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Original Research Article

Economics of Different Fungicidal Sprays Tested under Field Conditions against Major Foliar Fungal Diseases of Potato

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A B S T R A C T

Potato (*Solanum tuberosum* L.) is the most important crop among all vegetables. It suffers from a number of diseases among them, foliar fungal diseases are the most important which causes considerable yield loss. The experiment was conducted during *rabi* season 2011-2013, on spray schedules of different fungicides for the management of foliar fungal diseases of potato. The most economical schedule (First most) i.e., prophylactic spray with Mancozeb @ 0.2 per cent at 30 days after sowing followed by the spray of Sectin @ 0.3 per cent and one more spray with Mancozeb was found most effective in controlling the severity of Early and Late blight diseases and increasing tuber yield in comparison to other treatments, Second most economical schedule i.e., prophylactic spray with Mancozeb @ 0.2 per cent at 30 days after sowing followed by the spray of Curzate @ 0.3 per cent and one more spray with Mancozeb and third most economical schedule i.e., prophylactic spray with Mancozeb @ 0.2 per cent at 30 days after sowing followed by the spray of Acrobat @ 0.3 per cent and one more spray with Mancozeb was found most effective in controlling the severity of both diseases and increasing tuber yield on both varieties (Kufri Ashoka and Kufri Pukhraj) in two consecutive years. Variety Kufri Pukhraj treated by the prophylactic spray of Mancozeb followed by the spray of Sectin and one more spray of Mancozeb was found most effective and proved to be most economical with higher benefit cost ratio of 1:4.98 and 1: 4.94 in year 2011-2012 and 2012-13, respectively followed by spraying schedule of Mancozeb in alternation of Curzate (1:4.84 and 1:4.83) and Mancozeb in alternation of Acrobat (1:4.80 and 1:4.76), respectively.

Keywords

Early blight, Late blight, Yield, Economics, Field and Fungicides

Introduction

Potato is the most important food crop grown throughout the world. It is a versatile, carbohydrate rich food prepared and served in a variety of way. Potato is grown in various climatic conditions throughout the world in about 18.6 million hectares in 150 countries, and is an important part of global food supply (Anonymous, 2003). Potato is grown in almost all the states of India. The major potato producing states are Uttar Pradesh, Bihar, West Bengal, Punjab, Assam, Madhya Pradesh, Himachal Pradesh, Haryana, Maharashtra, Karnataka, Meghalaya and Tamil Nadu. Indian contribution to the world's production was 45.34 million tonnes from 1.99 million hectare area with average productivity of 22.8 tonnes per hectare. In Uttar Pradesh,

potato is cultivated in 0.60 million hectare with production of 14.43 million tonnes and average productivity was 23.9 tonnes per hectare (Anonymous, 2013).

The vegetable basket is incomplete without this king of vegetables, a sustaining force and a culinary delight. The power of potato is known for sustaining million of lives by providing nutritious food in the time of war and hunger and also used as staple food in several countries of the world. The high production potential per unit area, high nutritional value and great taste make potato one of the most important food crops in the world.

It is used as vegetable alone and mixed with other vegetable such as cabbage, cauliflower, pea, tomato, broccoli etc. It is used in preparation of brief products (chips and frozen French fries), dehydrated products (dices, flakes granules, starch, gravy thickener, potato custard powder etc.) and canned potato (Marwaha and Sandhu, 1999). Potato produces 3 kg of edible protein/ha/day as compared to 2.5 kg and 1.0 kg in wheat and rice, respectively. Potato also produces more carbohydrate, fiber and vitamins per unit area and per unit time than other food crops (Shekhawat and Dahiya, 2000). In the present study, the investigation was carried out to find the benefit cost ratio of different fungicidal sprays against major foliar fungal diseases.

