



# **Grower Summary**

**The National Cut-flower Trials Centre Programme  
for 2018 - 2023**

**PO/BOF 002b**

Interim report

**Project title:** The National Cut-flower Trials Centre Programme for 2018 - 2023

**Project number:** PO/BOF 002b

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**Report:** Annual Report (2022)

**Previous report:** Annual Report (2021)

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**Date project commenced:** 01 January 2018

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## GROWER SUMMARY

### Headline

- *Tanacetum* has been demonstrated to be a crop that can be produced by growers for the home market.
- New micro-propagated varieties of *Limonium* produce high quality long stems and good yield with very few P&D issues.
- *Aster ericoides* has the potential to be produced as a natural season perennial crop in the UK.
- Steam sterilisation is still the only viable way to ensure that *Fusarium oxysporum* is adequately controlled in an insensitive cropping programme for column stocks.
- A new range of column stocks called 'Stox' has been shown to produce flowers in high temperature conditions but more selection work is required by the breeder to ensure a higher percentage of marketable stems.
- There are varying levels of susceptibility of column stock to *Fusarium* amongst more recently introduced varieties as well as those already confirmed in the older, longer established varieties.
- Further investigations into the ongoing sunflower spotting issue has again isolated *Itersonilia* leading to the postulation that it could be the primary cause of the problem.
- Work is ongoing to find new fungicides to incorporate into the CFC/AHDB developed column stock downy mildew fungicide programme and potential candidates do not appear to have phytotoxicity issues.

### Background

The National Cut Flower Trials Centre (CFC) was proposed by industry representatives and subsequently funded by the HDC (now AHDB Horticulture), starting in 2007. Its short-term aim was to provide information on new product development, novel or alternative cut flowers

for production outdoors or in tunnels to stimulate UK production.

2018 was the first year of a new funded project at the CFC and after taking guidance from industry, a new five year programme of work (2018 to 2022) was agreed to broaden the remit of the CFC, addressing a wider range of issues beyond new product development (NPD). Topics addressed in the first three years included: ongoing trials examining *Fusarium* control in column stocks production in conjunction with Warwick University, evaluation of new herbicide products for field-grown crops and reactive trials examining current important industry issues. During 2018 the latter enabled the CFC to quickly investigate the downy mildew outbreak in column stocks, commission sensitivity testing by FERA and recommend a revised spray programme to address the issue of poor control on some nurseries. The spray programme developed as a result of this work continues to be the mainstay of the industry and has avoided any additional major outbreaks of the disease on UK grown column stocks.

The Covid 19 pandemic in 2020 resulted in the CFC losing a full year of trials and because of this the end date of the project has been moved from 2022 to 2023. In 2022 the CFC was able to run a full programme of trials but owing to the purchase of Rookery Farm by Sarah Raven Ltd, the site has had to be cleared by October 2022 which means that ongoing and new trials in 2023 will be undertaken on growers holding. After the industry voted to end the AHDB levy, the AHDB have agreed that the CFC will be one of the ongoing legacy projects ensuring funding will continue to the end of the contract for the work in 2023.

## **Summary**

### ***Aster ericoides.***

*Aster ericoides* is a product that is imported to the UK mainly for use as a filler in mixed bouquets. It naturally flowers in the Autumn but can be manipulated to produce an AYR crop by the use of blackouts and night break lighting. The CFC have investigated the crop in previous years, and it was included in the 2021 trials following a request from a local packer

who was interested in single flowered varieties. The 2021 trials demonstrated that a natural season crop produces flower stems that are too large and heavy to be of practical use as a filler for supermarket bouquets. At the 2021 Open Day it was suggested that once the stems are growing away vigorously, they should be cut back again to encourage shorter and lighter shoots that would be more suited for use as fillers in mixed bouquets. This technique was applied to the 2022 trials with half of each variety being cut back in week 23 and the other half being allowed to develop naturally.

Cutting the crop back to ground level in week 23 of 2022 did help to achieve a more manageable crop but in retrospect this could perhaps have taken place another 2 week later in order to achieve even shorter stems. The crop flowered in the first half of October.

There is a market demand for more UK product at the time of year that these asters flower with the shape of the stems making the product suitable for mail order and wholesale grade, and if cut back later the smaller and lighter stems would be suitable for fillers within bouquets. The white varieties would be popular for autumn weddings and other events and would replace *Gypsophila* at a time when the UK season would be coming to an end.

