

Pima Cotton Nitrogen Management, Uptake, Removal – Impacts of Varieties, Subsurface Drip and Furrow Irrigation

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Abstract

Over the past three decades, California cotton production has shifted from nearly all acreage being planted with specialized Upland cotton varieties (the sub-group of high-quality Uplands called “Acala” cotton) to Pima cotton. For the past 10+ years, over 70% of California’s cotton acreage has been planted with Pima cotton varieties, with recent years reaching over 85% of total acreage in Pima. As a premium-quality cotton, Pima commands a significantly higher price than Acala or non-Acala Upland cotton, so Pima is likely the type of cotton most producers will plant in future years. However, it requires a 2-3 week longer growing season than most Acala varieties, and there are known differences in sensitivity to insect pests, impacts of plant water stress on fruiting, and plant responses to management practices such as use of plant growth regulators (Kerby et al., 1994; Hutmacher et al., 2004). Silvertooth and Norton (2011), Unruh and Silvertooth (1996) in Arizona and some unpublished CA studies have demonstrated that petiole nitrate guideline recommendations for Pima differ greatly from those developed for Upland cotton. Due to the fact of these known differences in multiple plant characteristics between prevailing Upland versus Pima varieties, we believe separate studies are warranted. More Pima-specific information would assist in efforts to fine-tune nitrogen (N) management practices, avoid negative impacts associated with inadequate or excess N applications, and provide improved N removal estimates to be used in N management plans for CA producers.

Project Objectives

1. Evaluate high-yield potential Pima cotton for impacts of N application amount, variety and irrigation method on total plant N uptake and harvest removal
2. Utilize three grower farm sites with moderate to high yield potential, using multiple Pima varieties and representing different soil types to determine total aboveground plant N uptake at early open-boll timing, and N removal with harvest (measured as N content of seed, lint, gin trash, measured separately) to better understand Pima N requirements
3. As information is developed in the study, present information to appropriate grower groups, consultants and industry to give opportunities for feedback and to refine concepts of workable changes in N management approaches