Agricultural Development and Advisory Service

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CONTRACT REPORT

No. C/87/0360

Pot Chrysanthemums, Grading of Cuttings CV Princess Anne for Winter Quality

Undertaken for H.D.C

PRINCIPAL WORKERS

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AUTHENTICATION

I declare that this work was done under my supervision according to the procedures described herein and that this report represents a true and accurate record of the results obtained.

.....

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Date 6.5.88

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Summary

Unrooted cuttings of pot chrysanthemums of Princess Anne types were graded into two categories by weight or by thickness or by shoot length on the mother plant. Cuttings were stuck, 5 per 140 mm dwarf pot, all of a single grade or in combinations of grades or ungraded. The plants were grown on to flowering stage following standard commercial practice.

At marketing stage, the height of each plant in each pot was recorded as was the stage of development of the most advanced flower on each plant. The standard deviation was calculated for each measurement in each pot and taken as a measure of variability.

Grading by thickness had no effect on uniformity. Whilst there were effects observed between the experimental treatments when grading by weight, graded plots were not consistently better than ungraded plots. Shoot length on the mother plant had a consistent effect on performance, pots containing only cuttings from short shoots being most uniform.

Introduction

The major problem facing the growers of pot chrysanthemums in mid winter is uniformity of height and flowering of the five individual plants in a pot. It appears reasonable to assume that a uniform end product will only be achieved if uniform cuttings are stuck. Which criteria should be used for grading for uniformity, length, weight, thickness is, however, unclear.

This trial is intended to explore the possibilities of grading by different methods (weight and thickness) and to investigate the importance of control of cuttings taken from the mother plant (shoot length).

Treatments

Grading technique	1 - weight or (light or heavy)
(2 discrete grades	2 - thickness or (thick or thin)
by each method 'A' & 'B')	3 - shoot length on mother plant (long or short)

Combinations - 5A in a pot
4A plus 1B in a pot
5B in a pot
4B plus 1A in a pot
5 ungraded cuttings in a pot (excluding treatment 3)

Materials and Methods

Design

Each trial repeated 3 times in the course of winter. On each occasion, with 2 replicates of each treatment. One recorded plot consisted of 8 pots each containing 5 plants.

CulturalDetails

General culture followed normal commercial practice detailed in Lee Valley Report ECT 595 (HDC 641).

Experimental Procedure

Shoot length - cuttings for this trial were raised at Efford EHS (Lymington, Hants) especially for the trial. Stock beds of chrysanthemum cv Bronze, Princess Anne were grown using normal commercial practice. Flushes were timed using pairs of beds to enable cuttings to be taken from shoots leaving behind 6 - 8 leaves (long) or 2 leaves (short). On arrival at Lee Valley the cuttings were similar in appearance. Cuttings were stuck according to the experimental treatments. No ungraded control was stuck.

Shoot weight: unrooted cuttings of cv Purple Anne were purchased from a commercial propagator. A sample of cuttings was weighed, standard deviation calculated and weight categories defined so that the lightest, heaviest and a band of mean weight were discarded (in total about 30 - 40% of the cuttings) leaving two discrete groups of plants (1.2 to 1.8 g 'light' and 2.2 to 2.8 'heavy').

One batch of plants was set aside and left ungraded. Cuttings were stuck in week 40, 48 and 4, week 40 being regarded as a first observation.

Shoot thickness: an additional observation was made into the grading of cuttings by stem thickness, defining categories by a similar means as for weight. There was relatively little variation in thickness, however, andit was found difficult to define distinct categories. Only one complete run was possible in week 4.

Diary

Trial	Sticking Week	Stuck	Recorded
Weight grading	40	10 Oct	13 Jan
	48	1 Dec	12 March
	4	23 Jan	24 April
Shoot thickness grading	4	26 Jan	24 April
Shoot length	40	8 Oct	20 Jan
	48	26 Nov	12 March
	4	23 Jan	24 April

Recording

Each crop was recorded on one occasion when the majority of the pots reached a stage suitable for marketing. The height from the pot rim to the base of the crown flower was recorded individually for each plant in a pot. The stage of flower development was also noted on a scale from 1 - 8 (8 being most advanced) for the most advanced flower on each plant.

