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EFFECT OF DITHANE M-45 AND BAU BIOFUNGICIDE ON DISEASE INCIDENCE AND YIELD OF JUTE CV. CVL-1

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A B S T R A C T

The experiments were conducted in the field of Jute Agriculture Experimental Station (JAES), Manikgonj and Kishoregonj Regional Station (KRS), Kishoregonj of BJRI. The experiments were conducted during the period April 2012 to January 2013. Two different disease management practices viz. Dithane M-45 and BAU- Biofungicide were used for the present study. Disease management showed lowest disease incidence 1.98% and 1.87% at JAES and KRS, respectively with BAU- Biofungicide spraying and highest disease incidence 4.26% and 4.47% at JAES and KRS, respectively were recorded under control condition. The highest seed yield (588.35 kg/ha), fibre yield (4.12 ton/ha) and stick yield (9.33 ton/ha) were recorded under BAU- Biofungicide sprayed plant and lowest seed yield (378.45 kg/ha), fibre yield (2.21 ton/ha) and stick yield (5.43 ton/ha) under control treatment.

Keywords: Effect, disease management, disease incidence, seed quality, yield.

INTRODUCTION

Jute is one of the major cash crops of Bangladesh. Its influence is significantly related to the agro-ecology and the socio-economic life of the people. The jute crop also greatly improves the soil fertility status by incorporating organic matter to the soil through decomposition of shedded leaves and plant residues and helps in breaking plough-pans through its long taproots. Also, jute and jute goods have been recognized as being friendly to the environment. Jute is mostly grown in the Indo-Bangladesh region and in some countries of Southeast Asia. Among the jute growing countries of the world, Bangladesh was second position in respect of production (Islam, 2007). The land and climatic conditions of Bangladesh are congenial for the production of high quality jute. In Bangladesh, about 0.709 million hectares of land was under jute cultivation and the total yield was 8.40 million bales (BBS, 2011, http://www.jute.org/, 2012-13). As per Khandakar (1987), Bangladesh annually needs about 4000 metric tons of jute seeds of which only 12-15% is produced and supplied by the Bangladesh Agricultural Development Corporation (BADC). The rest of the seeds, about 85% or more of the requirement, are produced and managed by farmers' (Hossain *et al*., 1994). Jute suffers from more than 13 different diseases (Fakir, 2001) and 10 of them are seed borne. Sowing of infected seeds may cause the death of seedlings and often plants escaping early infection succumb to death due to different diseases. Seed germination decreases with the increase of the seed borne infection. Seeds having higher seed borne infection results to significantly higher amount of disease development in the field. The rate of transmission of these pathogens from infected seeds to the growing plants and finally to the harvested seeds was relatively low (Fakir and Islam, 1990). Among the seed-borne fungal diseases, stem-rot, black-band, and anthracnose caused by *Macrophomina phaseolina* (Tassi, Goid.), *Botryodiplodia theobromae* and *Colletotrichum corchori* (Ikata and Yoshida, 1940), respectively are frequently transmitted through jute seeds (Fazli and Ahmed, 1960; Ahmed, 1966; Fakir *et al*., 1991). *Macrophomina phaseolina* alone can cause 10% yield loss (Ahmed, 1968). Stem rot, black band, anthracnose, foot rot and wilt (*Rhizoctonia solani*) and leaf mosaic (virus) are responsible for seed rot, pre and post emergence damping off seedling, spread of the disease

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to standing crops and loss and deterioration of quality of fibre (Ahmed, 1966; 1968; Ahmed and Islam, 1980; Biswas *et al*., 1985). Soft rot, foot rot and wilt caused by *Sclerotium rolfsii* and *Rhizoctonia solani*, respectively also cause considerable yield losses to the crop. *Cercospora* leaf spot and target spot caused by *Cercospora chorchori* and *Corynespora cassicola*, respectively, are not so important, though these two pathogens are frequently transmitted through jute seeds. The pathogens like *Fusarium* spp. (*Fusarium semitectum* and *Fusarium oxysporum*), *Curvularia lunata* and *Phomopsis* sp. are responsible for causing germination failure and seed rot (Fazli and Ahmed, 1960). Yield loss due to seed borne diseases of jute is 8-20% depending on the severity of jute diseases from year to year (Ahmed and Sultana, 1985). Infected jute seed fail to germinate or the young seedlings emerging from the infected seed die. Infection of jute seed causes germination failure, post emergence damping off and seedling blight (Fakir, 1989). Jute seedlings or growing plants produced in the field from the infected seeds and escaping early infection may often be infected at the later stages of their growth by the primary seed borne inocula grown and multiplied on the infected dead seeds and seedlings. Later on, these inocula may be transmitted to the healthy growing plants of the same or neighboring plants or even neighboring fields resulting to disease outbreak, often in epidemic form. Seed borne pathogens causing diseases on the growing jute plants in the field quite often attack the capsules or pods and subsequently infect the seed, resulting to production of infected or unhealthy seeds. Considering the above facts, the present study was carried out with the objective was to find out suitable disease management for quality jute seeds and fibre production.

