



Horticultural  
Development  
Council

# **Final Report**

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## **PC 211a – Part 1**

### **Poinsettia:**

**Demonstration of commercial  
evaluation on the use of ethrel  
on poinsettia cuttings to increase  
shoot development and plant  
quality - a grower demonstration  
trial**

Final report 2007

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<b>Project Title</b>	Poinsettia: Demonstration of commercial evaluation on the use of ethrel on poinsettia cuttings to increase shoot development and plant quality – a grower demonstration trial	permission of the Horticultural Development Council
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## **Grower Summary**

### **Headline**

This project aimed to investigate if treatment of poinsettias with Ethrel C would increase the number of branches and improve branch uniformity to make production of certain old UK varieties commercially viable again. The best results were obtained using Ethrel C at 300 mg/l and 7 day intervals before and after pinching to produce plants of commercial quality of one of three cultivars tested. However, as this was only an initial one year investigation, further work would need to be done before industry can adopt the results.

### **Background, commercial objectives and benefits to the industry**

Ethrel has been used on poinsettias overseas, primarily the USA, to encourage uniform branching and to optimise the number of branches, thus enhancing quality and increasing the percentage of Class 1 produce. (Information printed in the Ecke Poinsettia Manual 2004. Private correspondence Joseph Fischer, Fischer KG 2004).

However, as the UK is some 400 miles north of the USA at latitude 49°N whereas only the Northern States of America are on a similar latitude, California being just 30°N, the UK normally has cooler summers which may reduce the effectiveness of Ethrel.

In the UK, Ethrel has not been used on poinsettias but the product Ethrel C (2-chloroethyl phosphoric acid) (Number 80 Greenbook 2007) is used and recommended on other ornamentals e.g. Rose, Geranium and non-edible Bromeliad as a plant growth regulator.

This project aims to investigate if treatment with Ethrel C can make production of certain UK varieties commercially viable again. For example, varieties such as Maren, Marblestar and previous varieties which performed well and had very good shelf life eg Lilo and Red Sails but were shy of branching, will be investigated. The work will also determine if the number of branches produced in the cooler UK climate is adequate to justify treatment with Ethrel C and if branch uniformity can be improved.

### **Summary of the project and main conclusions in 2006, one years work**

#### **Crop safety**

As previous work has shown that cultivars may respond differently to applications of Ethrel C and some may be damaged, three varieties: Infinity; Maren and Marblestar (had hard growth) were tested in this trial. Work in Germany has indicated that Ethrel can cause damage on cultivar 'Infinity' and this was also the case in this trial with Infinity being the worst affected, Marblestar less so and Maren not at all.

Damage may show as interveinal yellowing (Infinity), stunting of growth and slow growth or leaf scorch (Marblestar) although the latter disappeared at market stage.

### Timing of application

Timing of Ethrel C application pre and post stopping may be important. In the USA, applications were made at 3 and 7 day intervals using 150 mg/l before stopping and 450 mg/l after pinching.

In this trial, plants were potted in Wk 28 into 13 cm pots and Ethrel C was applied at 7 day intervals i.e. pre and post pinching. All plants were sprayed to run-off no combination of interval was tried. A control was sprayed with tap water only. These plants showed less damage than plants subjected to 3 day pre and post pinch applications. Three different rates of Ethrel C were used: 150 mg/l, 300 mg/l and 450 mg/l and damage was greater at the higher rates of application in all treatments.

### Climatic conditions

Different climatic conditions from Wk 28 to 50 may produce different growth effects. Day and night temperature set points were as follows:

	Night	Day
July	19–20°C	23–26°C
August	16–18°C	18–21°C
September	20–21°C	23–24°C
October	19–20°C	20–21°C
November	18–19°C	19–20°C
December	16–17°C	17–18°C

Plants were spaced pot thick after planting for 6 weeks then spaced at 10 m<sup>2</sup> on benches on 25 August.

### Feed

During August/September N:P:K feed was given in the ratio 5.1.4 and in October/November at 5.2.4.

### Plant growth regulator applications

Applications of 46% Cycocel were made on September 9 and 16 and October 1 at 1 ml and on October 6 at 2 ml, and October 19 at 1.5 ml.

Note: These results are only from 1 year's work i.e. 2006. No shelf-life observations were made.

### Conclusions

**Infinity** – The number of branches increased at all rates of Ethrel application (except 150 mg/l, 7 day treatment) at both the 7 and 3 day pre and post pinch treatments. However, crop damage was seen at both 300 and 450 mg/l at both 7 and 3 pre and post pinch treatment days. So whilst one treatment did increase shoot number in Infinity, (150 mg/l at 3 days) and did not show crop damage, height was suppressed and sleeveability was poorer such that this treatment would not be recommended.

**Maren** – The number of branches increased at all rates of Ethrel application at both the 7 and 3 day pre and post pinch treatments. However, height was suppressed and sleeveability was poorer in all 3 day treatments such that this treatment would not be recommended. The best results were obtained using 300 mg/l Ethrel at 7 day intervals before and after pinching to produce plants of commercial quality.