The standard deviation of the heights and flowering stage of each pot was calculated and used as a measure of variability within a pot.

Results Results have been quoted as being significant and LSDs calculated at the P 0.05 level

Table 1A Weight grading trial -standard deviations of heights within a pot (mm)

Grade	Sticking Week No. 40	48	4	Mean
5 large	19.2	17.7	18.5	17.8
4 large	26.0	25.7	18.8	23.5
5 small	17.1	17.4	15.6	16.7
4 small	20.0	17.0	14.6	17.2
ungraded	15.5	19.9	14.8	16.7
LSD	3.60	3.60	3.60	2.09

Table 1B Weight grading trial - standard deviations of stage of flowering within a pot (scale of 1 - 8)

Grade	Sticking Week No 40	48	4	Mean
5 large	1.02	1.37	0.94	1.17
4 large	1.39	1.59	0.84	1.27
5 small	1.17	0.74	0.68	0.86
4 small	1.22	1.15	0.69	1.02
ungraded	0.87	1.19	0.62	0.89
LSD	0.38	0.38	0.38	0.23 *

Table 2A Shoot length trial - standard deviations of of heights within a pot (mm)

Grade	Sticking Week No. 48	4	Mean
5 long	22.5	18.2	20.4
4 long	21.8	18.1	20.0
5 short	15.5	16.2	15.9
4 short	18.1	17.9	18.0
LSD	3.98	3.98	2.79 *

Table 2B Shoot length trial - standard deviations of flowering stage within a pot (score 1 - 8)

Grade	Sticking Week No. 48	4	Mean
5 long	1.30	0.53	0.92
4 long	1.39	0.61	1.00
5 short	0.79	0.49	0.64
4 short	1.29	0.75	1.02
LSD	0.34	0.34	0.23

Results

Weight grading - significantly influenced uniformity of height and flowering (Tables 1A & 1B). There was no evidence to suggest that grading reduced the overall variability, indeed ungraded cuttings gave some of the most uniform plants in terms of flowering. Of the cuttings which were graded, the combination of five small cuttings gave significantly greater uniformity in flowering than any other treatment from sticking week 48. This treatment also gave the most uniform results in terms of height, but in this instance the effects were only significant when compared to the combination of four heavy and one light cutting.

Thickness grading - the results were analysed and no significant effects were found, neither were any trends visible as a guideline to future trials.

Shoot length - the combination of five cuttings from short shoots gave significantly more uniform flowering than any other treatment, between which there were no significant differences (Tables 2A & 2B). The combination of five short cuttings gave the greatest uniformity in height also, although in this instance it was not significantly better than the combination of 4 short and one long cutting.

Discussion

In the weight grading trial, it was surprising to find that the ungraded cuttings produced some of the most uniform pots at marketing. This may have resulted from the extra handling to which the graded cuttings were subjected. In future grading trials, handling should be kept to a minimum and the ungraded (control) cuttings should be subjected to a "dummy" grading so that they are handled to the same extent as the graded treatments.

Although significant differences were found in the weight grading trial, in favour of the ungraded cuttings and the 5 light weight cuttings per pot, experienced growers were unable to pick out these differences at flowering stage, which suggests that the differences were of little or no practical significance.

Within the range examined in this trial, grading according to shoot thickness had no significant effect on uniformity. The comparison of shoot length on the mother plants produced differences which were statistically significant and which could also be picked out by growers. Five cuttings from short shoots on the mother plants produced more uniform pots than any other treatment. It was to be expected that a proportion of the cuttings from long shoots on the mother plant would be prematurely budded and would flower before those which were still vegetative.

Conclusions

1. The trial of shoot length on the mother plant should be repeated before any firm conclusions are drawn. There is strong evidence that cuttings from short shoots will produce more uniform pots than those from all long shoots or a mixture of the two. If confirmed, these results will have implications for the management of stock beds.

2. It is unlikely that grading cuttings by weight or thickness, in addition to the grading already done by the cutting supplier, will be commercially worthwhile and these trials should not be repeated.

