Int.J.Curr.Microbiol.App.Sci (2017) *6*(3): 500-509

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 3 (2017) pp. 500-509**
Journal homepage: http://www.ijcmas.com

Review Article https://doi.org/10.20546/ijcmas.2017.603.058

Source-Sink Relationship in Litchi verses Mango: A Concept

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Keywords

Carbohydrates, Flushing, Girdling, Photo-assimilate, Source, Sink.

Article Info

Accepted:
10 February 2017
Available Online:
10 March 2017

A B S T R A C T

In fruit production, the effects of flowering and fruiting, which modify source-sink relationships, cannot be overlooked and is even more true in tropical fruit production, where the flowering and fruiting phases exceed six months at the individual tree scale. More specifically, little is known about the effects of source/sink balance, and the associated changes in carbon export rate from leaves and leaf carbohydrate concentration, like the ones resulting from the presence of developing fruits, on leaf nitrogen and photosynthetic capacity within the crown of field-growing trees. The amount of carbohydrates supplied to tree fruits depends on the amount produced by leaf photosynthesis, on sink demand and on the availability of the reserve pool. Also, from the point of view of fruit quality, it is essential to understand how pre-harvest factors influence source-sink relationships involved in fruit growth. The intra-plant variation in flushing and shoot growth pattern influences the overall floriferousness of the litchi plants. The inability of shoots emerging after harvest from the fruiting terminals to bear fruits in the next spring was probably due to depletion of food reserves in the supporting tissues as a result of which the new shoots could not mature enough in time to differentiate to flower buds for the next crop. The major role of translocated assimilates from other plant parts in fulfilling the assimilate fruits in litchi where current photosynthesis contributes partially towards assimilate demand. The mango fruit size increased with increasing leaf-to-fruit ratio. In addition, to produce larger fruit at harvest on branches with the highest leaf-to-fruit ratio, changing carbohydrate supply to the fruit increased the proportion of fresh mass in the flesh to the rest of the fruit.

Introduction

Fruit trees exhibit two major multiannual reproductive strategies (Goldschmidt, 2013). First the regular bearer one, the amount of fruit produced allows a sufficient amount of vegetative growth to support production of an ample number of flowers during the following year (return bloom). They are characterized by a relatively stable multiannual yield, and usually possess efficient mechanism(s) to control excess fruit production. In the biennial bearer ones, that bears a heavy fruit load (ON-Crop) in one year, which inhibits return bloom and vegetative growth the next year (Monselise and Goldschmidt, 1982) i.e. second year is characterized by low yield (OFF-Crop) and high vegetative growth and they are usually characterized by low self-thinning ability (Goldschmidt, 2013).

Alternate bearer cultivars present a serious economic problem to fruit growers. Therefore, proper canopy management is