Materials and Methods

The experiment was carried out on spray schedules of different fungicides for the management of major fungal foliar diseases of potato in field conditions during *rabi* 2011-12 and 2012-13 in RBD with three replications using cultivars Kufri Ashoka (V_1) and Kufri Pukhraj (V_2) were sown on dated 17th November, with four replications and six treatments in RBD design along with recommended package and practices during 2011-13 at Vegetable Farm of Narendra Deva University of Agriculture & Technology, Kumarganj, Faizabad. The six treatments were used *viz*: Prophylactic spray with Mancozeb (Indofil M 45) @ 0.2 per cent at 30 DAS followed by two more spray at weekly intervals (T_1), Prophylactic spray with Mancozeb @ 0.2 per cent at 30 DAS followed by three more spray at weekly intervals (T_2), Prophylactic spray with Mancozeb @ 0.2 per cent at 30 DAS followed by Cymoaxnil + Mancozeb (Curzate) @ 0.3 per cent after disease initiation and one more spray with Mancozeb after 15 days of 2nd Spray (T_3), Prophylactic spray with Mancozeb @ 0.2 per cent at 30 DAS followed by Fenamidone + Mancozeb (Sectin) @ 0.3 per cent after disease initiation and one more spray with Mancozeb after 15 days of 2nd Spray (T_4), Prophylactic spray with Mancozeb @ 0.2 per cent at 30 DAS followed by Dimethomorph + Mancozeb (Acrobat) @ 0.3 per cent after disease initiation and one more spray with Mancozeb after 15 days of 2nd Spray (T_5) and T_6 serve as untreated. All the recommended agronomical and cultural practices were followed for raising a good crop.

After germination, the crop was regularly watched for the first appearance of foliar fungal diseases. Progress on disease severity were recorded at weekly intervals starting from disease appearance up to harvesting on the basis of percentage leaf area affected in newer and older leaves of 5 plants selected randomly for each disease in per replication of each genotype using 0-5 rating scale of Kaul (1983) to early blight and 0-9 rating scale of Shutong *et al.* (2007) for late blight. The observations on yield was recorded from individual plot in q/ha. Benefit cost ratio was point out to evaluate the most

economical spray among all treatments applied as different spray schedule.

Results and Discussion

All the combinations showed beneficial effect over control. Most economical schedule (First most) i.e., prophylactic spray with Mancozeb @ 0.2 per cent at 30 days after sowing followed by the spray of Sectin @ 0.3per cent and one more spray with Mancozeb was found most effective in controlling the severity of both diseases and increasing tuber yield in comparison to other treatments, Second most economical schedule i.e., prophylactic spray with Mancozeb @ 0.2 per cent at days after sowing followed by the spray of Curzate @ 0.3per cent and one more spray with Mancozeb and third most economical schedule i.e., prophylactic spray with Mancozeb @ 0.2 per cent at days after sowing followed by the spray of Acrobat @ 0.3per cent and one more spray with Mancozeb was found most effective in controlling the disease severity and increasing tuber yield on both varieties in both years .

In year 2011-12 earliest disease early blight appeared during last week of December 2011 and first week of January 2012 in untreated and treated plots, respectively on both varieties. The per cent disease severity of early blight increased gradually till maturity and reached its maximum i.e. 8.39, 9.13, 9.51, 16.58, 17.51 and 38.04 per cent on cultivar K. Ashoka (V_1) in treatment fourth, third, fifth, second, first and six, respectively. Similarly the disease was also progressed on cultivar K. Pukhraj (V_2) and terminal severity noted from minimum to maximum (5.96, 6.54, 6.81, 11.94, 12.63 and 27.70 per cent) in the respective order of same treatments. Among the treated plots minimum AUDPCs were 18.42 and 23.03 noted in treatment fourth followed by treatment third and fifth while, maximum AUDPCs 39.07 and 48.15 were recorded in treatment first followed by treatment second on cultivars K. Pukhraj and K. Ashoka, respectively (Table 1). In the crop season 2012-13 progression of the disease severity of early blight was noted at weekly intervals. The per cent disease severity of early blight increased gradually till maturity of the crop in February and reached up to 8.83, 9.64, 10.04, 17.60 18.47 and 39.99 per cent on cultivar K. Ashoka (V_1) in treatment fourth, third, fifth, second, first and six, respectively. Progression of the disease in similar manner was also recorded on cultivar K. Pukhraj (V_2) and terminal severity to be noted from minimum to maximum (6.30, 6.91, 7.21, 12.61, 13.38 and 29.24 per cent) in the respective order of same treatments. Among the treated plots minimum AUDPCs were 16.94 and 25.38 noted in treatment fourth, while maximum AUDPCs 30.38 and 43.23 were recorded in treatment first on cultivars K. Pukhraj and K. Ashoka, respectively. Maximum reduction percentage of disease over control was found in treatment fourth followed by treatment third and fifth on both the varieties in both crop seasons (Table 2).

