Pak. J. Agri. ser,
26(3) 278, 1989

A STUDY ON THE BLOOMING AND CROPPING BEHAVIOUR - OF SOME COMMERCIAL CITRUS CUL TIVARS OF THE PUNJAB

Muhammad Ibrahim Chaudl1.ry and Mahmood N. Malik
Department of Horticulrue, University of Agriculture, Faisalabad.

Kinnow mandarin, pineapple sweet orange and sweet lime were studied for their blooming habit and production potential. The data revealed that sweet orange bore the heaviest bloom but only 0.7 percent of that could reach maturity. Sweet lime, although was second but had profuse bloom while 0.4 percent of it could reach to harvesting. Kinnow's bloom was sparse but produced the heaviest crop, giving 19.7 percent mature fruit.

INTRODUCTION

Mandarin, sweet oranges and sweet limes raised in the commercial orchards of the Punjab have different production potentials. - (Reed (1919) that 52 percent of the lemon flower buds set fruit, while only 7 percent of them reached full maturity. Shavit (1956) found that in a normal tree of shamouti orange 15.6 percent buds dropped before they opened, 18.8 percent shed as opened flowers. The percent fruit drop at young stage was 45.1 and only 2.3 to 5.3 percent of the bloom reached to maturity. Erickson and Brannaman (1960) also recorded heavy natural thinning in Washington Navel and Valencia oranges. Monselise (1956) recorded reproductive crop of Washington Navel and Shamouti cvs. of sweet orange and Marsh seedless grape fruit. He reported that only 3 respectively, 3.2 and 2.2 percent crop was harvested of the total bloom. The initial fruit set in these cvs. was 27.3, 59.2 and 48.2 percent, respectively. Flowering and fruiting of some commercial cvs. of the Punjab was hence studied to identify their behaviour.

MATERIALS AND METHODS

Three fuU grown trees of sweet orange (Pineapple cv.), four trees of mandarin (Kinnow cv.) and two of sweet lime (Plaestine cv.) were selected. Average sizes in terms of height and spread of Pineapple trees were -3.75 x 5.75 m, Kinnow, 3.38 x 3.8 m and sweet lime 4 x 6 m. All the experimental trees selected were in good health.

Before blooming, the ground under the selected trees was cleared nicely to drip line so that the dropped flowrs/fruit could be easily seen and may not get splashed in the mud. The count of bloom was started right from the day the first flower appeared and continued until harvesting. The data were coUected for total bloom, sex ratio in flowers, initial fruit set, early fruit drop, June drop, preharvest drop and yield.

RESUL TS AND DISCUSSION

The observations regarding bloom and fruiting behaviour showed quite different pattern in each of the species- studied (Table 1). It was noted that the bloom started in March and ended in April in each cultivar. The heaviest bloom was noted in sweet oranges closely foUowed by sweet lime while Kinnow had quite a sparse bloom. The heaviest drop of unopened flowers (buds) was noted in sweet oranges and sweet lime i.e, 34306 and 2643 buds per tree, respectively. The drop of opened flowers was higher in sweet lime. Kinnow had a small bloom and, very little of it dropped as buds and opened flowers. In sweet lime the predominant flowers were male which were all to drop hence the number of open dropped flowers was higher. During March and April among a large number of the flowers dropped were also with petals abscised and styles intact. The numbr of such drop was again the highest in sweet orange (3818 flowers), followed by Sweet lime (890) and Kinnow (310) per tree. This drop indicated as if defected fruit lets failed to fertilize. It is possible to enhance yield by reducing drop rate at this stage in both sweet oranges and sweet lime. Another heavy drop that occurred during bloom, was of pea sized fruit lets with styles absclsed. It was significant in sweet oranges and Kinnow after apparently, successful accomplishment of fruit setting. This drop was negligible in sweet lime.

