Research Paper

ADVANCE RESEARCH JOURNAL OF
C R P
IMPROVEMENT
Volume 3 | Issue 1 | June, 2012 : 40-43

Effect of sowing and weed management practices on nutrient uptake by crops and weeds on prosomillet

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ABSTRACT : A field experiment was conducted during *Kharif* season of 2008-2009 at Agronomy Farm, College of Agriculture, Dapoli, (M.S.) to study the performance of prosomillet Vari No.10 with different methods of sowing and different weed management practices. Results revealed that transplanting produced lower weed dry weights, total dry weight (monocot and dicot) of weeds q ha^{-1}, the dry matter $plant^{-1}$ of the prosomillet was influenced significantly due to the methods of sowing (38.18 g/plant) over the dibbling (36.16 g/plant) and drilling (34.21 g/plant).In respect weed treatments weed free check produced significantly lower weed dry weight compared to other treatments. While, total nutrient uptake by crop was significantly highest in transplanting followed by the dibbling and drilling.

Key Words : Dry weight of weed, Nutrient uptake by crop and weeds, Growth, Yield

How to cite this paper : Tippanagoudar, P.G., Roodagi, M.B. and Jnanesha, A.C. (2012). Effect of sowing and weed management practices on nutrient uptake by crops and weeds on prosomillet, *Adv. Res. J. Crop Improv.*, **3** (1) : 40-43.

Paper History : Received : *27.03.2012;* **Revised :** *10.05.2012;* **Accepted :** *25.05.2012*

In recent years, there has been an increasing recognition of the importance of millets in India, since the major cereals which are grown on good soils supplied with large quantity of fertilizers, irrigation and pesticide inputs and superior nutritive value attained yield plateau. The millets are the crops that have potentiality of contributing to increased food production, both in developing and developed countries. Know a day's weeds are the major problem which will deplete the nutrients in the soil and compete with crops resulting in drastic decline in the yield level. So, use of herbicides to control the weeds will gain more scope in order to increase the yield of the crop.

Prosomillet is mainly grown by drilling, dibbling, and transplanting methods. The type of method used gives different yield levels and use of these methods is based on availability of the suitable conditions. In Konkan region, prosomillet is cultivated by transplanting method. Among the various agronomic practices, method of sowing plays very important role in establishment of the crop and further growth, development and yield.

RESEARCH PROCEDURE

The field experiment was planted in the terraced land of the Agronomy Farm, College of Agriculture, Dapoli, and Dist. Ratnagiri during the *Kharif* season, 2008. The experiment was laid out in Split Plot Design. The Main plot treatments comprised three methods of sowing and the subplot of treatments consisted of five weed management practices. Totally, there were 15 treatment combinations replicated three times. Main plot treatments-methods of sowing- drilling, dibbling and transplanting and sub plot treatments -weed management practices- unweeded control, two hand weedings (15-20) and 45-50 days after sowing (DAS), oxadiargyl (Pre emergence) 80 g *a.i.* per hectare, Oxadiargyl (Pre emergence) + one hand weeding 45-50 DAS) and weed free check.The soil of experimental plot was sandy clay in texture and slightly acidic in reaction with Soil pH (5.6) having high organic matter and high in available nitrogen, medium in available phosphorus and available potassium. The variety Vari No.10 of prosomillet was used in the present investigation. Seed rate used for drilling was 8 kg per hectare, for dibbling 5 kg per hectare and for Transplanting it was 3.0 kg per hectare sown with a spacing of 20 cm x 15 cm. Fertilizer application was done as per the recommended dose of the crop. Fertilizers were applied at the rate 80 kg N and 40 kg P_2O_5 per ha. Full dose of phosphorus and half dose of nitrogen were applied at the time of sowing.

Remaining half dose of nitrogen was applied 30 DAS or transplanting. Nitrogen and phosphorus were applied in the form urea and single super phosphate, respectively. To obtain nutrient uptake by plant sample of five hills at harvest, weed samples at 90 DAS were used for chemical analysis. Crop samples were used for determining total nitrogen, phosphorus and potassium uptake in straw and grain. Similarly, whole weed samples at 90 DAS/DAT were used for determining N, P and K uptake by the weeds. The total nitrogen in plant was determined by using modified micro kjeldahls method (Jackson, 1974). Total phosphorus was determined by spectrophotometer and potassium was determined by flame photometer method (Jackson, 1973).

RESEARCH ANALYSIS AND REASONING

Following weed species were observed in experimental plot. Monocot weeds were: *Cyperus rotundus, Cynodon dectylon, Echinochloa colonum, Eluesina indica* and other grasses. Dicot weeds *Ageratum conyzoides, Alternanthra sessile, Amaranthus viridis, Celosia argéntea, Mimosa púdica* and others

Experimental results revealed that there was no significant difference with respect to monocot and dicot weeds population among the different methods of sowing (Table1). But transplanting produced significantly lowest mean dry weight of monocot and dicot weeds and also total dry weight of weeds(q/ha) than drilling and dibbling. This attribute is mainly due to in drilling and dibbling both crop and weed germinate simultaneously and weeds will offered more competition to crop and put forth higher dry matter. While in case of transplanting, for first thirty days the crop was sown in the nursery and then after the field preparation the crop was transplanted to the field. Therefore, the dry matter accumulation in the weeds on the hectare basis was significantly less under transplanting than drilling and dibbling. Bhongale and Chavan (2002) reported the results on the same line.

