Amending Soilless Substrate with Calcined versus Pasteurized Clays for Production of Poinsettias

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Introduction

The USDA CSREES supports research that prevents and mitigates pollution from agricultural practices. Meanwhile, the U.S. Environmental Protection Agency (EPA) has set national safety standards for over 80 contaminants that may occur in drinking water. These contaminants include nitrate and phosphate, which are required in relatively large amounts during crop production. Aligned with these efforts, the objective of this study was to evaluate the effects of several clays added to container substrate as to their effects on poinsettia production and container leachate.

Materials and Methods

A greenhouse study was conducted in 2005 with 'Prestige' poinsettia grown in a commercial substrate used alone or amended (10% v/v) with attapulgite-type clay from Taft, CA (non-calcined/ pasteurized), Ochlocknee, GA (calcined) or Ripley, MS (calcined). A randomized complete block design was used with 14 plants per treatment. A controlled release fertilizer (Osmocote 19-6-12, 3-4 mo.) was the sole nutrient source. Leachate was collected at each irrigation using the pour through method and analyzed.

Outcomes and Impact

Plants grown with the CA clay were shorter and accumulated less biomass (Fig. 1 and table below). Electrical conductivity (EC) of leachate from this treatment was extremely high (dS/m) at the beginning of the study (Fig. 2) and did not drop to within a normal range until crop finish. Thus, at the rate tested, the non-calcined CA clay was unacceptable based on plant growth and leachate quality perspectives for open irrigation systems. Although biomass production was no higher with the GA clay than without clay, the GA clay resulted in the lowest average leachate EC level during crop production (Fig. 2).

Data suggest that certain clays can be used to reduce nutrient loss from production facilities with open, non-recycling irrigation systems.

Figure 1. Finished plants of 'Prestige' poinsettia with substrate amended (10% v/v) with attapulgite-type clays from (l.-r.) Taft, CA (pasteurized), Ochlocknee, GA (calcined), Ripley, MS (calcined) and peat-based substrate (control).

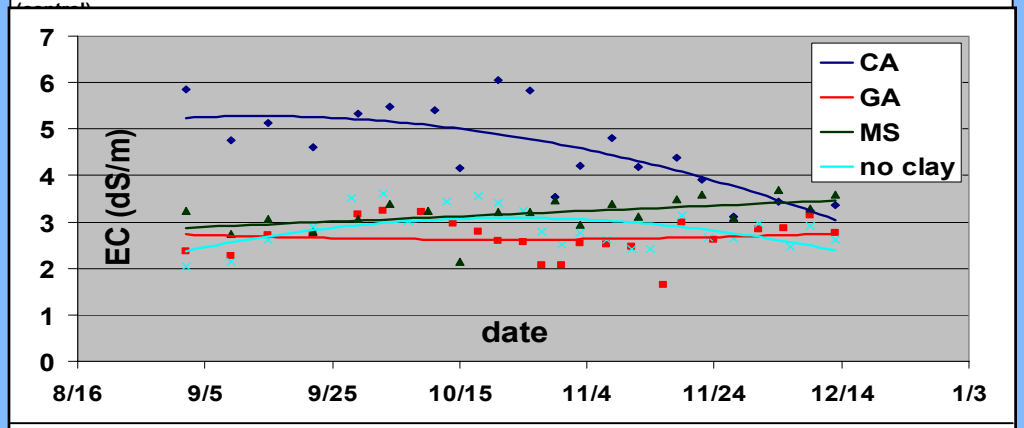

Fig. 2. Electrical conductivity of leachate from containers.

'Prestige' poinsettia final growth data.

treatment	plant height (cm)	shoot dry wt. (g)
CA	41.0	52.3
GA	43.6	62.0
MS	43.6	55.7
no clay	43.5	59.4
lsd (0.05)	1.9	4.0

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