

FINAL REPORT: NATURAL SEASON CHRYSANTHEMUM PRODUCTION TRIAL 1991

TRIAL AIMS

To investigate, in relation to the production of American Beauty, blooms for Christmas.

- a. The use of single stem production to delay the planting date and/or improve bloom quality.
- b. The potential crop loss when planting is delayed and the plants held in blocks.
- c. The use of an Alar spray pre stopping to improve the evenness of breaking and the strength of the base of the plant.
- d. The use of spraying Cycocel and Alar in combination to reduce the amount of Alar used.

GENERAL CROP CULTURE

Propagation:

All the plant material (White American Beauty select strain) was supplied as unrooted cuttings by Frank Rowe (Somerset). These cuttings were rooted in 5cm x 5cm x 5cm peat blocks and routinely planted three weeks after sticking.

House Preparation:

Steam sterilisation was carried out prior to planting and base dressing applied in accordance with ADAS recommendations for liquid fed Chrysanthemum crops.

Planting:

Rooted cuttings were planted three weeks after sticking with the block half buried at planting.

Plants to be stopped were planted at 7" x 7" and plants for single stem production planted at 5" x 5".

Plants were planted in 40" wide beds with a 15" path between beds.

Each treatment was replicated four times in each experiment.

Stopping and Rubbing out:

All plants except those for single stem production were stopped ten days after planting and the shoots rubbed out to leave two shoots per plant as soon as the shoots were big enough to handle.

Liquid feeding:

Stopping - End of September 200ppm N : 200ppm K
End of September - Flower colour 150ppm N : 200ppm K

Temperature control:

Planting - End of September 16`c min. Vent 20`c
End of September - flowering 10`c min. Vent 17`c

Blackout:

Applied to all treatment plots using dense black plastic, 7.00 p.m. -
8.00 a.m.

Pest and Disease Control:

Standard programme using Dichlorvos and Decis for WFT and Bravo,
Rovral and Thiram for Botrytis.

Growth Regulator Treatment:

American Beauty Cultivars Standard Treatment:

Standard treatment:

Alar:	0.125% ai	buds visible
	0. 25% ai	pre-disbudding
	0. 25% ai	post-disbudding
	0. 25% ai	ten days later.

TREATMENTS APPLIED

Experiment 1: To investigate the use of single stem production to improve
bloom quality.

Four treatments were compared with an established blueprint for American
Beauty Bloom production in the North West.

Control: plant week 31 at 7" x 7" stop and rub out to leave two
shoots/plant.

Treatments:

- a. plant week 31 at 5" x 5" stop and rub out to leave one
shoot/plant.
- b. plant week 33 at 5" x 5" not stopped.
- c. plant week 34 at 5" x 5" not stopped.
- d. plant week 35 at 5" x 5" not stopped.

Experiment 2: To investigate the effect of delayed planting on bloom quantity and quality.

Treatments applied:

Cuttings were stuck during week 29 and planted in week 32 (Control plot) and week 34 (Delayed planting treatments).

Rooted cuttings for delayed planting received the following feeding and Alar treatment prior to planting:

- a. No extra nutrition, no Alar.
- b. No extra nutrition, Alar 2500ppm in week 32
- c. Ficote (1kg/m³) in block, no Alar
- d. Ficote (1kg/m³) in block, Alar 2500ppm in week 32
- e. Balanced liquid feed, 200ppm N : 200ppm K, no Alar
- f. Balanced liquid feed, 200ppm N : 200ppm K, Alar 2500ppm in week 32
- g. High Potash liquid feed, 100ppm N : 200ppm K, no Alar
- h. High Potash liquid feed, 100ppm N : 200ppm K, Alar 2500ppm in week 32

All plants were pinched at the end of week 33.

Experiment 3: To investigate the potential for using a combined Alar : Cycocel spray programme to reduce the amount of Alar required to control the neck length in American Beauty blooms.

Treatments applied:

All rooted cuttings were planted in week 32 and grown on according to the general crop culture programme described.