Late blight appeared between 15-19 January and 17-21 January 2012 in different treatments on K. Ashoka and K. Pukhraj, respectively in crop season 2011-12. The experimental results are presented in Table 3. It was observed that the late blight first time appeared in control plots 4 days earlier than those plots sprayed with mancozeb (three spray) only (T_1) and three days earlier in the plots sprayed with mancozeb (four spray) only (T_2) but it appeared after seven days from control plots in those plots treated with alternation of Mancozeb and Curzate (T_3), Mancozeb with Sectin (T_4) and Mancozeb with Acrobat (T_5).

Table.1 Effect of different fungicidal schedules on appearance and progress of early blight in potato (2011-12)

Treatments	Appearance		Per cent disease severity at weekly intervals								Disease Reduction Over control (%)	AUDPC
	Date	DAS	1.01.12	8.01.12	15.01.12	22.01.12	29.01.12	5.02.12	12.02.12	19.02.12		
$V_1 T_1$	02.01.2012	46	0	2.45	3.57	4.81	5.82	9.05	13.4	17.51	53.97	48.15
$V_1 T_2$	02.01.2012	46	0	2.34	3.41	4.58	5.55	8.63	12.77	16.68	56.15	45.89
$V_1 T_3$	01.01.2012	45	0	1.28	1.86	2.51	3.04	4.72	6.99	9.13	76.00	25.12
$V_1 T_4$	01.01.2012	45	0	1.17	1.71	2.3	2.79	4.33	6.41	8.39	77.94	23.03
$V_1 T_5$	01.01.2012	45	0	1.33	1.94	2.61	3.17	4.92	7.28	9.51	75.00	26.17
$V_1 T_6$	25.12.2011	38	1.27	5.33	7.77	10.45	12.66	19.68	29.13	38.04	-	104.68
$V_2 T_1$	04.01.2012	48	0	1.76	2.55	4.87	5.94	7.58	9.78	12.63	54.40	39.07
$V_2 T_2$	04.01.2012	48	0	1.66	2.41	4.61	5.62	7.17	9.25	11.94	56.90	36.94
$V_2 T_3$	03.01.2012	47	0	0.91	1.32	2.52	3.08	3.92	5.06	6.54	76.39	20.22
$V_2 T_4$	03.01.2012	47	0	0.83	1.20	2.3	2.8	3.57	4.61	5.96	78.48	18.42
$V_2 T_5$	03.01.2012	47	0	0.95	1.38	2.63	3.21	4.09	5.28	6.81	75.42	21.08
$V_2 T_6$	27.12.2011	40	1.15	3.86	5.6	10.69	13.03	16.62	21.45	27.70	-	85.68

DAS- Days After Sowing, AUDPC-Area Under Disease Progress Curve

Table.2 Effect of different fungicidal schedules on appearance and progress of early blight in potato (2012-13)

Treatment	Appearance		Per cent disease severity at weekly intervals								Disease Reduction Over control (%)	AUDPC
	Date	DAS	30. 12.12	6. 01.13	13.01.13	20.01.13	27.01.13	03.02.13	10.02.13	17.02.13		
$V_1 T_1$	31.12.2012	44	0.00	2.59	3.77	5.07	6.15	9.55	14.14	18.47	53.81	43.23
$V_1 T_2$	31.12.2012	44	0.00	2.47	3.60	4.84	5.86	9.11	13.48	17.60	55.99	40.53
$V_1 T_3$	30.12.2012	43	0.00	1.35	1.97	2.65	3.21	4.99	7.38	9.64	75.89	26.43
$V_1 T_4$	30.12.2012	43	0.00	1.24	1.80	2.43	2.94	4.57	6.76	8.83	77.92	25.38
$V_1 T_5$	30.12.2012	43	0.00	1.41	2.05	2.76	3.34	5.19	7.69	10.04	74.89	27.25
$V_1 T_6$	23.12.2012	36	1.34	5.60	8.17	10.99	13.31	20.69	30.63	39.99	-	106.77
$V_2 T_1$	02.01.13	46	0.00	1.86	2.70	5.14	6.27	8.00	10.32	13.38	54.24	30.38
$V_2 T_2$	02.01.13	46	0.00	1.76	2.55	4.87	5.93	7.56	9.76	12.61	56.87	27.75
$V_2 T_3$	01.01.13	45	0.00	0.96	1.39	2.66	3.25	4.14	5.34	6.91	76.37	17.31
$V_2 T_4$	01.01.13	45	0.00	0.88	1.27	2.43	2.96	3.77	4.87	6.30	78.45	16.94
$V_2 T_5$	01.01.13	45	0.00	1.00	1.45	2.78	3.38	4.32	5.57	7.21	75.34	17.76
$V_2 T_6$	25.12.12	38	1.21	4.07	5.91	11.28	13.75	17.54	22.64	29.24	-	87.39

