



# Grower Summary

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## **PO 021b**

New Poinsettia Genetics  
and Controlled Substrate  
Moisture Growing

Final 2019

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# GROWER SUMMARY

## Project Background and Expected Deliverables

The poinsettia plant is purchased as a seasonal decoration by the domestic market, available from retail outlets from mid-November until Christmas. The market specifications are stringent, generally requiring a 1 litre potted plant, 25-30 cm high, with a foil of dark green leaves to clean red bracts; the cyathia should be prominent without pollen. The UK industry is reliant on a few varieties, of which Infinity 2.0 in previous years has accounted for up to 65% of the total market. Cutting material is sourced primarily from the EU.

Two trials are reported: the variety trial assessment and the precision and deficit irrigation assessment for plant growth control.

### *Variety trial*

The first trial was to further develop variety trial work from previous AHDB research, where new and existing varieties were benchmarked through growth and shelf life trials, against the leading commercial variety, Infinity 2.0. Problems occurred early in the season when material from Dummen showed the presence of Bemisia, therefore the cuttings were not sent to the UK. The replacement varieties from Volmary did not include the benchmark variety Infinity 2.0. This event highlights the industry's current vulnerability, with reliance on few varieties and stock plant material sourced from abroad.

The varieties tested were:

- **Beekenkamp** – Astro Red, Lenora Red, Hera Red.
- **Volmary** – Christmas Beauty, Christmas Beauty Princess, Moijin, Crunch Red.
- **Selecta** – Christmas Break, Christmas Cracker, Christmas Sensation, SKA 159.
- **Syngenta** – Mirage Red, Sigma, Blissful Red.

The variety trial plants were grown on three nurseries across the UK (Hills Bros Chichester, Volmary Wisbech St Mary and KRN House plants Louth) to represent the different range in facilities and growing methods between industry grower sites.

Previous trials have shown varieties such as Lenora Red, Christmas Sensation and Astro Red to be promising, these varieties continued to show good results.

Details of grower's methods and procedures can be found in Appendices one and two.

At harvest, the mean score of the three nurseries showed that three varieties did not attain a saleable score of 5 or above: Christmas Break, Christmas Beauty Princess and SKA 159. The highest mean score was attained by Astro Red at 6.4. The individual nursery results showed a range of quality scores, however no one nursery attained the highest score in all

varieties, indicating that location, past knowledge and growing techniques may suit particular varieties.

The most consistent quality scores across all nurseries were for Christmas Beauty Princess, SKA 159, Christmas Sensation and Christmas Crunch. However the last two varieties however were the only ones to attain a saleable quality score in all three nurseries.

At dispatch the mean quality assessment showed that three varieties scored below five, Christmas Break (4.8), Christmas Beauty Princess (2.3) and SKA 159 (4.9). Scores of five and above are considered suitable for commercial sale. The highest mean quality score was for Astro Red (6.4) although the quality score was also the least consistent across the three grower sites (scores 7.8, 7.3 and 4.3). The varieties showing the most consistency on quality scores between growers were SKA 159 (scores 4.8, 4.8 and 5.2) and Christmas Sensation (scores 6.4, 6.2 and 6.0).

Upon arrival at the University of Lincoln, the plants from one nursery (generally the largest plants) required additional water compared to the other two nurseries. Some plants had considerable water uptake during the first couple of weeks in line with observed continued plant growth.

During the shelf life assessment, most varieties continued to grow and improve in quality score during the first few weeks; this was not seen last year in any variety. The water deficit trial plants were generally observed as wetter than variety trial plants. There was less leaf fall than last year on all plants and very few incidences of pest and disease.

On week five of shelf life, the quality scores were higher than the previous year; 4<sup>th</sup> January 2018 all plants scores 1-6, 3<sup>rd</sup> January 2019 lowest score was 2, with 45 plants scoring 7 or above.

At the end of the shelf life assessment, most plants had survived with the loss of only six plants by the second open day (17<sup>th</sup> January). Some varieties have both high and low scorers, which may be due to growers' quality specifications, however certain growers have consistently better or worse scores with certain varieties. Five of the Leona Red plants scoring 7 were from one nursery, but also five of the Christmas Beauty Princess scoring 3 were from the same nursery. Some varieties such as Christmas Sensation have few high scoring plants, but the overall score is good– indicating that the plants consistently scored better than average.

Christmas Sensation attained consistent quality scores at dispatch and end of shelf life stages.

### ***Precision and deficit irrigation trial***

This second trial was carried out due to industry concerns regarding the potential loss of chemical Plant Growth Regulators (PGRs). PGRs such as chlormequat are used to control crop size. The deficit irrigation trial was conducted by Neame Lea, Spalding.

The trial showed there was a reasonable buffer zone between the degree of substrate drying that will effectively control stem height, and what would lower plant visual quality and shelf-life potential, which should help to allay grower concerns that the reduced deficit irrigation approach is too risky.

In 2018, the varieties Astro Red, Leona Red and Aries Red were used in the precision irrigation (PI) and deficit irrigation (DI) work. Precision irrigation was used throughout the growing season to ensure that substrate volumetric moisture content (SVMC) was maintained within the optimal range, avoiding large fluctuations between too wet and too dry; this was typically 35-55%. Due to the relatively late planting date in 2018 resulting from sourcing issues, the growing team at Neame Lea focused on achieving strong growth throughout most of the season so that the minimum plant height specification could be met. Only towards the end of the growing season did the growing team feel that DI was needed to slow extension growth in each of the three varieties.