Table 1. *Ability to bloom, fruit set and yield of some citrus cultivars*

Observation	Sweet orange (Pineapple) cv.)	Mandarin (Kinnow cv.)	Sweet Lime (Palestine cv.)
	(1)	(2)	(3)
Bloom/tree (buds + opened flowers + frui t drop + yield)	48271	4898	30001
Dropped as buds and flowers	45448	868	29739
Percent dropped	95	18	99
Percent of her ma-prodite flowers	84	99	4
Percent initial frui t set	6	82	1
Number of fruit harvested per tree	317	966	132
Percent fruit harvested	.7	19.7	.4

1. Average of three trees
2. Average of four trees
3. Average of two trees

Table 2 Bloom seasons of commercial citrus cultivars

Time of observation	[illegible] of flower/fruit per tree											
	Buds			Opened flowers			Fruitlets [illegible]			Pea sized fruit		
	1	2	3	1	2	3	1	2	3	1	2	3
March-April	3[illegible],30[illegible]	[illegible],7[illegible]	2[illegible],3	1884 [illegible]2[illegible]5	14 82[illegible]	2[illegible]2[illegible]4 1222[illegible]	3818	310	8[illegible]0	203[illegible]	1[illegible]81	[illegible]0
May-June	315	1[illegible],[illegible]	18	-	-	-	-	-	-	-	-	-
July-August	3	2[illegible]	2	-	-	-	-	-	-	-	-	-
September-October	[illegible]	23[illegible]	132*	-	-	-	-	-	-	-	-	-
Nov-December	3[illegible]*	[illegible]	-	-	-	-	-	-	-	-		
January-February	-	[illegible]*	-	-	-	-	-	-	-	-	-	-

1. Sweet orange cv [illegible]
2. Mandarin cv [illegible]
3. Sweet lime cv [illegible]
4. Male flowers
5. Hermaphrodite flowers
* [illegible]

Fruit drop continued until harvesting. In the months of May and June, Kinnow showed the heaviest fruit drop followed by sweet oranges. while in sweet lime it was very small' i.e; 1945,315 and 18 fruits per tree, respectively. The fruit drop during July and August remained low in sweet oranges but higher in Kinnow. The continued higher fruit drop in Kinnow caused natural thinning. Fruit drop again. rose during September and October in both sweet oranges and Kinnow. This was found mainly due to the attack of fruit fly. The insect was later controlled by sprays of diptrex. In September, sweet limes were harvested. The average fruit number per tree was 132, indicating a very low crop about which it is commonly complained by the farmers. Sweet oranges were harvested in December. The average number produced was 317 fruits tree Kinnow is a late cultivars and was harvested during february. The average number of fruit harvested was 966 tree

Total bloom, total dropped flowers, number of herrnaphrodite flowers, percent initial fruit set and percent harvested fruit is presented in table 2. It was quite evident that the sweet oran,gr (cv Pineapple) gave the heaviest bloom l:e.- 48271 powers tree , followed by Sweet lime with i30,001 flowers tree while Kinnow had only 4898 flowers tree • The heaviest flower drop was, however, in sweet lime, 99 percent, which was due to the predominant number of male flowers, followed by sweet oranges. 95 percent. The percent of hermaphrodite flowers was' 84, 99 and 4.0 in sweet orange, mandarin and sweet lime, respectively. In Kinnow the male flowers appeared by the end of bloom, and sweet orange in the mid bloom period while in sweet lime these were abundant even in the beginning of blooming. Initial fruit set is thought to be having an impact on the final fruit yield. In Kinnow, the intial fruit set wa the highest (82 percent) followed by sweet oranges (6 percent) and sweet lime only 1 percent. The percent crop harvested was the highest in Kinnow, 19.8, followed by sweet oranges, 0.7 and sweet lime 0.4. The studies indicate that there is scope to increase yield in both sweet oranges and sweet lime by minimizing the flower and small fruit drop at appropriate stage.

REFERENCES

Erickson, L.C. and B.L Brannaman. 1960. Abscission of reproductive structures and leaves of orange trees. Proc, Amer. Soc. Hort. Sci. 56 :79-82.

Monselise, S.P. 1986. CitrusCRC Hand Book of fruit set and development. P. 91.

Reed, H.S. 1919. Certain relationship between the flowers and fruit of the lemon. Jour. Agri.Res. 17 : 157-165.

Shavit, A. 1956. An investigation into the process of flower and fruit abscission of Shamouti orange. Bot. 5 : 189-199.