CHRYSANTHEMUM WEEK 40/41 GRADING TRIALS 1986

Date		Operation	
8/10	Bravo	2.2 ml/litre	(shoot length)
10/10	Bravo	2.2 "	(weight, thickness)
12/10	Alar	3 g/litre	(shoot length)
13/10	Alar	3 "	(weight, thickness)
18/10	Alar	3 "	(shoot length)
20/10	Alar	3 "	(weight, thickness)
23/10	Diazinon	1 ml/litre	
28/10	Nimrod	0.75 ml/litre	
3/11	Diazinon	1 ml/litre	
10/11	Alar	3 g/litre	
18/11	Nimrod	0.75 ml/litre	
19/11	Diazinon	1 ml/litre	
20/11	Alar	3 g/litre	
1/12	Lindex	1.25 ml/litre	
2/12	Alar	3 g/litre	
3/12	Diazinon	1 ml/litre	
5/12	Hostaquick	0.75 ml/litre	
8/12	Tomahawk	0.3 ml/litre	
17/12	Diazinon	1 ml/litre	
6/1	Diazinon	1 "	

CHRYSANTHEMUM WEEK 48 GRADING TRIALS 1986

Date	Operation		
26/11	Bravo	2.2 ml/litre	(shoot length)
29/11	Alar	0.7 g/litre	(" ")
1/12	Bravo	2.2 ml/litre	(weight)
4/12	Alar	0.75 g/litre	(shoot length)
7/12	Alar	3 "	(" ")
11/12	Alar	3 "	(" ")
17/12	Diazinon	1 ml/litre	
6/1	Diazinon	1 "	
16/1	Alar	3 "	
27/1	Diazinon	1 ml/litre	
28/1	Alar	3 g/litre	
30/1	Lindex	1.25 ml/litre	
9/2	Alar	3 "	(weight)
9/2	Lindex	1.25 ml/litre	
14/2	Diazinon	1 ml/litre	
18/2	Vertalec	0.5 g/litre	
25/2	Vertalec	0.5 "	
27/2	Diazinon	1 ml/litre	
4/3	Vertalec	0.5 g/litre	
4/3	Pirimor	0.5 "	
11/3	Vertalec	0.5 "	
11/3	Pirimor	0.5 "	
13/3	Diazinon	1 ml/litre	

CHRYSANTHEMUM WEEK 4 GRADING TRIAL 1987

Date	Operation		
23/1	Bravo	2.2 ml/litre	(shoot length, weight)
26/1	Bravo	2.2 "	(thickness)
27/1	Alar	0.75 g/litre	(shoot length, weight)
29/1	Alar	0.75 "	(shoot length, thickness)
2/2	Alar	3 g/litre	(shoot length, weight)
5/2	Alar	3 "	(thickness)
14/2	Diazinon	1 ml/litre	
18/2	Vertalec	0.5 g/litre	
25/2	Vertalec	0.5 "	
27/2	Diazinon	1 ml/litre	
2/3	Alar	3 g/litre	(weight, thickness)
4/3	Vertalec	0.5 g/litre	
4/3	Pirimor	0.5 "	
1/3	Vertalec	0.5 "	
11/3	Pirimor	0.5 "	
11/3	Alar	3 "	(weight, thickness)
13/3	Alar	3 "	(shoot length)
13/3	Diazinon	1 ml/litre	
16/3	Alar	3 g/litre	(shoot length)
18/3	Vertalec	0.5 g/litre	
20/3	Alar	4.5 g/litre	(weight)
23/3	Alar	3 "	(thickness)
25/3	Vertalec	0.5 "	
27/3	Diazinon	1 ml/litre	
1/4	Vertalec	0.5 g/litre	
4/4	Torque	0.5 "	(weight, thickness)
9/4	Torque	0.5 "	(" ")
9/4	Bravo	2.2 ml/litre	(weight)
10/4	Diazinon	1 ml/litre	
15/4	Pirimor	0.5 g/litre	
31/4	Hostaquick	5 ml/litre	
21/4	Stimufol	0.5 g/litre	