MATERIALS AND METHODS

Experimental sites: The experiments were conducted in the field of Jute Agriculture Experimental Station (JAES), Manikgonj and Kishoregonj Regional Station (KRS), Kishoregonj of BJRI. Three sites of each station and each sites designed for three replications were considered for the experiments.

Variety Used: Seeds of Jute cv. CVL-1 was selected for this study.

Moisture Content of Seeds: Seeds having moisture content 9.5% (Khandakar and Bradbeer, 1983 and Bangladesh Gazette, 2010) was selected for field study.

Disease management in the Field: Spraying of fungicide Dithane M-45 (0.2%)

i) Spraying of BAU- Biofungicide @ 2% in water (Hossain, 2011b)
ii) Control (without spray)

Spraying of Dithane M-45: Dithane M-45 (Mancozeb 80%) was sprayed @ 2gm/L (0.2%) water as a preventive measure against the diseases of jute plants. Altogether, two sprays were done. The first spraying was done after disease occurred and the second spraying was done after 45 days of 1st spraying.

Spraying of BAU- Biofungicide: BAU- Biofungicide was sprayed @ 2% in water as a preventive measure against the diseases of jute plants. Altogether, two sprays were done. The first spraying was done after disease occurred and the second spraying was done after 45 days of 1st spraying.

Experimental Design: The experiments were conducted following Randomized Block Design (RCBD) having three replications. The size of the unit plot was $10m^2$ (5m x 2m) and the distance between plots and replications were 1.0 m and 1.0 m, respectively.

Soil Characteristics and Nutrient Status: The Soil characteristics and nutrient status of the two experimental stations (JAES, Manikgonj and KRS, Kishoregonj) are shown in Table 1.

Application of Fertilizers: During final land preparation Urea 60 kg, Triple Super Phosphate 50 kg and Muriate of Potash 25 kg per hectare were applied (Islam, 2009; Islam *et Al.,* 2008). After 15-20 days of seed germination first top dressing with the urea @ 60 kg and again another 15 days later of first top dressing, the 2nd top dressing was given with 60 kg per hectare. Top dressing of urea was done very carefully so that it will not come in contact with the plant parts. To meet sulphur and zinc deficiency, gypsum and zinc oxide @ 45 kg and 5 kg per hectare were applied (Islam, 2009; Islam *et al.,* 2008).

Sowing of Seeds: Seeds were sown in line on 18 April, 2012 in Kishoregonj Regional Station (KRS), Kishoregonj and 30 April in Jute Agriculture Experimental Station (JAES), Manikgonj. Row to row and plant to plant distance were maintained as 1m and 1 m, respectively. The seed rate for CVL-1 was 5 kg per hectare.

Data collection: Data on different parameters were collected as shown below

1. Incidence of diseases (%)
2. Fibre yield per plant (gm)

3. Fibre yield per hectare (ton)
4. Stick yield per plant (gm)
5. Stick yield per hectare (ton)
6. Average number of branches per plant
7. Average number of fruits per plant
8. Seed yield per plant (gm)
9. Seed yield per hectare (kg)

Some plots were kept un- harvested for seed production

Statistical Analysis: Data were analysed statistically and treatments effects were compared by Duncan's Multiple Range Test (DMRT). Relation between seed borne fungal pathogens and germination was observed with regression equations. Relationships between disease severity and seed, fibre and stick yield were also observed by linear regression lines and equations (Gomez and Gomez, 1984).

Table 1. Soil characteristics (Quddus, 2009) and nutrient status of the two experimental locations in 2012.

