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Effect of sowing time, method of sowing and seed rate on yield and oil quality of niger (*Guizotia Abyssinica)*

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ABSTRACT

An investigation on suitable sowing time, method of sowing and seed rate for Niger indicated that higher seed (3.41 qha^{-1}) and stalk yield (18.80 qha^{-1}) was obtained by sowing Niger in 26 MW (25 June to 1st July), which proved significantly superior to the crop sown in 24 (11-17 June) or 28 (19-15 July) standard meteorological week. Marked increase in the protein (19.88%) and oil (39.93%) content as well as protein (67.96 kgha^{-1}) and oil (136.41 kgha^{-1}) yield was observed by sowing Niger in 26 MW. Similarly line sowing (30 cm) recorded significantly higher seed and stalk yield of Niger. The oil content in seed was not significantly influenced due to different sowing methods, but oil yield (kgha^{-1}) significantly improved with line sowing (30cm) method obviously due to higher seed yield by this method. The 4-kgha^{-1} seed rate produced significantly higher seed yield (3.07qha^{-1}) over 6 kgha^{-1} (2.92 qha^{-1}) and 8 kgha^{-1} (2.88 qha^{-1}) with noticeable improvement in oil and protein content as well as oil and protein yield. Results suggest that in this region under study on Niger non-cash input of early sowing (26MW) and line sowing (30cm) in combination of low cash input of 4 kg seed rate/ha should be followed.

Key word : Sowing time, Methods of sowing, seed rate, Yield, Quality, Niger

Niger (*Guizotia Abyssinica)* known by various local names such as Ramtil, Kalatil, Karala, khurasani etc. is on of the traditional oilseed crops. Seed contains oil by about 35 to 40 % of seed weight and is used for culinary purpose, for anointing the body, for manufacturing paints and soft soaps, for lighting, lubrication and for cosmetics. The oil cake is a well-known cattle feed. The crop sheds a large quantity of dry leaves in the field and thereby adds organic matter to soil.

In the Konkan region of Maharashtra with high rainfall and undulating topography, this crop is cultivated on very light soils on hill slopes, but under poor management. The farmers in Konkan region take this oilseed crop on sub marginal lands without any manuring or fertilization. Similarly, no attention is paid to sow it timely to provide suitable growing environment. These lands are often subjected to heavy erosion resulting in continuous reduction in soil fertility status and subsequent reduction in

yield of niger. The crop is usually broadcast on tilled land without any care to maintain optimum plant population. An investigation to work out suitable sowing time, appropriate method of sowing and seed rate for niger was carried out at Dapoli during *kharif* 1997.

MATERIALS AND METHODS

The experiment was conducted on the agronomy farm at the College of Agriculture, Dapoli, Dist. Ratnagiri. The experimental soil was clay loam in texture and acidic in reaction with moderately high content of organic matter (0.121 kgha^{-1}). The soil was medium in available nitrogen (312.15 kgha^{-1}), low in available phosphorus (9.28kgha^{-1}), medium in available potash (220.54 kgha^{-1}). Rainfall of 3517 mm was received from June to October in 106 days during the experimental period. The relative humidity was in the range of 65 to 95 percent. The minimum temperature varied from 24.9 to 16.8°C and maximum temperature ranged from 33.7 to 25.7°C during the crop growth. The experiment was laid out in split plot design. The main plot treatments comprised of three sowings viz. 24, 26 and 28 MW and subplot treatments constitute methods of sowing (line sowing and broadcasting) and seed rates (4, 6, and 8 kgha^{-1}). Thus there were in all 18-treatment combinations replicated thrice. The niger cultivar IGP-76 was used for the present investigation. Recommend package of practices were followed as and when required regarding weed control, manures, fertilizers and plant protection measures. Yield and meteorological data were collected and analyzed.

RESULTS AND DISCUSSION

Effect of sowing time

The results indicate that higher seed (3.41 qha^{-1}) and stalk yield (18.80 qha^{-1}) was obtained (Table 1) by sowing niger in 26 MW (25 June to 1st July), which proved significantly superior to the crop sown in 24 MW (11-17 June) i. e. early and 28 (19-15July) i. e. late meteorological week. Similarly early sowing of niger on 24 MW was also significantly superior to late sowing in 28 MW. The maximum temperature between 25 and 32°C, minimum temperature between 20 and 23°C, relative humidity between 75 and 93 percent and continuous rainy weather during crop growth period due to sowing in 26 mw proved congenial for enhanced nutrient uptake, better stand, development of sink and finally yield of the crop than early and late crop in 24 and 28MW respectively. Sharma and Kewat (1994) and Anonymous (1995) obtained similar results.

