



Agriculture & Horticulture  
DEVELOPMENT BOARD



# **Grower Summary**

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## **PO 007**

New cultivars of Poinsettia.  
Evaluation at marketing and in  
shelf life.

Final 2013

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HDC  
Stoneleigh Park  
Kenilworth  
Warwickshire  
CV8 2TL

Tel – 0247 669 2051

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|                                 |   |
|---------------------------------|---|
| <b>Project Number:</b>          | PO 007  |
| <b>Project Title:</b>           | New cultivars of Poinsettia. Evaluation at marketing and in shelf life. |
| <b>Project Leader:</b>          | Jill England  |
| <b>Contractor:</b>              | ADAS UK Ltd   |
| <b>Industry Representative:</b> | Mr Ian Mills, Creswick Nurseries  |
| <b>Report:</b>                  | Final Report 2013   |
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| <b>Previous report/(s):</b>     | None  |
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## Headlines

- 'Infinity' performed consistently well when assessed at marketing and shelf life.
- 'Christmas Feeling' also performed well both at marketing and in shelf life, compared with 'Infinity', with the varieties 'Bravo Red', 'Christmas Day' and 'Christmas Beauty' all showing promise.

## Background

An estimated four million poinsettia plants are grown in the UK annually. Poinsettia breeding programmes are continually producing promising new varieties, but they focus on the larger European and US markets rather than the UK. Performance of eleven varieties was evaluated under UK commercial production and environmental conditions to identify varieties that perform consistently well in the UK and to generate baseline data on their management.

## Summary of the project and main conclusions

Data was collected from a range of poinsettia under evaluation at Hills Brothers, Chichester, West Sussex for Sainsbury's. Material was assessed for its performance at marketing and in shelf life, at Warwick Crop Centre, and compared in both instances with the industry standard variety, 'Infinity'. Growers were invited to make their own judgments at marketing and towards the end of the shelf life period at HDC/BPOA grower open days. The study focused on key indicators at marketing (including plant height, cyathia maturity and quality) and in shelf life (including leaf and bract drop, new growth and quality) with overall quality scores calculated at marketing and at the end of shelf life ( **Table 1** and **Table 2**).

Eleven varieties were supplied by several breeding companies: Beekenkamp ('1070', 'Charon Red' and 'Saturnus'), Selecta ('Christmas Day', 'Christmas Feeling', 'Christmas Eve' and 'Christmas Beauty'), Syngenta ('Titan') and Dummen ('Prima Red', 'Bravo' and Protégé Dark Red'). The rooted cuttings, delivered in weeks 31 and 32, were managed according to the needs of the main commercial crop of 'Infinity' plants for marketing in week 48. 'Infinity' (Dummen) was included as a control for comparison. Plants were grown in 13cm pots at 18°C (24 hrs) with nine plants/m<sup>2</sup>. Plants were pinched in week 32 ('Saturnus', 'Charon Red', 'Prima Red' and 'Titan') and week 35 ('Infinity Red', 'Bravo', '1070', 'Christmas Beauty', 'Christmas Day', 'Christmas Feeling', 'Christmas Eve' and 'Protégé Red') in line with the commercial crop. Plant growth regulators were applied from week 35. Regular introductions of biological control agents were made to control aphid and whitefly.

Six plants of each variety were sleeved, boxed and transported to Warwick Crop Centre in week 49 for shelf life evaluation, designed to mimic supply chain conditions. The boxed plants were kept closed for 5 days. Three plants of each variety were then placed on saucers and irrigated, to the saucer by hand as required to maintain growing media moisture,

for a further 7 days before the sleeves were removed. The shelf life room temperature was set at 18°C ±1°C, relative humidity at 55-65%, and light (approximately 1000 lux, 1.5 W/m<sup>2</sup>) was provided for 14 hours per day by fluorescent lights, positioned at plant height.

### ***Marketing assessment***

A quality assessment was made of 100 plants of each variety on 28 November 2012 (week 48), with 'Infinity' as the reference variety. The following scoring assessment was used: Class 1: four even heads of bracts at the top of the plant, strong even growth; Class 2: plants were slightly smaller, with less even growth and bract position, they did not have four even heads of bracts to the top of the plant, but were saleable and outgrade: plants exhibited weaker, uneven growth, two or less heads of bracts, generally considered unsaleable.

