World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 6.129

CONTROL OF DAMPING –OFF DISEASE OF DIFFERENT VARIETIES OF BRINJAL (*SOLANUM MELONGENA* L.) BY USING BOTANICAL EXTRACTS.

Sabebaro Namo Das*

Assistant Professor, Department of Botany B.P.Chaliha College, Nagarbera, Kamrup, Assam, India.

Corresponding Author: Dr. Sabebaro Das
Assistant Professor, Department of Botany B.P.Chaliha College, Nagarbera, Kamrup, Assam, India.

Article Received on 17/03/2021 **Article Revised on 07/04/2021** **Article Accepted on 27/04/2021**

ABSTRACT

Damping off is a serious disease of brinjal which leads to the decay of germinating seeds, seedling and limit their production in nurseries and fields. The present investigation was carried out the effect of aqueous extracts of two botanical extracts viz. *Allium sativum* and *Allamanda cathertica* against damping-off disease on the three different varieties of brinjal *i.e* Pusa Purple, Pusa Purple Long and Pusa Purple Round in the shade-net nursery. Seed treatment with *Allium sativum* and *Allamanda cathertica* were evaluated against damping-off, seed germination and growth characters of brinjal seedlings. Both the treatments significantly reduced per cent damping-off of these three varieties of brinjal over control. The highest seed germination was recorded in Pusa Purple Round (88.33%) followed by Pusa Purple (86.33%) and Pusa Purple Long (80.33%) after seed treatment with *Allium sativum*; while the *Allamanda cathertica* extract showed 86.66, 84.33 and 73 per cent on Pusa Purple Round, Pusa Purple and Pusa Purple Long variety, respectively.

KEYWORDS: Brinjal, aqueous extracts, damping-off, seed treatment.

INTRODUCTION

Brinjal (*Solanum melongena* L.) is an important vegetable crop grown in Assam. It is grown round the year both as winter and summer crops. The soil-borne pathogens are the most dangerous diseases infecting worldwide crop plants since they attack different plant species. Some species of fungi such as *Fusarium oxysporum*, *Rhizoctonia solani* and *Phomopsis vexans* are known for causing damping-off disease for many economically important crops. Among the various diseases that attack brinjal plant damping-off is the most destructive one. Damping-off has been found to affect 80-100% of seedlings in nurseries of various crops (Agrios, 2005). Damping-off mainly affects plants prior to seed germination and throughout the seedling stage (Agrios, 1997). Crop losses due to damping-off disease vary from place to place. There are several methods applicable for controlling damping-off disease. Use of botanicals instead of chemical fungicides is one of the recent approaches for plant disease control, as fungicides may cause health hazard and may directly increase environmental pollution. However some research works has been found in controlling wide range of seed borne pathogens by different botanicals (Hawlader, 2003; Hossain *et al.*, 2005; Choudhury, 2005 and Islam *et al.*, 2006) and very few research have been performed to evaluate the efficacy of botanicals against soil borne pathogens in field level (Monaim *et al.*, 2011). In this context, the present study was designed to evaluate the efficacy of two plants extracts as a seed treating agent against the pathogens to control damping-off disease of brinjal.

MATERIALS AND METHODS

Three brinjal varieties viz. Pusa Purple, Pusa Purple Long and Pusa Purple Round selected for the study were collected from farmer's storages of Goalpara district, Assam. Two plants species namely *Allium sativum* and *Allamanda cathertica* were collected and washed first in tap water and then in distilled water. 100 grams of fresh sample was chopped and then crushed in a surface sterilized pestle and mortar by adding 100 ml sterile water (1:1w/v). The extracts were filtered through two layers of muslin cloth and then finally filtrate through what- man filter paper-No.1. For getting 15% ratio 85 ml distilled water was added with 15 ml plant extract. Seeds were treated by dipping separately in extracts for 30 minutes. Then the excess extract was drained off and treated seeds were kept in blotting paper to remove excess moisture from seed surface and dry in the open air. Then the seeds were sown in the pot at the rate of 100 seeds/pot. Observations were recorded on seed germination, percent damping-off, seedling height, shoot length, root length, fresh shoot weight, fresh root weight,

