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Efficacy of Bioagents and Fungicide Chemicals for the Management of Sclerotium Rot/Wilt disease and Survey for the Incidence of Diseases in Brinjal

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A B S T R A C T

Brinjal is one of the important vegetable crop cultivated widely in India. It is susceptible to many diseases like *sclerotium* rot/wilt, *verticillium* wilt, *fusarium* wilt and bacterial wilt and it is being attacked by several diseases of fungi and bacteria. The collar rot/wilt disease caused by *Sclerotium rolfsii* is an important constraint in brinjal production. Hence, an *in vivo* study was conducted to evaluate the bio efficacy of antagonistic bio-agents and fungicide chemicals against root rot/wilt disease of Brinjal at College of Agriculture, Bheemrayangudi during 2011–2012.during field studies three fungicides and two antagonist bio-agent were evaluated against the rot/wilt disease at various combinations by seed treatments and soil application at different concentrations. The roving survey was undertaken to know the incidence of different diseases of brinjal in different parts of the talukas in Yadgiri and Gulbarga districts. revealed among different bioagents and fungicides tested alone or in combination for the efficacy the seed treatment by *Trichoderma* (10gms/kg) along with soil application of *Trichoderma* (FYM enriched 1:100 kg/ha) at sowing significantly reduced Sclerotium rot by 16.76 PDI with increased yield of 30.64 tons/ha followed by Seed Treatment with *Trichoderma* (10gm/kg), followed by Soil drenching of P*seudomonas fluorescence* 10gm/lit recorded 20.55 percent disease with increased yield of 27.46 tons/ha and Seed Treatment by *Trichoderma* at 10gm/kg reduced color rot up to 20.98 PDI with 26.47 tons/ha yield which is on par with soil drenching by Raxil (0.1%) has recorded less 23.26 PDI and higher yield 25.27 tons/ha when compared to control which recorded higher color rot incidence of 37.02 percent (Table 1) and minimum yield of 19.66 tons/ha. The survey revealed that *Sclerotium* rot was severe in all the talukas surveyed and disease incidence ranged from 2.0 to 16.90 per cent. While, *Rhizoctonia* rot ranged from 1.0 to 9.25 percent, Bacterial wilt ranged from 2.0 to 9.0 PDI. However, fungal leaf spot ranged 2.2 to 3.4 percent and Mosaic disease ranged from 3.0 to 14.80 percent in different parts of the Gulbarga and Yadgir districts.

Introduction

Eggplant (*Solanum melongena* L.) is an important solanaceous crop grown worldwide and widely cultivated in India.

Brinjal is a hardy crop and is cultivated under a wide range of soils. Since a long duration crop with high yield, well -drained and fertile soil is preferred for the crop. Brinjal is

considered a native to India where the major domestication of large fruited cultivars occurred. In "Origin of cultivated plants" published in 1886 De Candolle, stated that the species *S. Melongena* has been known in India from ancient times and regarded it as a native of Asia. Brinjal is one of the major vegetables contributing 8.1 % of total vegetable production in India. India ranks second in area (680 thousand ha) and production of brinjal in the world (27.6 % of world production) with the productivity of 17.5 tonnes/ha in the average world productivity (25 tonnes/ha). In Karnataka, brinjal is a popular and widely grown vegetable that covers an area of 14.2 thousand ha with the production and yield of 354.5 thousand tonnes and 25 tonnes/ha respectively (Valmik M. Patil *et al* 2017).

Brinjal is known to be affected by various diseases including *Alternaria* leaf spot (*Alternaria melongena*), collar rot (*Sclerotium rolfsii*), damping off (*Pythium* spp.), early blight (*Alternaria solani*), fruit rot (*Phytophthora nicotianae*), leaf spot (*Cercospora melongena*), *phomopsis* blight (*Phomopsis vexans*), bacterial wilt (*Ralstonia solanacearum*), mosaic and mottle (viral) and little leaf (Phytoplasmal) (Vanita, S. and Suresh, M,2013). Among various diseases affecting brinjal, collar rot caused by *Sclerotium rolfsii* Sacc is becoming one of the major threats under field conditions (Jadon, 2009). The pathogen (*S. rolfsii*) has been reported to reduce the fruit yield losses up to 90-100%.

