Growth, Development, and Yield of Taro Plants Treated with Controlled and Fast Release Nitrogen Fertilizers

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Core Ideas
- Nitrogen sources affects the growth, development, and yield of taro plants.
- Nitrogen availability affects taro physiology.
- Changes in soil pH influences taro yield.

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Abstract

There is a scarcity of information on the influence of different N sources on the physiology of taro [Colocasia esculenta (L.) Schott] plants. Hence, this article investigates the effects of controlled release (CR) and fast release (FR) N fertilizers on the growth, development, and yield of taro in Trinidad and Tobago. A factorial experiment in randomized complete block design with three replications was conducted. Four N treatments (at 100 kg N ha⁻¹ rate), three harvest dates, and two sites (Mt. Hope and Orange Grove) were the experimental factors examined. The results showed that FR N fertilizers produced optimum taro heights and chlorophyll indices (CI) throughout the growing season. Also, FR N fertilizers produced optimum leaf blade yield (LY) at 2 and 6 months after planting (MAP). At 4 MAP, CR produced optimum LY in Orange Grove whereas FR N fertilizers produced optimum LY in Mt. Hope. Fast release N fertilizers produced optimum petiole yield (PY) throughout the growing season. At 2 MAP, CR and FR N fertilizers produced optimum corms yield (CY) in Mt. Hope and Orange Grove, respectively. At 4 MAP, optimum CY was attained as a result of FR fertilizers whereas CR N fertilizers produced optimum CY at 6 MAP. Therefore, the application of FR fertilizers enhanced LY and PY whereas CR fertilizers produced optimum CY at harvest.

Abbreviations: CI, chlorophyll indices; CR, controlled release; CY, corms yield; FR, fast release; LY, leaf blade yield; MAP, months after planting; PY, petiole yield; TT, Trinidad and Tobago.

Taro [Colocasia esculenta (L.) Schott] was present during mesolithic times making it one of the oldest domesticated crops (Rao et al., 2010). It is found nowadays in Australia, Bangladesh, Brazil, Nigeria, Hawaii, Samoa, and Trinidad and Tobago (TT). Hence, its distribution spans almost all continents from Africa, Asia, South America, Oceania, and the Caribbean (Akwee et al., 2015). Taro is mainly grown in TT for its economic and nutritional importance (Mohammed, 2013). However, the production of taro in TT has declined while its importation from other Caribbean countries has increased (Lovendal et al., 2007). From 2007 to 2012, wholesale markets in TT imported twice as much taro, than taro produced locally, which further highlighted the fact that current taro productions in TT are not sufficient to support the local markets. Furthermore, TT is ranked third behind the United States and Japan as the world’s top importers of taro (Mohammed, 2013). Subsequently, the cost of taro has gradually increased during the past few years.

Taro is mainly grown in the wet season to avoid the adverse impact of the dry season, which accelerates shoot senescence before it reaches maturity (Onwueme, 1999). Apart from a few countries that use specialized irrigated fields in low lying areas to grow taro,