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Efficacy of fungicide to reduce the associated mycoflora in soybean seeds

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Abstract
The present investigation was carried out in the Department of Plant Pathology, College of Agriculture, I.G.K.V., Raipur (C.G) during the year 2020-21. Six varieties of soybean seed samples *viz*.JS 95-60, JS 97-52, RSC 10-46, RSC 10-71, CG Soya-1 and local variety were selected for experiment. A pot experiment was conducted to study the effect of fungicide on the seedling vigour of different varieties of soybean. The results revealed that, among fungicide, maximum mean increase of seedling vigour index over control were recorded (52.98%) in copper hydroxide and minimum increase of seedling vigour index over control were recorded in Propiconazole (29.37%) treated seeds. Seed samples were treated with different fungicides noticed enhanced vigour index of seedling as compared to control.

Keywords: soybean, seed treatment, fungicide

Introduction
Among the cultivated oilseed crops soybean (*Glycine max* L.) Merrill) is the world's most important seed legume, which contributes 25% of global edible oil. It is popularly known as 'Golden bean' or 'Miracle bean' and 'Wonder bean' of the 20th century because of its characters and usage. It is the most common oilseed crop grown mostly in the rainy season. Soybean seeds have a greater nutritional value it is a major source of protein and vegetable oil. It contains 40-42% proteins, 20-22% oil, 21% starch, vitamins- A, B, C, D & K beside essential amino acids like lysine (5%) and a small amount of calcium, phosphorous, magnesium and iron (Rao *et al.* 2015) [4]. The quality of seeds is affected by seed borne mycoflora. The attack of plant pathogen is one of the reasons for the low productivity of soybean. Most of the economically important plant pathogen is transported from one region to another through seeds or propagating materials. Seed borne diseases are commonly occurring during storage periods if the seeds are stored in a moist dark place. The pathogens can be found in seeds after or before the germination of seeds. Seed borne disease can be spread through wind, water, insect, agricultural equipment and transportation. Germination and seedling vigour is reduced by seed borne mycoflora of soybean and they can destroy or affected grains during storage them unfit for human consumption. Some seed associated fungi can affect the seedling or plant resulting in productive capacity reduced (Rahman *et al*. 1999) [3]. Some fungal pathogens are associated with the testa and cotyledons of seeds infected form of conidia (spores) and mycelium, after seed germination the infection move to hypocotyls and base of the stem. Seed fungal flora plays a significant role in determining seed quality and longevity. Hence, an experiment was conducted to study the efficacy of fungicide to reduce the associated mycoflora in soybean seeds.

Materials and Methods
Effect of Different Fungicide on Seedling Vigour of Soybean Seeds
To find out the effect of seed priming on seedling vigour, 6 seed coating fungicide *viz.* Azoxystrobin, Propiconazole, Tebuconazole, Propineb, Copper hydroxide and Copper oxychloride were taken at their recommended dose along with a control (no chemical). Ten seeds in each pot treated and untreated seeds were sown in pots filled with sterilized soil. The seedling growth was assessed in terms of seedling vigour index after sowing"21 days.

Results and Discussion
Effect of Different Fungicides on Seedling Vigour of Soybean Seeds
A pot experiment was conducted to know the effect of seed treatment by different fungicides on the seedling vigour of different varieties of soybean. Fungicides treated seeds and untreated (control) seeds were sown in pre-sterilized soil and vigour index was recorded 21 days after sowing. Data presented in table show that all the fungicides treated seeds had a higher vigour index as compared to that of control. Analysis of data presented in table 1 reveals that among fungicide, maximum mean increase of seedling vigour index over control were recorded (52.98%) in copper hydroxide across the six seed lots treated. This might be attributed to that Copper hydroxide not only reduces seed borne mycoflora (internally and externally) but also exhibit the plant growth-promoting activity and thereby higher vigour index was recorded over control across the six seed lots of soybean variety tested which was followed by Copper oxychloride (47.25%), Propineb (43.94%), Tebuconazole (40.85%), Amistar (Azoxystrobin) (37.51%) and a minimum increase of seedling vigour index over control were recorded in Propiconazole (29.37%). It is clear from the above findings that mycoflora associated with seed reduced the seedling vigour index whereas, fungicidal increases the seedling vigour index by keeping seed associated mycoflora under check. Similar results were also reported by various researchers like Kesharwani *et al.*

(2018) conducted a pot experiment to know the effect of seed priming by different fungicides and bio control agents (*Trichoderma* + Vermicompost) on the seedling vigour of various varieties of pea in glasshouse condition. Pradhan (2019) [2] conducted a pot experiment to know the effect of seed priming by different fungicides and bio control agents on the seedling vigour of different Indian bean varieties. Sahu (2020) [5] conducted a pot experiment to know the effect of seed priming by different fungicides and bio control agents (*Trichoderma viride*) on the seedling vigour of different varieties of lentil supports the findings of the present study.

