RESEARCH ARTICLE

ENHANCE THE PRODUCTIVITY OF RIDGE GOURD (*LUFFA ACUTANGULA* L.) CULTIVATION IN NET TRELLIS SYSTEM IN BARMER DISTRICT OF RAJASTHAN

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Abstract: To test and popularize the Krishi Vigyan Kendra, Barmer-II, Gudamalami, Rajasthan recommended Enhance the Productivity of Ridge gourd (*Luffa acutangula* L.) Cultivation in Net Trellis System in Barmer District of Rajasthan, On Farm Trials (OFT's) were conducted during the *kharif* season of 2019 and 2020 in farmers participatory mode at three locations in Barmer District of Rajasthan. The experiment consisted of two treatments *viz*., recommended practice (Net trellis system) and farmers practice (Furrow). Net trellis system had significant increase number of picking (13), fruit length (43.33 cm) and fruit weight (210 g) as compared to farmer's practice (07, 22.67 cm and 101.5 g) during both the year as well as pooled data. The two year average fruit yields of net trellis system have shown doubled production over farmers practice method. Net trellis system was recorded increase yield for 73.57% (138.06 t/ha) as compared to farmers practice (79.54 t/ha) during both the year as well as pooled data. Similarly, the net returns and B:C ratio also revealed that maximum under net trellis system during both the year as well as pooled data Rs 232790 per hectare and 3.36:1 as compared to farmers practice Rs 89913.5 per hectare and 2.30:1. Net trellis system had significant reduce the damage of pest and soil borne diseases and improve the quality of fruits.

Keywords: Ridge Gourd, Net trellis system, On Farm Testing (OFT), Yield and B:C ratio

INTRODUCTION

Ridge gourd is a very important Indian vegetable crop and it can be grown throughout the year. Ridge gourd belongs to the cucurbitaceous family. The ridge gourd vegetable in green stage and leaves with stem are used as vegetable. It is an excellent blood purifier, possessing laxative properties, a cure for jaundice, beneficial for diabetes, ridge gourd is extremely rich in dietary fiber, aiding weight loss, anti-inflammatory and anti-biotic, fortifying the immune system, Skincare and good for the stomach. Ridge gourd is a climbing plant with *tendrils and vines* that pull it upward, and just like other vine crops it requires a plant support for it to develop and produce fruits efficiently. The plants need a net trellis system to grow and spread. You can make one using timber poles, GI wires and crop support net about seven to eight feet above the ground level. Using a crop support net increases yield by allowing the crop grows upwards where the leaves are exposed to light. It also protects the plants from damage by pests that reduce the quality of the fruits and from soil borne diseases. While increased yield is the optimum benefit of using a support trellis for ridge gourd, it also improves overall fruit quality. Net trellis system keeps the field tidy, allowing you to save space as well. Finally, use of crop support net reduces fruit curvature. Ridge gourd fruits developing on a support most often do not encounter obstructions like they do on the ground. Therefore, fruits harvested are straight and big. There is a lot of variation in shape and length of the fruit. Ridge gourd is an annual herbaceous plant grown for about 3 – 4 months after sowing. Hence *kharif* sown crop will not exist for following summer season. For getting good yields sowings should be taken up in June or July for *kharif* season crop and January or February for summer crop.

Most of the farmers' traditionally cultivating ridge gourd on soil surface with surface irrigation. Farmers are getting not only less yields but also inferior quality fruits with this method of cultivation. This may be due to incidence of more soil borne pests and diseases and unsuitable growing condition to both vine and fruits when compared to trellis or pandal system of cultivation. Previous studies indicated that more yields were produced in trellis and pandal system of cultivation.

Pandey *et al*., 2002 reported that gummosis, anthracnose, *Phytophthora* blight, *Cercospora* leaf spot, root knotnematode and watermelon bud necrosis virus are becoming the most destructive diseases among many other diseases occur in cucurbits.

Konsler and Strider (1973) observed that vertical trailing or staking found to be superior in increasing yield and obtaining good fruit quality and better control of foliar and fruit diseases in cucumber over growing it on ground cultivation. Sadanandan (2013) had reported that highest fruit yields were obtained in horizontal trailing system than vertical trailing system of cucumber grown in rain shelter in Vellanikkara Kerala. Growing of pickling cucumber on wires has given not only higher fruit yields but also good quality when compared to growing them on the ground (Tokatly and Ozgur, 1999).

