and have not yet reached maximum yield).

The production area of both lisianthus and hardy perennials is likely to increase in 2014.

In an attempt to enable growers to undertake a basic assessment of the commercial potential of some of the plant material that has potential, this section will in future include some basic yield and planting density data starting with the three subjects listed above.

Antirrhinum: planting density around 64 plants/m² of bed with 80 to 95% of stems being harvested (one stem produced per plant). **The plant cost is approx €40 per 1000 plus**

delivery.

Lisianthus: planting density between 64 to 80 plants/m² of bed with 80 to 95% of stems being harvested (one stem produced per plant)); **the plant cost is approximately €53 to €78 per 1000 (dependent on variety) plus delivery.**

Hardy perennials: using *Symphoricarpos* (snowberries) as an example, the planting density is around 1.3/m², with a yield of around 20 stems per plant from year 3 onwards. **The plant cost of hardy perennials varies with the subject, the cheapest being sedum at less than €1 per plant, then hypericum at about €1.5 per plant, and snowberries at about €1.75 per plant. The expected life of these crops would be between 10 and 20 years**

Action Points

- Column stock growers should use the results of the Fusarium wilt susceptibility trial to help plan their future production.
- The 'Anytime' series of column stocks should be considered for late production, especially for the second round, because it is quick to crop, has a lower susceptibility to Fusarium wilt (except 'Anytime Lavender') and, from commercial observation during the hot July and August of 2013, seems less prone to heat-induced blindness.
- 'Breanthus' and 'Solomio' carnations are potential new crops for UK growers to investigate, but the economics of production will depend on agreeing a realistic stem price.
- The 'Benary's Giant' range of *Zinnia* is also worthy of consideration, with stronger stems than the *Zinnia* varieties previously tested, but additional vase-life work is required before it can be regarded as a firm candidate for supply to supermarkets.
- The Centre's trials have generated an interest in *Eryngium*, but to date no commercial plantings are known. After consultation with their customers about the form of flower required, which varies considerably from the large-headed, spiky 'Arabian Dawn' to the more delicate 'Cloud' series, growers could consider small-scale commercial plantings of this crop. If planting in areas with potentially severe frosts, the hardiness of varieties in their first year will need to be taken into account.
- *Sedums* produce high yields of stems with good length and weight and a long vase-life irrespective of picking over a range of growth stages, and could be considered as a new crop.
- Amongst a range of hardy foliage tested, *Hypericum* and *Symphoricarpos* were effective and popular and could be considered as new crops.
- In lily growing there is potential to substitute some or all of the peat used in crates with a cheaper substrate such as 'green-compost', and this will be the subject of

additional work by the Centre. Growers may also want to consider undertaking their own small-scale trials, but should be aware of the possibility of contamination by herbicides.

- Growers should continue to use the Cut-flower Centre, in its 'crop association' role, as a conduit for feeding in ideas that they believe would benefit their businesses or the wider industry, whether in the form of R&D requirements, study tours, technical workshops, additional publications, etc.