

Effect of cultural practices and selected chemicals on flowering and fruit production in some mango (*Mangifera indica* L.) cultivars.

By

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“He is like a tree planted by streams of water,
which yields its fruit in season and whose leaf
does not wither.” Psalms 1:3

*I dedicate this thesis to the almighty GOD who,
through his mercifulness, allowed me to reach
the level I am now.*

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**EFFECT OF CULTURAL PRACTICES AND SELECTED
CHEMICALS ON FLOWERING AND FRUIT PRODUCTION IN
SOME MANGO (*Mangifera indica* L.) CULTIVARS.**

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ABSTRACT

Although mango (*Mangifera indica* L.) has been studied for many years, numerous problems still elude researchers. The objectives of the current trials were to study the effects of some cultural practices (fruit thinning, panicle/ bud/ renewal/ post-harvest pruning) and chemicals (Corasil.E, potassium nitrate/urea, paclobutrazol) on various vegetative, floral, yield and quality parameters. The study meant to address problems of both South African and Ethiopian mango growers. The thinning (on ‘Sensation’) and pruning (on ‘Tommy Atkins’ and ‘Keitt’) experiments were conducted for two seasons (2001-2003) at Bavaria Fruit Estate in South Africa. Effects of Paclobutrazol and Potassium nitrate were studied on ‘Tommy Atkins’ during 2002-2003 season at Upper Awash Agro-industry Enterprise in Ethiopia. Complementary effects of paclobutrazol and potassium nitrate on floral induction were studied in growth

chamber experiments at the experimental farm of University of Pretoria on ‘Tommy Atkins’ and ‘Keitt’ mango.

Where fruit on ‘Sensation’ were thinned to one and two fruit per panicle, a significant increase was obtained for most of the fruit quantitative parameters. The treatments where one fruit and two fruit per panicle were retained and 50% panicles removed, produced a significant increase in size of the fruit, fruit qualitative parameters and fruit retention percentage. Corasil.E produced very small sized fruit with a considerable percentage of “mules” (fruit without seed). Trees subjected to severe thinning intensities showed earlier revival of starch reserves and better vegetative growth.

Applications of paclobutrazol (1- (4-chlorophenyl) –4,4-dimethyl-2- (1,2,4- triazol-1-yl) pentan-3-ol) at rates of 5.50 and 8.25 g a.i. per tree, both as a soil drench and spray applications, on ‘Tommy Atkins’ mango were effective in suppressing vegetative growth as compared to the control. Consequently, the trees from these treatments had higher total non-structural carbohydrate in their shoots before flowering which led to higher results of percentages of shoots flowering, number of panicles produced, percentages of hermaphrodite flowers, yield and quality of the fruit.

Trees that received panicle pruning (during full bloom) treatment at the point of apical bud attachment, were observed to be induced for synchronized re-flowering and also attained more fruit per panicle. On the other hand, trees on which renewal pruning (early in the season) and post-harvest pruning (especially for early cultivars) treatments were applied, have been observed for the development of an adequate

number of productive inflorescences. Post-harvest pruning treatments also resulted in greater vegetative growth on both cultivars. The responses to pruning treatments were greater especially in 'Tommy Atkins' than 'Keitt'.

The trend for the interaction of duration and chemicals in Tommy Atkins and Keitt mango cultivars revealed the possible floral induction complementary effect of PBZ after the trees were induced only for 15 days at 10/15 °C temperature. Higher potassium nitrate concentrations especially in combination with urea (5 litre solution of 4% KNO_3 +0.5 g urea tree⁻¹ and 5 litres of 4% KNO_3 +1 g urea tree⁻¹) produced higher results for most of the flowering and yield parameters in 'Tommy Atkins'.

Key words: apical bud, apical whorl of leaves, cold units, fruit per panicle, fruit quality, fruit quantity, fruit thinning, mango, paclobutrazol, potassium nitrate, total-non-structural carbohydrate, urea