

**FINAL REPORT** : **APRIL 1994**

**PROJECT NUMBER** : **PC 19 F**

**PROJECT TITLE** : **PRODUCTION OF NATURAL SEASON  
CHRYSANTHEMUMS FOR SALE IN MIXED  
WRAPS**

**PROJECT LEADER** : **GLENN HUMPHRIES**

**LOCATION OF PROJECT** : **WELSH COLLEGE OF HORTICULTURE**

**PROJECT CO-ORDINATOR** : **MR. R. LAWRENCE**

**DATE PROJECT COMMENCE** : **JULY 1993**

**DATE PROJECT COMPLETED** : **DECEMBER 1993**

**KEY WORDS:** **Natural Season Spray  
Chrysanthemum Production**

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## **'PRACTICAL SECTION FOR GROWERS'**

### **Project Objectives:**

- To produce natural season spray of uniform size and suitable quality for sale in mixed wraps using AYR type cultivars and natural season production techniques.

### **Key results:**

- Selection of cultivars is of primary importance in achieving compatible mixes of flower colours, types and spray formation.
- The application of Alar pre-pinching and the use of a variety of pinching techniques has little or no effect on the uniformity of spray production.
- The marketing of the product as a mixed wrap needs careful consideration regarding target market, wrap size and pricing.

## PROJECT SUMMARY

High yield of spray (80 - 100 stems/m<sup>2</sup>) can be achieved by growing selected AYR type cultivars as a pinched crop under natural season conditions.

This trial investigates the suitability of a number of cultivars for this type of production and the possibility of achieving a uniform grade of spray by, using a pre-pinching Alar spray, altering the pinching technique or selective rubbing out of shoots.

Plants were planted in Week 30, pinched at approximately 7 and 14 days after planting and the flowers harvested during Weeks 44 and 45. The production temperature was maintained at 16 c minimum night until flower buds were visible then lowered to 10 c minimum night, 12 c day, Venting at 14 c.

Wider spacing 8" x 8" cf 7" x 7" gives no reduction in yield /m<sup>2</sup> and produces stronger stemmed larger sprays. Close spacing does not reduce first shoot dominance.

Soft pinching (removal of half inch growth) caused a small increase in the number of sprays produced (5%), but none of the treatments applied improved the uniformity of size of spray produced.

The uniformity of flowering date of all cultivars permitted once over harvesting, but the lack of uniformity of spray size resulted in a high labour input for grading.

Packaging and marketing of the product resulting from this system of production require careful consideration.

The larger sprays, approximately 35% of the crop, can be marketed in single coloured 5's and as such for cultivars that do not compound are indistinguishable from 'AYR' produce.

Marketing of the smaller grades as mixed wraps requires development of a niche market and emphasis should be placed on the product image. Packaging and presentation are very significant in developing the idea of the mixed wrap being a valuable ensemble of flowers rather than a cheap bunch.

Demand for the product on the wholesale market was lukewarm due to an established supply of mixed wraps from Holland and florists felt that they could make up the wraps themselves. However, the mixed wraps did find a very ready market with local van traders, hospital shops, greengrocers, garages, etc.

Sales to supermarkets were not investigated due to the relatively small quantities produced, but the product does compare favourably with that already offered by these outlets.

Marketing opportunities such as these should be investigated prior to production to ensure that the smaller mixed wrap does not depress the price or demand for larger single coloured wraps of 5, which may be retailed by the stem.

Selection of cultivars for mixed packing requires that attention is given to colour mix, flower type and spray conformation. Colours should be co-ordinated to be either complimentary or contrasting. A colour mix of three seems to be the optimum and white is acceptable in all mixes except a red/white mix. The colour print on the sleeves should also be taken into consideration. Flower type affects the acceptability of the mix; singles with singles, singles with anemones, spiders and spiders and decoratives with decoratives are acceptable, but other combinations of flower type are difficult to manage.

