



Manipulation of vegetative growth and improvement of yield potential of cashew (*Anacardium occidentale* L.) by Paclobutrazol

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ABSTRACT

Cashew (*Anacardium occidentale* L.) is a perennial tree crop that realizes yield after several years of planting due to its long gestation period. Therefore, canopy management by pruning in later stages of growth often affects orchard life and performance of trees. High density planting system (HDP) has been attempted in cashew to obtain early benefits in terms of yield during initial years of planting. Under HDP, maintenance of tree and canopy growth becomes important due to closer spacing and shading of canopy of trees. In cashew, due to non availability of dwarf clones and dwarfing rootstocks, use of growth retardants, paclobutrazol (PBZ), assumes importance. Hence, this study was aimed to evaluate the morpho-physiological responses of cashew to PBZ treatments under field trials. PBZ treatments resulted in reduced vegetative growth and enhanced reproductive growth with most striking responses at PBZ 3 g a.i./tree treatment. PBZ treatments altered cashew tree physiology by modifying tree size, canopy growth, internodal length, branching pattern and overall ground coverage of the tree. Higher total leaf chlorophyll content, better photo assimilation and enhanced leaf photosynthesis contributed in inducing early flowering and development of more flowering panicles with perfect flowers. Enhanced fruit set and increased number of nuts/m² canopy contributed in yield increment. Regression analysis showed leaf pigments, nut number and number of inflorescence as the most contributing traits for yield enhancement under PBZ. These findings may highlight the exploitation of morpho-physiological traits for better canopy growth and yield maximization by PBZ in cashew under the HDP.

1. Introduction

The cashew (*Anacardium occidentale* L.) was introduced to other parts of the world from Brazil including India during the 16th century mainly for afforestation and soil conservation purpose being a hardy crop. However, cashew has earned a commendable position in the global market as a major foreign exchange earner from its initial beginning as a wasteland crop to control soil erosion and reclamation of degraded land. Cashew belongs to the family *Anacardiaceae* including 60 genera and 400 species of trees and shrubs. Other important tree and nut crops from the same family are mango (*Mangifera indica* L.) from North East India and Myanmar and pistachio nut (*Pistacia vera* L.) from Iran and Central Asia.

The area under Indian cashew cultivation is about 9.82 lakh ha and Indian cashew nut production has shown steady growth to the extent of 4.4% over the five decades (Anonymous, 2014). This can be attributed to several factors such as release of varieties with good agronomical

traits, adoption of proper crop management practices and adoption of improved cultivation technologies, including the high density planting (HDP) system for enhanced cashew nut production. Indian cashew occupies a commendable position in the global market with 20% and 16% share in terms of the area and raw nut production. Being an important horticultural and export oriented crop, Indian cashew earns about \$580740, 000 USD per annum through export of cashew kernel globally (Anonymous, 2019). The cashew industry plays a major role in rural economy by employment generation to millions of people including women through processing industries and other allied activities. However, the present domestic production of raw nut is not enough to meet the demand of cashew industry with a processing capacity of two million tons per annum. Hence, India relies heavily on the import of raw nuts from other producing countries including Africa and South East Asia for almost half of their requirements for several decades. Over the decades, the import rate has gone up to 9.71% with only 4.45% as domestic raw nut production (Anonymous, 2014). There is an urgent

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