Among the weed management practice (Table 1) weed free check recorded lowest weed population (00.0) and dry weight of weeds (00.0) while it was highest with weedy check (11.23qha^{-1}) at 90 DAS. This was due to the uninterrupted growth of weeds throughout their life span under weedy check. The weed count in respect of monocot and dicot weeds was found to get reduced significantly in comparison with Weedy

Table 1 : Monocot and dicot weeds population (per 0.25 m^2), mean dry weight (q/ha) of monocot and dicot weeds and total dry weight of weeds (q/ha) as influenced by the different treatments in prosomillet. (Observations at 90 DAS)

Treatments	Monocot weeds per 0.25 m^2	Dicot weeds per 0.25 m^2	Dry weight of monocot weeds(q/ha)	Dry weight of dicot weeds(q/ha)	Total dry weight of weeds(q/ha)	Dry matter production plant^{-1} (g)	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})
Main plot treatments-methods of sowing								
Drilling	17.17	19.39	1.45	1.60	3.05	34.21	8.10	28.46
Dibbling	18.00	22.83	1.66	2.04	3.72	36.16	8.91	35.17
Transplanting	17.11	16.17	1.24	1.31	2.67	38.18	10.52	37.14
S.E. $\pm$	0.32	2.07	0.08	0.16	0.07	0.24	0.54	0.60
C.D. (P=0.05)	NS	NS	0.31	0.65	0.27	0.95	2.11	2.36
Sub plot treatments weed management practices								
Unweeded control (W_1)	62.11	66.56	5.34	5.88	11.23	38.28	7.71	32.96
Two hand weedings (15-20 days after sowing (DAS) and 45-50) (W_2),	18.33	27.89	1.42	2.19	3.74	43.81	10.95	39.09
Oxadiargyl (Pre emergence) 80g a.i. per hectare (W_3),	13.44	13.44	1.04	0.99	2.01	42.71	10.17	37.03
Oxadiargyl (Pre emergence) + one hand weeding 45-50 DAS) (W_4)	10.67	8.89	0.90	0.83	1.72	44.51	12.14	43.20
Weed free check (W_5).	00.00	00.00	0.00	0.00	0.00	47.79	14.09	49.26
S.E. $\pm$	0.68	1.57	0.26	0.17	0.02	0.37	0.27	0.48
C.D. (P=0.05)	1.99	4.58	0.75	0.51	0.06	1.07	0.80	1.41
Interaction								
S.E. $\pm$	1.18	2.72	0.11	0.06	0.04	0.63	0.47	0.84
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS

NS=Non-significant

Table 2 : Total nitrogen, phosphorus and potassium uptake (kg/ha) of prosomillet (in grains and straw) and by the weeds (monocot and dicot) as influenced by the different treatments

Treatments	Crop			Weeds		
	Total N uptake (kg/ha)	Total P uptake (kg/ha)	Total K uptake (kg/ha)	Total N uptake (kg/ha)	Total P uptake (kg/ha)	Total K uptake (kg/ha)
Main plot treatments-Methods of sowing						
Drilling	19.83	8.12	98.38	3.98	0.87	2.80
Dibbling	23.44	10.16	122.86	5.07	1.12	3.19
Transplanting	27.12	11.42	131.62	3.26	0.68	2.09
S.E. $\pm$	0.17	0.15	2.98	0.07	0.08	0.10
C.D. (P=0.05)	0.68	0.58	11.71	0.28	0.33	0.38
Sub plot treatments -Weed management practices						
Unweeded control	27.96	10.55	134.33	12.76	3.46	9.94
Two hand weedings (15-20 days after sowing (DAS) and 45-50)	28.06	11.63	141.63	5.10	1.21	3.09
Oxadiargyl (Pre emergence) 80g a.i. per hectare	28.02	11.21	138.52	3.54	0.53	1.54
Oxadiargyl (Pre emergence) + one hand weeding 45-50 DAS)	28.28	12.76	143.98	3.25	0.20	1.24
Weed free check	28.36	13.25	147.22	0.00	0.00	0.00
S.E. $\pm$	0.04	0.09	0.97	0.02	0.05	0.03
C.D. (P=0.05)	0.12	0.25	2.23	0.06	0.15	0.08
Interaction						
S.E. $\pm$	0.01	0.15	1.68	0.04	0.09	0.05
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS

NS=Non-significant

check. Further, the dry weight of weeds per unit area is generally directly proportionate with the weed count per unit area in the seasonal crops; and therefore, weedy check recorded significantly higher rate of monocot and dicot weeds per unit area than the weed management practices. Similar results were obtained by Ebhad (1998), Singh and Arya (1999) in fingermillet.

Experimental results (Table 2) revealed that, transplanting method of sowing shows significantly superior nutrient uptake of nitrogen, phosphorus and potassium of prosomillet over the dibbling and drilling. This was due to significantly higher grain and straw yield of prosomillet under transplanting than drilling. However, the uptake of nitrogen, phosphorus and potassium by the weeds were considerably less under transplanting method than the drilling and dibbling. This was attributed to the significantly less dry weight of monocot and dicot weeds under transplanting due to effective control of weeds in early stages than drilling and dibbling. Similar findings were reported by Bhongale and Chavan (2002) in prosomillet.

In weed management treatments can be arranged in the following descending order of significance in respect of nitrogen, phosphorus and potassium uptake by the monocot and dicot weeds *i.e.* weedy check, two hand weeding, oxadiargyl, oxadiargyl + HW and weed free check except oxadiargyl and oxadiargyl+HW treatments which were at par with each other. Similar findings were reported by Sagvekar (1991) and Jena and Tripathi (1997) in fingermillet. For obtaining *Kharif* prosomillet it should be cultivated by transplanting method and weed management should be done by pre-emergence application of oxadiargyl (80 g a.i./ha) + one hand weeding at 40-50 DAS in lateritic soils of konkan.

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