

Effect of clipping and diammonium phosphate spray on growth and seed yield of *dhaincha* (*Sesbania aculeata*)

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ABSTRACT

A field experiment was conducted to study the effect of diammonium phosphate spray and clipping of the terminal shoot of *dhaincha* (*Sesbania aculeata* Pers.) plant during summer season of 1998 and 1999 under sodic soil (pH 8.9). The diammonium phosphate (DAP 2% spray enhanced the shoot length, shoot dry weight and branch numbers/plant. Clipping either on 25 or 35 days after sowing significantly reduced the shoot length; but improved the dry weight of the shoot by increasing the branch numbers/plant. The diammonium phosphate spray registered higher seed yield of 18.3 and 18.2% than water spray and 62.6 and 59.0% than the control in 1998 and 1999 respectively. Clipping also improved the seed yield significantly.

Key words : DAP spray, Clipping, *Dhaincha*, Growth, Seed yield, Germination

Inclusion of green-manures in the cropping system is one of the components of an integrated nutrient management. Due to scarcity of farmyard manure in bulk to add to the field, farmers depend more on green-manure crops to increase the organic carbon content of the soil than other sources. At the sowing time, availability of *Sesbania aculeata* seed is questionable, due to lack of production of seed during summer period with less availability of water for irrigation. To increase the seed yield of *Sesbania aculeata*, production technology has to be evaluated with available resources. Hence this study was

carried out to formulate the production technique of *Sesbania aculeata* seed.

MATERIALS AND METHODS

A field experiment was conducted to study the effect of clipping and DAP 2% spray on seed yield of *Sesbania aculeata* during summer season of 1998 and 1999 under sodic soil as on-farm trials. The local variety of *Sesbania aculeata* was sown during February on the side of ridge with the spacing of 45 cm x 30 cm. The soil had pH 8.9 and available N, P and K 180, 98 and 290 kg/ha. The treatments were combination of spraying of diammonium

phosphate 2% solution and water, clipping at 25 and 35 days after sowing and control (unsprayed and unclipped). Solution (2%) was prepared by dissolving 40 g diammonium phosphate in 200 ml water and next day, the solution at top was mixed with 1.8 litres water to spray 40 m² area.

This nutrient solution was sprayed at 45 and 60 days after sowing. The terminal shoot of the *Sesbania aculeata* plant was clipped 25 and 35 days after sowing and the control was maintained. Irrigation was given based on the need of the crop. No fertilizer and plant-protection measures were given. The experiment was conducted in randomized block design with 3 replications.

At harvest stage (during May), 5 plants were selected to collect the data on roots, shoots, pods and seeds. Root length, dry weight and effective nodule numbers were taken. Shoot length, shoot dry weight and branch numbers, pod length and pod numbers, seeds/pod, 100-seed weight and seed yield were recorded, and germination count was taken by placing the seeds of randomly selected seeds in the wet sand.

RESULTS AND DISCUSSION

Effect of diammonium phosphate on growth

Diammonium phosphate spray had no influence on root length and root dry weight. But its effect was noticed on shoot growth. Effective nodule number was significantly reduced by the spray of diammonium phosphate. Water spray registered 41.3 nodules in 1998, whereas the control recorded 34 nodules. Due to addition of nitrogenous substances through

foliage, the nodule-forming (N fixing) bacterial activity could be reduced. This confirms the statement of Kennedy and Pendick (1995).

The diammonium phosphate spray improved the shoot length significantly. Shoot dry weight was also enhanced by diammonium phosphate spray (Table 1). The average branch number registered by diammonium phosphate spray was 6.3 and 6.0 in 1998 and 1999 respectively.

Effect of clipping on growth

There was no significant effect of clipping on root growth. Clipping the terminal shoot of the plant with water spray 35 days after sowing registered significantly more number of nodules (Table 1). Shoot length was significantly reduced by clipping either on 25 or 35 days after sowing in both diammonium phosphate and water-sprayed plants. Clipping on 35 days after sowing produced significantly the highest shoot dry weight in 1999. Such an effect was not observed in water-sprayed plant in 1998. Branch number was significantly increased by clipping treatment. Clipping of diammonium phosphate-sprayed plant 35 days after sowing registered the highest number of branches, 8.2 and 8.0 in 1998 and 1999 respectively. Clipping significantly reduced the shoot length. Between the days of clipping, there was no significant difference on shoot length.