Data on the quality aspect of niger seeds (Table 3) showed that the protein and oil content as well as yield were relatively higher in sowings from 24 to 26 MW, with a reduction thereafter. Marked increase in the protein (19.88%) and oil (39.93%) content as well as protein (67.96 kgha^{-1}) and oil (136.41 kgha^{-1}) yield was observed in 26 MW sowing over late (28MW) sowing. The results indicated that overall quality of niger seed is also weather dependent and hence

Table 1 : Yield of niger as affected by different treatments.

Treatment	Seed yield (qha^{-1})	Stalk yield (qha^{-1})
Sowing Time (Met. Week)		
24	2.93	15.03
26	3.41	18.80
28	2.53	12.42
'F' Test	Sig.	Sig.
S.E. +	0.112	0.187
CD 5%	0.440	0.734
Method of sowing		
Line sowing	3.36	15.92
Broadcasting	2.55	14.91
'F' Test	Sig.	Sig.
S.E. +	0.035	0.089
CD. 5%	0.100	0.257
Seed rate ($kgha^{-1}$)		
4	3.07	14.42
6	2.92	15.53
8	2.88	16.30
'F' Test	Sig.	Sig.
S.E. +	0.042	0.109
CD 5%	0.123	0.314
General mean	2.95	15.41

Table 2 : Oil content (%), protein content (%), oil yield and protein yield (kg/ha) of Niger as affected by different treatments.

Treatments	Oil content (%)	Oil yield ($kgha^{-1}$)	Protein content (%)	Protein yield ($kgha^{-1}$)
Sowing Time Met. Week				
24	38.86	114.34	19.82	58.31
26	39.93	136.41	19.88	67.96
28	38.00	96.37	19.80	50.19
'F' Test	Sig.	Sig.	Sig.	Sig.
S.E. +	0.209	3.658	0.014	2.236
CD 5%	0.822	14.36	0.054	8.78
Method of sowing				
Line sowing (30cm)	39.06	132.02	19.90	67.04
Broadcasting	38.80	99.39	19.77	50.60
'F' Test	N.S.	Sig.	Sig.	Sig.
S.E. +	0.116	1.297	0.010	0.695
CD. 5%	-	3.746	0.029	2.008
Seed rate ($kgha^{-1}$)				
4	39.84	122.95	19.92	61.38
6	38.95	114.27	19.80	58.03
8	38.01	109.90	19.78	57.05
'F' Test	Sig.	Sig.	Sig.	Sig.
S.E. +	0.143	1.589	0.012	0.852
CD 5%	0.412	4.59	0.036	2.46
General mean	38.93	115.70	19.84	58.83

due attention needs to be paid for timely sowing of the crop.

Effect of method of sowing

Seed yield and stalk yield of niger (Table 1) indicate that line sowing (30 cm) method was significantly superior to broadcasting method. The benefits of line sowing were reflected in yield improvement amply. In case of quality studies (Table 2) the oil content in seed was not significantly influenced due to different sowing methods, but oil yield (kgha^{-1}) significantly improved with line sowing (30 cm) method obviously due to higher seed yield in this method. Similar results were reported by Arvind kumar *et al* (1995). Contrary to oil content, protein content and protein yield of niger significantly improved with line sowing as compared to broadcasting, where nitrogenous fertilizer was also broadcast leading to losses.

Effect of seed rate

The 4-kg ha^{-1} seed rate produced significantly higher seed yield (3.07q) over 6 kg/ha^{-1} (2.92 q) and 8 kgha^{-1} (2.88 qha^{-1}) (Table 2). Nevertheless, seed rate of 8 kg produced significantly higher stalk yield (16.30 qha^{-1}), over the other two. This was essentially owing to higher biomass produced under high seed rate. Chaudhary and Verma (1994) and Patro and Kar (1995) also reported similar observation.

Oil, protein content and yield in Niger improved significantly (Table 2) with 4 kg seed rate ha^{-1} over 6 and 8 kgha^{-1}.

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