

**EFFECT OF WEEDS ON KINNOW (*Citrus reticulata*)
PRODUCTION IN RURAL AREAS OF TEHSIL SARGODHA,
PAKISTAN**

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ABSTRACT

*This study was carried out in tehsil Sargodha of Pakistan. The major objective of the study was to investigate the effect of different weeds on Kinnow production in the study area. A total of 20 union councils were selected, while randomly ten growers from each union council were chosen making a total of 200 respondents that were interviewed using a questionnaire. Data were collected and analyzed through simple percentage and chi-square techniques. According to the results, 97.5% respondents regarded weeds as a problem in kinnow production in the study area. Among the weeds reported, 64% were broad leaf, 26% grassy and 3% sedges in the orchards of the farming community. Negative association between weeds and per acre production was found significantly at 5% significance level. About 57.5% respondents reported that weeds were present in medium quantity in the field of the respondents. Hoeing, mulching and herbicides applications were observed for control of weeds in the study area while the strength of hoeing by respondents were looked more than the other techniques. On the basis of results, the study suggested careful management of water; quality seed application and proper timely herbicides application for control measures of weeds in citrus orchards for enhancing the kinnow (*Citrus reticulata*) production in the study area.*

Key words: Kinnow production, orchards, Sargodha Pakistan, weeds.

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INTRODUCTION

Fruits are very important for human beings on several accounts and are a rich source of minerals, nutrients, vitamins and enzymes, in addition to having higher medicinal values. For instance, they provide

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protection against cancer of stomach, lung, esophagus, pharynx, oral cavity, pancreas and colon (Sisson, 2002). According to Hanschke (2006), fruits consumption improves the maternal health and enhances the reduction in child mortality along with playing an important role in the uplifting of economy of the farming community.

Pakistan is blessed with ideal climatic conditions for growing of fruits. The best irrigation system of the country ensured that Pakistan may have bumper crops and fruits year around. Citrus is one of the main fruit crops which contribute substantially to the national income. Due to the inherent good quality of taste, foreign fruit vendors generally prefer Kinnow from Pakistan. It has become an important variety in the Punjab province occupying a major part of the area under cultivation for fruit crops i.e. 0.465 million acres in 2009-10 (Agricultural Statistics of Pakistan). Its production has increased overtime. The citrus production in overall Pakistan was 1.898 million tons in 2001 and has increased to 2.150 million tons in 2010 (Agricultural Statistics of Pakistan 2009-10). Among the citrus species and cultivars, Kinnow has distinguishing position for Pakistan. Mahmood and Sheikh (2006) reported that Pakistan contributes 95% of the world total production of Kinnow reticulate variety. Citrus fruit is grown in all four provinces of Pakistan but Punjab produces over 95% of the fruits and 70% under kinnow (PHDEB News-2008).

There are many factors which condense the production of citrus plants and weeds are one of them which lessen the production of Kinnow (Mandarin). Weeds in the orchards fight with trees for nutrients, water and light resulting in stressed plant and poor fruit quality and yield. Weeds also cause problems by contributing to arthropod pest problems, interfering with cultural operations, and increasing frost hazard. Weeds slow down the growth of young trees and increase their susceptibility to insect and disease damage. Moreover, the weeds around the trunks of citrus trees create a favorable environment for pathogen that infect the trunk and root as well as provide shelter for field mice. Excessive weed growth creates high humidity in the foliage that results in increasing disease spread and inviting insects. Weeds therefore reduce the crop production and contribute in future problems through constant increase in weed seed banks. Buker (2005) is of the view that weeds density can affect the vegetative growth, fruit yield and critical periods. The length of critical periods increases as a result of increase in the weeds density. Another potential problem is soil quality and soil moisture. Soil is the medium which facilitates a plant's nutrition, water absorption, and root strength. If soil is of poor quality, the plants' health will reflect this. Soils that are too wet or too dry may certainly cause many problems in which defoliation is a common one. According to Julian (2011), good

weed control is essential for rapid vigorous growth of young citrus trees. Eliminate all existing weeds for several feet around the trees. As a result the spread of the tree will increase, and the grass-free area beyond the tree canopy will widen. Organic mulches are not recommended for citrus trees because of the potential for inducing foot rot disease (Julian, 2011). If mulches are used, at least 12 inches of bare ground should be kept between the tree trunk and the mulch. The herbicides such as Roundup(TM) and Cleanup(TM) are excellent for control of existing weeds and pre-emergent herbicides may be used to prevent weed seeds from germinating (Julian, 2011).

The major objectives of the study were to see the effects of weeds on the production of kinnow in the study area, to assess the methods and techniques used for weeds control, and to enlist the suggestions and recommendations of the farming community for future policy formulation in order to boost the kinnow production in the study area.

MATERIALS AND METHODS

The study area was tehsil Sargodha, which lies in the province of Punjab, Pakistan. Sargodha is famous for the Kinnow production not only in the country but also around the world. On the basis of highest production of kinnow, 20 union councils of tehsil Sargodha were selected for the investigations. In each of the union councils, 10 representative respondents were randomly chosen and were interviewed for many aspects of kinnow production and constraints.

A total of 200 respondents/farmers were thus contacted or interviewed using a questionnaire, as the interview were scheduled and planned in the season of the kinnow production. For data analysis simple percentage and chi square techniques were used. The level of significance was 5%.

RESULTS AND DISCUSSION

Weeds not only negatively affect the yield of the Kinnow productions but also the quality of the fruits is affected. Therefore, its removal is an important issue in the project area. The weeds eat the nutrients from the kinnow plants and make the food deficient for the plants which latter on affect the growth of the plant and reduce the production of the fruits.