### **Column stocks (*Matthiola*) - Fusarium control using biopesticides**

A previous AHDB funded trial investigating *Fusarium* on lettuce has indicated that T34 Biocontrol (*Trichoderma asperellum* – strain T34, a biopesticide for the control of *Fusarium*) applied to the peat blocks at seeding gave a degree of control of the disease. In 2019, in order to assess the potential of T34 to control *Fusarium* in column stocks, the CFC replicated this technique by direct seeding stocks into treated peat blocks. The results were not conclusive but were promising enough to continue further trials.

In 2022 trays of very young seedlings which had only recently germinated were drenched on the propagators site (in Holland) with T34 and Prestop (*Gliocadium catenulatum* - another product claimed to have some control of *Fusarium oxysporum*). These were then grown on by the propagator until ready for planting when they were then delivered to the CFC site.

The 2022 *Fusarium* biopesticide trial is a culmination of a number of years trials which have been undertaken by the CFC both on growers holdings and at the CFC site. Unfortunately, none of the biopesticide trials, including those undertaken in 2022 showed any statistically (or visual) improved control of *Fusarium* on column stocks. It should be noted though that these trials were conducted in soils that had a high level of *Fusarium* infection and in some cases during very warm weather which meant that the plants susceptibility to the disease would be at its greatest. It is not now envisaged that the CFC will undertake any additional work on these products unless new information becomes available.

### **Column stocks (*Matthiola*) - *Fusarium* control using Elicitors**

Over recent years a number of plant elicitors have been introduced into the plant protection armoury. The mode of action of elicitors is to stimulate natural defence reactions in plants which in turn helps to make them less susceptible to attack from pests and diseases. In 2002 the CFC undertook a trial to look at the potential of elicitors for controlling *Fusarium* on column stocks.

Unfortunately, the 2022 trial indicated that they are not able to provide enough defence to enable the plant to reduce its susceptibility to *Fusarium* attack in this situation. This result is the same as has been obtained with the other CFC trials investigating *Fusarium* control in column stocks when the plant is subjected to a high level of inoculum. In these situations, the only control option still open to growers producing in intensive production systems if a crop rotational option is not available (which it isn't to most UK producers) is to sterilise with steam.

### **Column stocks (*Matthiola*) – Late flowering trial of new 'Stox' varieties**

Extending the season of column stocks beyond the late spring / early summer period is always an issue because most of the commercially grown varieties do not perform well in hot conditions leading to either blind plants or short and distorted flower spikes. The CFC has previously trialled the 'Iron' series which has been developed by Japanese breeders but while it does perform well in hot weather, it is not easily selectable and hence the crop has a lot of

stems of single flowers (only doubles are saleable to UK supermarkets) as well as some distorted stems of double flowers meaning that there were not enough marketable stems to make the crop economically viable. However a new range of column stocks has recently been introduced to the market called 'Stox' which are a cross between the genetics of the traditional and Japanese varieties. It is claimed that these are fully selectable and will flower during hot weather hence enabling the season to be extended. In order to investigate these claims the CFC made 2 late plantings (week 27 and 30) of the full range of colours of 'Stox' (except white which was not available in week 27).

This trial showed that new 'Stox' series do not have the same issues with hot weather as do the more traditional varieties. July and August of 2022 was excessively hot with temperatures reaching in excess of 40°C yet all of the 'Stox' varieties produced flowers, with the best stems exceeding 60cms in length. However the current selections will not be commercially viable for a UK supermarket crop because of the low percentage of stems that were of high enough quality to market. The number of marketable stems per square metre varied from 12 in the silver up to 34 in the Rose Pink and even the higher value would only be commercially viable if a premium price was being obtained for an out of season product.

From the 2022 observations (both at the CFC and on growers holdings) it can be concluded that the genetics of the 'Stox' variety mean that they could potentially be used to extend the season during the warm summer period but more work is required by the breeder to reduce the high levels of variability and significantly increase the percentage of marketable stems. It is hoped to undertake future trials on growers holdings if improved strains of 'Stox' become available in the future. 'Stox' however is a very confusing name and it has been suggested that they should simply be called 'scented autumn stocks'.

There would be a market for autumn stocks through florist outlets and for autumn weddings but without further market testing it is not possible to determine if they would command a premium price to offset the low yield, although the height variability and irregular column length may be less of an issue than when supplying the supermarkets.



### **Column stocks (*Matthiola*) - *Fusarium* varietal susceptibility trial**

It is known that some varieties of column stocks are more susceptible to *Fusarium* than others as was clearly demonstrated in previous CFC trials. As there have been a number of new varietal introductions in recent years it was intended to undertake a large scale replicated variety trial in the Haygrove tunnel during the 2023 season. However, after becoming apparent that 2022 would be the final year that the CFC would be hosted by Rookery Farm (owing to the sale to Sarah Raven) the decision was taken to bring the trial forward to 2022 and plant it after the biopesticide trial was completed. This meant that the trial was not planted until week 29 which is not ideal for column stocks but the decision was taken that it was worth the risk rather than obtaining no results as would have been the case if no trial was undertaken.

