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RESPONSE OF KUTH (*SAUSSUREA LAPPA* L.) TO SEED RATES AND NITROGEN FERTILIZER

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ABSTRACT

A field experiment was carried out during summer season 1990 and continued still september 1992 to find out the optimum seed rate and nitrogen dose for kuth crop cultivation. Highest kuth yield 54.04 q/ha, was obtained with 35 kg seed/ha, followed by 52.37 q/ha kuth yield with 45 kg seed/ha. The highest yield was recorded with a dose of 60 kg N/ha (57.8 q/ha), which was at par with the dose of 40 kg N/ha (56.6 q/ha) and which were significantly higher the 20 kg N/ha and control.

The Lahaul valley of Himachal Pradesh has been considered as potential area for cultivation of cash crops. The area is characterised by fairly low temperature, a definite period of snowfall and mild summer season (May- October). Potato (*Solanum tuberosum* L.), Kuth (*Saussurea lappa* L.) and hops (*Humules lapulus* L.) are the only potential profitable crops grown in the valley. Kuth is an important cash crop having medicinal value. Kuth roots are used as in incense perfumes and insecticide to protect shawls and woollen fabric. The roots are some times smoked as a substitute for opium. The kuth yield harvested in farmers field is quite low. The average yield of kuth is quite low mainly due to sparse plant population and improrer use of fertilisers.

The information on fertilizer use and seed rate is scanty hence, the present investigation was under taken to study the effect of seed rate and nitrogen on kuth yield.

A field experiment was started in the summer season of 1990 and continued still September 1992 at the experimental farm of H.P.K.V., Regional Research Station, Kukumeri, Lahaul and Spiti (H.P.). The station is at 30° 42' N latitude and 77° 37' E longitude and is at an elevation of 10,650 feet above mean sea level in dry temperate hill zone of H.P. Lahaul valley is characterized with slopy deserts mountains with short growing season of 5-6 months. Annual snow fall ranges from 2-4 m, during winter and rain fall is negligible. During summer, which is the growing season of the crop there is no snow. The soil of the experimental plot was sandy loam, rich in organic matter (2.54) with pH 6.6 available nutrients in the soil were 650 kg N/ha, 10.4 kg P/ha and 163 kg K/ha.

Twelve treatment combinations comprising of 3 seeds rates, *viz.*, 25, 35 and 45 kg/ha and 4 N levels *viz.*, 0, 20, 40 and 60 kg N/ha, were tried in randomized block design with three replications. The kuth crop was drill sown with the row to row spacing 20 cm in middle of October, 1990 and harvested in September, 1992. A uniform dose of 25 kg P_2O_5 and 25 kg K_2O/ha, were applied to the crop every year whole of nitrogen as per treatment was applied at time of sowing. The kuth yield was recorded on dry weight basis. When the kuth crop hallum was dry and leaves were fallen, but same leaves were yellow-green in colour. After cutting hallum, plots had remained vacant at least for one week. After one week the kuth roots were duged with help of spade. The depth of the kuth roots were in the soil near 6-8 Inches. The kuth roots were sun dried for a week.

In the present study the kuth crop was harvested after two years. The number of plants per plot at the seed rate of 25, 35 and 45 kg/

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Table 1. Effect of seed rates and N levels on root length, root girth and yield of Kuth

Treatment	Root length (cm)	Root girth (mm)	Kuth yield (D.M.) (q/ha)
Seed rates (kg/ha)			
25	20.40	11.14	49.8
35	22.31	11.24	54.4
45	21.76	11.15	52.4
S.Em. ±	0.24	0.10	1.85
CD. (5 %)	0.71	N.S.	N.S.
C.V. (%)	2.00	6.00	5.00
N levels (kg/ha)			
0	20.17	9.95	43.2
20	21.15	11.05	50.6
40	22.04	11.87	56.6
60	22.60	11.82	57.8
S.Em. ±	0.28	0.21	1.91
C.D. (5 %)	0.82	0.71	6.6
C.V. (%)	2.60	6.30	4.4

Note: Interaction between seed rate and nitrogen levels was found non significant.

ha, were recorded 200, 280 and 360, respectively.

Different seed rates influenced the root length significantly. Seed rate of 35 kg/ha, resulted in significantly higher root length compared to 25 kg/ha, but it was on par with 45 kg/ha. Seed rates could not influence the root girth as well as yield significantly, but there was impact on increase in yield (Table 1).The highest yield 54.04 q/ha, was obtained with 35 kg seed/ha followed by 52.37 q/ha kuth yield with 45 kg seed/ha. The nitrogen levels affected the yield and yield attributes of kuth crop significantly. Application of nitrogen upto 40 kg N/ha, resulted in significantly increase in length as well as girth of roots. The highest yield was recorded with a dose of 60 kg N/ha (57.8 q/ha), which was at par with the dose of 40kg N/ha (56.6 q/ha), and which were signficantly higher than 20 kg N/ha, and control (No nitrogen).

There was 31% increase in yield by 40kg N/ha, over control and 12% over 20 kg N/ha. The positive effect of nitrogen application on root length and girth might have finally resulted in increased yield of kuth. It may be concluded from this study that 35 kg/ha, seed rate and a dose of 40 kg N/ha is optimum for kuth crop.