In sustainable agriculture, the brinjal production is challenged by several foliar and root diseases that cause yield losses qualitatively and quantitatively. The diseases have been considered as the major constraint for cultivation across world. It causes over 50 per cent losses in production and productivity in various regions of world and to the extent of 10–20 per cent in India. In India, the field surveys have been conducted in the states including Karnataka (Valmik M. Patil *et al* 2017) and different diseases caused by various group of pathogens is highly versatile to changing environmental conditions and shows high variability across different agro-climatic regions. Keeping above in view, the present studies on surveys were conducted to record the prevalence and incidence of different foliar and soil borne disease in major brinjal growing regions of Gulbarga and Yadgir areas.

The collar rot of Brinjal caused by *Sclerotium rolfsii* commonly affects the plant population, yield and quality of the crop. Collar rot occasionally occurs in serious form and the lower portion of the stem is affected from the soil borne inoculums (Mohammad Nuray *et al* 2018). Decortication is the main symptom characterized by exposure and necrosis of underlying tissues may lead to collapse of the plant. The mycelia and sclerotia may be seen near the ground surface on the stem.

Applications of chemical, cultural and biological measures are common practices followed to control this disease to some extent and it is difficult to control using conventional chemical fungicides, because spores of this fungus survive for many years in the soil. Intensive use of chemical fungicides accumulates toxin in the environment and create residue problems (Vanita, S. and Suresh, M,2013). The Rhizospheric microorganisms are the ideal control for soil borne plant pathogens. *Trichoderma viride*, *Bacillus subtilis, Pseudomonas fluorescens* are recommended for the control of soil borne plant pathogens. There are several methods which are presently being used to control plant pathogens including soil pathogens. Keeping in view the use of fungicides chemicals, biological agents and soil amendments in the management of plant diseases are gaining importance. Hence, the present study was

undertaken to know the efficacy of antagonistic fungal bio agents and chemical fungicides against *sclerotium* rot of brinjal.

Materials and Methods

The field experiment was carried out to evaluate the efficacy of bioagents and fungicide chemicals for the management of collar rot caused by *Sclerotium rolfsii* Sacc. in brinjal at college of agriculture, Bheemrayangudi during kharif/rabi for 2011-12. An *in vivo* study was laid out by following randomized block design (RBD) with three replications and nine treatments. The field experiments comprising three fungicides chemical and two antagonist bioagent were evaluated against the rot/wilt disease through various methods by seed treatments and or soil application at different concentrations. Fungicides and bioagents were seeds treated and drenched at the base of each plant and adjacent soil at 30, 45 and 55 days after transplanting and bio-agent and organic manure were applied to the soil before transplanting.

The treatment details comprises;T1: Seed Treatment with *Trichoderma* (10gm/kg),T2: Seed Treatment with *Pseudomonas fluorescence* 10 gm/kg,T3: Seed Treatment with *Pseudomonas* 10gm/kg, followed by Soil drenching of P*seudomonas fluorescence* 10gm/lit, T4: Seed Treatment with *Trichoderma* (10gm/kg), by Soil application of *Trichoderma* (FYM enriched 1:100 kg/ha) at sowing,T5: Seed treatment with Carbendazim (2g/kg), followed by soil drenching of Carbendazim (2g/lit),T6: Seed treatment with Raxil (Tebuconazole) (1g/kg), followed by soil drenching of Raxil (1g/lit),T7: Seed Treatment with *Trichoderma* (10gm/kg), followed by Soil drenching of P*seudomonas fluorescence* 10gm/lit,T8: Seed treatment with Hexaconazole (1g/kg), followed by soil drenching of Hexaconazole (1g/lit) and T9: Control.