There were production issues on the nursery where energy/blackout screens were used between 16 September and 29 October 2012, putting the poinsettia into short days early and promoting flowering before the plants had reached the correct height. Comparison of the trial 'Infinity' plants with the main crop 'Infinity', which were not subjected to this treatment, indicated the effect of early short days. Bracts and leaves were smaller in the trial 'Infinity', and overall the plants were smaller; 95% of the main crop 'Infinity' were graded as Class 1, with 1% outgrades, when compared with the trial 'Infinity', where 55% of the plants were graded Class 1 and 11% outgrades. Although all of variety '1070' were outgrades, in light of the production issues, they were taken forward into shelf life assessment.

There were some clear differences in the quality of the trial varieties (**Table 1**). Plant quality ranged from 'Charon Red', the only variety with zero outgrades and 72% the plants evaluated as Class 1, to variety '1070', where all plants were considered outgrades. 'Charon Red', 'Prima Red' and 'Titan' all performed better at marketing compared with 'Infinity'. The majority of varieties were below the height specification (22-28 cm), and variety '1070' was not measured as they had all been assessed as outgrades. 'Charon Red' was the most vigorous variety. Performance may have been affected by the early short day treatment, with some varieties responding better than others to subsequent treatments to increase their height.

Cyathia were graded for maturity on a scale of 1-5, where 1 = tight green bud, 2 = bud colour, 3 = pollen showing, 4 = stigma open, 5 = pollen and stigma. Grades 2-3 were considered ideal at the point of marketing. The majority of cyathia scores were in the 2-3 range, suggesting the plants were of the correct maturity to perform well for the end consumer. 'Christmas Feeling' scored a borderline 1-2, but did maintain quality through shelf

life. At grade 4, cyathia were considered more likely to drop during the dark transportation period, and at grade 5 they would be more prone to *Botrytis cinerea* infection. Variety '1070' attained a cyathia score of 3-4.

Data were used to calculate an overall ranking for each variety. 'Infinity' (control) and 'Prima Red' ranked best overall at marketing, both being within the height specification, with few outgrades and a good cyathia score; both varieties achieved the maximum score of 3.0. 'Charon Red' achieved a lower score as the plants assessed were above the height specification, whilst other varieties achieved lower cyathia scores. Those plants that did not achieve the highest scores across the board may have been less mature than average and given more time their scores may have improved.

**Table 1.** Marketing assessment. Height specification: 22-28 cm. Cyathia scores: 1-2 = immature, 2-3 = ideal for marketing, 4 = more likely to drop during transportation, 5 = more prone to *Botrytis cinerea* infection. The overall ranked score was calculated based on quality, height and cyathia score. For more detail refer to the science section.

| Variety<br>(Response group)   | Quality (%) |             |            | Height<br>(cm) | Cyathia<br>score | Overall<br>ranking |
|-------------------------------|-------------|-------------|------------|----------------|------------------|--------------------|
|                               | Class 1     | Class 2     | Outgrade   |                |                  |                    |
| 'Infinity' – control (8.0)    | 55          | 34          | 11         | 23.4           | 2                | 3.0                |
| 'Prima Red' (7.5)             | 70          | 25          | 5          | 22.7           | 2-3              | 3.0                |
| 'Charon Red' (7.5/8.0)        | 72          | 28          | 0          | 29.0           | 2-3              | 2.7                |
| 'Saturnus' (7.5)              | 23          | 60          | 17         | 22.6           | 3-4              | 2.7                |
| 'Christmas Feeling' (7.5/8.0) | 53          | 37          | 10         | 22.5           | 1-2              | 2.7                |
| 'Titan' (7.5/8.0)             | 62          | 31          | 7          | 21.5           | 2-3              | 2.7                |
| 'Protégé Dark Red' (7.5/8.0)  | 49          | 45          | 6          | 20.1           | 2-3              | 2.7                |
| 'Christmas Day' (7.5)         | 40          | 45          | 15         | 19.5           | 3-4              | 2.3                |
| 'Christmas Eve' (7.0)         | 45          | 37          | 18         | 20.4           | 2-3              | 2.3                |
| 'Christmas Beauty' (8.0)      | 29          | 47          | 24         | 18.3           | 2-3              | 2.3                |
| 'Bravo Red' (7.5)             | 38          | 48          | 14         | 17.6           | 2-3              | 2.3                |
| '1070' (7.5/8.0)              | 0           | 0           | 100        | -              | 3-4              | 1.3                |
| <b>Average</b>                | <b>55.0</b> | <b>38.0</b> | <b>9.0</b> | <b>21.0</b>    | <b>2.6</b>       | <b>1.3</b>         |