Flower configuration on the stem, influenced by cultivar and the incidence of compounding affects the number of stems required to give a full sleeve. Where possible mixes should be on the basis of like with like, i.e. flat topped spray in separate wraps to those with flowers spaced evenly down the stem. Compounded sprays are heavy and bulky so fill the sleeve well but in most cases have less vase appeal.

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Clubbed heads either as a result of varietal characteristic or excessive use of Alar also require that more stems are required to fill the sleeve.

The range of cultivar grown in this trial should not be taken as a definitive list of those cultivars which are suitable for production as a pinched crop grown at natural season temperatures. However, for those growers with an established mixed wrap trade or for those who wish to establish a mixed wrap trade the high yield /m<sup>2</sup> resulting from the production techniques reported here are worthy of further consideration.

## SCIENCE SECTION

### Trial Aims

To produce a uniform grade of spray chrysanthemum, suitable for the mixed wrap trade, using Natural Season production techniques and 'AYR' type cultivars.

### Introduction

Previous trials work (1992) has shown that some 'AYR' type cultivars, raised as a pinched crop under Natural Season daylength and temperature regimes produce very high yields of sprays suitable for the mixed wrap trade. Unfortunately, the size range of the sprays is considerable resulting in a lengthy harvesting and grading operation. This work aims to reduce the size variation of the sprays by applying a range of spacing, pinching and Alar treatments. Four cuttings suppliers were invited to submit cultivars likely to flower naturally in early November, when grown without day length control at 'Natural Season' temperatures ( 10° c Night, 12° c Day, Vent 14° c).

### Materials and Methods

Cuttings were rooted in 5 cm x 5 cm biscuit blocks and planted in week 30 into a house which had been steam sterilised. Fertiliser was added in accordance with ADAS recommendations for a liquid fed crop and liquid feed applied from week 33 to flower colour.

The following cultural treatments were applied:-

- Temperature regime was maintained using computer controlled pipe heating.

	Night	Day	Vent
Planting to buds visible	16° c	16° c	18° c
Buds visible to flowering	10° c	12° c	14° c

- Alar treatment (2500 ppm) applied two days before planting, to half of each cultivar, to reduce apical dominance.

- Spacing and pinching:-

7" x 7" stopped and rubbed out to leave 4 shoots/plant.

8" x 8" pinched hard ( $\geq 1\frac{1}{2}$ " removed to leave 8 leaves).  
not rubbed out.

8" x 8" pinched lightly ( $\leq \frac{1}{2}$ " removed to leave 8 leaves).  
not rubbed out.

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- Alar was also applied to some cultivars during the production period to control stem and pedicel length and strength ( details in Appendix 1 ).

Each plot comprised 2.5 m<sup>2</sup> of production area and individual treatments were not replicated.

### Results

The flowering of all the cultivars trialed was remarkably uniform; once over harvesting would have been possible on all plots and flowering date was not affected in any cultivars by the treatment applied.

The number of flowering stems produced per plot varies considerably with cultivar, pinching treatment and spacing; Table 1. Wide spacing 8'' x 8'' combined with a soft pinching technique produces the largest number of marketable stems whilst hard pinching and closer spacing with rubbing out produce a 5% - 10% reduced in the number of stems harvested /m<sup>2</sup>.

The effect of the treatments on uniformity of spray size has unfortunately been negligible; Table 2. The number of small sprays present in each plot planted at 7'' x 7'' and rubbed is the same as when wider spacing and no rubbing is used. However spacing and rubbing out have had a significant effect on the stem production per plant; Table 3.

The format of the spray is influenced primarily by cultivar; Table 4. Some cultivars show a tendency for the most dominant shoots to compound and this response was consistent irrespective of pre-pinching Alar treatment and variations in pinching technique.

Spray form, configuration of the flowers, flower shape and colour all have an influence on the mixing and marketing of the flowers. In general flat topped sprays of similar flower characteristics mix well in colour co-ordinated contrasting or complimentary colour ranges with three colours/shades per wrap being most acceptable.