Table-1 indicates the presence of weeds by sampled respondents in the sampled area. According to the given Table, 97.5% respondents claimed that the weeds were existed in their field which created a great problem in their kinnow production, while 2.5% respondents reported that there was no weed problem in their fields. So in the project area weeds presence was found higher and its

removal from the field is required for boosting the production of kinnow. Weeds eat food and use water for their survival which distress the production of the kinnow and also make the quality of the kinnow un-standardized and decrease the return of the farmer which latter on influence the purchasing power of the farmers.

Table-2 shows different types of weeds distribution in the kinnow orchards of the sampled respondents in the study area. According to Table-2, 64.5% respondents claimed broad leaf weed, while 26% respondents reported grassy weeds in their orchards of kinnow. The results were found significant indicating that weeds are the main hurdles for reducing kinnow production in the study area. Weeds are spread by animal, and human beings as well, so its care is necessary before entering into the field because the animals eat the weeds which after animal and human residual come into manure in form of undigested seeds while after application instead of fertility increase the weeds in the field which not only decreases Kinnow production but also influences the productivity of other crops.

Table-3 represents the density of weeds distribution in the orchards and their relationship with the yield of the sampled respondents in the project area. Majority of the respondents (57.5%) replied that weeds were present in medium quantity, while 27.5% respondents replied that weeds were observed in low quantity. There was also significance difference ($P < 0.05$) between the density of weeds and the yield per acre of kinnow production in the study area. So the study concluded that weeds density decrease the production of kinnow in the study area.

Table-4 reveals the weeds eradication techniques for the removal of weeds in the orchards of kinnow and their relationship with the yield of sampled respondents in the study area. According to table 62.5% respondents eradicated their weeds from their farm through hoeing, while 3.5% used herbicides for the eradication of weeds. The Chi-square result was also found significant at 5% level which indicated that weeds were great obstacle for Kinnow production in the study area. These are the weeds which eat food from the kinnow trees which directly affect the health of the Kinnow tree adversely which reduce the kinnw production in the study area.

Table-1. Presence of weeds as reported by the sampled respondents in the study area.

Response	No. of Respondents	Percent
Yes	195	97.5
No	5	2.5
Total	200	100.0

Source: Field Survey

Table-2. Different types weeds distribution in the kinnow orchards of the sampled respondents in the study area.

Response	Frequency of response to the yield per acre					Chi-square Significance level
	Very High (Above 50%)	High (Up to 50%)	Low (Up to 50%)	Very low (Above 50%)	Total	
No weeds	-	-	5 (5.8%)	-	5 (2.5%)	
Broad leaf	27 (93.1%)	55 (69.6%)	46 (53.5%)	1 (16.7%)	129 (64.5%)	
Grassy	1 (3.4%)	21(26.6%)	25 (29.1%)	5 (83.3%)	52 (26%)	
Sedges	-	2 (2.5%)	4 (4.7%)	-	6 (3%)	
Any other	1 (3.4%)	1(1.3%)	6 (07%)	-	8 (4%)	
Total	29 (100%)	79 (100%)	86 (100%)	6 (100%)	200 (100%)	

Source: Field Survey

Table-3. Density of weeds distribution in the orchard and their relationship with the yield of the sampled respondents in the study area

Particular items	Frequency of response to the yield per acre					Chi-square Significance level
	Very High (Above 50%)	High (Up to 50%)	Low (Up to 50%)	Very low (Above 50%)	Total	
No weeds	-	-	5 (5.8%)	-	5 (2.5%)	
Low	14 (48.3%)	27 (34.2%)	12 (14%)	2 (33.3%)	55 (27.5%)	
Medium	11 (37.9%)	47 (59.5%)	53 (61.6%)	4 (66.7%)	115 (57.5%)	
High	4 (13.8%)	5 (6.3%)	16 (18.6%)	-	25 (12.5%)	
Total	29 (100%)	79 (100%)	86 (100%)	6 (100%)	200 (100%)	

Source: Field Survey

Table-4. Weeds eradication techniques in the orchard of kinnow and their relationship with the yield of the sampled respondents in the project area

Response	Frequency of response to the yield per acre					Chi-square Significance level
	Very High (Above 50%)	High (Up to 50%)	Low (Up to 50%)	Very low (Above 50%)	Total	
No weeds	-	-	5 (5.8%)	-	5 (2.5%)	0.007
Mulching	13 (44.8%)	16 (20.3%)	10 (11.6%)	-	39 (19.5%)	
Hoeing	12 (41.4%)	48 (60.8%)	61 (70.9%)	4 (66.7%)	125 (62.5%)	
Herbicides	1 (3.4%)	4 (5.1%)	2 (2.3%)	-	7 (3.5%)	
Total	29 (100%)	79 (100%)	86 (100%)	6 (100%)	200 (100%)	

Source: Field Survey

CONCLUSION

The study concluded that presence of weeds had close relationship with the yield per acre production of Kinnow in the target area. Weeds decreased the yield of Kinnow per unit area. Weeds are precarious factor for reducing the kinnow production; therefore weed control measures are highly required for enhancing kinnow production in the study area for livelihood fulfillment and boosting the economy of Pakistan.

The study recommends the following suggestions for minimizing the yield losses in the study area. Plant basin should be covered with grass and polyethylene mulch to reduce the weeds intensity in the study area. Systematic application of herbicides will also minimize the weeds in the study area. Best quarantine system application in the country is required for weed reduction in the study area. The availability of weed free farm yard manure must be ensured. Properly and in time hoeing also helps in decreasing the attack of the weed plants in the fields.

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