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ANTIFUNGAL ACTIVITIES OF PLANT EXTRACT AS SEED TREATMENT TO CONTROL WILT IN MUNG BEAN (*VIGNA RADIATA* L. WILEZEK)

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Abstract

The present investigation deal with the evaluation of commonly available botanicals of Neem (*Azadirachta indica*), Karanj (*Pangamia pinnata*), Babul (*Acacia nilotica*), Neelgiri (*Eucalyptus globulus*), Ashok (*Polyanthia longifolia*), Tulsi (*Ocimum sancatum*), *Bougainvillea (Bougainvillea* sp). Mehndi (*Lawsonia alba*), Jatropha (*Jatropha curcas*) as seed treatment. The wilt symptoms on mung bean appeared within 7 days and the plants were killed within 14 days. On open split the roots the tissues showed typical browning. Out of nine plants leaf extracts tested Neem leaf extract when used as seed treating agent proved its efficacy and minimum number of wilted plants were noted. The leaf extract of Ashok (*Polyalthia longifolia*) did not show any significant effect as seed treating agent.

Key words : Mung bean, wilt, botanicals, leaf extract, seed treatment, plant mortality.

Introduction

Mungbean [*Vigna radiata* (L.) *Wilczek*], also called green gram in India, and mungo in the Philippines, is a leguminous pulse crop, prized for its seeds, which are high in protein, easily digested, and consumed as food. In a symbiotic relationship with specific soil rhizobia, root nodules develop on mungbeans in which atmospheric nitrogen is converted to forms available to the mungbean plant. The mung bean is one of many species recently moved from the genus Phaseolus to Vigna and is still often seen cited as Phaseolus aureus or Phaseolus radiatus. These are all the same plant. Skin color of mung bean can be classified into dark green,olivine,green black these three kinds, seed skin can be classified as lustrous and unpolished (dark green).The best grade is the one lustrous, big size round shape and easy broken when boiled. Mung bean is a traditional food source of our Chinese people. Vitamins, calcium, irons, phosphorus ratio higher than crude rice. So it got good values both as food and as medicine, in the hot summer,mung bean soup are nice drinks for local folks to drive away heat. Mungbean seeds are sprouted for fresh use or canned for shipment to restaurants. Sprouts are high in protein (21%–28%), calcium, phosphorus and certain vitamins. Because they are easily digested they replace scarce animal protein in human diets in tropical areas of the world. Because of their major use as sprouts, a high quality seed with excellent germination is required. The food industry likes to obtain about 9 or 10 grams of fresh sprouts for each gram of seed. Larger seed with a glassy, green color seems to be preferred.

Generally, *Fusarium* wilts first appear as slight vein clearing on the outer portion of the younger leaves, followed by epinasty (downward drooping) of the older leaves. At the seedling stage, plants infected by *F. oxysporum* may wilt and die soon after symptoms appear. In older plants, vein clearing and leaf epinasty are often followed by stunting, yellowing of the lower leaves, formation of adventitious roots, wilting of leaves and young stems, defoliation, marginal necrosis of remaining leaves, and finally death of the entire plant (Agrios, 1988). Browning of the vascular tissue is strong evidence of *Fusarium* wilt. Further, on older plants, symptoms generally become more apparent during the period

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between blossoming and fruit maturation (Jones *et al*., 1982; Smith *et al*., 1988). The plant parts like roots, stem, bark, leaf, flower, pollen, bulb and rhizomes of horticultural crops forage crops, medicinal plants weeds and forest trees are used to control. Crop disease in the form of extract, powder, decoction better. Cake and oil both the form fresh and dried materials. The plants and their products check the myeclial growth sporulation spore germination germ tube elongation in fungi bacteria viruses and nematodes. The plant products are also applied as seed treatment soil drenching and spray to control the diseases of crop growth. The use of plants in crop diseases control is highly safe and rewarding (Khare and Shukla, 1998).

Materials and Methods

Sandy loam soil was thoroughly washed with three to four changes of water so as to remove the soluble leachiest and air dried. This soil was then mixed with well decomposed FYM (3:1) to prepare soil composite and the same was used throughout the investigation. The soil composite was sterilized with four per cent commercial formaldehyde by sealing the heap corners with polyethylene sheet for 15 days and spread in a thin layer and later exposed to direct sunlight to allow complete evaporation of remnants of formaldehyde. Sterilized soil composite was stored in a clean aluminum tray, covered with polyethylene sheet and was utilized whenever required for the experimental purpose. Mung seeds were crushed in bulk and moisoned with water. One hundred g. of crushed seeds were filled in 250 ml. Erlenmeyer flask and sterilized in an autoclave. After cooling the flasks, these were inoculated with five mm disc of seven days old culture of the fungus. The flask were then incubated at 25 ± 1^{0}C. On sufficient growth of the fungus on the crushed seeds this was mixed with the sterilized soil @ 20g/500g soil (Tripathi, 1998). The pots were kept for seven days to allow the multiplication, development and spread of the fungus. Surface sterilized mungbean seed were sown in each pot. The pots were alternatively irrigated with 50 ml of sterilized tap water. The pots were observed for germination of seed and mortality of the seedlings. The plants showing wilt symptoms were removed carefully and isolations were made from the affected plant to confirm the pathogenicity. The experiment was conducted to observe the efficacy of plant leaves extract as seed treatment. One hundred seeds of mungbean were surface sterilized with mercuric chloride (1:1000) and dried in shed. Good and bold seed of mung (TJM-1) were dipping in 30 per cent leaf extract of each plant for 30 minutes and sown in the sterile earthen pots contain sterilized soil composite. Each pot received 25 seeds and after germination 15 seedlings were maintained. Each treatment was replicated three times and randomized over the glass house bench. The pots were irrigated with sterilized tap water as and when needed. Observation on seed germination, seedling mortality and appearance of symptoms were recorded as they appear on the plant. The glass house temperature ranged between 18–30^{0}C during the period of experimentation. The data so obtained was subjected to statistical analysis.