**Marblestar** – Ethrel had no affect on shoot number at any of the concentrations tested. Plants showed crop damage although this disappeared at market stage.

### **Financial benefits for growers**

This project aimed to investigate if treatment with Ethrel C can make production of certain UK varieties commercially viable again. There may be potential for using Ethrel C at 300 mg/l and 7 day intervals before and after pinching to produce plants of commercial quality but further work will need to be done to clarify this and it should be noted that the response may be variety specific.

### **Action points for growers**

There are no action points for growers from this work.



## Appendix 1

Table 1 shows the number of shoots per pot following pre and post pinching applications of Ethrel.

**Infinity** – there was an increase in leaf interveinal yellowing at the 2 highest 7 day rates whereas there was a decrease at the 3 day applications. Shoot number was not affected.

**Maren** – showed no damage at any treatment but there was slight increase in shoot number with the 7 day applications and no difference with the 3 day applications.

**Marblestar** – showed some leaf scorch but no other damage. Shoot number appeared to be variable with both 7 and 3 day applications. This may be due to the hard cutting material in the trial.

**Table 1 Crop damage and shoot score following pre and post pinching applications of Ethrel (25 August Wk 34)**

		Control	7 Day			3 Day		
			150 mg/l	300 mg/l	450 mg/l	150 mg/l	300 mg/l	450 mg/l
<b>Infinity</b>	Height	6.6	6.0	5.4	5.0	5.0	5.6	4.8
	Width	11.8	9.6	6.4	5.6	5.6	5.2	4.6
	No.Shoots	5.8	5.6	6.6	6.6	6.4	6.2	7.0
	Damage	0.0	0.0	1.8	2.0	4.0	2.4	0.6
<b>Maren</b>	Height	6.4	6.4	6.0	5.6	5.6	4.4	5.4
	Width	15.4	12.2	10.6	10.0	11.6	9.2	7.4
	No.Shoots	5.8	6.4	6.4	6.6	6.6	6.0	6.6
	Damage	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Marblestar</b>	Height	7.8	6.6	5.8	6.8	6.4	5.4	5.2
	Width	12.8	9.8	9.2	6.2	8.8	7.8	5.8
	No.Shoots	6.0	5.2	5.8	5.4	5.6	6.0	5.0
	Damage	0.0	0.0	0.0	0.0	0.0	0.0	1.6

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## Appendix 2

Table 2 shows the number of shoots and plant quality by Ethrel treatment (8 December Wk 49).

At market stage no bract damage was noted. Some Infinity appeared stunted or were late to develop. The scorch on Marblestar had disappeared. Maren showed no ill effect.

Height was good with the 7 day treatment but suppressed with the 3 day treatment. Spread was similar throughout the treatments but less with the highest (450 mg/l) Ethrel treatment.

The number of primary breaks increased with the 7 day treatment over control and the 3 day treatment, particularly at the 450 mg/l Ethrel treatment.

Secondary breaks were not affected by treatment, bract size was similar in all treatments. Cyathia size, grassy growth were similar. Sleeveability was best with the control and also in the 7 day treatments, 3 day treatments were poorer.

Quality scores were highest with the lowest rates of Ethrel in both the 3 and 7 day treatments and worst at the highest rates of 450 mg/l Ethrel.

**Table 2 Market evaluation number of shoots and plant quality following Ethrel C treatment (8 December Wk 49)**

		Control	7 Day			3 Day			
			150 mg/l	300 mg/l	450 mg/l	150 mg/l	300 mg/l	450 mg/l	
<b>Infinity</b>	Height (cm)	21.4	22.8	20.4	18.0	17.3	17.4	17.2	
	Spread (cm)	33.0	35.2	31.4	29.8	30.0	32.2	25.4	
	No. of primary breaks	4.4	4.6	4.4	5.2	3.4	4.8	3.8	
	No. of secondary breaks	1.0	0.8	1.0	0.8	1.2	0.6	1.6	
	No. of breaks in size category mm:	<150	1.0	1.0	1.2	2.8	2.4	2.0	2.4
		150-200	1.4	1.0	1.8	1.6	1.0	2.8	0.6
		200-225	1.4	1.2	1.4	0.6	0.4	0.4	1.4
		225>	1.8	2.2	0.8	0.2	0.8	0.2	1.0
	Average Cyathia size (1,2,3)	2.0	1.4	1.6	1.0	1.5	1.0	1.8	
	Average stage of Cyathia development (1-6)	2.0	1.8	2.0	2.2	1.8	1.6	2.6	
	Grassy grown (0, 1, 3)	0	0	0	0	0	0	0	
	Sleevability (1, 3, 5)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Plant quality (0, 1, 2)	4.4	4.2	3.2	2.0	2.3	2.0	2.0		
<b>Maren</b>	Height (cm)	18.7	19.0	17.5	16.4	17.0	19.0	18.4	
	Spread (cm)	31.7	28.3	32.5	33.8	38.0	34.6	35.6	
	No. of primary breaks	3.3	5.0	4.8	5.0	6.0	4.6	4.0	
	No. of secondary breaks	1.3	1.3	1.5	1.0	0.7	1.2	2.0	
	No. of breaks in size category mm:	<150	1.3	1.0	1.8	1.2	0.7	1.0	1.6
		150-200	1.7	1.3	1.5	1.8	0.7	0.8	1.2
		200-225	1.7	2.7	1.3	1.4	1.3	2.0	1.4
		225>	0.0	1.3	1.8	1.6	3.3	1.8	1.8
	Average Cyathia size (1,2,3)	3.0	3.0	3.0	2.8	3.0	2.8	3.0	
	Average stage of Cyathia development (1-6)	3.0	4.0	4.8	3.8	4.0	3.2	3.8	
	Grassy grown (0, 1, 3)	0	0	0	0	0	0	0	
	Sleevability (1, 3, 5)	5.0	5.0	4.0	3.8	3.3	3.4	4.2	
Plant quality (0, 1, 2)	2.3	4.7	4.8	4.2	5.0	4.4	3.8		
<b>Marblestar</b>	Height (cm)	21.0	20.6	19.2	15.8	19.6	20.4	14.5	
	Spread (cm)	34.7	34.6	32.6	30.8	35.0	35.2	28.5	
	No. of primary breaks	4.0	4.0	4.2	3.5	4.2	3.4	4.0	
	No. of secondary breaks	1.0	0.4	1.2	0.5	0.2	1.4	0.5	
	No. of breaks in size	<150	1.0	0.4	1.4	0.5	0.4	2.0	2.0
		150-200	0.3	1.2	1.2	1.5	0.8	2.0	2.0