Location	Agro Ecological Zones	Soil characteristics			Nutrient status			
		Land type	Soil type	pH	% OM	% N	P (ppm)	K (meq/100)
Jute Agriculture Experimental Station (JAES), Manikgonj, BJRI	Active Brahmaputra and Jamuna Flood Plain (AEZ-7)	Medium land	Sandy and Silt	6.69	1.79	0.35	14.38	0.138
Kishoregonj Regional Station (KRS), BJRI	Old Brahmaputra Flood Plain (AEZ-9)	Medium land	Loam	6.11	1.24	0.39	14.98	0.15

RESULTS

Disease incidence in CVL-1 at JAES and KRS, BJRI: Altogether eight diseases (seedling blight, stem rot, black band, anthracnose, die back, soft rot, mosaic and root knot) of CVL-1 were recorded. Total as well as individual disease incidence varied independently of each other with respect to variety CVL-1 and locations (Table 2). Seedling blight was recorded before one month age of the plants. Seedling blight was not found at JAES and root knot was not found at KRS depending on soil characteristics and weather conditions. Before spraying, highest total disease incidence (19.65%) and lowest total disease incidence (12.17%) were recorded at KRS. After spraying, the highest total disease incidence (4.47%) at KRS was recorded under control treatment. Whereas the lowest total disease incidence (1.87%) at KRS was recorded with BAU- Biofungicide spraying.

Effect of disease managements on fibre and stick yield per plant and per hectare in CVL-1 at JAES and KRS, BJRI: Different types of disease management strategies differed significantly in respect of fibre and stick yield in CVL-1 grown at JAES and KRS of BJRI (Table 3). The highest fibre yield/plant (9.61 gm) and fibre yield/ha (4.12 ton) at JAES were recorded under BAU- Biofungicide sprayed plants. The lowest fibre yield/plant (8.43 gm) and fibre yield/ha (2.21 ton) at KRS were recorded under control condition. The highest mean fibre yield/plant (9.44 gm) and fibre yield/ha (3.70 ton) of two locations were recorded under BAU- Biofungicide sprayed plants. Highest stick yield/plant (21.89 gm) and stick yield/ha (9.33 ton) at JAES were recorded under BAU- Biofungicide sprayed plants. The lowest stick yield/plant (19.84 gm) and stick yield/ha (5.43 ton) at KRS were recorded under control treatment. The highest mean stick yield/plant (21.25 gm) and stick yield/ha (8.99 ton) of two locations were recorded under BAU- Biofungicide spraying plants.

Effect of disease managements on number of branch and capsule per plant in CVL-1 at JAES and KRS, BJRI: Different types of disease managements differed significantly in respect of number of branch and capsule per plant in CVL-1 grown at JAES and KRS of BJRI (Table 4). The highest branch (4.66) of CVL-1 was recorded with BAU- Biofungicide sprayed plants at JAES and highest capsule/plant (70.22) at KRS was recorded under BAU- Biofungicide sprayed plants. The lowest branch (3.25) and capsule/plant (47.12) at KRS were recorded both under control treatment. The highest mean branch (4.40) and capsule/plant (70.19) of two locations were recorded under BAU- Biofungicide sprayed plants. The lowest mean branch (3.48) and capsule/plant (47.97) of two locations were recorded under control condition.

Effect of disease managements on seed yield per plant and per hectare in CVL-1 at JAES and KRS, BJRI: Different types of disease managements differed significantly in respect of seed yield in CVL-1 grown at JAES and KRS of BJRI (Table 5). The highest seed yield/plant (4.49 gm) and seed yield/ha (588.35 kg) at JAES were recorded under BAU- Biofungicide sprayed plants. The lowest seed yield/plant (3.74 gm) and seed yield/ha (378.45 kg) at KRS were recorded under control condition. The highest mean seed yield/plant (4.31 gm) and seed yield/ha (547.31 kg) of both locations were recorded under BAU- Biofungicide sprayed plants.

Table 2. Dithane M-45 and BAU biofungicide on disease incidence in CVL-1 at JAES and KRS, BJRI.