dry root weight, dry shoot weight and average biomass. Percent germination was observed after 18 DAS and Damping-off disease incidence was recorded at 30 days after sowing. Seedling growth characters such as shoot length, root length, seedling height, fresh shoot weight, fresh root weight, dry shoot weight, dry root weight and biomass were also recorded after 35 days sowing.The diseased plants were collected from the pot and were brought out to the laboratory for identification of the pathogen associated with the damping-off diseases. Then the disease plants were cut into small pieces (about 0.5-1 cm) and surface sterilized by dipping in $Hgcl_2$ solution(0.01%) for 30 second followed by washed in sterilized water for three times. They were then placed onto PDA media in sterilized petridishes with the help of sterile forceps. The plates were incubated at 28±1°C for 7 days. Pure culture was maintained for proper identification. The pathogen was identified under compound microscope. Complete Randomized Block Design (RCBD) was followed to carry out the experiment.

RESULT AND DISCUSSION

The pathogens *Phomopsis vexans, Fusarium oxysporum* and *Rhizoctonia solani*.were isolated from the infected seedling.

***Phomopsis vexans*:** The culture grows as white like creamy colour. Conidia are hyaline, one celled, sub cylinder.

***Fusarium oxysporum*:** The culture grows as whitish mycelium. In the initial stage the pathogen produce single cell of microconidia and macroconidia produce 2-3 celled slightly curved at the later stage.

***Rhizoctonia solani*:** The culture grows as whitish mycelium contains several nuclei. The mycelium was colorless at the initial stage but later turns yellowish colour. The mycelium produces branches that grow at approximately right angles to the main hypha.

The result is in agreement with Anonymous (2004) who reported *Phomopsis vexans, Fusarium sp, Rhizoctonia solani, Sclerotium rolfsii and Phytophthora capsici* causes damping-off, seedling blight of eggplant.The findings are also in consonance with Morsy *et al.* (2009) who identified *Fusarium oxysporum, F solani, Sclerotium rolfsii, Rhizoctonia solani* and *Macrophomina phaseolina* as damping-off pathogen of cucumber.

It was observed that both the plant extracts were the most effective in inhibiting percent damping-off disease incidence in comparison to control of all the three varieties of brinjal. The highest percentage of seed germination and lowest damping-off incidence were recorded on Pusa Purple Round 88.33-1.66% followed by Pusa Purple 86.33-3.66% and Pusa Purple Long 80.33-13% as compared to control after the treatment of seed with *Allium sativum,* while the *Allamanda cathertica* extract showed better performance regarding seed germination and damping-off incidence 86.66, 84.33-5.66% and 73-17% of Pusa Purple Round, Pusa Purple and Pusa Purple Long respectively (Table1,2,&3).The data indicated that *Allium sativum* and *Allamanda cathertica* extracts significantly improved most of the growth characteristics i.e. seedling height, shoot length, root length, fresh shoot weight, fresh root weight and biomass. The present findings correlate with previous finding of Hawlader (2003) who observed that seed treatment with *Allamanda* leaf extract (1:1) effectively increased germination of eggplant seeds and tremendously decreased nursery diseases. The present findings also do agree with Islam and Meah (2011). They reported seed treatment with garlic extract highly increased seed germination of eggplant and completely controlled of damping-off disease.

Table.1. Effect of seed treatments with plant extracts on seed germination, damping-off disease and growth characters of brinjal seedlings of Pusa Purple.

Treatments	% germination at18 DAS	Damping-off incidence at 30DAS	Seedling height (cm)	Shoot length (cm)	Root length (cm)	Fresh Shoot weight (g)	Fresh root weight (g)	Dry shoot weight (g)	Dry root weight (g)	Biomass (g)
T_1	86.33	3.66	14.3	6.6	4.23	0.1873	0.061	0.0111	0.007	0.229
T_2	84.33	5.66	12.33	5.7	5.46	0.2073	0.0363	0.0127	0.0123	0.213
T_3	63.66	26.33	9.8	3.83	3.73	0.1	0.009	0.0103	0.0006	0.098

Table.2. Effect of seed treatments with plant extracts on seed germination, damping-off disease and growth characters of brinjal seedlings of Pusa Purple Long.