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Some farmers are obtaining higher yields by cultivating cucurbit vegetables by adopting drip irrigation system along with plastic mulching over surface irrigation method. This may be due to less weed infestation and hence low pests and disease incidence. Growing creeper vegetables like bitter gourd, bottle gourd, and ridge gourd on net trellis system is a technological improvement for getting not only higher yield, but also better quality.

Net trellis system grown cucurbits produce uniform sized fruits with uniform skin colour which attract better price in the market. Peter *et al*., (2008) reported that cucurbit vegetables such as bitter gourd, snake gourd, ridge gourd, and ivy gourd grown on pandal system produced higher yields and better fruit quality in Kerala. Balaji *et al*., (2016) in their study reported that ribbed gourd cultivated on pandal system increase yield and net return per hectare in Tamilnadu.

Training is an important practice for vegetables for obtaining optimum vegetative growth, higher yield and good quality produce (Narayan *et al*., 2008). Keeping this in view we have conducted an On-Farm Trial in Barmer District of Rajasthan in India in three locations during *kharif* 2019 and repeated in *kharif* 2020.

MATERIALS AND METHODS

On-farm research trials (OFT's) on enhance the productivity of ridge gourd (*Luffa acutangula* L.) cultivation in net trellis system in Barmer District of Rajasthan were designed and conducted in farmer's participatory mode during Khrif, 2019 and Khrif, 2020 at three different locations at six farmers' fields in Barmer District of Rajasthan under Krishi Vigyan Kendra, Barmer-II, Gudamalami, Rajasthan. The experiment consisted of two treatments *viz*., T_1 - recommended practice (Net trellis system) and T_2 - farmers practice (Furrow).

Farmer practice

Field preparation & sowing

Barmer farmers of Rajasthan traditionally growing ridge gourd on soil surface with surface irrigation. In farmers practice field was ploughed with tractor drawn mould board plough once and with cultivator twice followed by a rotavator to get fine tilth. Later furrows were formed, with country plough consisting of a blade, at spacing of 2.5 m. Ridge gourd variety of Thar Karni was sown at 2.0 m spacing within the furrow with two seeds per pit of 30cm x 30cm x30 cm sizes. 3.5-4.5 kg seed per hectare was used and sowings were taken up by farmers in 3 locations in the second fortnight of June in year 2019 and first fortnight of July in year 2020. First irrigation was given before sowing to fill the pits through furrow-channel and subsequent irrigations were given at weekly intervals except that if rainfall occurs sufficiently.

Net trellis system

Field preparation & sowing

Under Net trellis system of cultivation, Barmer farmers of Rajasthan started cultivating ridge gourd on surface of crop support net of trellis with drip irrigation along with plastic mulching. Field was ploughed with tractor-drawn mould board plough one time and tractor with cultivator ploughed twice and one time with rotavator to get fine tilth. Later bunds were formed with tractor drawn bund former at spacing of 2.0 m between two adjacent bunds. Ridge gourd variety of Thar Karni was sown at two feet spacing on center of the bund covered with plastic much sheet and holes were made to facilitate sowing of seed.

In the same fashion sowings were taken up by farmers in 3 locations in the second fortnight of June in year 2019 and first fortnight of July in year 2020. Plants were reduced to one per hill, 1 week after emergence. Woven, reusable, unknotted, nylon trellis netting was attached to two steel T-posts, one on each end of the plots, at a height of 1.5 m. Although randomization caused trellised and ground culture plots to sometimes be adjacent to each other, effects of shading were minimal since plots were 2.0 m apart arranged in an east-west orientation at both locations. There are so many crop support net available to pick from. While some are very easy to construct and install, others are tedious and take a lot of time. The net trellis however, is everyone's favorite. It is durable, and can last so many growing seasons. It also provides a good support for ridge gourd.

To popularize the net trellis system in the district, awareness/training camps and TV talks were organized in the area. The farmers were demonstrated the proper crop support net. To assess the impact of these awareness/ training programs, 50 farmers belonging to 15 villages of district Barmer were randomly selected. Recommended practice had significant reduce the damage of pest and soil borne diseases and improve the quality of fruits was recorded. The observation on number of picking, fruit weight (g), fruit length (cm), yield per ha (t/ha), net income (Rs.) and B:C ratio were recorded.