Seed Treatment	% Major disease incidence recorded in JAES																	
	Seedling blight		Stem rot		Black band		Anthracnose		Die back		Soft rot		Mosaic		Root knot		Total disease	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
T_1	0.00	0.00	3.40	0.33 b	0.33 b	0.00 b	0.52	0.08	1.90	0.20 b	0.51	0.11 c	3.60	0.81	2.50 c	0.45 b	12.76 c	1.98 b
	0.71	0.71	1.97	0.91	0.91	0.71	1.01	0.76	1.55	0.84	1.00	0.78	2.02	1.14	1.73	0.07	3.64	1.57
T_2	0.00	0.00	3.67	0.44 b	0.33 b	0.00 b	0.87	0.09	2.25	0.36 ab	1.08	0.25 b	3.98	0.54	2.90 b	0.57 a	15.08 b	2.25 b
	0.71	0.71	2.04	0.97	0.91	0.71	1.17	0.77	1.66	0.93	1.26	0.87	2.12	1.02	1.84	1.03	3.95	1.66
T_3	0.00	0.00	3.86	1.13 a	1.66 a	0.46 a	1.03	0.09	3.35	0.60 a	1.28	0.45 a	4.35	0.76	3.68 a	0.77 a	19.21 a	4.26 a
	0.71	0.71	2.09	1.28	1.47	0.98	1.24	0.77	1.96	1.05	1.33	0.97	2.20	1.12	2.04	1.13	4.44	2.18
Significance Level	NS	NS	NS	0.05	0.05	0.05	NS	NS	NS	0.05	NS	0.05	NS	NS	0.05	0.05	0.05	0.05

Seed treatment	% Major disease incidence recorded in KRS																	
	Seedling blight		Stem rot		Black band		Anthracnose		Die back		Soft rot		Mosaic		Root knot		Total disease	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
T_1	2.72 b	0.00	2.66 b	0.58 b	1.01 b	0.00 b	0.22	0.10	1.75 b	0.59 c	0.06	0.02	3.75	0.58	0.00	0.00	12.17 c	1.87 b
	1.79	0.71	1.78	1.04	1.23	0.71	0.85	0.77	1.50	1.04	0.75	0.72	2.06	1.04	0.71	0.71	3.56	1.54
T_2	3.02 ab	0.00	2.96 b	1.01 a	1.32 b	0.05 b	0.36	0.12	1.89 b	0.77 b	0.10	0.05	3.91	0.70	0.00	0.00	13.56b	2.70 b
	1.88	0.71	1.86	1.23	1.35	0.74	0.93	0.79	1.55	1.13	0.77	0.74	2.10	1.10	0.71	0.71	3.75	1.79
T_3	3.26 a	0.21	3.98 a	1.25 a	3.88 a	0.73 a	0.42	0.23	3.33 a	1.10 a	0.15	0.06	4.63	0.89	0.00	0.00	19.65 a	4.47 a
	1.94	0.84	2.12	1.32	2.09	1.11	0.96	0.85	1.96	1.26	0.81	0.75	2.26	1.18	0.71	0.71	4.49	2.23
Significance Level	0.05	NS	0.05	0.05	0.05	0.05	NS	NS	0.05	0.05	NS	NS	NS	NS	NS	NS	0.05	0.05

T_1= Spraying of BAU- Biofungicide (2%), T_2= Spraying of Dithane M-45 (0.2%), T_3 = Control (No spray), JAES = Jute Agriculture Experimental Station (JAES), Manikgonj, KRS = Kishoregonj Regional Station (KRS), BJRI, Figures in parentheses indicates the transformed value, Data in column having common letter(s) do not differ significantly at 5% level of significance. NS = Not Significant.

Table 3. Effect of disease managements on fibre and stick yield per plant and hectare in CVL-1 at JAES and KRS, BJRI.

Treatments	Fibre yield (gm/plant)			Stick yield (gm/plant)			Fibre yield (t /ha)			Stick yield (t/ha)		
	JAES	KRS	Mean	JAES	KRS	Mean	JAES	KRS	Mean	JAES	KRS	Mean
T_1	9.61	9.26	9.44	21.89	20.60	21.25	4.12 a	3.28 a	3.70	9.33 a	8.65 a	8.99 a
T_2	9.53	8.93	9.23	21.56	20.23	20.90	3.88 a	2.99 a	3.44	8.15 b	7.35 b	7.75 b
T_3	9.33	8.43	8.88	20.39	19.84	20.12	3.08 b	2.21 b	2.65	5.91 c	5.43 c	5.67 c
Significance Level	NS	NS	NS	NS	NS	NS	0.05	0.05	NS	0.05	0.05	0.05

T_1= Spraying of BAU- Biofungicide (2%), T_2= Spraying of Dithane M-45 spray (0.2%), T_3 = Control (Untreated), JAES = Jute Agriculture Experimental Station (JAES), Manikgonj, KRS = Kishoregonj Regional Station (KRS), BJRI, Data in column having common letter(s) do not differ significantly at 5% level of significance. NS = Not Significant.

Table 4. Effect of disease managements on number of branch and capsule per plant in CVL-1 at JAES and KRS, BJRI.

