International Journal of Microbiology Research
ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 12, Issue 5, 2020, pp.-1841-1842.
Available online at https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000234

Research Article

STUDIES ON EFFECT OF SOME NEW FUNGICIDE MOLECULES ON STEM & ROOT ROT DISEASE AND FIBRE YIELD OF OLITORIUS JUTE

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Received: May 01, 2020; Revised: May 12, 2020; Accepted: May 15, 2020; Published: May 30, 2020

Abstract- The experiments were conducted in the field of Jute Research Station (JRS), Kendrapara, Odisha during *Kharif* season of 2014 and 2015. Some new fungicide molecules were taken with eight (8) treatments for observing the effect on stem and root rot diseases of Olitorius jute. Lowest disease incidence of both stem rot (CODEX 10.83) and root rot (3.06%) was found in T_7 (Seed treatment with Azoxystrobin + Difenconazole @ 1.0 ml/kg seed + spraying of Azoxystrobin + Difenconazole @0.075% at 40-45 days of crop age) with maximum fibre yield (26.77q/ha).

Keywords- *Fungicide, Stem rot, Root rot, CODEX*

Citation: Srabani Debnath (2020) Studies on Effect of Some New Fungicide Molecules on Stem and Root Rot Disease and Fibre Yield of Olitorius Jute. International Journal of Microbiology Research, ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 12, Issue 5, pp.-1841-1842.

Academic Editor / Reviewer: Takemi Otsuki, Kiranjot Kaur

Introduction

India is the Jute is one of the most important fibre crops grown in West Bengal, Assam, Orissa & Bihar. It is also known as the golden fibre. The most important disease affecting the production & quality of fibre of jute crop is stem and root rot disease. This disease is found in all stages of plant growth. Young plants are affected at the collar region which sometimes causes damping-off and death of seedlings. The leaves of mature plants are infected with buff to black colored lesions along the margin, apex, on midribs and petioles. In advanced stage the fungus attacks the stem at the nodal region, causing small dark brown to black lesions, which enlarge to girdle the stem. The affected plants wilt and the leaves fall off prematurely. The infection often spreads from the basal stem to the roots, killing the plants. The causal fungus of this disease is *Macrophomina phaseolina*. So, for increasing the production as well as improving the quality of fibre of jute proper management of this devastating disease is very much necessary. In this experiment some new fungicide molecules are tested against this disease.

Materials and Methods

This experiment was conducted at the experimental fields of Jute Research Station, Kendrapara, Orissa on 2014 and 2015. The design of experiment was RBD with three replications. The variety used in this experiment was JRO 204 with plot size 5mx4m & number of treatments were eight. Sowing of jute crop was done in first week of April during both the years with recommended dose of fertilizers. The farm yard manure was directly mixed in the soil and the basal dose of fertilizer was broadcasted in field at the time of final land preparation. Observation on stem rot was taken at 60 & 90 DAS and on root rot at 90 DAS. Stem rot infection was taken CODEX (Disease Incidence x PDI) value and root rot as % disease incidence. The data were subjected to statistical analysis for the test of significance [1-5].

Result

According to Pooled data of two years of 2014 & 2015, seed treatment with Azoxystrobin + Difenconazole @ 1.0 ml/kg seed + spraying of Azoxystrobin + Difenconazole @ 0.075% at 40-45 days of crop age (T7) recorded significantly lower disease incidence of both stem rot (CODEX 2.22) & root rot (3.06%) at 90 days of crop age. But in case of root rot low incidence (4.4%) was also found in T4 (Seed treatment with Difenconazole @ 1.5ml/kg seed + spraying of Difenconazole @ 0.15% at 40-45 days of crop age) after T7 and in case of stem rot disease low incidence (CODEX 34.39) was found in T6(Seed treatment with Tricyclazole + Propiconazole @ 1.0 ml/kg seed + spraying of Tricyclazole + Propiconazole @ 0.1% at 40-45 days of crop age) after T7. Maximum fibre yield (26.77q/ha) was also obtained in T7 (seed treatment with Azoxystrobin + Difenconazole @ 1.0 ml/kg seed + spraying of Azoxystrobin + Difenconazole @ 0.075% at 40-45 days of crop age) followed by T4 (Seed treatment with Difenconazole @ 1.5ml/kg seed + spraying of Difenconazole @ 0.15% at 40-45 days of crop age)(25.22q/ha).