DAS- Days After Sowing, AUDPC-Area Under Disease Progress Curve

Table.3 Effect of different fungicidal schedules on appearance and progress of late blight of potato (2011-12)

Treatment	Appearance		Per cent disease severity at weekly intervals					Disease Reduction Over control (%)	AUDPC
	Date	DAS	Reduction	29.01.2012	05.02.2012	12.02.2012	19.02.2012		
$V_1 T_1$	19.01.2012	63	5.4	14.12	16.5	18.45	21.42	52.54	109.34
$V_1 T_2$	20.01.2012	64	5.2	12.45	15.6	17.56	20.62	54.31	102.41
$V_1 T_3$	23.01.2012	67	0	7.61	9.57	10.85	11.41	74.72	59.04
$V_1 T_4$	23.01.2012	67	0	7.58	9.5	10.04	10.97	75.69	57.06
$V_1 T_5$	23.01.2012	67	0	7.64	9.59	11.15	11.97	73.48	60.14
$V_1 T_6$	15.01.2012	59	5.8	25.5	36.55	42.6	45.13	-	227.70
$V_2 T_1$	21.01.2012	65	3.22	8.8	10.05	12.35	13.18	53.66	68.95
$V_2 T_2$	22.01.2012	66	0	7.95	9.93	11.71	12.67	55.45	62.87
$V_2 T_3$	25.01.2012	69	0	4.65	5.81	6.03	6.56	76.93	34.60
$V_2 T_4$	25.01.2012	69	0	4.63	5.78	5.96	6.39	77.53	34.24
$V_2 T_5$	25.01.2012	69	0	4.66	5.82	6.23	6.88	75.81	35.26
$V_2 T_6$	17.01.2012	61	4.8	17.1	20.9	25.8	28.44	-	140.74

DAS- Days After Sowing, AUDPC-Area Under Disease Progress Curve

Table.4 Effect of different fungicidal schedules on appearance and progress of late blight of potato (2012-13)

Treatment	Appearance		Per cent disease severity at weekly intervals		Per cent Reduction Over control	AUDPC
	Date	DAS	10.02.13	17.02.13		
$V_1 T_1$	08.02.2013	83	3.4	16.48	51.60	69.58
$V_1 T_2$	09.02.2013	84	3.3	15.84	53.48	66.99
$V_1 T_3$	10.02.2013	85	0	8.9	73.86	31.15
$V_1 T_4$	10.02.2013	85	0	8.7	74.45	30.45
$V_1 T_5$	10.02.2013	85	0	9.31	72.66	32.58
$V_1 T_6$	06.02.2013	81	6.2	34.05	-	140.88
$V_2 T_1$	10.02.2013	85	0	12.02	52.86	42.07
$V_2 T_2$	11.02.2013	86	0	11.56	54.67	40.46
$V_2 T_3$	12.02.2013	87	0	6.23	75.57	21.81
$V_2 T_4$	12.02.2013	87	0	6.09	76.12	21.31
$V_2 T_5$	12.02.2013	87	0	6.54	74.35	22.89
$V_2 T_6$	08.02.2013	83	4.55	25.5	-	105.18

DAS- Days After Sowing, AUDPC-Area Under Disease Progress Curve

Table.5 Benefit cost ratio of different treatments (2011-12)