Treatments	Number of branch/plant			Number of capsule/plant		
	JAES	KRS	Mean	JAES	KRS	Mean
T_1	4.66 a	4.13 a	4.40	70.16 a	70.22 a	70.19 a
T_2	4.03 ab	3.75 ab	3.89	66.83 a	66.13 a	66.48 a
T_3	3.70 b	3.25 b	3.48	48.82 b	47.12 b	47.97 b
Significance Level	0.05	0.05	NS	0.05	0.05	0.05

T1= Spraying of BAU- Biofungicide (2%), T2= Spraying of Dithane M-45 spray (0.2%), T3 = Control (Untreated), JAES = Jute Agriculture Experimental Station (JAES), Manikgonj, KRS = Kishoregonj Regional Station (KRS), BJRI, Data in column having common letter(s) do not differ significantly at 5% level of significance. NS = Not Significant.

Interaction effect among the locations and disease managements on disease incidence, seed yield, stick yield and fibre yield: Interaction effect of locations with different types of disease managements differed significantly for disease incidence, fibre yield, stick yield, number of branch, number of capsule and seed yield (Table 6). After spraying, interaction effect of KRS and BAU- Biofungicide sprayed plants resulted lower seed borne infection (1.87%) and highest disease incidence (4.47%) was encountered in interaction effect among KRS and control condition. Interaction effect between locations and different types of disease managements on fibre yield/ha were found significant. But there was no significant differences among L_1XT_1 (4.12 ton) and L_1XT_2 (3.88 ton). Again there was no significant variation among L_1XT_3 (3.08 ton), L_2XT_1 (3.28 ton), L_2XT_2 (2.99 ton) and L_1XT_2 (3.88 ton), L_2XT_1 (3.28 ton). The highest result was found in L_1XT_1 (4.12 ton) followed by L_1XT_2 (3.88 ton). The lowest result was found in L_2XT_3 (2.21 ton) preceded by L_2XT_2 (2.99 ton). Interaction effect between locations and different types of disease managements on stick yield/ha were found significant. The highest result was found in L_1XT_1 (9.33 ton) followed by L_1XT_1 (8.65 ton). The lowest result was found in L_2XT_3 (5.43 ton) preceded by L_1XT_3 (5.91 ton). Interaction effect between locations and different types of disease managements on seed yield/ha were found significant. But there was no significant differences among L_1XT_1 (588.35 kg) and L_1XT_2 (567.34 kg). Again there was no significant variation among L_2XT_1 (506.26 kg) and L_2XT_2 (488.37 kg). The highest result was found in L_1XT_1 (588.35 kg) followed by L_1XT_2 (567.34 kg). The lowest result was found in L_2XT_3 (378.45 kg) preceded by L_1XT_3 (432.29 kg).

Table 5. Effect of disease managements on seed yield per plant and per hectare in CVL-1 at JAES and KRS, BJRI.

Treatments	Seed yield (gm/plant)			Seed yield (kg/ha)		
	JAES	KRS	Mean	JAES	KRS	Mean
T_1	4.49 a	4.13	4.31	588.35 a	506.26 a	547.31 a
T_2	4.22 ab	3.90	4.06	567.34 a	488.37 a	527.86 a
T_3	3.82 b	3.74	3.78	432.29 b	378.45 b	405.37 b
Significance Level	0.05	NS	NS	0.05	0.05	0.05

T_1= Spraying of BAU- Biofungicide (2%), T_2= Spraying of Dithane M-45 spray (0.2%), T_3 = Control (Untreated), JAES = Jute Agriculture Experimental Station (JAES), Manikgonj, KRS = Kishoregonj Regional Station (KRS), BJRI. Data in column having common letter(s) do not differ significantly at 5% level of significance. NS = Not Significant.

DISCUSSION

In field experiment, two disease practices viz. spraying of BAU- Biofungicide and Dithane M-45 and moisture content (9.5% moisture) were used for this study. Field experiments were conducted at two different locations- Jute Agriculture Experimental Station (JAES), Manikgonj and Kishoregonj Regional Station (KRS), Kishoregonj of Bangladesh Jute Research Institute. Under field condition, effects of BAU- Biofungicide and Dithane M-45 on disease incidence and production of quality healthy seeds were studied. Disease incidence occurred minimum in both the jute varieties at JAES and KRS by BAU- Biofungicide spraying. After spraying, the highest total disease incidences 4.26% and 4.47% were recorded under control condition and the lowest total disease incidences 1.98% and 1.87% were recorded when BAU- Biofungicide sprayed in the field at JAES and KRS, respectively.