The very hot weather throughout August 2022 meant that a lot of plants were lost at the seedling stage and the plants continued to struggle throughout the period of the trial. However, the results from older varieties did confirm already known susceptibility traits (e.g. Aida purple is much less susceptible than Opera Deborah even though they are similar colours) so while the results obtained from the newer varieties (e.g. 'Stox') must be treated with some caution, they can probably be used as an indication of varietal susceptibility until more information becomes available.

### **Column stocks (*Matthiola*) – Phytotoxicity testing of potential new downy mildew fungicides.**

Following industry wide issues with the control of downy mildew on column stocks during the 2018 production season, the CFC has undertaken a number of trials to ensure that the industry is able to adequately control the disease. A spray programme developed by the CFC in 2018 has been used very successfully since, but one of the key active ingredients (*dimetomorph*) could be lost in the near future and *Mancozeb* is already difficult to obtain. Earlier CFC funded trials undertaken at FERA have identified a number of potential chemicals that could be incorporated into the spray programme if suitable EAMU's can be obtained for

their use on column stocks. In order to assess potential phytotoxicity issues, four of these products were chosen in 2022 to undertake specific phytotoxicity trials at the CFC. These trials have shown that there is very little risk of phytotoxicity issues occurring when using the selected range of fungicides that have the potential to be introduced to the column stock downy mildew control programme. This information will also be used to support ongoing EAMU applications going forward.

### **Limonium**

*Limonium* is grown in Holland but is not produced by many UK growers. Of the product that is grown in the UK, most is direct seeded annual varieties with very little vegetatively or micro-propagated crop being produced. New varieties of micro propagated *Limonium* from Danziger were offered to the CFC in 2021 and some of these showed real promise. The best performing varieties were planted on a larger scale at the CFC in 2022 ie 'Sensy Pink Beauty', 'Pinocolada' and 'White.' The 2022 planting produced a superb quality crop with stems being in excess of 1m tall and produced an average of around 100 stems per m<sup>2</sup> of bed. However, because these are produced by micropropagation, the plant price is very expensive at about £1.50 per plant, therefore 15p per stem would be required just to recoup the plant cost. It would therefore need to be sold as a premium product and achieve a stem price (probably around 40 to 45p) that reflected both the high plant cost and long production time.

### **Peony herbicide trial.**

The area of UK grown peony has increased over the past decade and one of the main issues that growers face is weed control. This was highlighted at the 2019 CFC Open Day where it was identified as the top priority for future trials conducted by the CFC. In order to address this need, the CFC has instigated a number of trials to investigate both pre and post weed emergence control. The 2022 trial investigated the use of contact and systemic herbicides applied after the crop has been cut down in the Autumn. The herbicides will be applied again when weed growth occurs in the spring and both weed cover and crop phytotoxic observations will be recorded.

## **Seed Priming Trial**

Seed priming is a technique used quite extensively in the vegetable industry but has not been widely adopted by the cut flower industry. Preliminary trials undertaken by Elsoms Seeds had shown that there may be the potential to prime some flower seeds with the intention of producing an earlier and more even germination hence aiding both weed control and making flower maturity more even. Initial trials undertaken at the CFC in 2021 did not show any differences between the primed and unprimed seeds and it was decided to undertake further trials in 2022. It had been intended to undertake these trials at the CFC site but owing to the sale of Rookery Farm to Sarah Raven the site had to be vacated by October so it was decided to sow the trial in a cold tunnel on a growers holding in September.

Unfortunately, the CFC trials undertaken in 2021 and 2022 did not demonstrate any observable differences in the treatments for larkspur and Sweet William. The CFC will investigate this further with Elsoms to see if there are further ongoing developments that would justify future trials on growers holdings.

## **Sunflower petal spotting issue**

The CFC has for some years investigated the petal spotting issues that occur on UK grown sunflowers for cutting, but no conclusive cause of the problem has so far been identified. In previous years the disease *Itersonilia perplexans* was isolated from some samples, but not from all, meaning that it could not be categorically identified as the cause of the problem. Unfortunately, the methodology required to identify *Itersonilia* was notoriously difficult but recently been revised for the investigation of parsnip canker which can be caused by *Itersonilia* spp. Some of this work on parsnips has been undertaken by Lauren Chappell from Warwick Life Sciences who was contacted by the CFC with a view to develop a joint project to further investigate the sunflower issue. During the 2022 season, Lauren and other colleagues from Warwick visited sunflower fields in Lincolnshire to better understand the production process and also collected samples to return to the labs in order to refine their technique for testing for sunflower *Itersonilia*.