	category mm:	200-225	2.0	1.8	1.2	1.0	1.0	0.5	0.5
		225>	1.7	1.0	1.2	0.8	2.4	0	0
	Average Cyathia size (1,2,3)		3.0	2.8	2.8	2.8	3.0	3.0	1.5
	Average stage of Cyathia development (1-6)		3.3	3.6	3.0	3.3	4.4	4.8	1.5
	Grassy grown (0, 1, 3)		0	0	0	0	0	0.0	0
	Sleevability (1, 3, 5)		5.0	5.0	3.2	5.0	4.0	4.4	5.0
	Plant quality (0, 1, 2)		4.7	4.0	3.6	3.0	3.8	3.0	1.5

## Appendix 3

Table 3 shows the number of shoots and plant quality by variety at market stage (Wk 49 8 December)

**Infinity** – The number of primary breaks decreases with the 3 day prior/post applications, quality was poorer with increasing rates of Ethrel and the 3 day treatments.

**Maren** – Primary breaks increased over control with the application of Ethrel as did quality. With the 7 day treatments primary breaks and quality was highest, with the 7 day treatments the 300 mg/l level was best. With the 3 day treatments the 150 mg/l level was best all round.

**Marblestar** –The best quality was the control, no Ethrel C just water. Again the 7 day treatments were better than 3 day.

Please note 2006 was very warm but had a cool period at the end of August to first week of September. In other seasons and with other varieties and with Infinity, Maren and Marblestar different results may occur.

**Table 3 number of shoots and plant quality by variety at market stage (Wk 49 8 December)**

### Infinity

	Number primary breaks	Secondary	Total	Plant quality
Control	4.4	1.0	5.4	4.4
7 x 150	4.6	0.8	5.4	4.2
7 x 300	4.4	1.0	5.4	3.2
7 x 450	5.2	0.8	6.0	2.0
3 x 150	3.4	1.2	4.6	2.3
3 x 300	4.8	0.6	5.4	2.0
3 x 450	3.8	1.6	5.4	2.0
<b>Total</b>	<b>4.4</b>	<b>1.0</b>	<b>5.4</b>	<b>2.9</b>

### Maren

	Number primary breaks	Secondary	Total	Plant quality
Control	3.3	1.3	4.6	2.3
7 x 150	5.0	1.3	6.3	4.7
7 x 300	4.8	1.5	6.3	4.8
7 x 450	5.0	1.0	6.0	4.2
3 x 150	6.0	0.7	6.7	5.0
3 x 300	4.8	1.2	6.0	4.4
3 x 450	4.0	2.0	6.0	3.8
<b>Total</b>	<b>4.7</b>	<b>1.3</b>	<b>6.0</b>	<b>4.2</b>

### Marblestar

	Number primary breaks	Secondary	Total	Plant quality
Control	4.0	1.0	5.0	4.7

7 x 150	4.0	0.4	4.4	4.0
7 x 300	4.2	1.2	5.4	3.6
7 x 450	3.5	0.5	4.0	3.0
3 x 150	4.2	0.2	4.4	3.8
3 x 300	3.4	1.4	4.8	3.0
3 x 450	4.0	0.5	4.5	1.5
<b>Total</b>	<b>27.3</b>	<b>5.2</b>	<b>32.5</b>	<b>23.60</b>
<b>Mean</b>	<b>3.9</b>	<b>0.7</b>	<b>4.6</b>	<b>3.4</b>