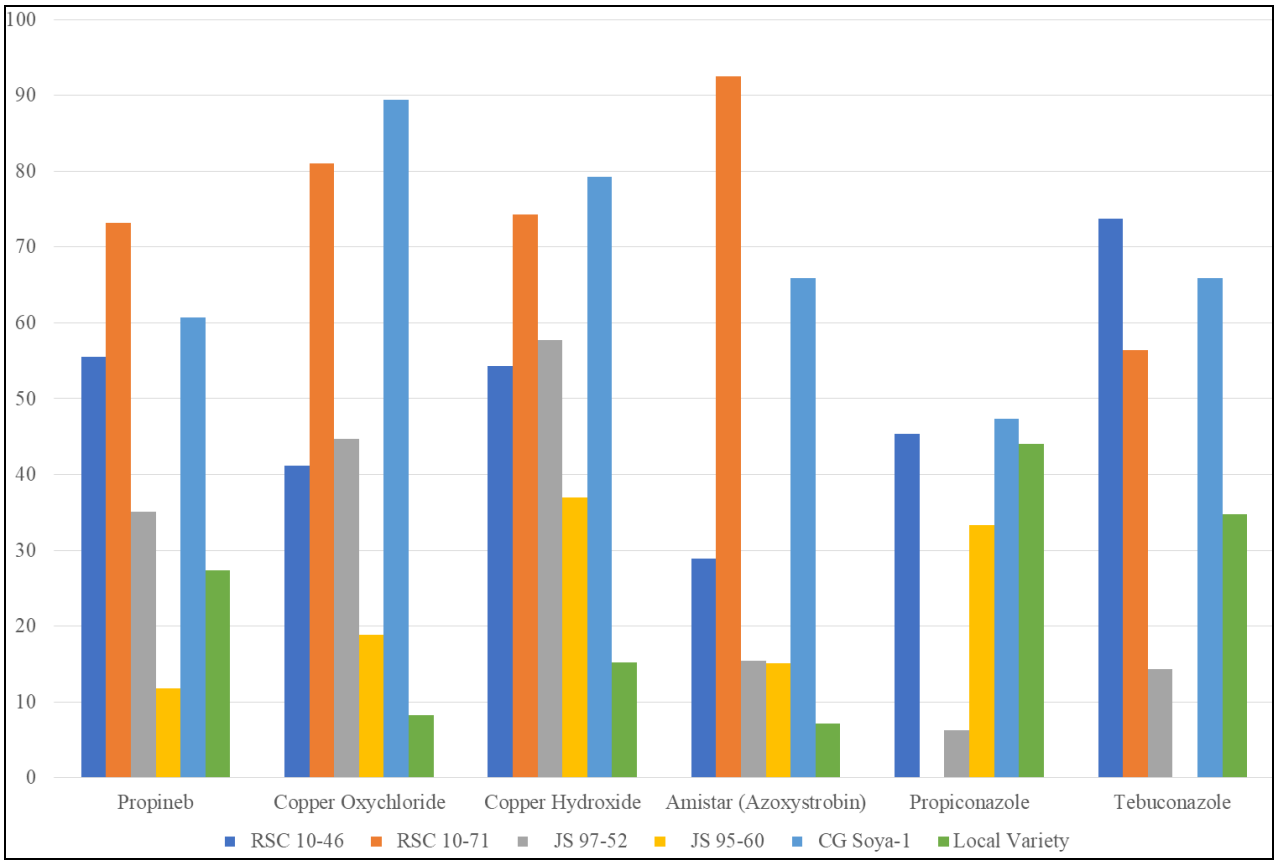

Fig 1: Effect of Different Fungicide on Seedling Vigour of Soybean Seeds Over Control

Fig 2: Seed Fungicide Priming

Table 1: Effect of different fungicide on seedling vigour of soybean seeds

Treatment	Seedling vigour index (% Increase (+) or decrease (-))												Mean Seedling vigour index	Mean increase over control
	RSC 10-46		RSC 10-71		JS 97-52		JS 95-60		CG Soya-1		Local Variety			
	SVI	% I or % D	SVI	% I or % D	SVI	% I or % D	SVI	% I or % D	SVI	% I or % D	SVI	% I or % D		
Propineb	1675.82	55.47	1684.78	73.19	1560.20	35.04	1154.24	11.78	1921.20	60.76	1057.39	27.41	1508.48	43.94
Copper Oxychloride	1521.79	41.18	1760.80	81.01	1672.16	44.73	1227.74	18.90	2264.26	89.47	898.14	8.22	1557.48	47.25
Copper Hydroxide	1663.89	54.36	1695.88	74.33	1822.12	57.71	1414.14	36.95	2142.41	79.28	956.43	15.25	1615.81	52.98
Azoxystrobin	1389.63	28.92	1873.00	92.54	1334.24	15.48	1118.50	15.10	1982.21	65.87	889.66	7.20	1431.20	37.51
Propiconazole	1567.00	45.37	Seed not germinated	-	1227.74	6.26	1376.23	33.28	1760.80	47.34	1195.00	44.00	1187.79	29.37
Tebuconazole	1873.00	73.76	1521.79	56.44	1320.51	14.29	Seed not germinated	-	1982.21	65.87	1118.50	34.78	1302.66	40.85
Control	1077.89		972.76		1155.32		1032.55		1195.00		829.86		1043.89	

*SVI- Seedling vigour index
*% I or % D - (% Increase (+) or decrease (-)

Fig 3: Fungicide Treated Seedlings

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