The data were taken from randomly selected five plants of each plot and disease incidence of *sclerotium* rot and yield were recorded and data were analyzed statistically. Percent disease incidence was calculated using number of diseased plant as percent of total plant observed and calculated using the following formula:

$$\text{Percent Disease Incidence} = \frac{\text{Number of diseased plants}}{\text{Number of total plant observed}} \times 100$$

Field survey was conducted to record the prevalence and incidence of diseases in major brinjal growing regions of Gulbarga and Yadgir areas in Karnataka at the farmers fields during 2011-12. During survey, farmers' fields were visited at each location and the disease incidence at different growth stage of brinjal was recorded. From each village five fields were selected and the percent of disease incidence was assessed by recording the number of plants showing disease symptoms and the total number of plants examined by using the formula. The number of diseased plants in each plot was counted, tabulated and represented in percentage.

Results and Discussion

The results from the experiment conducted to test the bioefficacy of bioagents and fungicides for the management of *Sclerotium* rot / wilt disease revealed that, seed treatment with *Trichoderma* (10gms/kg) followed by soil application of *Trichoderma* (FYM enriched 1:100 kg/ha) at sowing found effective in reducing the disease up to 16.76 PDI with significant increase in yield to 30.64 tons/ha, followed by seed treatment with *Trichoderma* (10gm/kg), followed by soil drenching of P*seudomonas fluorescence* 10gm/lit recorded 20.55 percent disease with increased yield of 27.46 tons/ha, Seed treatment by *Trichoderma* at 10gm/kg reduced color rot up to 20.98 PDI with 26.47 tons/ha

yield. Whereas, Seed treatment with *Pseudomonas* 10gm/kg, along with Soil drenching of P*seudomonas fluorescence* 10gm/lit recorded 23.48 PDI with 24.86 tons/ha yield and Seed Treatment with *Pseudomonas fluorescence* 10 gm/kg showed 24.66 PDI and yield of 24.10 tons/ha when compared to control recorded higher disease incidence by 37.02 percent with lowest yield 19.66 tons/ha (Table 1).

The fungicides tested for seed treatment and soil drenching by Raxil (0.1%) recorded low disease incidence up to 23.26 PDI and higher yield of 25.27 tons/ha followed by seed treatment with Hexaconazole (1g/kg) along with soil drenching of Hexaconazole (1g/lit) 24.28 PDI with 24.46 tons/ha yield and seed treatment with Carbendazim (2g/kg) along with soil drenching by Carbendazim (2g/lit) had maximum color rot incidence of 28.33 PDI with lower record of 22.90 tons/ha yield when compared to control which recorded higher color rot incidence of 37.02 percent (Table 1) with lowest yield of 19.66 tons/ha.

However, the conclusion from the result revealed that, among different bioagents and fungicides tested alone or in combination for the management the seed treatment by *Trichoderma* (10gms/kg) along with soil application by *Trichoderma* (FYM enriched 1:100 kg/ha) at sowing significantly reduced *Sclerotium* rot by 16.76 PDI with increased yield of 30.64 tons/ha followed by seed treatment with *Trichoderma* (10gm/kg), followed by soil drenching of P*seudomonas fluorescence* 10gm/lit recorded 20.55 percent disease with increased yield of 27.46 tons/ha and seed treatment by *Trichoderma* at 10gm/kg reduced color rot up to 20.98 PDI with 26.47 tons/ha yield which is on par with soil drenching by Raxil (0.1%) has recorded 23.26 percent incidence and higher yield of 25.27 tons/ha. The results on bioefficacy of fungicides, bioagents and amendments for integrated management on collar rot on brinjal are in conformity with earlier findings. Cumulative bioefficacy of fungicides, botanicals Trichoderma spp. and organic amendments against *S.rolfsii* affecting brinjal and other crops have been reported (Jadon, 2009; Begum *et al*., 2011).