### **Shelf life assessment**

The general condition of the poinsettia was assessed following five days of dark treatment. The majority were in good condition, although *Botrytis cinerea* was found on 13 plants ('Saturnus', 'Christmas Beauty', 'Titan', 'Prima Red', 'Bravo Red' and 'Protégé Dark Red'). 'Saturnus' looked good whilst sleeved, but fell open and was no longer upright once the sleeves were removed. 'Christmas Day' also fell slightly open, making a broader plant. 'Infinity' and 'Prima Red' both remained upright throughout.

Shelf life quality scores were allocated on a scale of 5-1 (5 = high quality, cyathia intact; 4 = good quality, some cyathia; 3 = acceptable quality, no cyathia; 2 = poor quality, no cyathia; 1 = end of shelf-life) using the same criteria as in project PC 156a to enable comparisons to be made. All plants were of adequate quality (score 3) or better at the start of shelf life (**Table 2**). After six weeks, scores ranged between 1.7 and 3.7. 'Protégé Dark Red' and 'Saturnus' were considered poor quality, scoring 1.7 and 2.0 respectively. Some marginal chlorosis was seen in one or two plants of 'Titan', 'Saturnus', 'Protégé Dark Red', 'Bravo Red', 'Infinity' and 'Christmas Feeling', generally on the lower leaves. A small amount of leaf marking occurred in one or two plants of 'Charon Red', 'Prima Red', 'Protégé Dark Red' and 'Christmas Beauty'. Few cyathia were remaining on any varieties. 'Infinity' and 'Bravo Red' plants were still generally well clothed with leaves and bracts. 'Prima Red', 'Titan' and the Selecta 'Christmas' series also performed well.

A number of plants did not lose any leaves during shelf life: 'Infinity' (2 plants), 'Christmas Feeling' (2 plants), 'Bravo Red' (1 plant), 'Prima Red' (1 plant) and 'Titan' (1 plant). Least leaf drop was seen in 'Christmas Feeling', 'Infinity' and variety '1070'; greatest leaf drop was seen in 'Saturnus', 'Charon Red' and 'Protégé Dark Red' by the end of shelf life. However, generally, one plant of the three of each variety being tested performed poorly, dropping the majority of the leaves recorded for that variety ('Christmas Eve', 'Protégé Dark Red', 'Saturnus', 'Prima Red', 'Christmas Beauty' and 'Infinity'). 'Saturnus' and 'Protégé Dark Red' lost leaves early and continued to degrade. Conversely, each of the three plants of 'Christmas Day' lost five leaves at the start of shelf life, but then stabilised with only three more leaves lost for that variety during the remainder of the trial.

Less than 50% of the plants dropped bracts and some varieties dropped none ('Christmas Feeling', variety '1070' and 'Christmas Beauty'). 'Protégé Dark Red', 'Charon Red' and 'Saturnus' performed least well, with one or two plants of each variety losing bracts at the start. One of the 'Titan' plants had lost two heads of bracts by the end of the trial.

New growth, detracting from the appearance of the poinsettia, was noted in some varieties ('Saturnus', 'Christmas Day', 'Christmas Feeling', 'Christmas Eve', 'Christmas Beauty' and 'Protégé Dark Red') at marketing and continued to develop in all varieties during the shelf life trial. New growth was scored on a scale of 1 to 3 (1 = slight, 2 = moderate, 3 = high) in the final assessment at the end of the shelf life trial. 'Saturnus', 'Charon Red', 'Christmas Day' and 'Bravo Red' were the least affected at the end of shelf life.