Growth regulator treatment was applied as follows:

Control treatment: Four sprays Alar

0.125% ai	buds visible
0.25% ai	pre-disbudding
0.25% ai	post-disbudding
0.25% ai	10 days later

Experimental treatments:

- a. Apply Alar at quarter the strength used on control each time the control is sprayed.
- b. Pre-spray with Cycocel then spray with Alar whilst foliage is still wet.

N.B.: Combined spray strength:

500ppm Cycocel

Quarter concentration Alar used on the control plots.

- c. Apply Alar at half the strength used on the control each time the control is sprayed.
- d. Pre-spray with Cycocel then spray with Alar whilst the foliage is still wet.

N.B.: Combined spray strength:

500ppm Cycocel

Half concentration of Alar used on the control plots.

Each treatment was replicated four times and the results on flower grade out, neck length for both early yellow and white select strains noted.

RESULTS:

EXPERIMENT 1. (Single Stem Production)

Flowers were harvested, from all plants planted during and prior to week 34, in the third week in December. Plants planted in week 35 produced flowers which were not sufficiently developed for harvest until the end of December thus missing the Christmas market.

Bud initiation and development shows distinct variation between single stem and stopped crops. The single stem plants produce a small terminal bud flanked by very large side shoots whilst the stopped crop produced a larger terminal bud and smaller side shoots. This had a marked effect on the neck strength of the two production system.

All the flowers from single stem plants had thin necks compared with the control and thus neck weakness is a problem where large flower heads are produced; "Table 1".

Plants planted in week 35 produced a significantly lower % 24 grade than all earlier planting dates and flowers from this planting date were notably flat rather than ball shaped.

Leaf counts made on 40 stems per treatment showed that a greater number of leaves were found on the single stem plants than on the stopped crop flower stems (stop-flower), "Table 2".

This may indicate that the single stem plants produce buds in relation to the number of leaves produced whilst the stopped crop has responded to short day treatment.

Table 1.

The effect of single stem production on the quantity and quality of bloom production.

	% Weak necks	* Length of neck cm.	% 24 Grade	% 30 Grade	% Bunch Grade	Total harvested
Control Plant wk 32 Stop and rub to 2's	3	7	48	33	19	152
Plant wk 32 Stop and rub to 1's	50	7.5	46	25	29	160
Single Stem Plant wk 33	100	9	66	23	21	146
Single Stem Plant wk 34	100	9.6	37	36	24	148
Single Stem Plant wk 35	7	7	16	34	50	155
				Maximum flowers possible		160

* All treatments received Alar sprays on four occasions, as detailed in general crop culture, 23rd Sept, 2nd Oct, 14th Oct, 24th Oct.

Table 2.

Leaf Numbers on single stem and stopped crops all blacked out 7 -21st September.

	No leaves Ground to stop	No leaves Stop to flower	No leaves Ground to flower
Plant wk 32 Stop and rub to 2's	6	24	--
Plant wk 32 Stop and rub to 1's	6	24	--
Single Stem Plant wk 33	--	--	32
Single Stem Plant wk 34	--	--	30
Single Stem Plant wk 35	--	--	31

EXPERIMENT 2. (Delayed Planting).

Delaying the planting caused a marked reduction in the uniformity of rooted cuttings planted. Alar treatment did not restrict this loss of uniformity which was not apparent in the plants planted on time either at planting or later in the season.

Pinching the rooted cutting in the block was time to leave six leaves on the plant and this task was made more difficult by the unevenness of height growth.

After planting growth remained less uniform than the control plots up to the time of disbudding but at flowering the difference in uniformity was less marked and all blooms were harvested in the second and third week in December for the Christmas market.

However, the delay in planting did result in loss of crop height and all blooms harvested from the treatment plots had a short stem length; only 50 - 60 cm compared with 70 - 80 cm for the plants planted on time in week 32.

Delayed planting also had a small detrimental effect on the % 24 grade at harvest Table 3.

Table 3.

Flower Quantity and Quality resulting from delayed planting.