Results

The experiment was conducted under glass house conditions in pots where the seeds were soaked in 30 percent concentration of leaf extract for 30 minutes and then sown in pots were the fungus was pre inoculated. The data presented in table 1, fig. 1 indicated that the extract of each plant was effective in keeping the plants healthy up to 40 days under pot conditions. It is evident from the data presented in the Table that minimum (2.33)

Table 1 : Leaf extracts against *Fusarium oxysporum* f. sp. *vigni* as seed treatment.

S. no.	Treatments	Number of wilted plants*		
			Days	
		20	30	40
1.	*Azadirachta indica* **(Neem)**	2.33* (1.68)**	5.33 (2.41)	9.99 (3.24)
2.	*Ocimum sancatum* **(Tulsi)**	3.33 (1.96)	7.66 (2.86)	10.11 (3.26)
3	*Pongamia pinnata* **(Karanj)**	4.33 (2.20)	8.66 (3.03)	11.00 (3.39)
4	*Jatropha curcas* **(Jatropha)**	4.11 (2.15)	8.00 (2.92)	10.22 (3.27)
5	*Acacia nilotica* **(Babul)**	3.66 (2.04)	7.33 (2.80)	11.66 (3.49)
6	*Polyanthia longiifolia* **(Ashok)**	5.33 (2.41)	8.66 (3.03)	13.00 (3.67)
7	*Bouganivillea* sp. **(Bouganivillea)**	4.33 (2.20)	7.50 (2.830)	11.99 (3.53)
8	*Lawsonia inermeris* **(Mehndi)**	5.33 (2.41)	9.33 (3.14)	12.89 (3.66)
9	*Eucalyptus globulus* **(Neelgiri)**	5.66 (2.48)	9.66 (3.19)	12.99 (3.67)
10	Control	6(2.55)	10.66(3.34)	15(3.94)
	S.Em.±	0.004991	0.003068	0.007829

*Each value is a mean of three replications.

** Figure in parentheses are square root transformed values.

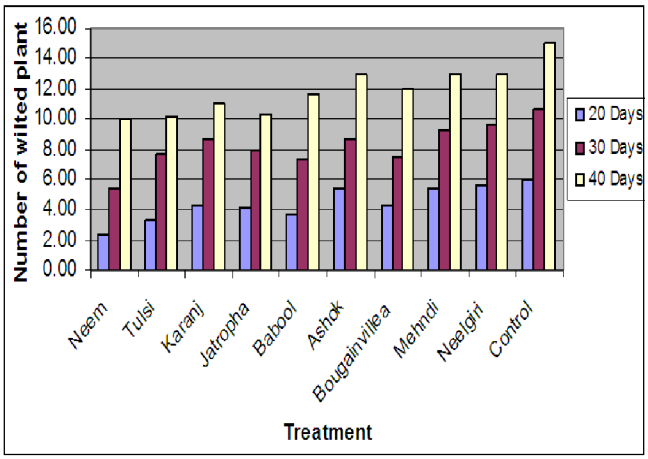

Fig.1 : Leaf extracts against *Fusarium oxysporum* f. sp. *vigni* as seed treatment.

plant mortality was recorded when mung seeds were treated with neem extract. This was followed by Tulsi (3.33), Babul (3.66) and Jatropha (4.11). Karanj and Bougainvillea were at par in their efficacies within 20 days of plant growth. Rests of the treatments were observed to be inferior to neem and tulsi but superior over control where maximum (6.00) plants were noted to be killed. Similarly minimum (5.33) plant mortality was recorded in pots were mung seeds treated with neem extract were sown followed by Tulsi where 7.33 plants dried within 30 days against maximum (10.66) in control. Rests of the treatments were inferior to neem and Tulsi but superior over control when the observations on 30th day were recorded. On the 40th day however the efficacy of neem as seed treatment declined, but significantly superior over control and rest of the treatments. Plant mortality was minimum (9.99) in neem followed by Tulsi (10.11), Jatropha(10.22), Karanj (11.00) and Babul (11.66). The leaf extracts of Bougainvillea, Mehndi, Neelgiri and Ashok were inferior than the above treatments but superior over control were maximum (15.00) plan mortality was noted on 40th day of plant growth.

Summary and Conclusion

An experiment was conducted the plant leaves as seed treatment. Out of nine plant leaf extracts tested neem again showed its superiority over rest of the treatments. The leaf extract of Neelgiri (*Eucalyptus tereticornis*) did not show any significant effect in managing the disease as seed treating agent. Similarly neem leaf extract when used as seed treating agent proved its efficacy and minimum number of wilted plants were noted. The leaf extract of Ashok (*Polyalthia longifolia*) did not show any significant effect as seed treating agent.

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