Treatments		No of spray	Cost due to treatments				Total cost (Rs.)	Yield (q/ha)	Additional yield over control (q/ha)	Additional Income (Rs./ha)	B:C ratio
			Fungicide		Charges						
			Amount (kg/ha)	Cost (Rs.)	Sprayer (Rs.)	Labour (Rs.)					
V_1 T_1	Mancozeb @ 0.2%	3	6	1620	150	600	2370	196.1	18.1	9050	3.82
V_1 T_2	Mancozeb @ 0.2%	4	8	2160	200	800	3160	202.5	24.5	12250	3.88
V_1 T_3	Mancozeb @ 0.2%	2	4	1080	100	400	7980	245.3	67.3	33650	4.22
	Curzate @ 0.3%	1	3	6150	50	200					
V_1 T_4	Mancozeb @ 0.2%	2	4	1080	100	400	7815	245.6	67.6	33800	4.33
	Sectin @ 0.3%	1	3	5985	50	200					
V_1 T_5	Mancozeb @ 0.2%	2	4	1080	100	400	8025	244.9	66.9	33450	4.17
	Acrobat @ 0.3%	1	3	6195	50	200					
V_1 T_6	Control							178.0			
V_2 T_1	Mancozeb @ 0.2%	3	6	1620	150	600	2370	224.3	21.3	10650	4.49
V_2 T_2	Mancozeb @ 0.2%	4	8	2160	200	800	3160	231.8	28.8	14400	4.56
V_2 T_3	Mancozeb @ 0.2%	2	4	1080	100	400	7980	280.3	77.3	38650	4.84
	Curzate @ 0.3%	1	3	6150	50	200					
V_2 T_4	Mancozeb @ 0.2%	2	4	1080	100	400	7815	280.8	77.8	38900	4.98
	Sectin @ 0.3%	1	3	5985	50	200					
V_2 T_5	Mancozeb @ 0.2%	2	4	1080	100	400	8025	280	77	38500	4.80
	Acrobat @ 0.3%	1	3	6195	50	200					
V_2 T_6	Control							203.0			

Fungicide cost (Rs./Kg): Mancozeb- 270, Curzate-2050, Sectin-1995 and Acrobat-2065; Sprayer: Efficiency- 1 ha/day, Rent –Rs. 50/days Labour: 2 labour /Spray, Charges- Rs.100/day/labour; Potato: Price- Rs.500/ q., V_1 - Kufri Ashoka, V_2 - Kufri Pukhraj

Table.6 Benefit Cost ratio of different treatments (2012-13)

Treatments		No of spray	Cost due to treatments				Total cost (Rs.)	Yield (q/ha)	Additional yield over control (q/ha)	Additional Income (Rs./ha)	B:C ratio
			Fungicide		Charges						
			Amount (kg/ha)	Cost (Rs.)	Sprayer (Rs.)	Labour (Rs.)					
$V_1 T_1$	Mancozeb @ 0.2%	3	6	1620	150	600	2370	197.5	17.9	8950	3.78
$V_1 T_2$	Mancozeb @ 0.2%	4	8	2160	200	800	3160	203.9	24.3	12150	3.84
$V_1 T_3$	Mancozeb @ 0.2%	2	4	1080	100	400	7980	246.7	67.1	33550	4.20
	Curzate @ 0.3%	1	3	6150	50	200					
$V_1 T_4$	Mancozeb @ 0.2%	2	4	1080	100	400	7815	247.1	67.5	33750	4.32
	Sectin @ 0.3%	1	3	5985	50	200					
$V_1 T_5$	Mancozeb @ 0.2%	2	4	1080	100	400	8025	245.9	66.3	33150	4.13
	Acrobat @ 0.3%	1	3	6195	50	200					
$V_1 T_6$	Control							179.6			
$V_2 T_1$	Mancozeb @ 0.2%	3	6	1620	150	600	2370	225.5	21	10500	4.43
$V_2 T_2$	Mancozeb @ 0.2%	4	8	2160	200	800	3160	233	28.5	14250	4.51
$V_2 T_3$	Mancozeb @ 0.2%	2	4	1080	100	400	7980	281.6	77.1	38550	4.83
	Curzate @ 0.3%	1	3	6150	50	200					
$V_2 T_4$	Mancozeb @ 0.2%	2	4	1080	100	400	7815	281.7	77.2	38600	4.94
	Sectin @ 0.3%	1	3	5985	50	200					
$V_2 T_5$	Mancozeb @ 0.2%	2	4	1080	100	400	8025	280.9	76.4	38200	4.76
	Acrobat @ 0.3%	1	3	6195	50	200					
$V_2 T_6$	Control							204.5			

Fungicide cost (Rs./Kg): Mancozeb- 270, Curzate-2050, Sectin-1995 and Acrobat-2065; Sprayer: Efficiency- 1 ha/day, Rent –Rs. 50/day; Labour: 2 labour/Spray, Charges- Rs.100/day/labour; Potato : Price- Rs.500/ q. , V_1 - K. Ashoa, V_2 - K. Pukhraj

