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Crop rotation in brinjal (*Solanum melongena* L.) for bacterial wilt incidence

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ABSTRACT : An experiment was conducted for two years during 2004 to 2006 to study the crop rotation impact on the bacterial wilt incidence in the brinjal crop involving the two non-host crops *viz.*, maize and sorghum. Study indicates that, the wilt incidence was reduced to 59.10 and 58.52 per cent with maize and sorghum, respectively compared to monocropping sequence (82.31%) of brinjal.

KEY WORDS : Brinjal, Crop rotation, Bacterial wilt, *Ralstonia solanacearum*

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The brinjal (*Solanum melongena* L.) can be grown in all year round as it is highly productive and find its place as poorman's crop in India. Except in higher altitudes, it can be grown in almost all parts of India. Large numbers of cultivars are grown throughout the country depending upon the consumer's preference for the colour, size, shape and the yield. Consumer's preference for shape and colour are specific which changes with region. Brinjal is continuously growing in the same piece of land and land subjected to become sick with some of the soil borne diseases. One such devastating disease, bacterial wilt is caused by *Ralstonia solanacearum* (Smith) Yabuchi *et al.* (1995). The proportion of the incidence of this disease increases alarmingly due to the crop rotation with other solanaceous alternate hosts of the causal organism. It is often possible to rotate the same kind of vegetable families and certain level of success can be achieved in control of soil borne disease by the crop rotation with non-hosts. Keeping in this view, the present experiment was conducted to know the wilt incidence in the different crop sequence.

The experiment was conducted in the Olericulture unit, Department of Horticulture, College of Agriculture, University of Agricultural Sciences, Dharwad during 2004 to 2006. The material for this study consisted of two non-hosts crops *viz.*, maize and sorghum and brinjal (host crop), which were used in crop rotation. The experiment was laid out in a complete randomized design (CRD) in pots (30 cm diameter) containing *Ralstonia solanacearum* sick soils with three replications including three cropping sequence *viz.*, brinjal – brinjal - brinjal, brinjal – maize - brinjal and brinjal – sorghum - brinjal. Artificial inoculums was also poured @ 10 ml per pot at the concentration of 5 x 10^8 cfu per ml. Control was maintained separately without bacterial load in the pot.

Details of the experiment	
Season	Crop
Kharif, 2004 and 2005 (May to July)	Brinjal cv. Malapur
2004 and 2005 (August to October)	Non-host maize and sorghum
2005 and 2006 (January – March)	Brinjal cv. Malapur

The number of plants wilted in each entry in the pots were recorded and expressed as per cent. The angular transferred values were used for the analysis. Fisher's method of analysis of variance was applied for the analysis and interpretations of the data as given by Panse and Sukhatme (1967).

The analysis of variance with respect to wilt incidence in brinjal cv. Malapur is presented in Table 1. The results indicated that, initial wilt incidence during 2004 and 2005 remained at par with all the three crop sequences. However, from the table it is evident that the wilt incidence was higher during 2005 compared to 2004.

Among the cultural methods, now-a-days crop rotation with cereal crops is quite effective in control of wilt in brinjal. Its effect has been studied more with potato than other

Table 1 : Per cent wilt incidence in the crop rotation with non-hosts

Sr. No.	Treatments	2004			2005			Pooled		
		Before crop rotation	After crop rotation	Mean	Before crop rotation	After crop rotation	Mean	Before crop rotation	After crop rotation	Mean
1.	Brinjal-Brinjal-Brinjal	75.57b	87.00a	81.28a	78.00b	88.67a	83.33a	76.79b	87.83a	82.31a
2.	Brinjal-Maize-Brinjal	74.20b	42.83b	59.52b	77.17b	42.17b	59.67b	75.69b	42.50b	59.10b
3.	Brinjal-Sorghum-Brinjal	74.70b	42.77	58.44b	76.42b	40.17b	58.32b	75.56b	41.47b	58.52b
	Mean	74.82a	57.33	66.41	77.21	57.00	67.11	76.01	57.27	66.64
	S.E.±		1.64			1.93			1.53	
	C.D. (P=0.05)		4.94			5.81			4.61	
	CV (%)		3.96			4.56			3.68	

solanaceous vegetables. The non-host crop maize and sorghum are very popular in this area and cultivated on large scale in *Kharif* and *Rabi* season, respectively were used in this experiment. The effect of these crops in reducing the wilt incidence was studied for two years with cultivar Malapur. Shekawat *et al.* (1988) reported that, the crop rotation sequences involving graminae family crop have brought down the brown rot significantly.

The pooled data indicated that the two crop sequence brinjal-maize-brinjal (59.10%) and brinjal-sorghum-brinjal (58.52%) reduced wilt incidence significantly compared to brinjal-brinjal-brinjal (82.31%) crop sequence. However, the crop sequence brinjal-maize-brinjal and brinjal-sorghum-brinjal remained at par with each other (Table 1). Kulkarni (2003) observed that the wilt incidence has reduced to 45.72 per cent from its initial wilt incidence of 67.14 per cent when the two non-host crops *viz.*, maize and sorghum were used in the crop rotation of tomato field. In a year trial with brinjal cultivation pusa purple long susceptible to *R. solanacearum*, ascertained that, the proper crop rotation reduces the disease infestation (Sohi *et al.*, 1981).

The results revealed that both maize and sorghum were equally effective in reducing the wilt incidence. When the brinjal was grown continuously for three seasons, wilt incidence increased from 76.79 to 87.83 per cent. The wilt incidence reduced from 75.69 and 75.56 per cent in brinjal-maize-brinjal and brinjal-sorghum-brinjal rotation, to 42.50 and 41.47 per cent, respectively. This is mainly because of the pathogen was deprived of its host for one season and hydrogen cyanide (HCN), which exudes from the roots of maize and sorghum is toxic to pathogen. Hence, pathogen load was considerably reduced in the soils. Similar findings were reported by Verma and Shekawat (1991) in potato, Kishore *et al.* (1992) in tomato. It is confirmed that, crop rotation either with maize or sorghum reduces the incidence of wilt.

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