While the 2022 season was mainly used to develop a strategy for further work in 2023, it also produced some useful results with *Itersonilia* being isolated from a number of samples.

### ***Tanacetum parthenium***

2021 was the first year that the CFC has investigated *Tanacetum* (also known as *Matricaria*) and the trials proved very encouraging. It was trialled again in 2022 with a particular emphasis on planting dates and continuity. Each planting took around 9 to 10 weeks to produce a marketable crop and the 2022 trials indicate that to achieve a good continuity of cropping, planting would need to be around fortnightly. The crop was easy to grow and suffered from very few problems, although a prophylactic spray programme was applied to control leaf miner which was a slight issue in 2021. Powdery mildew was an issue in the 2022 trial especially on the 'Vegmo Single' but had not been seen in 2021. This is a product that would appear to have a good potential for UK produced filler and its similarity to Santini type chrysanthemums gives it further potential for a wider usage in mixed bouquets. The 2022 trial have shown that continuity is easily achievable and once over harvesting is possible for all except the latest planting dates (week 29 and 30) which produced a crop that is potentially too uneven to apply this harvesting technique.

### **Financial Benefits**

This is the fourth year of the new five-year project and as such any financial benefits reported will not take into account the potential £2.5 million of new product trialled and facilitated by previous CFC trials.

One of the main ongoing financial benefits to the industry from the current 5 year CFC work plan has been from the 2018 work on downy mildew in column stocks. The 2018 work was able to quickly develop an effective new spray programme that when adopted by growers reduced losses considerable. Since then the CFC has continued to monitor the situation and has ensured that the spray programme continues to be effective by followed up with additional sensitivity testing in 2019 and 2021. Phytotoxicity trials were also undertaken in 2022 as part of the scoping work to develop additional products to include in the spray programme. As in

previous years, it is impossible to put an exact figure on the savings, the ongoing adoption of the control measures and spray programme from the 2018 trials resulted in no known major outbreaks of downy mildew on column stocks. The UK produces about 18 million stems at an average of 29p per stem in 2002, making a total industry value of around £5.2m. A conservative industry estimate of potential crop loss from the new strain of downy mildew (based on 2018 losses in Holland and the UK) of 10% represents an annual saving to the industry in 2022 of over half a million pounds.

A number of new products trialled during the first years of the current CFC programme such as *Astrantia*, *Lepidium*, *Limonium*, *Scabious* and *Veronica* have been planted by small to medium sized nurseries. An estimate of the total area of these new products in 2022 is 2 ha and if *Scabious* is used as an example, with a yield of around 30 stems/m<sup>2</sup> at a return of 25p per stem this is an additional annual farm gate value of £150,000.

Other new products have been planted either on a commercial scale or as commercial trials for supply to the supermarkets. These include *Eryngium*, *Tanacetum* and *Willow*. An estimate of the area of these products would be 6ha and with an estimated average farm gate value of £30,000 to £50,000 per ha depending on species this amounts to an additional total farm gate value of between £180,000 and £300,000.

## **Action Points**

- Production of *Aster ericoides* should be considered for production as a natural season perennial crop if the first flush of shoots is cut back at the appropriate time to ensure that the stems are of smaller enough size to be manageable.
- New varieties of micro-propagated *Limonium* perform very well in UK conditions but may only be considered to be niche crop because they but would need to command a premium price to ensure that the crop is economically viable.

- Growers could consider the large scale commercial production of *Tanacetum* as a summer flowering crop if commitment can be obtained from UK packer and supermarkets.
- Column stock growers should continue to be vigilant to the ongoing threat of the new and very damaging strain of downy mildew identified in 2018, and obtain a copy of, and implement the recommendations of AHDB / CFC Information Sheet 11 [Maintaining successful control of downy mildew in protected crops of cut flower column stocks](#). Additional trials on DM are an integral part of the ongoing CFC work and growers should be alert to any updates to the control strategy that develops from this work.
- As part of the column stocks downy mildew work, the CFC is investigating the possibility of obtaining EAMU's to add more fungicides to the DM armoury and growers should therefore keep themselves regularly updated on new EAMU approvals via the internet or their local agronomist.
- Peony growers should keep themselves up to date with the ongoing herbicide trials.
- Sunflower growers will have the opportunity to be involved with the ongoing petal spotting issues and should keep themselves up to date with developments.