The roving survey studies for incidence of major diseases of brinjal was carried in Shahapur, Shorapur, Jeewargi and Yadagir Dist. during 2011-12 and plants showing typical symptoms of different soil borne and foliar disease was considered for the observations. The survey results revealed that, among various diseases highest incidence of 16.90 percent of *sclerotium* rot was recorded in shakapur village followed by 14.80 per cent of Mosaic observed in gundalli village in Shahapur taluka. Similarly, in kaldevanhalli 16.40 percent collar rot incidence and 14.50 PDI was recorded in Avura of Shorapur taluka.

At sonna village 14.0 percent *sclerotium* rot and 9.5 percent incidence of mosaic was recorded in Andola of Jeevargi taluka while, Balichakra village has recorded 14.00 percent incidence and 12.50 percent of disease incidence in Balched village of Yadgiri (Table 1-5).

Table.1 Efficacy of bioagents and fungicide chemicals for the Management of Sclerotium rot/wilt disease in brinjal during kharif/rabi for 2011-12

Tr. No	Treatment Details	Dosage	Mean PDI	Yield (Tons/ha)
T1	Seed Treatment with *Trichoderma* (10gm/kg)	1%	20.98 (27.25)	26.47
T2	Seed Treatment with *Pseudomonas fluorescence* 10 gm/kg	1%	24.66 (29.77)	2410
T3	Seed Treatment with *Pseudomonas* 10gm/kg, followed by Soil drenching of P*seudomonas fluorescence* 10gm/lit	1%	23.48 (28.96)	24.86
T4	Seed Treatment with *Trichoderma* (10gm/kg), by Soil application of *Trichoderma* (FYM enriched 1:100 kg/ha) at sowing	1%	16.76 (24.15)	30.64
T5	Seed treatment with Carbendazim (2g/kg), followed by soil drenching of Carbendazim (2g/lit)	0.2%	28.33 (32.15)	22.90
T6	Seed treatment with Raxil (Tebuconazole) (1g/kg), followed by soil drenching of Raxil (1g/lit)	0.1%	23.26 (28.82)	25.27
T7	Seed Treatment with *Trichoderma* (10gm/kg), followed by Soil drenching of P*seudomonas fluorescence* 10gm/lit	1%	20.55 (26.95)	27.46
T8	Seed treatment with Hexaconazole (1g/kg), followed by soil drenching of Hexaconazole (1g/lit)	0.1%	24.28 (29.52)	24.46
T9	Control		37.02 (37.47)	19.66
	SEm		0.58	0.40
	CD @ 5%		1.71	1.21

*Figures in parenthesis are arc sign angular transformed values

Table.2 Survey for the incidence of various diseases in Brinjal at different villages of Shahapura taluka during khariff/rabi 2012

