

AREA TEMÁTICA: FISILOGIA VEGETAL

025 - STARCH STORED IN STEM AND ROOT OF COTTON PLANTS FROM PLANTING TO HARVEST

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Resumo:

Cotton plants in tropical environment are able to survive after harvest and create problems for management of pests and diseases. However, killing the plant is challenging because after harvesting the plant has reduced leaf surface for absorbing herbicides and slow physiological activity. A new approach is proposed for tackling the problem of cotton crop residues destruction. Cotton plants depend on stored carbohydrates to survive along the dry season and to sprout when environment conditions become favorable. The plant would not survive without such carbohydrate reserves. The plant would not survive if the starch reserves were depleted at harvesting time. This study was performed with the objective of monitoring the carbohydrate content along the cropping season. Samples were collected in a regular cotton field in the Experimental Farm of Fundação BA (Luis Eduardo Magalhães, BA, Brazil) in the 2014-2015 cropping season. Cotton plants were pulled from the soil (dug when required), and the samples were composed of a 20 cm segment with 10 cm of taproot and 10 cm of the stem. The material was collected every 10 days, from plant emergence (10 DAP) to after harvesting (240 DAP) when soil was dry and the canopy had been chopped. Crop management was regular with all the practices employed for cotton production in the region. The samples were oven-dried, ground, and the content of starch, sucrose, glucose, and fructose were measured with Megazyme® kits (K-TSTA and K-SURFRG). From seedling up to 40 days after emergence (DAE), which corresponds to the pre-flowering phases of plant development, the total carbohydrates content was stable around 3.2% of the tissue dry weight. From 50 to 100 DAE, corresponding to the phases of flowering and fruit filling the total carbohydrates content increased to approximately 9% of the tissue dry weight. After 110 DAE, corresponding to the phases of fruit maturation, crop termination, harvest, and canopy removal, the total carbohydrates had peaks of 15% of the tissue dry weight, and it diminished slowly during the dry season. The harvest occurred around 150 DAE, and from then up to 240 DAE, the plants were exposed to stressful conditions (very hot and dry) and the stored carbohydrates in the cotton taproot and stems remained as high as 11.5% of the tissue dry weight. Soluble sugars (sucrose, glucose, and fructose) are important storing carbohydrates in the early crop development. After 40 DAE, starch is by far the most important carbohydrate stored in the roots and stems. After 50 DAE, starch corresponds on average to 90% of the total carbohydrate stored in that part of the plant. In conclusion, it was found that after fruit maturation, cotton plants stored plenty of carbohydrates (especially starch) to survive the dry season and support sprout and regrowth when environmental conditions become favorable.

Palavras-chave:

Crop management, Plant physiology, Stored reserves