TREATMENTS		TOTAL FLOWERS HARVESTED	% 24	% 30's	% Bunch
CONTROL	Planted wk 32	126	51	26	21
ALAR	Sprayed week 32	136	34	33	32
NO LIQUID ALAR		127	44	25	31
NO FEED		136	38	27	34
FICOTE	in blocks	126	41	26	32
HIGH K	liquid feed	130	43	28	28
BALANCED	liquid feed	134	29	32	37

Maximum number of flowers possible 140

ALAR	Planting delayed until week 34
NO LIQUID ALAR	Planting delayed until week 34
NO FEED	Planting delayed until week 34
FICOTE	Planting delayed until week 34
HIGH K	Planting delayed until week 34
BALANCED	Planting delayed until week 34

EXPERIMENT 3: Combined use of Alar and Cycocel

The use of Cycocel as a pre-spray has a marked beneficial effect on the effectiveness of Alar in relation to the bloom neck length "Table 4", and strength "Table 5". None of the spray treatments had a detrimental effect on bloom quality, "Table 6", and growers noted that Cycocel had a small effect on leaf colour and flower colour. Leaves on plants treated with Cycocel were slightly darker green and to yellow blooms a more intense colour. White bloom colour was not affected.

TABLE 4

THE EFFECT OF GROWTH REGULATOR ON NECK LENGTH

	TREATMENTS	YELLOW	WHITE
	CONTROL	5	5.2
Treatment a	1/4 Alar - Cycocel	9.5	7.5
Treatment b	1/4 Alar + Cycocel	6.2	6.5
Treatment c	1/2 Alar - Cycocel	5.7	6.7
Treatment d	1/2 Alar + Cycocel	4	7.2

Neck length measured in centimetres and taken as the distance from the base of the flower to the first true leaf.

TABLE 5

THE EFFECT OF GROWTH REGULATOR TREATMENT ON NECK STRENGTH

Treatment	%	NECKS	GRADE	*
Control	95		5	
1/4 Alar - Cycocel	20	55	25	
1/4 Alar + Cycocel	40	50	10	
1/2 Alar - Cycocel	55	35	10	
1/2 Alar + Cycocel	60	28	12	

* Neck strength was graded on a scale of 1 - 3 with 1 and 2 being acceptable for sale but 3 not acceptable (neck unable to support the bloom in a near vertical position).

TABLE 6

THE EFFECT OF GROWTH REGULATOR TREATMENT ON BLOOM QUANTITY AND QUALITY

TREATMENTS	TOTAL FLOWERS	% 24's	% 30's	% BUNCH
Control	153	45	25	30
1/4 Alar - Cycocel	159	51	25	24
1/4 Alar + Cycocel	153	55	17	26
1/2 Alar - Cycocel	160	59	17	24
1/2 Alar + Cycocel	146	48	30	21

Maximum number of flowers possible - 160.

CONCLUSION

Single stem production does not seem to be a viable method of improving the % grade 2⁴ due to the production of 'poor quality' terminal buds that results in weak necked blooms. Single stem production planted in week 33 did produce a significant increase in bloom head size but the neck length and strength remain unacceptable despite the use of four sprays of alar. The use of more frequent alar sprays or the inclusion of cycocel in the spray programme are possibilities worthy of further investigation.

Delayed planting is not to be recommended but where this is unavoidable, the production of marketable flowers from a stopped crop is possible. The use of high potash feed during the period of delay appears to be the most effective and one might expect more significant results where shallow (biscuit) blocks have been used for rooting.

Cycocel applied as a pre-spray made the production of a high quality bloom possible using a smaller amount of alar. However, until tank mixing of these two chemicals is possible, the labour input needed to spray the crop eight times compared to four times, renders this treatment uneconomical despite the saving in alar used.

As a result of this year's work, recommendations for American Beauty (select strain) production in the north west remains as follows:

Plant in Week 31, stop and rub out to leave two shoots, black out for 14 days 7th - 21st September to ensure flowering for Christmas and control the neck length and strength with four applications of alar, two pre-disbudding and two post-disbudding.

Any delay to planting is likely to be detrimental to flower uniformity and quality and single stem production needs further investigation before becoming accepted commercial practice.