Flowers that are well spaced on strong stems give an illusion of size resulting in fewer stems being required to fill a wrap.

All the cultivars in the trial produced stems of acceptable marketable quality either as a traditional 'AYR' 5 or in a mixed wrap, but cultivar selection to give acceptable combinations needs careful consideration and further trials work.

TABLE 1

The effect of cultivar, spacing, pinching and pre-planting Alar treatment on the number of stems harvested per plots ( 2.5 m<sup>2</sup>).

Cultivar	Spacing, 7' x 7'		8' x 8'		8' x 8'	
	rubbed to 4's		Soft Pinch		Hard Pinch	
	- Alar	+ Alar	- Alar	+ Alar	- Alar	+ Alar
Enzo					150	163
Zeta					198	213
Jan					203	190
Peach Fiji					194	173
Sharla					179	181
Deane Dainty					169	175
Naru	221	263	248	204	213	231
Dark Fiji	213	222	223	197	177	169
Funray	209	220	294	329	221	237
Cassa	260	228	302	276	235	259
Polo	234	236	237	239	300	205
Lineker	208	237	230	218	189	191
Isis	292	239	263	290	232	213
Yellow Teide	218	215	190	197	123?	188
Mesmer	180	187	169	216	176	181
Malibu	218	212	217	191	213	198
Momento	207	197	186	208	207	202
Hero	160	163	197	171	168	141
Average (12 cvs)	218 ± 34	218 ± 26	229 ± 42	228 ± 47	211 ± 37	201 ± 32



TABLE 2. THE EFFECT OF TREATMENT ON THE SIZE RANGE OF SELECTED CULTIVARS

SPACING AND PINCHING TREATMENTS

CULTIVAR AND ALAR TREATMENT	SPACING 7 x 7 Rubbed to 4's			SPACING 8 x 8 Not rubbed Soft pinch			SPACING 8 x 8 Not rubbed Hard pinch		
	No. of Stems/Plot	Spray Grades			Spray Grades			Spray Grades	
No Alar Applied Pre-pinching	Small	Medium	'AYR' 5's	Small	Medium	'AYR' 5's	Small	Medium	'AYR' 5's
Dark Fiji	57	128	28	54	127	43	29	80	68
Isis	15	172	110	19	118	126	36	100	98
Hero	16	103	41	32	96	69	22	83	63
<b>AVERAGE</b>	<b>29</b>	<b>134</b>	<b>60</b>	<b>35</b>	<b>114</b>	<b>89</b>	<b>28</b>	<b>88</b>	<b>76</b>
<b>Alar Applied Pre-pinching</b>									
Dark Fiji	53	133	34	33	78	74	31	65	73
Isis	20	139	80	11	142	127	28	104	83
Hero	24	110	29	32	102	37	10	84	47
<b>AVERAGE</b>	<b>32</b>	<b>127</b>	<b>48</b>	<b>25</b>	<b>107</b>	<b>79</b>	<b>23</b>	<b>84</b>	<b>68</b>

FOOTNOTE: Small : < 3 flowers/stem  
 Medium; 4 - 5 flowers/stem  
 AYR '5': > 5 flowers/stem

**TABLE 3      STEM PRODUCTION/PLANT**

Average of 3 cultivars:    Dark Fiji  
    Isis  
    Hero

Treatment Spacing/pinching	Average Stem Production Stems/Plant
7" x 7" rubbed to 4's	2.8
8" x 8" hard pinch no rubbing	3.2
8" x 8" soft pinch no rubbing	3.8

