

Field Efficacy of Seed Dressing Fungicides on Emergence, Survival and Seedling Vigour of Sunnhemp (*Crotalaria juncea* L.)

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ABSTRACT Five seed treating fungicides namely Apron, Divident, Mancozeb, Thiram and Bavistin were evaluated in four sunnhemp varieties namely K-12 yellow, K-12 black, Chindwara and T-6 for field emergence, survival and seedling vigour under field condition at GBPUA&T, Pantnagar. The best results in increasing survival percentage of seedling were recorded in Thiram or Mancozeb treated seed of all the varieties. Field emergence and seedling vigour were also significantly higher in Thiram treated seed.

Keywords: Sunnhemp, fungicidal seed treatment, field emergence, seedling vigour.

Sunnhemp (*Crotalaria juncea* L.) is an important bast fibre crop mainly grown in traditional areas for its fine fibre, which is the source of raw materials in cottage industry for the preparation of strings, ropes, twines, tat patties etc. Apart from fibre it is also largely cultivated as green manure. One of the major constraints in sunnhemp cultivation is the non-availability of quality seed [1]. The farmers often face the problem of poor stand in the field, which has a direct bearing on the yield. Poor field stand may also be attributed to various seedling diseases caused by *Pythium butleri*, *Rhizoctonia solani*, *R. bataticola*, *Sclerotium rolfsii*, *Sclerotinia* and *Colletotrichum curvatum* [2-7]. That is why a wide range of seed rate is reported in literature [8-9]. Treating the seed with fungicides can often protect young seedlings, which are particularly susceptible to fungal attack. But literature revealed no work on fungicidal seed treatment at field level. Therefore, a field experiment was conducted at G.B. Pant University of Agriculture and Technology, Pantnagar during 2001-2002 to investigate the effect of seed treatment on field emergence, survival and seedling vigour.

MATERIALS AND METHODS

Seeds of four-sunnhemp varieties namely K-12 yellow, K-12 black, T-6 and Chindwara were obtained from Sunnhemp Research Station, Pratapgarh and treated in polythene bag with five fungicides namely Thiram, Bavistin, Apron, Mancozeb and Divident @ 2g/kg seed. One sample was left untreated which serve as check. Four hundred seed from each treatment were sown in well prepared field in last week of June, 2001-2002 at Crop Research Centre of GBPUA&T, Pantnagar in factorial RBD with three replications having plot size 3 m x 3 m. The spacing between plant-to-plant was 5 cm and row-to-row distance was 75 cm. Field emergence (%) was recorded after seven days of sowing and survival percentage was calculated by using the following formula.

$$\text{Per cent survival} = \frac{\text{No. of plant survived}}{\text{Total seed sown}} \times 100$$

The parameters related to seedling vigour (shoot length, root length) were recorded after 45 days of sowing.

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Table 1. Varietal effect of sunnhemp on field emergence, survival and seedling vigour of sunnhemp.

Variety	Field Emergence (%)	Percent survival	Seedling vigour at 45 DAS	
			Shoot length (cm)	Root length
K-12 yellow	81.3 (64.6)	77.6 (58.2)	90.6	8.4
K-12 black	82.0 (65.1)	78.0 (60.1)	89.1	7.8
T-6	80.3 (63.8)	77.2 (57.9)	79.3	7.3
Chindwara	80.9 (64.4)	78.2 (61.1)	82.2	7.9
CD (P=0.05)	NS	NS	3.9	0.6

Figure in the parenthesis represent angular transformed value

Table 2. Effect of fungicidal seed treatment on field emergence, survival and seedling vigour of sunnhemp.

Seed Treatment @2g/kg	Field Emergence (%)	Percent survival	Seedling vigour at 45 DAS	
			Shoot length (cm)	Root length (cm)
Check	77.8 (57.4)	73.3 (56.7)	76.8	7.3
Apron 35 WS	81.1 (64.2)	77.0 (59.1)	70.6	6.6
Divident 3 WS	82.1 (65.1)	78.9 (62.1)	76.8	6.8
Mancozeb	83.3 (66.0)	81.1 (64.3)	85.5	7.8
Thiram 75 WP	86.0 (68.1)	84.2 (67.2)	109.7	9.9
Bavistin 75 WP	83.6 (66.2)	80.3 (64.1)	92.8	8.6
CD (P=0.05)	2.9	2.7	4.7	0.8

Figure in the parenthesis represent angular transformed value

RESULTS AND DISCUSSION

Field Emergence-The result (Table 1) revealed that there was no varietal difference in field emergence. However, it varied from 80.3% in T-6 to 82.0% in K-12 black. On the other hand different fungicidal treatment have significant difference on field emergence (Table 2). Statistically all the fungicides were effective in enhancing emergence in comparison to the check. But maximum field emergence (86%) was recorded with Thiram. The extent of field emergence in Apron, Divident, Mancozeb, and Bavistin treated seed was 81.1%,

82.1%, 83.3% and 83.6% respectively which were statistically at par.

Percent Survival-The result (Table 1) revealed that there is no varietal effect on survival percent. But significant difference in survival was recorded in different fungicide treated seed (Table 2). Although all the fungicides statistically enhanced the survival percent of seedlings over the check, maximum (84.4%) seedlings survived in Thiram treated seed followed by Mancozeb (81.1%).

Numerous reports are available on seed treatment of different crops in relation to seedling diseases.

But in sunnhemp only few reports on efficacy of fungicides are available, and these are mostly confined to testing of fungicides against different seedling pathogens under laboratory conditions [10-11]. On the other hand what ever fungicides were found suitable are either banned or not available in the market. In the present investigation, effective fungicides (Thiram/Mancozeb) are easily available in the market. Thus either of these fungicides can be recommended for seed treatment.

Seedling vigour-Significant varietal difference (Table 1) on shoot length were recorded with maximum in K-12 yellow (90.6 cm.) and K-12 black (89.1). Similarly shoot length also varied significantly with different fungicidal seed treatments (Table 2) in comparison to the check (76.8). The highest shoot length was recorded in Thiram treated seed (109.7cm) followed by Bavistin (92.8 cm) and Mancozeb (85.5 cm). Like shoot length, root length of K-12 yellow (8.4 cm) and K-12 black (7.8 cm) was also significantly higher in comparison to T-6 (7.3 cm). Results (Table 2) of different/fungicidal seed treatment on root length also varied significantly with maximum effect of Thiram (9.9 cm) and Bavistin (8.6 cm) in comparison to the check and other fungicides.

In addition to disease control fungicidal seed treatment also show the growth promoting effects on various crops [12]. Growth promotion seems to be due to the availability of some essential micronutrients. Toxic effects of antagonistic fungi and/or competition for food and space among the soil microorganisms may also have reduced by fungicidal seed treatment that ultimately leads to accelerate seedling growth.

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