RESEARCH ARTICLE

KNOWLEDGE LEVEL OF DRIP IRRIGATION FARMERS AND NON-DRIP IRRIGATION FARMERS REGARDING TOMATO PRODUCTION TECHNOLOGY

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Received-25.12.2016, Revised-10.04.2017

Abstracts: The present study was carried out during 2013 in the Durg district of Chhattisgarh state. This study was conducted in randomly selected 8 villages of two purposively selected blocks i.e. Durg and Dhamdha located in Durg district. The aim of this study was to know the level of knowledge about tomato production technology. A total of 128 respondents including 64 drip irrigation farmers and 64 non-drip irrigation farmers were selected randomly. The data collection was done by the use of interview schedule through personal interview. Data were analyzed with help of suitable statistical tools. The findings further revealed that Majority of the DIF and non-DIF were having high level of knowledge about sowing time and were adopted U. S.440 and mahalakshmi varieties of tomato and harvested their tomato in partial ripe stage. Gajargansh was found as important weed, tomato fruit borer and blight diseases were prevalent in the study area.

Keywords: Drip irrigation, Knowledge level, Risk bearing capability, Tomato growers

INTRODUCTION

Vegetables not only provide maximum output but also give more income per unit area of land. Vegetable cultivation among small land holders has always been source of supplementary income and provides gainful employment through intensive cultivation and thus vegetable growers are normally more prosperous than those who grow cereals, because of higher returns. A tomato is the edible, often red fruit from the plant (*Solanum lycopersicum)* commonly known as a tomato plant. Both the species and its use as a food originated in Mexico, and spread around the world following the Spanish colonization of the Americas. Its many varieties are now widely grown, sometimes in greenhouses in cooler climates. The tomato is consumed in diverse ways, including raw, as an ingredient in many dishes, sauces, salads, and drinks. While it is botanically a fruit, it is considered a vegetable for culinary purposes, which has caused some confusion. The fruit is rich in lycopene, which may have beneficial health effects.

Tomatoes are now eaten freely throughout the world, and their consumption is believed to benefit the heart, among other organs. They contain the carotene lycopene, one of the most powerful natural antioxidants. In some studies, lycopene, especially in cooked tomatoes, has been found to help prevent prostate cancer, but other research contradicts this claim. Lycopene has also been shown to improve the skin's ability to protect against harmful UV rays. A study done by researchers at Manchester and Newcastle universities revealed that tomato can protect against sunburn and help keeping the skin looking youthful. Natural genetic variation in tomatoes and their wild relatives has given a genetic plethora of genes that produce lycopene, carotene, anthocyanin, and other antioxidants. Tomato varieties are available with double the normal vitamin C (Doublerich), 40 times normal vitamin A (97L97), high levels of anthocyanin (resulting in blue tomatoes), and two to four times the normal amount of lycopene (numerous available cultivars with the high crimson gene). Lycopene has also been shown to protect against oxidative damage in many epidemiological and experimental studies. In addition to its antioxidant activity, other metabolic effects of lycopene have also been demonstrated. The richest source of lycopene in the diet is tomato and tomato derived products. Tomato consumption has been associated with decreased risk of breast cancer, head and neck cancers and might be strongly protective against neurodegenerative diseases. Tomatoes, tomato sauces and puree are said to help lower urinary tract symptoms (BPH) and may have anticancer properties. Tomato consumption might be beneficial for reducing cardiovascular risk associated with type 2 diabetes.

Keeping in view of the above facts in to consideration, the present study was undertaken to find out the level of knowledge about tomato production technology.

RESEARCH METHODOLOGY

This study was conducted in Durg district of Chhattisgarh, during the year 2013. The Chhattisgarh state consists of 27 districts, out of which Durg district was selected because the farmers of this district adopted highest drip irrigation technology. From this district only two blocks i.e., Durg and Dhamdha were selected purposively. From each selected block, 4 villages (Total 4 X 2 = 8) will be selected on the basis of maximum availability of drip irrigation technology adopters in the villages. From

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each selected village, 8 tomato growers having drip irrigation system were selected randomly and similar number of tomato growers not having drip irrigation system was selected randomly from the same village. In this way a total of 164 farmers were considered as respondent. Out of which 64 was drip irrigation holders and remaining 64 was treated as control group without having drip irrigation. In this investigation farmers having drip irrigation were enumerated as DIF and those respondents who have no drip irrigation facility were considered as non-DIF were selected as respondents for the present study. Respondents were interviewed through personal interview. Prior to interview, respondents were taken in to confidence by revealing the actual purpose of the study and full care was taken in to consideration to develop good rapport with them. For the data collection well designed and pre-tested interview scheduled were used. Collected data were analyzed by the help of various statistical tools i.e. frequency, percentage, mean and standard deviation, etc.