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Percent Diseases incidence recorded						
									P	D	I				
Crop	**Location (Taluks/ Villages)**	**Name and Address of farmer**	**Soil type**	**Previous crop**	**Variety /Hybrid**	**DOS**	**Area (Ac)**	**Stage of crop**	**Sclerotium rot**	**Root rot (R)**	**B. wilt**	**Leaf spot (Fungal)**	**Leaf spot (B)**	**Fruit rot**	**Mosaic**
	Shakapur	Suresh Rathod	Black	Chilli	Mhyco	10.7.10	1.5	Fruits	16.90	-	8.5	-	-	-	**4.5**
		Shenkar Chvan	Black	Tomato	Mhyco	1.8.10	0.5	Fruits	12.00	-	6.8	-	-	-	**6.7**
	Khanapur	Jaganatha Patil	Red	Cotton	Mhyco	6.8.10	2.5	Fruits	6.50	3.00	-	-	-	-	-
		Paravathppa	Black	Redgram	Local	12.7.10	1.3	Fruits	4.60	-	5.0	-	-	-	-
	Dornahalli	Devendrapa M	Red	Sunflower	Mhyco	11.8.10	3.0	Fruits	8.00	5.80	-	-	-	-	**13.5**
		Mallanna	Red	Brinjal	Round	16.7.10	2.0	Vege	2.50	-	-	-	-	-	**9.6**
	Chamanal	Bheemanna Hosamani	Red	Tomato	Local	19.7.10	2.7	Fruits	4.00	10.50	-	-	-	-	**10.5**
		Basavaraj Heremath	Black	Bendi	Mhyco	9.8.10	0.5	Fruits	2.80	8.70	4.9	-	-	-	**14.5**
	Rabbanali	Hanmatha Rathod	Red	Cotton	Mhyco	15.8.10	1.0	Fruits	14.50	4.50	-	2.2	-	-	**5.6**
		Manappa Chavan	Red	Redgram	Mhyco	25.8.10	0.8	Fruits	3.20	2.00	-	-	-	-	**8.0**
	Gundahalli	Teju Naik	Red	Onion	Mhyco	25.7.10	4.0	Fruits	6.00	8.40	3.8	-	-	-	**14.8**
		Mallakappa Gouda	**Red**	**Cotton**	**Mhyco**	**16.8.10**	**2.0**	**Fruits**	**-**	**4.60**	**6.0**	**-**	**-**	**-**	**7.5**

R= Rhizoctonia, B= Bacteria

Table.3 Survey for the incidence of various diseases in Brinjal at different villages of Shorapur taluka during khariff/rabi 2012

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Percent Diseases incidence recorded						
											P	D	I		
Crop	**Location (Taluks/ Villages)**	**Name and Address of farmer**	**Soil type**	**Previous crop**	**Variety /Hybrid**	**DOS**	**Area (Ac)**	**Stage of crop**	**Wilt Sclerotium rot**	**Root rot (R)**	**B. wilt**	**Leaf spot (Fungal)**	**Leaf spot (B)**	**Fruit rot**	**Mosaic**
	Kaldevahalli	Siddanagouda	Black	Wheat	Mhyco	16.7.10	1.5	Fruits	16.40	-	4	-	-	-	**8.5**
		Govind Rao	Black	Jowar	Local	1.8.10	1.0	Harvest	12.00	3.50	-	-	-	-	**6.0**
	Devatakal	Shabir Pasha	Red	Chilli	Mhyco	10.8.10	1.3	Fruits	18.40	-	-	6.5	-	-	**3.8**
		Chendrashekar	Red	Cotton	Mhyco	4.7.10	2.0	Harvest	6.40	-	-	-	-	-	**8.5**
	Krishanpur	Hanmathappa Nayakodi	Red	Redgram	Round	13.8.10	1.0	Fruits	-	-	10.8	-	-	-	**12.6**
		Lingaraju	Red	Cotton	Mhyco	18.8.10	1.0	Harvest	3.80	-		-	-	-	
	Hunasigi	Bheemaraya	Black	Sunflower	Mhyco	1.9.10	2.5	Fruits	8.90	2.00	7.5	-	-	-	**4.5**
		Lakappa Patil	Black	Beans	Arka	4.9.10	0.5	Harvest	6.00	-	10.4	-	-	-	**3**
	Kakkera	Naganagouda	Black	Redgram	Mhyco	6.8.10	0.5	Fruits	14.50	-	-	-	-	-	**10.2**
		Bheemanna Pujari	Red	Cotton	Mhyco	12.8.10	1.3	Harvest	9.50	-	-	-	-	-	**3.8**
	Avura	Mallikarjun	Black	Bajra	Mhyco	1.8.10	0.5	Fruits	2.00	4.80	-	-	-	-	**14.5**
		Hulagappa	**Black**	**Mallige**	**Local**	**10.9.10**	**0.8**	**Harvest**	**-**	**6.20**	**-**	**-**	**-**	**-**	**10.5**

