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### FUELING THE GROWTH OF COTTON

**Successful cotton growers must be well acquainted with their fields.** Nothing can substitute for learning the language of the crop in the field and how to interpret these messages. Optimizing cotton production and profit requires close attention to all inputs and an understanding of cotton development, soil conditions, and plant tissue analysis.

**Cotton's negative reputation for being taxing on soil is quite incorrect.** This myth originated from the lack of nutrient inputs provided to continuously grown cotton in the 1800s—resulting in a steady soil fertility decline. Early farmers recognized that cotton tolerated relatively infertile soils, so they applied manure and nutrients to other, more nutrient-demanding crops. In doing so, yields gradually declined where cotton was continuously planted without replenishing the nutrients.

**Modern cotton production requires an adequate supply of all the essential nutrients for top yields.** With Acala varieties, approximately 50 to 67% of the final dry weight of the aboveground dry matter is in the boll. Cotton is grown primarily for lint, which is composed of 95 to 98% cellulose and 1% minerals. Cotton lint is 99% composed of carbon, hydrogen, and oxygen—constituents derived from air and water. However, cottonseed removes a considerable amount of nutrients. The leaves and stems also contain sizable amounts of nutrients required to support the growth of the boll.

**Here's why potassium and phosphorus are key nutrients for achieving top cotton production.**

**Potassium: Absorbed by the root as a K<sup>+</sup> ion, potassium is required throughout the season for plant growth.** By the end of the season, 65 to 75% of the total plant potassium is in the boll—demonstrating that the fruit is the strongest sink for plant potassium. Potassium is mobile in the plant, so leaf deficiency symptoms would be expected to appear first in the older leaves. However under field conditions, deficiency symptoms frequently appear on newer leaves on the top-third of the plant, with the severity related to the demand from the developing boll.

**Potassium requirements are closely related to the boll load.** It is estimated that during rapid boll fill, potassium uptake rates can exceed 2 to 3 pounds per acre per day. If soil supplies of potassium run low, leaves are drained of nutrients and lint yield is reduced.

**Phosphorus: Cotton is quite efficient at recovering phosphorus from the soil and has a continual demand for phosphorus throughout the entire growing season.** Plant sufficiency should be estimated by soil testing prior to planting and followed with petiole monitoring during the growing season. Over two-thirds of the phosphorus is found in the bolls at the end of the season. Although phosphorus is needed in significant quantities by cotton, the requirement is often met by proper fertilization of rotational crops in the same field.

**Balanced nutrition is as essential for cotton as it is for all crops.** Any plant nutrient that is marginal or low in the soil must be applied as part of an overall crop nutrition program.

**A new publication from PPI titled *Be Your Own Cotton Doctor* offers growers and their advisers and consultants a new tool.** The 8-page booklet features 40 color illustrations showing typical symptoms of nutrient deficiencies, toxicities, diseases, and other disorders in cotton production. It is available through the website: >[www.ppi-ppic.org](http://www.ppi-ppic.org)<. Or call the Circulation Department at (770) 825-8082.

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Note: *Agri-Briefs* are available online at the PPI website: [www.ppi-ppic.org/agri-briefs](http://www.ppi-ppic.org/agri-briefs)