The moisture sensors, dataloggers and telemetry systems were again reliable, while remote access to real-time data through the new "Grower Dashboard" helped to inform the grower's decision-making regarding the frequency and duration of irrigation events. Results again confirmed that rate of change in SVMC correlated with daily vapour pressure deficits (VPDs). Differences in this relationship were used to remotely detect when DI stress was sufficient to reduce plant water loss via lowered stomatal conductance.

DI was imposed successfully on three occasions during November 2018 for each variety, and resulted in slowed extension growth. Consequently, all three varieties were within height specifications by the end of the growing season, despite the fact that no PGRs were applied during the season. Residue tests confirmed that production was PGR-free, and also confirmed that the growth control was not achieved as a consequence of an earlier application of PGR applied before plants were dispatched to the UK.

Overall quality at dispatch of randomly selected, DI-treated plants was similar to that in commercial controls from the participating nurseries, and the shelf-life tests carried out by the University of Lincoln (UoL) on the DI-treated plants indicated that shelf-life potential was at least as good as commercial controls.

***Additional work conducted:***

***Chemical residue testing***

Chemical residue testing, this work was conducted in response to industry concerns regarding the chemical presence on cutting material and its potential to be systemically transferred to new plant growth. The presence of chemicals on ornamental plants at point of sale may become a public concern in the future. This work was carried out as a benchmarking exercise to ascertain the current situation.

***Poinsettia nutritional monitoring work***

Over the last twenty years, there has been a regular nutrient monitoring scheme of substrate and leaf tissue. Whilst there have been considerable variety changes in the poinsettia used in the market there has been a build-up of data on available nutrients in substrates during the cropping period and also a library of tissue nutrient levels.

## **Benefits to Industry**

Approximately 8 million poinsettias were sold within the UK market per year, a popular houseplant associated with Christmas especially with red bracts on green leaves, although new coloured and glitter varieties are beginning to enter the market. Approximately 50% of the retail market has previously been supplied by UK growers with Dutch growers supplying the remaining plants. Due to “Brexit”, the coming 2019 season may bring both challenges and opportunities. New trade agreements and unknown euro exchange rates coupled with shorter UK distribution routes may help UK growers to improve plant quality in the home market and gain a competitive advantage.

### ***Benefits of the variety trial***

This project has reaffirmed previous trial data on the resilience of several new varieties, the importance of which was further highlighted by the absence this year of the known benchmark variety Infinity 2.0. The commercially grown varieties allow growers to evaluate and assess varietal resilience, performance and reliability of poinsettias at harvest, then through retail and domestic shelf life. High quality scores at harvest did not always follow through into shelf life.

### ***Benefits of the deficit irrigation trial***

Work conducted during 2017/18 showed the potential of DI within a commercial operation, using remote soil moisture sensing together with soil moisture deficit to control stem extension (plant height) during the period of rapid stem elongation, and reducing the need for PGRs. The previous trial formed a PI model to maintain “optimum” moisture content. This trial’s objective was to take the research to the next level replacing grower-led irrigation with model-led decisions. The intention is for future transferable irrigation models to other crops.

### ***Benefits of chemical residue testing***

Chemical residue testing provides the industry with current information regarding chemical residues on cutting material and saleable products, to provide a benchmark for future analysis.

### ***Benefits of poinsettia nutritional monitoring.***

Monitoring of both substrate and leaf tissue was done to ensure and predict the need for additional feeding during the production period of the crop. The overall improvement of crop quality and increase in quantity of marketable products would raise the international reputation of UK growers and their products not only in the poinsettia market but potentially for other nursery grown plants, plus increase their financial return.

## ***Financial Benefits to the industry***

### *Water*

The three nursery locations used for the variety trial employed two irrigating plants by traditional methods on static benches and on the floor, the third location was on ebb and flow benches. The deficit irrigation trial to control the height of pot grown poinsettias to client specifications implied the use of reduced water to grow the crop by up to 20 %. The water saving could be approx. £25-30k dependent on weather and number of plants (traditional watering vs recirculating)

The automated systems installed at the deficit irrigation trail location have allowed for increased efficiency in potting, spacing and packing. Overall costs have dropped by approx. 40%. The glasshouse heating biomass boiler vs oil heating is a cost saving of approx. 0.60p/pot.

### *Chemical*

The application of water deficit to the Poinsettia crop to control height reduced the need for chemical applications of PGRs. Therefore the success of the water deficit system to the industry and the environment is the potential reduction in water and chemical application. Dependent upon rate of application, the number of plants and issues during growing the crop an estimated saving of £3k per season.

### *Space*

The control of plant growth allows easier maximisation of space (more pots/ m<sup>2</sup>), but choosing the best performing varieties is an important element.

### *Nutritional analysis*

If previously growers were losing between 5-10% because of poor control of nutrition, this probably equated to their gross profit. The cost of analysis is negligible and it protects crop profit.

### *Varietal selection*

The results of the variety trial at all stages of the production will assist growers in their selection of growing material for the coming season. An important financial consideration, especially if they are forced to change to new and for them unknown varieties due to material availability and change in purchasing trends such as coloured and glitter.