RESULT AND DISCUSSION

Level of knowledge about tomato production technology

The findings on extent of knowledge regarding time of sowing, seed rate, sowing distance, improved variety, use of fertilizer, irrigation method, weed control, insect control, disease control, are presented in Table 1. The data represented in Table 1 indicated that majority of the DIF (89.06%) had high level of knowledge about time of sowing, followed by 62.5 per cent had high level of knowledge regarding sowing distance, insect control (50.00%), disease control (46.88%), improved variety (46.56%), weed control (40.63%), seed rate (37.5%), irrigation method (18.75%) and use of fertilizer (17.60%). Similarly, majority (76.56%) of the non-DIF had high level of knowledge about time of sowing, followed by 21.88 per cent of the non-DIF had high level of knowledge regarding disease control, weed control (20.32%) and insect control (20.32%), sowing distance (10.94%), seed rate, improved variety (10.93%), irrigation method (9.37%) and use of fertilizer (7.82%) in tomato cultivation.

It is worthwhile to note that majority of the DIF (82.40%) and non-DIF (92.18%) had medium level of knowledge about use of fertilizer. Irrigation method (81.25%), seed rate (62.5%), weed control (59.37%), improved variety (53.44%), insect control (50.00%), disease control (43.75%), sowing distance (37.5%) and 10.94 per cent of the DIF had medium level of knowledge regarding time of sowing. However, non-DIF had medium level of knowledge about irrigation method (90.63%), seed rate and improved variety (89.07%), sowing distance (87.50%), insect control (76.56%), weed control (70.31%), disease control (64.06%) and time of sowing (23.44%).

Table 1. Distribution of respondents according to their practice wise level of knowledge regarding tomato production technology

Tomato cultivation practices	Level of knowledge					
	DIF (n=64)			Non-DIF (n=64)		
	Low	Medium	High	Low	Medium	High
• Time of sowing	00.00	10.94	89.06	0.00	23.44	76.56
• Seed rate	00.00	62.5	37.5	0.00	89.07	10.93
• Sowing distance	00.00	37.5	62.5	1.56	87.5	10.94
• Improved variety	00.00	53.44	46.56	00.00	89.07	10.93
• Use of fertilizer	1.56	82.40	17.60	00.00	92.18	7.82
• Irrigation method	00.00	81.25	18.75	00.00	90.63	9.37
• Weed control	00.00	59.37	40.63	9.37	70.31	20.32
• Insect control	00.00	50.00	50.00	3.12	76.56	20.32
• Disease control	9.37	43.75	46.88	14.06	64.06	21.88

Similarly, about 9 per cent of the DIF and non-DIF (14.06%) had low level of knowledge about disease control, followed by use of fertilizer (1.56%). Whereas, weed control of the non-DIF (9.37%), insect control (3.12%) and sowing distance (1.56%).

It could be concluded from the table that majority of the DIF and non-DIF had high level of knowledge about time of sowing.

Table 2. Distribution of the respondents according to their overall level of knowledge regarding tomato production technology

Category	DIF (n=64)		Non-DIF (n=64)	
	Frequency	Percentage	Frequency	Percentage
Low (<6.66)	0	0	00	00
Medium (6.67-13.34)	31	48.43	52	81.25

High (13.35-20)	33	51.57	12	18.75
Overall knowledge (%)	78.51		58.20	

The overall extents of knowledge regarding tomato production technology are present in Table 2. The data reveals that the majority of the DIF (51.57%) had high level of knowledge regarding tomato production technology, followed by 48.43 per cent of DIF were having medium level of knowledge, no DIF respondent were found to have low overall knowledge. Whereas, the majority of the Non-DIF (81.25%) had medium level of knowledge regarding tomato production technology, followed by 18.75 per cent had high level of knowledge.

Regarding overall knowledge, 78.51 per cent overall knowledge about tomato production technology was reported amongst the DIF respondent as compared to 58.20 per cent overall knowledge of non-DIF respondents towards tomato production technology. It could be concluded that non-DIF had low percentage of overall knowledge about tomato production technology than the DIF respondents.

Technological characteristics of the respondents

Popular variety and harvesting time

Table 3. Distribution of the respondents according to popular variety and harvesting time adopted by the farmers in tomato production technology

Category	DIF (n=64)		Non-DIF (n=64)	
	Frequency	**Percentage**	**Frequency**	**Percentage**
• **Varietal use***				
• Avinash	11	17.18	12	18.75
• Abhishek	14	21.88	0	00
• Mahalakshmi	9	14.06	19	29.68
• U. S.440	26	40.62	19	29.68
• U. S. 3140	5	7.81	4	6.25
• Karina	7	10.93	12	18.75
• Karishma	1	1.56	1	1.56
• Indour	3	4.68	9	14.06
• **Harvesting time**				
• Before ripe	7	10.93	4	6.25
• Partial ripe	53	82.81	59	92.18
• Fully ripe	4	6.25	1	1.56

*Frequency based on multiple responses

Distributions of the respondents according to popular tomato varieties and harvesting time adopted by the farmers in tomato production are presented in Table 3. The table shows that majority (40.62%) of the DIF were adopted U.S.440 variety of tomato, followed by 21.88 per cent of the DIF were adopted abhishek variety. Avinash (17.18%), mahalakshmi (14.06%), karina (10.93%), U. S. 3140 (7.81%), indour (4.68%) and karishma variety were also adopted by the DIF respondents but by slightly less number. Whereas, majority (29.68%) each of the non-DIF respondents was adopted mahalakshmi and U. S.440 variety of tomato, followed by avinash and karina (18.75%). Indour (14.06%), U. S. 3140 (6.25%) and karishma variety of tomato (1.56%) were relatively less adopted by the non-DIF respondents.