Effect of diammonium phosphate on Yield traits and seed yield

All the yield parameters, viz. pods/plant, pod length, filled seeds/pod and 100-seed weight increased significantly by

Table 1. Effect of clipping and diammonium phosphate on growth characters of *dhaincha*

Treatment	Root length (cm)		Root dry weight (g)		Effective nodules (No.)		Shoot length (cm)		Shoot dry weight (g)		Branches (No.)	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
<i>DAP 2% spray</i>												
Clipping at 25 DAS	28.6	29.2	13.8	14.4	18	32	183.0	187.4	56	62	6.4	6.0
Clipping at 35 DAS	29.0	29.4	15.0	15.4	22	26	191.7	192.5	57	63	8.2	8.0
Unclipped	29.1	29.9	13.2	13.4	27	23	200.5	211.9	51	59	4.5	4.1
Mean	28.9	29.5	14.0	14.4	22.3	27.0	191.7	197.2	54.6	61.3	6.3	6.0
<i>Water spray</i>												
Clipping at 25 DAS	28.0	28.4	15.0	15.6	39	45	170.5	177.7	50	60	4.4	4.2
Clipping at 35 DAS	28.6	29.2	14.8	15.4	46	44	175.9	180.5	49	59	6.3	6.1
Unclipped	29.0	29.4	13.9	14.5	39	33	194.2	192.8	53	49	2.0	2.2
Mean	28.5	29.0	14.5	15.1	41.3	40.6	180.2	183.6	50.6	56.0	4.2	4.1
Control	27.8	28.2	13.9	14.1	34	46	182.1	178.3	54	50	3.8	4.2
CD (P=0.05)	NS	NS	NS	NS	4.57	7.40	3.70	5.22	2.39	3.70	0.43	0.65

DAS, Days after sowing

Table 2. Effect of diammonium phosphate and clipping treatments on yield attributes and seed yield of *dhaincha*

Treatment	Pods/ plant		Pod length (cm)		Filled seeds/ pod		Unfilled seeds/pod		100-seed weight (g)		Seed yield (kg/ha)			Germination (%)		
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	Mean	1998	1999	Mean
<i>DAP 2% spray</i>																
Clipping at 25 DAS	42	36	20.2	20.0	22	20	7	5	1.90	1.92	855	895	875	95.0	95.6	95.3
Clipping at 35 DAS	40	36	19.3	20.3	21	19	6	4	1.90	1.90	840	860	850	97.3	97.1	97.2
Unclipped	36	32	19.2	21.0	16	20	6	2	1.87	1.83	720	750	735	98.0	98.8	98.4
Mean	39.3	34.6	19.5	20.1	19.6	19.6	6.3	3.6	1.89	1.88	805	835	820	96.7	97.1	96.6
<i>Water spray</i>																
Clipping at 25 DAS	37	35	18.0	18.6	15	21	3	5	1.64	1.60	717	743	730	84.2	86.4	86.3
Clipping at 35 DAS	35	33	17.9	18.3	15	21	6	6	1.60	1.64	715	715	710	80.9	90.9	85.3
Unclipped	27	25	17.1	18.1	16	18	3	7	1.60	1.62	618	662	640	85.3	87.3	86.5
Mean	33.0	31.0	17.6	18.3	15.3	20.0	4.0	6.0	1.61	1.62	680	706	693	83.4	88.2	86.2
Control	25	31	18.0	18.0	17	17	5	7	1.60	1.62	495	525	510	86.0	87.8	86.2
CD (P=0.05)	2.61	1.30	0.65	0.87	2.39	2.83	NS	NS	0.06	0.04	27.01	29.85	38.3	3.26	3.70	8.69

diammonium phosphate spray. Total seeds/pod were also high in diammonium phosphate-sprayed plant. However, it was also recorded higher number of unfilled seeds in 1998.

The diammonium phosphate spray recorded the seed yield of 805 and 835 kg/ha in 1998 and 1999 respectively, being 18.3 and 18.2% higher seed yield than water spray and 62.6 and 59.0% higher than the control in 1998 and 1999 years respectively.

Effect of clipping on yield traits and seed yield

Clipping either at 25 or 35 days after sowing produced more pods/plant than unclipped, both in diammonium phosphate and water spray treatments. This effect was observed in pod length of water-sprayed plant. But it was not influenced on filled seeds and 100-seed weight.

Seed yield of *Sesbania aculeata* plants, sprayed with diammonium phosphate was influenced by clipping either on 25 or 35 days after sowing. Clipping significantly

improved the seed yield of both diammonium phosphate- and water-sprayed plants. Narayanagowda and Jeyanthi (1998) reported that clipped chrysanthemum produced bigger flower, and higher yield than unclipped plant.

Effect on germination

The seeds obtained from diammonium phosphate-sprayed plants showed the highest germination (96.7 and 97.1%) in 1998 and 1999 respectively. But this effect could not be observed in water-sprayed plant seeds. This might be due to nitrogen content of the seeds which influenced by DAP spray either on 25 or 35 days after sowing. Clipping had no effect on seed germination.

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