Plot Size:      2.5 m<sup>2</sup>

Spaced at:    7" x 7"      76 plants/plot

Spaced at:    8" x 8"      58 plants/plot

TABLE 4 REVIEW OF FLOWERING PERFORMANCE

CULTIVAR	FLOWERING WEEK	SPRAY FORM	COMMENT
Enzo	45	Simple	Large flowered Red single
Zeta	45	Simple	Pink single with large yellow centre. Alar treatment used was too much and too late.
Jan	45	Simple	Large flowered white single
Peach Fiji	45	Simple	Peach decorative. Spray size large and very uniform.
Sharla	45	Simple	Large flowered pink single, some colour variation present.
Deane Dainty	45	Simple	Very attractive White/Pink tinge spider. Difficult to mix but popular with customers.
Naru	45	Simple	Deep purple decorative.
Dark Fiji	45	Simple	Dark Pink decorative like Peach Fiji in habit.
Funray	45	Compound	Pink/Purple tinge pom-pom. Very popular with customers but difficult to mix. Some plants inclined to premature budding.
Cassa	44	Simple and Compound	White with yellow centre. Does not hold well on the bed.
Polo	45	Mixed simple and Compound	Small White single with green centre. Hold well on the bed, mixed with all colours and is popular with customers.
Lineker	45	Simple	Pink single with green centre. Flowers well down stem.
Isis	45	Mixed simple and compound	Pink single. Very uniform.
Yellow Teide	46	Simple	Yellow with Green tinge flowers open slowly at low temperature.

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TABLE 4 (CONTD.)

CULTIVAR	FLOWERING WEEK	SPRAY FORM	COMMENT
Mesmer	45	Simple	Bronze double. Stems quite light in weight.
Malibu	45	Mixed simple and compound	White decorative, inclined to be single.
Momento	45	Mixed simple and compound	Small flowers yellow double. Plants are tall and inclined to stretch.
Hero	45	Simple	Deep Red double

**NOTE:**

Where spray form is mixed simple and compound, the stems with compound form are always the strongest stems produced from the uppermost breaks.

## CONCLUSION

The results would indicate that producing a uniform grade from a pinched crop is not easily achieved by manipulating plant spacing and pinching technique or by using Alar. Consequently to reduce the amount of time needed to grade produce, growers may need to consider the full wrap approach rather than the standard count approach to packing the flowering in wraps. This is a possibility if the flowers are marketed in mixed colours and fancy sleeves making the product distinct from the traditional AYR '5' presentation.

The uniformity of flowering was encouraging as this would permit once over harvesting, which may need to be done mechanically to reduce the labour input which is considerable when production is in the region of 80 - 90 stems /m<sup>2</sup>.

Marketing of the 'mixed wrap' product needs careful consideration. The product must be presented as an attractive pack to be sold on without unwrapping. This entails careful selection of packaging - printed sleeves of a slightly smaller size than AYR are important and help to differentiate the product from the AYR '5'. Producers should beware of generating too many grades and products which confuse the customer and encourage purchasing of 'the cheapest'.

Flowers produced in this trial all found a ready market as mixed wraps 7 stems/wrap, and competed well in the market place with the imported 'Dutch mixed bunch'. In general florists prefer to generate their own mixtures, but small greengrocers, garages, hospitals, etc., all found the product very acceptable at prices averaging £1.00 ex VAT wholesale.

For the traditional Natural Season producer spray production using selected AYR cultivars grown at 8' x 8'' spacing, pinched, not rubbed out and raised at 10 °c minimum night appears to be an alternative technique for producing spray for the mixed wrap trade.

## APPENDIX 1

Alar treatments applied to control stem and pedicel length and strength.

SUPPLIER	CULTIVAR	ALAR TREATMENT APPLIED
Yoder Toddington	Mesmer	None
	Hero	625ppm soon after start of short days (15th September 1993).
	Momento	Same as Hero
	Malibu	Same as Hero and repeat 14 days later.
Southern Glasshouse Produce	Polo	None
	Isis	None
	Yellow Teide	None
	Lineker	440ppm soon after start of short days (15th September 1993).
Ficor	Naru )	Received one spray at start of short days. 1300ppm (actually applied 15th September 1993).
	Dark Fiji )	
	Funray )	
	Cassa )	
Frank Rowe	Enzo )	One spray at start of short days. and repeat 10 days later. 1oz. in 8 gallons applied 5th and 15th September 1993.
	Zeta )	
	Peach Fiji )	
	Jan )	
	Sharla )	
	Deane Dainty )	

Contract between Welsh College of Horticulture (hereinafter called the "Contractor") and the Horticultural Development Council (hereinafter called the "Council") for a research/development project.

