Poinsettia unrooted cuttings enjoy significantly improved postharvest quality when treated with EthylBloc™ ethylene-action inhibitor during shipping.

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Introduction

Successful poinsettia propagation often rests on the postharvest quality of unrooted cuttings (URC) received from offshore locations. Shipment to North America or Europe typically involves 72 to 96 hours in conditions including darkness, temperature extremes and constant vibration. While challenging in themselves, shipping conditions are complicated further by exposure to ethylene gas that occurs during transport.

While poinsettia sensitivity to ethylene varies, many cultivars are very ethylene sensitive. Ethylene production in unrooted cuttings is heightened by the cutting harvest itself. Production of this gaseous plant hormone then intensifies under shipping conditions, building up in shipping bags and boxes to increase harmful ethylene levels even more

Exposure of poinsettia unrooted cuttings to ethylene during shipping typically causes some initial yellowing and leaf abscission. This is followed by more substantial leaf drop during the initial course of propagation. Leaf drop not only reduces rooting performance but also puts cuttings at risk of secondary botrytis infection, impacting survival and eventual success of young plant production.

Objective

The objective of this study was to determine how treatment with EthylBloc™ 1-MCP technology (active ingredient 1-methylcyclopropene) during shipping could improve postharvest cutting quality, reduce ethylene-induced leaf drop, and increase propagation success of ethylene-sensitive poinsettia cultivars.

Materials & Methods

Poinsettia shoot-tip cuttings from four different cultivars with various ethylene sensitivities were harvested at an offshore production location in Guatemala. Cultivars harvested for the study were: 'Prestige Red', 'Freedom Early Red', 'Snow Cap White' and 'Classic Red'. A total of 2,000 cuttings were harvested.

The harvested cuttings were packed in 100s in perforated bags for shipping in two boxes (1,000 cuttings per box). A larger, sealable outer bag was placed inside each of the empty shipping boxes. A frozen ice pack, surrounded by cardboard to protect against direct contact with cuttings, was then placed in each outer bag as a center divider. The perforated bags of unrooted cuttings were then divided and placed into the sealable outer bag in each box, with half on each side of the cardboard divider.

One box then received two 2.5-gram EthylBloc™ Sachets inside the sealable outer bag (one placed to the center left and one to the center right). The control box did not receive EthylBloc™ Sachet treatment. With the exception of EthylBloc™ Sachets, the two boxes were packed in an identical manner. Both outer bags were then sealed, and the shipping boxes were closed and sealed.

The two boxes were then shipped from Guatemala to the Oasis Grower Solutions RI&D (Research, Innovation & Development) facility in Kent, Ohio, USA. On arrival, the cuttings were unpacked and propagated in OASIS® Wedge® engineered foam substrate strips.

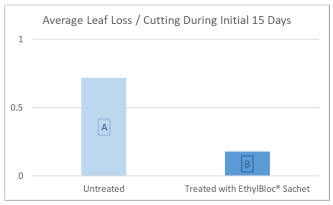
Observations & Analysis

EthylBloc™ ethyl-action inhibitor works naturally with plants by binding ethylene receptors. Application of this technology protects unrooted cuttings from both internal and external ethylene during the shipping process.

To assess the impact of EthylBloc™ 1-MCP technology treatment on poinsettia unrooted cuttings, leaf drop was evaluated and recorded for both treated cuttings and controls at 15 days after propagation. In addition, rooting response in the treated and control groups was evaluated and recorded 27 days after sticking. The data was analyzed using ANOVA/MANOVA.

During the initial 15 days after sticking, untreated controls averaged almost one leaf lost per cutting. EthylBloc™-treated cuttings displayed minimal or no leaf drop. Rooting response in poinsettia cuttings treated with EthylBloc™ during shipping was neither inhibited nor delayed, with treated cuttings showing robust rooting development. Data for what were determined to be the study's two most ethylene-sensitive cultivars, 'Prestige Red' and 'Freedom Early Red', are presented in Fig. 1 and Fig. 2 as follows:

Fig. 1 Effect of EthylBloc™ treatment on leaf abscission and rooting performance of Poinsettia 'Prestige Red' cuttings. EthylBloc™ completely minimized leaf abscission and had no negative impact on rooting response.



'Prestige Red' Leaf loss during initial 15 days after sticking

No treatment

Treated with Ethylbloc™ Sachet

Fig. 2 Effect of EthylBloc™ treatment on leaf abscission and rooting performance of Poinsettia 'Freedom Early Red' cuttings. EthylBloc™ completely minimized leaf abscission and had no negative impact on rooting response.

'Freedom Early Red' Leaf loss during initial 15 days after sticking

No treatment

Treated with Ethylbloc™ Sachet

Conclusions

EthylBloc™ with 1-MCP Technology significantly inhibits and reduces leaf drop in ethylene-sensitive poinsettia cultivars, thereby improving postharvest cutting quality and rooting response. Among the four poinsettia cultivars tested in this study, ethylene sensitivity varied.

As noted above, 'Prestige Red' and 'Freedom Early Red' were found to be very ethylene sensitive. 'Snow Cap White' was found to be moderately sensitive, and 'Classic Red' was least sensitive to ethylene. Treatment with EthylBloc™ 1-MCP technology had no negative impact on rooting performance.

For best results, it is noted that EthylBloc™ treatment should be applied as soon as possible after cuttings are harvested. In addition, although EthylBloc™ irreversibly binds ethylene receptors and inhibits ethylene action, vegetative cuttings keep generating new ethylene receptors. Therefore, it is important to reapply EthylBloc™ if the cuttings are repackaged or if the storage is prolonged.

Even after applying EthylBloc™ treatment, it is imperative to continue to follow best practices to manage the temperature and moisture content of cuttings and prevent deterioration.