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Effect of Land Configuration and Potassium Management on Potassium Uptake By Safflower

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Deep black cotton soils having high water holding capacity and stickiness under Nagpur region of Maharashtra limits the safflower cultivation due to poor drainage. To protect the safflower from such saturated hazards and to provide better soil condition for healthy, luxurious proliferation of roots and thereby good response to fertilizer application, suitable land configuration is essential. Better land configuration favours vigorous growth of plant due to better drainage aeration and uptake of nutrients. Though the available potassium in soil is high but its availability is less due to fixation of potassium in clay lattice as most of these soils are 2:1 type. Hence, there is need to supply potassium to fulfill the requirement of the crop and increased the safflower productivity.

METHODOLOGY

A field experiment was conducted at Agronomy Farm, College of Agriculture, Nagpur, during *rabi* 2014-15 on safflower variety AKS-207. The experiment was laid out in split plot design with five treatment combinations consisting of three land configurations viz. L_1-Flat bed, L_2-Ridges and furrows and L_3 -BBF and four potassium management treatments viz. N_1-RDF, N_2-RDF +30 kg ha^{-1} potassium, N_3- RDF + 45 kg ha^{-1} potassium and N_4-RDF + 60 kg ha^{-1} potassium. The soil is clayey in texture, low in nitrogen, medium in phosphorus and very high in potassium. The treatments were imposed as per the layout of the design.

RESULTS

Land configuration :

Data in respect of potassium uptake by seed and stover of safflower and available potassium in soil as influenced by different treatments is presented in Table-1. The data revealed that broad bed furrow (L_3) recorded significantly more potassium content in seed (1.26%) and stover (0.70 %) as well as potassium uptake by seed (22.99 kg ha^{-1}) and stover (28.73 kg ha^{-1}) over flat bed but was at par with ridges and furrows (L_2). Similarly total uptake of potassium was significantly higher with broad bed furrows as compared to other treatments. These findings are in conformity with the findings of Yadav *et.al.* 2013 and Hari *et. al.* 2013.

Available potassium in soil was significantly more with broad bed furrows (440.67 kg ha^{-1}) as compared to other treatments.

Potassium management:

Potassium content in seed and stover of safflower was significantly influenced by various levels of potassium and was found maximum with application of RDF + 60 kg ha^{-1} potassium (1.28 and 0.72 %) as compared to RDF and RDF + 30 kg ha^{-1} potassium. Application of potassium increased the availability and uptake of potassium that reflected in the potassium content in seed and stover. The potassium uptake in seed (25.61 kg ha^{-1}) and stover (29.93 kg ha^{-1}) of safflower as well as total uptake was (53.54 kg ha^{-1}) significantly higher with application of RDF + 60 kg ha^{-1} potassium as compared to other treatments. Similar findings were reported by Vafai *et.al.* 2013, Yadav *et. al.* 2013.

Available potassium in soil after harvest of safflower was found to be increased significantly with each increment in levels of potassium to safflower. Application of RDF + 60 kg ha^{-1} potassium to safflower (438.33 kg ha^{-1}) registered significantly higher potassium in soil over RDF (410.56 kg ha^{-1}) and RDF + 30 kg ha^{-1} potassium (418.78 kg ha^{-1}). These findings are in accordance with the findings of Brar *et. al.* 2010.

The interaction effect due to land configuration and potassium management on potassium content, uptake by safflower as well as available potassium in soil after harvest of safflower was found to be non significant.

Table -1: Potassium content (%) and its uptake (kg ha^{-1}) and available potassium after harvest as influenced by various treatments.

Treatments	Potassium Content (%)		Potassium uptake (kg ha^{-1})			Available potassium (kg ha^{-1})
	Seed	Stover	Seed	Stover	Total	
Initial Value						430.8
Land configuration						
L_1-Flat bed	1.15	0.65	19.16	25.00	4415	415.33
L_2-Ridges and furrows	1.18	0.68	20.20	26.85	47.05	427.08
L_3-BBF	1.26	0.70	22.99	28.73	51.72	440.67
SE(m)±	0.03	0.01	0.74	0.54	1.45	6.17
CD at 5 %	0.10	0.04	2.91	2.12	5.69	24.23
Potassium Management						
N_1-RDF	1.06	0.60	16.85	21.98	38.83	410.56
N_2-RDF + 30 kg potassium ha^{-1}	1.18	0.66	19.42	25.05	44.47	418.78
N_3-RDF + 45 kg potassium ha^{-1}	1.21	0.70	21.86	28.01	49.87	427.44
N_4-RDF + 60 kg potassium ha^{-1}	1.28	0.72	23.61	29.93	53.54	438.33
SE(m)±	0.02	0.02	0.61	0.66	1.24	5.00
CD at 5 %	0.07	0.05	1.80	1.97	3.68	14.85
Interaction						
SE(m)±	0.04	0.03	1.05	1.15	2.14	8.66
CD at 5 %	NS	NS	NS	NS	NS	NS
GM	1.18	0.67	20.44	26.24	46.67	423.78

CONCLUSION

In view of above it can be concluded that broad bed furrow recorded significantly higher potassium content and its uptake by safflower as well as available potassium in soil. Similarly application of 60 kg ha^{-1} potassium in addition to recommended dose of fertilizer (40:40:00) to safflower showed highest potassium content its uptake as well as available potassium in soil.

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