Plate 1. Overview of ridge gourd field under net trellis system

RESULTS AND DISCUSSION

The results revealed (Table 1) that among the net trellis system had significant increase during both the year as well as pooled analysis with number of picking (13), fruit length (43.33 cm) and fruit weight (210 g) as compared to farmers practice (07, 22.67 cm and 105 g). Similarly, increase yield under net trellis system for 73.57% (138.06 t/ha) as compared to farmers practice (79.54 t/ha) was recorded during both the year as well as pooled analysis. Murali *et al.* (2020) had reported that highest fruit yields in ridge gourd were obtained in horizontal pandal system in Nalgonda District of Telangana, India.

Table 1. Number of picking, Fruit length (cm), Fruit weight (g) and Yield (q/ha) of ridge gourd as affected by recommended practice and farmers practice.

Year	Number of picking		Fruit length (cm)		Fruit weight (g)		Yield (q/ha)		% increase yield
	RP	FP	RP	FP	RP	FP	RP	FP	
2019	12	06	42.33	21.67	210.33	100.67	140.5	78.5	78.98
2020	14	08	44.33	23.67	209.67	102.33	135.62	80.57	68.34
Pooled	**13**	**07**	**43.33**	**22.67**	**210**	**101.5**	**138.06**	**79.54**	**73.57**

* RP - Recommended practice (Net trellis system)
** FP - Farmers practice (Furrow)

Plate 2. Effect of net trellis system on ridge gourd

Economics

Net trellis system was recorded increase yield for 73.57% (138.06 t/ha) as compared to farmers practice (79.54 t/ha) during both the year as well as pooled analysis (Table 2). Similarly, the net returns and B:C ratio also revealed that maximum under grown of ridge gourd in net trellis system Rs 232790 per hectare and 3.36:1 as compared to farmers practice Rs 89913.5 per hectare and 2.30:1 during both the year as well as pooled analysis (Table 2). Balaji *et al*., 2016 had also reported the similar results in a study taken up in three blocks and 3 villages in each block in Tamil Nadu. Net trellis system had significant reduce the damage of pest and soil borne diseases and improve the quality of fruits.

Table 2. Yield (q/ha), Cost of cultivation (Rs/ha), net return (Rs/ha) and benefit: cost ratio of ridge gourd as affected by recommended practice and farmers practice.

Year	Average Yield (q/ha)		Average Sale price (Rs. /q)		Cost of Cultivation (Rs/ha)		Gross Return (Rs/ha)		Net Return (Rs/ha)		Benefit Cost ratio B:C Ratio	
	RP	FP			RP	FP	RP	FP	RP	FP	RP	FP
2019	140.5	78.5	2000	2400	116253	66793	337200	157000	220947	90207	2.90	2.35
2020	135.62	80.57	2000	2400	80856	71540	325488	161130	244632	89590	4.03	2.25
Pooled	**138.06**	**79.54**	**2000**	**2400**	**98554.5**	**69166.5**	**331344**	**159080**	**232790**	**89913.5**	**3.36**	**2.30**

* RP - Recommended practice (Net trellis system)

** FP - Farmers practice (Furrow)

*** In second year under Demonstration cost of cultivation was less as compared first year because in first year fixed assets established.

CONCLUSION

Ridge gourd is one of the important cucurbitaceous vegetable crops in India. Which is an annual herbaceous plant with creeping and climbing habit this is giving opportunities to explore new crop cultivation techniques. However, farmers' traditionally cultivating ridge gourd on soil surface with surface irrigation. Because of this farmers are getting not only less yields but also inferior quality fruits due to soil borne pest and disease incidence and unfavorable growing condition to both vine and fruits when compared to net trellis system of cultivation. To evaluate net trellis system of ridge gourd cultivation in Barmer district of Rajasthan, an On-Farm Trial was conducted in three locations during *kharif 2019* and *kharif 2020*. In net trellis system of cultivation the increase fruit weight and fruit length obtained were (210g and 43.33cm) as compare to farmers practice 101.5g and 22.67cm during both the year as well as pooled data. In net trellis system of cultivation the highest two year average yield obtained was 138.06 q/ha and in farmers practice method it was 79.54 q/ha. That indicates simply doubled production over farmers practice method. It was observed that average fruit price was Rs. 2400/q with net trellis system of cultivation which might be due to good fruit quality and uniform long fruits. In net trellis system of cultivation farmers received higher during both the year as well as pooled data in net returns and BC ratio of Rs. 232790/- and 3.36:1 respectively. Whereas in farmers practice average price obtained was Rs. 2000/q and net returns and BC ratio obtained were Rs. 89913.5/- and 2.30:1 respectively during both the year as well as pooled data.

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