R= Rhizoctonia, B= Bacteria

Table.4 Survey for the incidence of various diseases in Brinjal at different villages of Jeewargi taluka during khariff/rabi 2012

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Percent Diseases incidence recorded						
											P	D	I		
Crop	**Location (Taluks/ Villages)**	**Name and Address of farmer**	**Soil type**	**Previous crop**	**Variety /Hybrid**	**DOS**	**Area (Ac)**	**Stage of crop**	**Wilt Sclerotium rot**	**Root rot (R)**	**B. wilt**	**Leaf spot (Fungal)**	**Leaf spot (B)**	**Fruit rot**	**Mosaic**
	Sonna	Basavaraj	Red	Cotton	Mhyco	10.8.10	0.5	Harvest	6.80	-	4.5	-	-	-	**6.8**
		Bheemaraya	Red	Chilli	Round	12.9.10	1.3	Fruits	14.00	-	-	-	-	-	**4.2**
	Andola	Somashekar gouda	Black	Sugarcane	Arka	1.7.10	0.8	Fruits	-	5.40	-	-	-	-	**9.5**
		Nagappa Madul	Black	Cotton	Local	8.8.10	1.0	Fruits	-	-	-	-	-	-	**2.5**
	Gavhara	Mallakappa P	Black	Redgram	Mhyco	9.7.10	0.5	Fruits	8.00	-	-	-	-	-	-
		Rudranna Kumar	Black	Redgram	Mhyco	4.8.10	1.5	Harvest	14.00	-	-	-	-	-	-
	Hipparaga	Shekarppa Hosamani	Red	Redgram	Local	10.8.10	1.0	Harvest	3.40	2.00	-	-	-	-	-
		Sheranagouda	Black	Cotton	Arka	14.8.10	0.3	Harvest	6.00	-	-	-	-	-	-
	Rajanagi	Babu rao Kulkarni	Red	Sunflower	Mhyco	6.8.10	0.5	Flowering	-	4.00	8.5	-	-	-	**3.5**
		Muttappa Kalakati	**Black**	**Wheat**	**Local**	**2.9.10**	**0.8**	**Fruits**	**-**	**7.00**	**2.9**	**-**	**-**	**-**	**5.0**

R= Rhizoctonia, B= Bacteria

Table.5 Survey for the incidence of various diseases in Brinjal at different villages of Yadgiri Dist during khariff/rabi 2012

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Percent Diseases incidence recorded						
									P	D		I			
Crop	**Location (Taluks/ Villages)**	**Name and Address of farmer**	**Soil type**	**Previous crop**	**Variety /Hybrid**	**DOS**	**Area (Ac)**	**Stage of crop**	**Wilt Sclerotium rot**	**Root rot (R)**	**B. wilt**	**Leaf spot (Fungal)**	**Leaf spot (B)**	**Fruit rot**	**Mosaic**
	Balched	Mallikarjun	Black	Cotton	Mhyco	14.7.10	1.0	Fruits	8.50	-	9.8	-	-	-	**12.5**
		Basavaraj	Black	Redgram	Round	16.8.10	0.3	Fruits	2.80	-		-	-	-	**8.0**
	Balichekra	Naganagouda D	Black	Redgram	Mhyco	2.8.10	0.8	Harvest	14.00	-	4	-	-	-	-
		Husen Sab	Black	Wheat	Local	8.8.10	1.3	Harvest	5.80	-	3.2	-	-	-	-
	Madavar	Ramanna Patil	Red	Cotton	Mullu	9.7.10	0.8	Fruits	-	-	4.5	-	-	-	**9.8**
		Santhosh Chigari	Red	Chilli	Mhyco	10.8.10	0.5	Fruits	-	-	2	-	-	-	**10.5**
	Hatikuni	Basavanthray	Red	Cotton	Mhyco	4.8.10	1.5	Fruits	11.80	2.50	-	-	-	-	**2.8**
		Mahendrappa	Red	Redgram	Mhyco	14.8.10	2.0	Fruits	6.80	-	-	-	-	-	**3.4**
	Rampur	Ashok Chavan	Black	Redgram	Mhyco	9.7.10	1.3	Fruits	-	4.20	1.8	-	-	-	**4.5**
		Sugureshwar	**Black**	**Cotton**	**Mhyco**	**12.8.10**	**0.8**	**Fruits**	**-**	**6.40**	**2.2**	**-**	**-**	**-**	**2.8**

