

Chapter 6

Conclusion

The effects of everbearing mango rootstock (Choke Anan) and Kaew on 3 scion cultivars namely 'Pim Sen Mun', 'Khiew Sawoey' and 'Nam Dok Mai' were studied on the following parameters: vegetative growth and development, flowering, fruit-setting, fruit production, fruit quality, chlorophyll content, photosynthetic rate, stomatal behavior of leaves, changing in carbohydrate, mineral nutrients, gibberellin-like substances of terminal shoots during the 4 stages of inflorescence development (which corresponding to mature shoot stage, bud-break, inflorescence 3-4 cm long and the inflorescence 10-12 cm long) and cytokinins content in xylem exudate. This studied was conducted in the experimental plots at Department of Horticulture, Faculty of Agriculture, Chiang Mai University, in Chiang Mai during May 1998 to April 2000. The results of the study were summarized in Table 6.1 and as followed:

1. Nam Dok Mai and Khiew Sawoey on Choke Anan rootstock had higher percentage of flowering, total numbers of flowering, fruit weight, stomata width and the C/N ratio of leaves in the 3rd stage of inflorescence development than on Kaew rootstock. While Nam Dok Mai on Kaew had higher ratio of male to perfect flower, gibberellin-like substances in the 2nd and the 4th stages of inflorescence development and the average gibberellin-like substances in the terminal shoots, and the C/N ratio of terminal shoots in the 1st to the 3rd stage of inflorescence development than on Choke Anan but lower total soluble solids (TSS) in the fruits. Whereas Khiew Sawoey and Pim Sen Mun on Choke Anan had higher phosphorous level of leaves, the average gibberellin-like substances of terminal shoots and the width of new leaves than on Kaew but shorter new shoots length.

2. Choke Anan rootstock caused the scions to have higher net photosynthetic rate, stomatal density, the amount of total non-structural carbohydrate (TNC) of leaves in all 4 stages of inflorescence development, the potassium level of leaves of scions and the zeatin/zeatin riboside (Z/ZR) level in xylem exudate than on Kaew.

3. There were no effect of rootstocks on stem height, canopy width and stem diameter growth rate, percentage of shooting, total numbers of shooting, number of leaves per new shoot, percentage of fruit setting, number of fruits per tree, titratable acid (TA), amount of chlorophyll

a and b of leaves, dry weight of roots, stems, leaves and whole plants, amount of reducing sugar (RS) of leaves and terminal shoots, amount of TNC of terminal shoots, total nitrogen (TN), calcium, and magnesium level of leaves of scions and N⁶-(δ^2 -Isopentenyl) adenine/ N⁶-(δ^2 -Isopentenyl) adenosine (iP/iPA) level in xylem exudate of the stocks

4. The result of the study on the stomatal behavior of scions by Silicone rubber impression technique showed that the stomata of Pim Sen Mun and Nam Dok Mai on Choke Anan opened widest at 9.30 a.m., while Pim Sen Mun on Kaew and Khiew Sawoey on Choke Anan opened widest at 10.30 a.m. Whereas Nam Dok Mai and Khiew Sawoey on Kaew open widest at 13.30 p.m. and 16.30 p.m., respectively. Stomata of all scions on the two rootstocks closed at 12.30 p.m. and opened wider at 13.30 p.m., then closed again at 18.30 p.m. Another method of measuring stomata behavior was by using mixed solvents in the Infiltration Technique. Leaves of the scions on Kaew rootstock required more time for the solvents to penetrate than those on Choke Anan which indicated a smaller stomatal opening and lower density.

5. The amounts of TNC, RS and potassium of the leaves were decreased from the 1st stage to the 4th stage. The amount of TNC of the terminal shoots were low in the 1st stage, increased in the 2nd stage and constant in the 3rd and 4th stages, while the RS of the terminal shoots were increased from the 1st stage to the 4th stage. The amount of TN of leaves and terminal shoots were decreased from the 1st stage and to the lowest in the 2nd stage, then increased in the 3rd to the 4th stage. The C/N ratio of leaves and terminal shoots were increased from the 1st stage to the highest in the 2nd stage, then decreased in the 3rd to the 4th stage. While the content of GA-like substances of the terminal shoots of all scion-rootstock combinations were increased from the 1st to the 4th stage.

6. The impact of severe climatic variability of 'El Niño' (from June to September 1998) and 'La Niña' condition (from June to September 1999) showed that, the rate of height, canopy width, stem diameter and percentage of new shoots of all scion-rootstock combinations were definitely higher during 'El Niño' than 'La Niña' condition. During 'El Niño' condition, almost all scion-rootstock combinations had off-season flowering from May to November 1998; especially, Nam Dok Mai on Choke Anan which had the highest percentage of flowering. Only Khiew Sawoey on Kaew had no off-season flowering. Whereas during 'La Niña' condition, there were no off-season flowering in all scion-rootstock combinations.

It was concluded that, the everbearing mango rootstock 'Choke Anan' had significantly influenced on physiological properties and flowering of the scions; especially, on improving off-season flowering during 'El Niño' condition, the normal season flowering and the fruit-quality of 'Nam Dok Mai' and 'Khiew Sawoey' scions.

Table 6.1 (continued)

Parameters	Rootstocks				Scions				Interaction (scions-rootstocks)				CV (%)		
	Kaew		Choke Anan		Pim Sen Mun		Nam Dok Mai		Pim Sen Mun/ Kaew		Choke Anan / Kaew			Nam Dok Mai / Choke Anan	
	ns	a	ns	a	b	a	ns	c	ns	ns	ns	ns		ns	ns
9.9. Level of nitrogen of leaves	ns	ns	ns	a	b	a	ns	c	ns	ns	ns	ns	ns	ns	
9.10. Level of phosphorous of leaves	b	a	b	b	b	a	b	c	c	b	b	d	d	2.02	
9.11. Level of potassium of leaves	b	a	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	4.43	
9.12. Level of calcium of leaves	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	14.85	
9.13. Level of magnesium of leaves	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	11.82	
10. Endogenous hormone															
10.1. GA-like substances in terminal shoots															
stage 1	a	b	ns	b	a	b	b	b	b	b	b	b	b	29.41	
stage 2	ns	ns	ns	b	b	a	a	a	de	c	c	a	b	4.08	
stage 3	b	a	b	a	c	b	b	b	b	a	a	bc	c	4.40	
stage 4	a	b	ns	a	c	b	b	a	a	a	a	a	c	3.71	
average	ns	ns	ns	ns	c	a	d	b	b	a	a	a	c	1.84	
10.2. cytokinin content in xylem exudate															
10.2.1 ZZR level	b	a	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-	
10.2.2 iP/PA level	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-	

Mean with in the same row in the same subtitle with different letter differ significantly at 95% confidence by Duncan's Multiple Range Test (DMRT)

ns = non-significance at 95% confidence

Stages of the terminal shoots' development during the flowering

when; stage 1 = Mature terminal shoots (ready to bud-break)

stage 2 = Bud-break (bud emergence with whitish tip)

stage 3 = Inflorescence 3-4 cm long.

stage 4 = Inflorescence 10-12 cm long.