Treatments	% germination at18 DAS	Damping-off incidence at 30DAS	Seedling height (cm)	Shoot length (cm)	Root length (cm)	Fresh Shoot weight (g)	Fresh root weight (g)	Dry shoot weight (g)	Dry root weight (g)	Biomass (g)
T_1	80.33	13	13.16	6.33	4.5	0.162	0.0426	0.085	0.0073	0.112
T_2	73	17	12.33	4.83	3.86	0.18	0.0563	0.0139	0.0056	0.218

T_3	53.66	36.33	9.3	3.6	3.53	0.566	0.0073	0.0044	0.0004	0.569

Table.3. Effect of seed treatments with plant extracts on seed germination, damping-off disease and growth characters of brinjal seedlings of Pusa Purple Round.

Treatments	% germination at18 DAS	Damping-off incidence at 30DAS	Seedling height (cm)	Shoot length (cm)	Root length (cm)	Fresh Shoot weight (g)	Fresh root weight (g)	Dry shoot weight (g)	Dry root weight (g)	Biomass (g)
T_1	88.33	1.66	18.53	8.66	6	0.330	0.097	0.048	0.023	0.356
T_2	86.66	3.33	16.16	6.83	5.66	0.2933	0.05	0.0286	0.0056	0.31
T_3	66.33	23.66	10.66	4.3	4.33	0.1366	0.02	0.0143	0.0071	0.135

T_1= seed treatment with *Allium sativum* (1:1w/v) T_3=control.
T_2=seed treatment with *Allamanda cathertica* (1:1 w/v)

T_1 (seed treatments with *A.sativum*) T_2(seed treatments with *A.cathertica*) T_3 (Control)

Fig.1.Effect of treatments with plant extracts on seed germination of brinjal.

ACKNOWLEDGEMENTS

The author is very much thankful to the Principal Scientist, CPCRI, Kahikuchi, Guwahati, Assam for providing necessary facility of my research work.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

1. Agrios GN, Plant Pathology. Fifth (eds). Elsevier Academic press, London U.K, 2005; pp.922
2. Agrios GN, Plant Pathology, fourth (eds). Academic Press, New York, 1997.
3. Anonymous, Development of an Integrated Approach for Management of *Phomopsis* Blight and Fruit Rot of Eggplant in Bangladesh: Annual Research Report (2003-2004), USDA- Bangladesh Collaborative Research Project (No. 99/24/USDA), Department of plant pathology, Bangladesh Agricultural University, Mymensingh, 2004; pp. 4-27.
4. Chowdhary SD. Comparative effect of plant extracts, Physical and chemical agents in seed treatment. M.S thesis, Bangladesh Agricultural University, Mymensingh Bangladesh, 2005.
5. Hawlader AN. Effect of seed selection and seed treatment on the development of *Phomopsis* blight and fruit rot of eggplant. MS thesis, Bangladesh Agricultural, Mymensingh, Bangladesh, 2003.
6. Hossain MM, Khalequzzaman KM, Aminuzzaman FM, Mollah MRA, Rahman GMM. Effect of plant extract on the incidence of seed-borne fungi of wheat. Journal of Agriculture and Rural Development, 2005; 3(1&2): 39-43.
7. Islam MA, FM Aminuzzaman Islam MR and Zamal MS. Seed treatment with plant extract and Vitavax-200 in controlling leaf spot (*Bipolaris sorokiniana*) with increasing grain yield of wheat. International journal of sustainable Agricultural Technology, 2006; 2 (8): 15-20.
8. Islam MR, Meah MB. Association of *Phomopsis vexans* with Eggplant *(Solanum melongena)* Seeds, Seedlings and its Management. The Agriculturists, 2011; 9(1 & 2): 8-17.
9. Monaim AMFK, Elyour AMA, Morsy KM. Effectiveness of plant extracts on suppression of damping-off and wilt diseases of lupine(*Lupinus termis* Forsik).Crop protection, 2011; 30: 185-195.
10. Morsy SMEA, Drgham, Mohamed GM. Effect of garlic and onion extracts or their intercropping on suppressing damping-off and powdery mildew diseases and growth characteristics of cucumber. Egyptian Journal of Phytopathology, 2009; 37(1): 45-46.