Discussion

The strobilurin group of fungicide (Azoxystrobin) inhibit mitochondrial respiration, blocking the cytochrome bc 1 complex of the fungus. It exerts the fungicidal action by blocking electron transport in the mitochondrial respiratory chain in fungi. Godwin et al. in 1994 stated that, azoxystrobin severely reduces the aerobic energy production, thereby inhibiting growth of the fungus and in the laboratory strobilurins have been shown to inhibit the germination and prepenetration growth of several plant pathogenic fungi. Difenconazole acts as a sterol biosynthesis inhibitor against the fungus. According to Bertelsen *et al.* (2001) [6], mycelia growth on leaf surfaces of wheat mainly originating from saprophytic fungi were reduced by azoxystrobin & epoxyconazole and increased yield of winter wheat. Nithyameenakshi *et al.* (2006) [7] showed that, azoxystrobin and difenconazole proved to be superior over other fungicides in controlling the grapevine diseases and blister blight of tea to the maximum extent at 0.05% concentration. In this experiment also we have found superiority of azoxystrobin and difenconazole combination in minimizing the disease complex of Olitorius jute crop as well as increasing fibre yield and previous evidences of research is justifying this finding.

Conclusion

Hence seed treatment with Azoxystrobin + Difenconazole @ 1.0 ml/kg seed +

Table-1 *Treatment details*

Treatment	Treatment details
T_1	Seed treatment with Carbendazim @ 2gm/kg seed + spraying of Carbendazim @ 0.2% at 40-45 days of crop age
T_2	Seed treatment with Propineb @2gm/kg seed + spraying of Propineb @0.2% at 40-45 days of crop age
T_3	Seed treatment with Tebuconazole @ 1.5 ml/kg seed + spraying of Tebuconazole @ 0.15% at 40-45 days of crop age
T_4	Seed treatment with Difenconazole @ 1.5ml/kg seed + spraying of Difenconazole @ 0.15% at 40-45 days of crop age
T_5	Seed treatment with Cyproconazole @ .0 ml/kg seed + spraying of Cyproconazole @ 0.08% at 40-45 days of crop age
T_6	Seed treatment with Tricyclazole + Propiconazole @ 1.0 ml/kg seed + spraying of Tricyclazole + Propiconazole @ 0.1% at 40-45 days of crop age
T_7	Seed treatment with Azoxystrobin + Difenconazole @ 1.0 ml/kg seed + spraying of Azoxystrobin + Difenconazole @0.075% at 40-45 days of crop age
T_8	Absolute check with no fungicide application

Table-2 *Effect of some new fungicide molecule-based management on stem rot and root rot diseases of Olitorius jute*

Treatments	Stem Rot (CODEX)			Root Rot (%)		
	2014	2015	Pooled	2014	2015	Pooled
T_1	134.64	59.8	97.22	7.92	8.3	8.11
T_2	148.5	78.71	113.6	4.44	6.36	5.4
T_3	42.5	42.58	42.54	9.18	6.09	7.64
T_4	32	70.81	51.4	2.96	5.86	4.41
T_5	4.67	42.86	58.76	10.12	8.58	9.35
T_6	30.67	38.12	34.39	2.96	6.36	4.66
T_7	4.08	17.59	10.83	2.22	3.91	3.06
T_8	42.58	198.54	120.56	21.63	26.96	25.79
SEm +	1.43	1.44	1.44	1.16	1.18	1.17
CD 0.05	4.36	4.39	4.38	3.51	3.59	3.55

Table-3 *Effect of some new fungicide molecule-based management on fibre yield of Olitorius jute*

Treatments	Fibre Yield (Q/ha)		
	2014	2015	Pooled
T_1	20.42	19.12	19.77
T_2	19.11	18.97	19.04
T_3	19.35	19.49	19.42
T_4	24.6	25.84	25.22
T_5	18.98	18.51	18.74
T_6	24.76	25.32	25.04
T_7	25.64	27.9	26.77
T_8	11.83	10.61	11.22
SEm +	1.33	1.33	1.33
CD 0.05	4.05	4.06	4.05

showed the best result for minimizing both the stem & root rot disease of Olitorius jute crop with maximum fibre yield.

Application of Research: This research work is done with the aim of searching the suitable fungicide / fungicides for better management of two soil borne diseases of jute. Better options of fungicides are found out against stem rot and root rot diseases of jute, the most important fibre crop of India and this finding definitely will help the farming community.

Research Category: Management of diseases of jute, Chemical fungicide

Acknowledgement / Funding: Authors is thankful to Central Research Institute for Jute and Allied Fibres and Odisha University of Agriculture and Technology for financial and technical support. Authors is also thankful to AICRP on Maize, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, 741252, West Bengal, India

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Research project name or number: Jute Research Project

Author Contributions: Sole author

Author statement: Author read, reviewed, agreed and approved the final manuscript. Note-Author agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Jute Research Station, Kendrapara, Orissa
Cultivar / Variety / Breed name: Jute

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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