Contract No.: PC/19f  
Contract Date: 4th November 1993

1. **TITLE OF PROJECT**

CULTIVAR SELECTION AND PRODUCTION TECHNIQUES FOR NATURAL SEASON SPRAY PRODUCTION.

2. **BACKGROUND AND COMMERCIAL OBJECTIVE**

Chrysanthemum growers in the North West are under increasing pressure to reduce production costs, improve crop quality and develop niche markets. Selection of cultivars and strains has a big impact on the quality and quantity of flowers which are produced. The trials will investigate the response of various cultivars for commercial production in the North West using techniques investigated in the 1992 season.

3. **POTENTIAL FINANCIAL BENEFIT TO THE INDUSTRY**

- a. The trials on spray production are geared to improving the uniformity and quality of sprays produced from a pinched crop using cultivars which are currently grown as single stem crops at high temperature. There is potential for developing a nice market for mixed wraps if the quantity of small uniform, good quality sprays can be increased. This could be an alternative production system for growers currently producing a natural season spray, which does not always find a ready market.

HDC funded work at the Welsh College of Horticulture in 1992 identified a significant market demand for mixed wraps of chrysanthemums. The same trial also demonstrated that some AYR type chrysanthemum cultivars give an increase in yield of up to 20% when grown as a pinched crop in a natural season regime.

The work proposed has been discussed with the North West Chrysanthemum Growers' group and has their support.

4. **SCIENTIFIC/TECHNICAL TARGET OF THE WORK**

- a. To investigate various methods of production of pinched crops of spray chrysanthemums to find the best method of ensuring uniformity of shoot development.
- b. To screen a range of AYR spray short response group type cultivars for their suitability for production as a pinched crop grown at lower temperatures than currently recommended.

5. **CLOSELY RELATED WORK**

HDC funded trials work on Natural Season Spray production at the Welsh College of Horticulture (PC 19).

6. **DESCRIPTION OF THE WORK**

**Trial 1**

Production of spray using various cultivars and pinching techniques.

Sprays to flower in November.

Facilities: One twin span glasshouse 44' x 96' with pipe heat and computerised temperature control.

Treatments used:-

Cultivars: Six natural season spray cultivars suitable for bunch production:-

Enzo	Peach Fifi
Zeta	Sharla
Jan	Deane Dainty

Twelve AYR type cultivars recommended for mixed wrap production:-

Naru	Isis
Peach Pipi	Yellow Teide
Funray	Mesmer
Cassa	Malibu
Polo	Momento
Lineka	Hero

Crop Cultural treatments:-

- Plant week 30 and raised as a pinched crop as follows:-

- (a) 7" x 7" stopped and rubbed out to leave 4 shoots;
- (b) 8" x 8" pinched hard ( $\geq 1\frac{1}{2}$ " removed to leave 8 leaves);
- (c) 8" x 8" pinched lightly ( $> \frac{1}{2}$ " removed to leave 8 leaves);

Each plot to have half the plants sprayed with Alar prior to pinching to reduce upper shoot dominance.

- (d) No day length control to be used.

Records to be kept:-

- flowering date.
- spray configuration.
- yield/m<sup>2</sup>.
- market response to individual cultivars and mixed wraps.



7. **COMMENCEMENT DATE, DURATION AND REPORTING**

Start date 1st July 1993; duration 9 months. The experimental work will be completed by December 1993 and the final report will be produced by March 1994.

Trial Open Days: Usually two, early November and early December, dates to be published in the Grower diary of events.

8. **STAFF RESPONSIBILITIES**

Project leader: Dr. E.G. Humphries, Head of Horticulture.  
Other staff: Mr. G.A. Limb, Principal.

9. **LOCATION**

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