Regarding harvesting time, the study (Table 3) revealed that majority of DIF (82.81%) as well as non-DIF respondents (92.81%) were harvested their tomato in partial ripe stage. Before ripe stage harvesting was done by 10.93 and 6.25 percentage of the DIF and non-DIF respondents, respectively. Only 6.25 per cent DIF and 1.56 per cent non-DIF respondents were harvested their produce at fully ripe stage.

It could be concluded that majority of the DIF and non-DIF respondents were adopted U. S.440 and mahalakshmi varieties of tomato. Majority of the DIF and Non-DIF respondents harvested tomato fruit in partial ripe stage may be because of convenience to transport and marketing.

Popular weed, major insect pest and major diseases

Distributions of the respondents according to popular weed, major insect pests and major diseases in tomato production are presented in Table 4. The finding shows that majority (46.87%) of the DIF reported about gajargansh weed, followed by sava (39.06%). Dubghas (18.75%) and dalbaji weed were also found in some tomato field. The non-DIF respondents also reported about gajargansh (64.06%), sava (46.87%), dalbaji (23.43%), dubghas (18.75%), motha (6.25%) and patharchatta as important weed found into the tomato field.

As regard to major insect pest, majority (67.81%) of the DIF perceived about fruit borer, followed by thrips (45.31%) as important insect pest. Whitefly (17.18%), aphid (10.93%) and mites (9.37%) were also causing harm in some of the DIF respondent's tomato field. Whereas, majority, 92.18 per cent non-

DIF respondents perceived that fruit borer is most harmful insect pest, followed by whitefly (20.31%), thrips (15.62%) and aphid (12.5%).

Table 4. Distribution of respondents according to their perception about popular weed, major insect pest and major diseases in tomato production

Category	DIF (n=64)		Non-DIF (n=64)	
	Frequency	**Percentage**	**Frequency**	**Percentage**
• **Major weeds** *				
• Gajargansh	30	46.87	41	64.06
• Sava	25	39.06	30	46.87
• Dalbaji	02	3.12	15	23.43
• Dubghas	12	18.75	12	18.75
• Patharchatta	00	00	03	4.68
• Motha	00	00	04	6.25
• **Major insect pest***				
• Thrips	29	45.31	10	15.62
• Fruit Borer	43	67.81	59	92.18
• Aphid	07	10.93	08	12.5
• Mites	06	9.37	0	00
• Whitefly	11	17.18	13	20.31
• **Major disease***				
• Blight	40	62.5	51	79.68
• Virus	25	39.06	25	39.06
• Leaf curl	04	6.25	08	12.5

*Frequency based on multiple responses

Regarding major diseases occurred in tomato crop, the findings envisaged that blight disease was most popular amongst both the DIF (62.5%) and non DIF (96.68%) respondents. Further the viral disease was found as the second important disease being occurred in the tomato as perceived by the 39.06 per cent of both DIF and non DIF respondents. Leaf curl disease was another important disease, but its occurrence was perceived by only 12.5 per cent non-DIF and 6.25 per cent DIF respondent.

It could be concluded that majority DIF and non-DIF respondents perceived gajargansh as important weed. However, majority of the DIF and non-DIF respondent had knowledge about tomato fruit borer. Majority of the DIF and non-DIF had knowledge about blight diseases.

CONCLUSION

From the above research works it can be concluded that the majority of the DIF (89.06%) and majority (76.56%) of the non-DIF had high level of knowledge about time of sowing. Whereas, 95.33 per cent of the DIF and majority (96.87%) of the non-DIF had medium level of knowledge about average yield and majority of the DIF (9.37%) and majority (14.06%) of the non-DIF had low level of knowledge about disease control. The overall extents of knowledge regarding tomato production technology the majority of the DIF (51.57%) had high level of knowledge and majority of the non-DIF (81.25%) had medium level of knowledge regarding tomato production technology.

Majority (40.62%) of the DIF and majority (29.68%) of the non-DIF were adopted U. S.440 and mahalakshmi variety of tomato. Majority of DIF (82.81%) as well as non-DIF respondents (92.81%) were harvested their tomato in partial ripe stage. Majority (46.87%) of the DIF and majority (64.06%) of the non-DIF reported about gajargansh weed. However, majority (67.81%) of the DIF and majority of the 92.18 per cent Non-DIF perceived about fruit borer. Regarding major diseases occurred in tomato crop, the findings envisaged that blight disease was most popular amongst both the DIF (62.5%) and non DIF (96.68%) respondents.

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