**Christmas Feeling**



**Bravo Red**



**Christmas Beauty**



**Infinity**

**Figure 1.** Selection of Poinsettia at the end of shelf life

Data collected during the shelf life assessment were used to calculate an overall rank for each variety (**Table 2**). The varieties that ranked best overall at the end of shelf life were 'Infinity' and 'Bravo Red', closely followed by 'Christmas Feeling', 'Christmas Day', 'Christmas Beauty' and variety '1070'. Although all plants of variety '1070' were classed as outgrades at marketing, as the plants were less mature than required at this stage; they scored better during shelf life, losing few leaves or bracts and with a high quality score. 'Charon Red', 'Saturnus' and 'Protégé Dark Red' performed less well in shelf life, failing to achieve high scores in most categories. Varieties that performed well at marketing generally did not maintain their quality through the shelf life trial, the most notable exception was 'Infinity' which scored well throughout and proved its position as the current industry standard. 'Christmas Feeling' also showed promise, scoring consistently well and maintaining quality throughout. 'Bravo Red' and variety '1070' in particular improved their scores relative to other varieties, having the lowest overall scores at marketing; 'Bravo Red' gained the same high score as 'Infinity' by the end of the trial. Conversely, 'Prima Red', 'Charon Red', and 'Saturnus' were all graded Class 1 at marketing, but fell to the bottom half of the ranking by the end of shelf life.



Some varieties did not respond well to the early use of energy/ blackout screens, which meant they were below the height specification at marketing, but they may have reached the height specification had the marketing date been delayed, and gone on to perform well during shelf life, as suggested by the overall quality score of variety '1070'.

**Table 2.** Scores at the end of shelf life: Leaf drop: '3' = 0 – 5 leaves, '2' = 6 – 10 leaves, '1' = > 10 leaves. Bract drop: '3' = 0 – 5 bracts, '2' = 6 – 10 bracts, '1' = > 10 bracts. New growth ( $\pm 0.5$ ): '3' = little new growth, '2' = moderate new growth, '1' = high level of new growth. Shelf life quality score: on a scale of 5-1 (5 = high quality, cyathia intact; 4 = good quality, some cyathia; 3 = acceptable quality, no cyathia; 2 = poor quality, no cyathia; 1 = end of shelf-life). The overall ranked score = average of scores across leaf and bract drop, new growth and shelf life performance (refer to science section for more detail).

| Variety<br>(Response group)   | Leaf<br>drop | Bract<br>drop | New<br>growth | Shelf life<br>quality | Overall<br>rank |
|-------------------------------|--------------|---------------|---------------|-----------------------|-----------------|
| 'Infinity' – control (8.0)    | 3            | 3             | 2             | 4.0                   | 3.0             |
| 'Bravo Red' (7.5)             | 3            | 3             | 3             | 3.0                   | 3.0             |
| 'Christmas Feeling' (7.5/8.0) | 3            | 3             | 2             | 3.0                   | 2.8             |
| 'Christmas Day' (7.5)         | 2            | 3             | 3             | 3.0                   | 2.8             |
| 'Christmas Beauty' (8.0)      | 3            | 3             | 2             | 3.0                   | 2.8             |
| '1070' (7.5/8.0)              | 3            | 3             | 2             | 3.0                   | 2.8             |
| 'Titan' (7.5/8.0)             | 3            | 2             | 2             | 2.7                   | 2.5             |
| 'Prima Red' (7.5)             | 3            | 3             | 1             | 2.7                   | 2.5             |
| 'Christmas Eve' (7.0)         | 3            | 3             | 1             | 3.0                   | 2.5             |
| 'Charon Red' (7.5/8.0)        | 2            | 1             | 3             | 2.7                   | 2.3             |
| 'Saturnus' (7.5)              | 2            | 1             | 3             | 2.0                   | 2.0             |
| 'Protégé Dark Red' (7.5/8.0)  | 2            | 1             | 2             | 1.7                   | 1.8             |
| <b>Average</b>                | <b>4.7</b>   | <b>5.2</b>    | <b>1.9</b>    | <b>2.6</b>            | <b>2.6</b>      |

## Financial benefits

The value of the UK grown poinsettia market is estimated at £8 million, of which 60-70% is Infinity. This trial provides growers with information on which poinsettia varieties are most likely to perform well under UK conditions, enabling growers to reduce costs by carrying out targeted in-house trials. Growers need to be confident that varieties are robust enough to withstand transportation, and retail storage and display, reducing costly wastage and returns from retailers. Shelf life evaluations provide useful information where growers do not have facilities to carry out their own evaluations.

## **Action points for growers**

- In this trial, 'Infinity' proved that it is robust and capable of maintaining quality through marketing and shelf life, but growers should evaluate 'Infinity' with new varieties on their own holdings.
- Promising new varieties (e.g. 'Bravo Red', 'Christmas Feeling', 'Christmas Day' and 'Christmas Beauty') which may challenge 'Infinity' are coming through the breeding programmes, but they will need to be evaluated by growers on their own holdings.