The result also revealed in the respect of variety K. Ashoka, the best result was observed in T_4 where severity of the disease was 10.97 per cent and AUDPC was 57.06. The second and third best result were observed in T_3 and T_5 where disease severity were 11.41 and 11.97per cent and AUDPC were 59.04 and 60.14 found, respectively, after 35 days of its appearance. These treatments were statistically at par and significantly differed from other treatments. In case of K. Pukhraj result was found in similar trend in different treatments. The best result was noted in T_4 with minimum severity of the disease i.e., 6.39 per cent along with minimum AUDPC (34.24). The second and third best result was observed in T_3 and T_5 where disease severity was 6.56 and 6.88 per cent, and AUDPC 34.60 and 35.26, respectively, after 33 days of its appearance. Treatments T_3, T_4 and T_5 were statistically at par and significantly differed from other treatments. T_1 and T_2 also best as compared to control, it was found 13.18 and 12.67 per cent severity and 68.95 and 62.87 AUDPC in T_1 and T_2 respectively. While maximum disease severity 28.44 per cent and maximum AUDPC 140.74 was recorded in control plots (Table 3). During 2012-13, late blight was occurred at 81 and 83 days after sowing on control plots in K. Ashoka and K. Pukhraj, respectively. Late bight was also noted 4-8 days delayed on treated plots with different fungicidal schedules than control in both the varieties. Table (4) revealed that the variety K. Ashoka showed minimum disease severity (8.7 per cent) along with minimum AUDPC (30.45) in T_4 which was proved most effective by maximum reduction of disease (74. 45 per cent). The disease severity 8.9 and 9.31 per cent along with AUDPC 31.15 and 32.58 were recorded in the respective order of T_3 and T_5 which were significantly at par with T_4 and these were differed from others. Disease severity 16.48 and 15.84 per cent and AUDPC 69.58 and 66.99 were found in respective order of T_1 and T_2. Similarly, K. Pukhraj showed that the best result in T_4 with minimum severity of the disease i.e., 6.09 per cent along with minimum AUDPC (21.31). The second and third best result was observed in T_3 and T_5 where disease severity (6.23 and 6.54 per cent), and AUDPC (34.60 and 35.26) were found, respectively. Statistically all treatments have similar trend as 2011-12. These observations are in accordance with Kapsa (2010) reported that the effectiveness of new chemicals *viz.*, Curzate, Fenamidone and Acrobat to management of early and late blight. Muchiri *et al*. (2009), reported that the efficacy of fungicide mixers for the management of *Phytophthora infestans* on potato. Similar results were also revealed by Singh (2008), Shashibala and Pundhir (2008), Chaudhari *et al*. (2005), Singh *et al*. (1997) and Chakraborty and Majumdar (2012).

Variety K. Pukhraj treated by the prophylactic spray of Mancozeb followed by the spray of Sectin and one more spray of Mancozeb was found most effective and proved to be most economical with higher benefit cost ratio of 1:4.98 and1: 4.94 in year 2011-2012 and 2012-13, respectively followed by spraying schedule of mancozeb in alternation of Curzate (1:4.84 and 1:4.83) and mancozeb in alternation of Acrobat (1:4.80 and 1:4.76), respectively. Prophylactic spray of Mancozeb and three more spray of same fungicide also found beneficial (1:4.56 and 1:4.51) followed by three spraying of Mancozeb including prophylactic spray (4.49 and 4.43) in respective order of both years. Similar results also found in variety K. Ashoka, whereas maximum benefit cost ratio 4.33 and 4.32 was recorded by first most economical schedule in year 2011-12 and 2012-13, respectively followed by second

(1:4.22 and 1:4.20) and third (1:4.17 and 1:4.13) most economical schedule in respective order of both testing years (Table 5 and Table 6). The results are in accordance with Dhinganij *et al*., 2013; Jambhulkar *et al*., 2012.

Over all, the highest benefit cost ratio was recorded on variety K. Pukhraj treated with prophylactic spray of Mancozeb followed by one spray of Sectin and one more spray of Mancozeb. It was found superior to K. Ashoka in respect of same fungicidal schedules in both years. Lowest benefit cost ratio was found on variety K. Ashoka treated with three spray of Mancozeb including prophylactic spray. These findings are in accordance with Pathak, *et al.,* 2012 reported 3 effective fungicidal schedules to manage early blight disease. The present study is in agreement with Sahu *et al*., 2013; Kumar *et al.*, 2016. These results obtained on the economics of different fungicidal spraying treatments for the management of foliar fungal diseases of potato are in conformity with those reported earlier by several workers (Kumar *et al*., 2009; Meena *et al*., 2011 and Singh *et al.*, 2013).

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