R= Rhizoctonia, B= Bacteria

Table.6 Mean values of survey for the incidence of various diseases in Brinjal at different village during khariff/rabi 2012

(1)	(2)	Percent Disease incidence recorded Mean P D I				
Taluka	**Location (Taluks/ Villages)**	**Sclerotium rot**	**Root rot (R)**	**B. wilt**	**Leaf spot (Fungal)**	**Mosaic**
Shahapur	Shakapur Khanapur	14.45	-	7.8	-	5.6
	Dornahalli	5.5	1.5	2.5	-	-
	Chamanal Rubnalli	5.0	2.7	-	-	11.6
	Gundalli	3.5	9.25	2.48	2.2	12.5
		8.6	3.4	-	-	7.3
		3.0	6.5	4.7	-	11.5
Shorapur	Kaldevahalli	14.2	1.75	2.0	-	7.3
	Devatkal	12.4	-	-	3.4	6.2
	Krishnapur	2.14	-	-	-	6.3
	Hunasigi Kakkera	7.45	1.0-	5.4	-	7.0
	Avura	12.0	5.5	9.0	-	12.5
		2.0	-	-	-	-
Jewargi	Sonna	10.4	-	4.5	-	5.5
	Andola	-	2.7	-	-	6.0
	Gavhara	11.0	-	-	-	-
	Hipparaga	4.5	2.0	--	-	-
	Ranjanagi	--	5.5	-	-	-
		--	-	5.8	-	4.3
Yadgir	Balched	5.66	-	4.7	-	10.4
	Balichakra	9.4	-	3.5	-	-
	Madavara	-	-	3.2	-	10.15
	Hatikuni	9.3	2.5	-	-	3.0
	Ramapur	-	5.3	2.0	-	3.7

Mean values of different diseases in Brinjal for different village ; R= Rhizoctonia, B= Bacteria

The mean percent incidence of *sclerotium* rot was observed in brinjal and ranged highest 16.90 percent from Shahapur taluka followed by 14.20 percent in Shorapur taluk, 10.40 PDI found in Jeevargi taluka and 9.40 percent incidence in Yadgiri taluka. However, highest incidence of *Rhizoctonia* rot ranged from 9.25 percent to lowest of 1.0 percent in Shorapur taluka. Similarly, Bacterial wilt incidence ranged from 9.0 PDI in Kakkera followed by 7.8 percent in Shakapur of Shahpur taluk. While, least incidence of 2.0 percent was recorded in kaldevanhalli of Shorapur taluka (Table 6). Similarly, fungal leaf spot incidence ranged by highest of 3.4 percent in Devatkal of

Shorapur taluka to 2.2 percent in chamanal of Shahpur taluk. However, Mosaic disease ranged from 14.80 percent in gundalli of Shahapur taluk followed by 12.5 percent in Kakkera of Shorapur taluk and 10.15 percent in Madavara of Yadgiri area followed by mean least incidence of 3.0 percent in Hattikuni of Yadgiri taluk was observed.

The survey results concluded that S*clerotium color* rot was severe in all the talukas surveyed and disease incidence ranged from 2.0 to 16.90 per cent. While, *Rhizoctonia* rot ranged from 1.0 to 9.25 percent, Bacterial wilt ranged from 2.0 to 9.0 PDI. However, fungal leaf spot ranged from 2.2 to 3.4 percent and Mosaic disease ranged from 3.0 to 14.80 percent in different parts of the districts.

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