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Banding fertilizer in celery yields multiple benefits

BY ALAN WRIGHT, VICTOR GUZMAN, DAVID SUI AND RONALD RICE

Celery is an important winter crop in south Florida, with about 2,000 acres in production annually on the muck soils of the Everglades Agricultural Area.

Celery is first seeded and established in growhouses, then transplanted into fields about 10 to 12 weeks after germination. Celery is grown on muck soils high in nitrogen but often low in essential phosphorus and potassium, as well as micronutrients. So supplemental fertilization is essential.

With increasing fertilizer costs, it is important to maximum fertilizer use efficiency and minimize over-application. Scientists and Extension agents with the Everglades Research & Education Center and Palm Beach County Extension are working to develop new management strategies to optimize fertilizer inputs for celery.

Historically, broadcast was the best way to apply fertilizers because the celery's extensive root system is efficient at taking up nutrients. Soil pH also was lower, and phosphorus fixation to soil was not a major problem when the university developed its original celery fertilizer recommendations.

Due to the agricultural draining of muck soils and subsequent oxidation, soil conditions have changed considerably. The primary results are increased pH, which decreases nutrient availability to crops, particularly phosphorus and micronutrients. Issues associated with high soil pH include greater retention of nutrients in forms that are unavailable to plants. Therefore, the current recommendations may underestimate phosphorus requirements.



Foliar fertilization of seedlings at the pre-transplant stage and banding show promise in reducing fertilizer rates.

Along with fertilizer rate studies, different application methods hold promise for further reducing field nutrient requirements.

One method is seedling foliar fertilization at the pre-transplant stage. Seedlings established in flats are treated with overhead irrigation that contains a small amount of fertilizer to enhance nutrient uptake and promote nutrient accumulation in the rootball.

The potential benefits of accumulated nutrients carrying over into the field are decreases in field phosphorus requirements. Several years of studies have shown that seedling fertilization significantly increased seedling growth and vigor, but did not reduce the need for field-applied fertilizer.

Banding fertilizers within a few inches adjacent to rows has shown a marked improvement compared with broadcasting, which results in fertilizer placement across the entire field. For the past two years, banding phosphorus at one-half the broadcast rate produced an equivalent yield to the current recommended broadcast rate.

The emerging data suggest that phosphorus fertilizer requirements for celery may be cut in half with banded application methods. Due to rising fertilizer costs, the savings to growers can be considerable. This also has an added benefit of reducing potential nutrient runoff from agricultural fields into drainage ditches and canals, and ultimately into Everglades wetlands.

Alan Wright is an assistant professor of soil and water science at the Everglades Research and Education Center in Belle Glade. Victor Guzman is professor emeritus at EREC. David Sui and Ronald Rice are Extension agents at Palm Beach County Extension in Belle Glade.