Table 6. Interaction effect among the locations and disease managements in CVL-1 variety on disease incidence, seed yield, stick yield and fibre yield.

Interaction	DI (%)		F Y (gm/P)	S Y (gm/P)	F Y (t/ha)	S Y (t/ha)	branch /plant	capsule /plant	Seed (gm /P)	Seed (kg/ha)
	Before	After								
L_1 X T_1	12.76 d	1.98 bc	9.61 a	21.89 a	4.12 a	9.33 a	4.66 a	70.16 a	4.49	588.35 a
L_1 X T_2	15.08 b	2.25 bc	9.53 ab	21.56 ab	3.88 ab	8.15 c	4.03 b	66.83 a	4.22	567.34 a
L_1 X T_3	19.21 a	4.26 a	9.33 ab	20.39 bc	3.08 c	5.91 e	3.70 bc	48.82 b	3.82	432.29 c
L_2 X T_1	12.17 d	1.87 c	9.26 ab	20.60 bc	3.28 bc	8.65 b	4.13 b	70.22 a	4.13	506.26 b
L_2 X T_2	13.56 c	2.70 b	8.93 bc	20.23 c	2.99 c	7.35 d	3.75 bc	66.13 a	3.90	488.37 b
L_2 X T_3	19.65 a	4.47 a	8.43 c	19.84 c	2.21 d	5.43 f	3.25 c	47.12 b	3.74	378.45 d
Significance Level	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	NS	0.05

L1= JAES, Manikgonj, BJRI, L2 = KRS, Kishoregonj, BJRI, T1= Spraying of BAU- Biofungicide (2%), T2= Spraying of Dithane M-45 (0.2%), T3 = Control (No spray), Data in column having common letter(s) do not differ significantly at 5% level of significance. NS = No significant, FY = Fibre yield, SY = Stick yield.

BAU- Biofungicide and Dithane M-45 have been recorded as superior means for controlling seed borne fungi as well as field fungi with higher seed yield and better improvement of seed quality as reported by Hossain (2011a), Hossain and Sultana (2011), Hossain and Hossain (2010) and Mostafa (2009). The present findings revealed that disease incidence was comparatively lower in case of using BAU- Biofungicide and Dithane M-45 spraying. Moreover, management of disease by BAU- Biofungicide increased yield with the decrease of total seed borne fungal pathogens. Ahmed (1966) reported that among the causal agents of jute diseases, fungal pathogens are the main group of organisms responsible for the loss of fibre yield. Ahmed (1968) also reported that three important diseases as stem rot (*Macrophomina phaseolina*), anthracnose (*Colletrotichum corchori*) and leaf mosaic (virus) disease that deteriorated jute seed. Hossain (2011a, 2009) and Mostafa (2009) similarly reported that BAU-Biofungicide (3%) was found to control the seed borne pathogens and also increased the yield (seed and fibre). The low yield in control was related to high prevalence of seed borne fungal infections. Similar result was also reported by Biswas *et. al.* (1985). The highest seed yield (588.35 kg/ha), fibre yield (4.12 ton/ha) and stick yield (9.33 ton/ha) of CVL-1 was recorded in BAU-Biofungicide (3%) sprayed plants and lowest seed yield (378.45 kg/ha), fibre yield (2.21 ton/ha) and stick yield (5.43 ton/ha) were recorded under control condition. Ahmed (1966) reported that seed and fibre yield and quality decreased if seed borne fungal pathogens increased. He also reported that among the causal agents of jute diseases, fungal pathogens were the main group of organisms responsible for the loss of fibre yield. Hossain and Sultana (2011), Hossain and Hossain (2010) and Mostafa (2009) reported that yield was increased in BAU- Biofungicide sprayed field.

Therefore, the following conclusion may be drawn for quality seed and fibre production from the findings of this study:

- BAU- Biofungicide (2% in water) can successfully used as spraying agent to avoid Dithane M- 45 or other chemical fungicides for the production of quality healthy jute seeds with higher seed and fibre yield.
- Fibre and seed yield were found to decrease with the increase of seed borne infection of fungal pathogens.

So, the following recommendation may be drawn for quality seed and fibre production from the findings of this study:

- Foliar spray of BAU- Biofungicide enhance the quality and yield of the jute seed and fibre in the field.

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