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Short Communication

Participatory varietal selection in fodder oats under temperate conditions of Kashmir valley

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Abstract

A study was done on the participatory varietal selection (PVS) for adoption of improved forage oat varieties in Kashmir under Himalayan conditions. The study assessed how this approach influence farmers' uptake of the introduced forage oat varieties and determined socio-economic, bio-physical and institutional factors that influence the adoption of these improved forage oat varieties. Therefore a survey was carried out in Shopian, Pulwama, Srinagar, Bandipora and Gandarbal districts in Kashmir. Data were collected from 113 farmers using a pre-designed questionnaire. Before administering the individual questionnaire, a participatory rural appraisal (PRA) was conducted by selecting 50 households from 16 selected sites. The sites were selected from central, north and south areas of Kashmir valley. Three sites from Districts of Srinagar, four sites from Gandarbal, four from Shopian and five sites selected from Pulwama to identify background information, production constraints as well as the farmers perception about varietal specification of fodder oats. Descriptive statistics were generated using χ^2-test. The most preferred genotypes identified by the farmers through PVS were SKO-90, SKO-96 and SKO-98. These genotypes needs to be evaluated further by Baby Trial evaluation system on big plot size and over many more locations to corroborate the real performance and finally to recommend the varieties for up scaling through Participatory Seed Production under such ecologies.

Key words: Oats, participatory varietal selection, Himalayan conditions, seed production.

Participatory Varietal Selection specifically refers to evaluation of released varieties, pipeline materials, advanced breeding lines, landraces or germplasm accessions on farmers' fields under his management practices. Participatory Varietal Selection (PVS) approaches can be used to rapidly and cost-effectively identify the best existing varieties. It allows the farmers to evaluate varieties for all traits and to make trade of between traits and tests varieties across more of the physical niches in which the crop is grown because the trials are replicated across more locations Witcombe et al. 2005). Farmers are increasingly participating in agricultural research as scientists and development workers become more aware of the philosophy of "farmer first and its effectiveness" (Witcombe and Joshi 1995). Farmers Participatory Varietal Selection (PVS) approach is used to address the problems of the limited varietal choices available to farmers. In plant breeding, farmer participation is seen as key to increase the probability of adoption of new varieties and addresses the issue of selection efficiency in participatory plant breeding by testing the effect of selection environment on the performance of the selected lines (Ceccarelli et al. 2003). The genotypes used for evaluation were tested in farmer managed, participatory trials, in order to identify farmer acceptable cultivars more effectively. Keeping in view the large gap between demand and supply of forage oats and limited varietal profile and scarcity, the present research programme was carried out to evaluate twelve genotypes of fodder oats across diverse agro-ecological situations in participatory mode to assess their performance, suitability and utilization.

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Based on the experience gained through this investigation it become evident that appropriate use of participatory breeding technique/methods during breeding process shortens the breeding cycles, saves time, has quick impact besides helping in the production of cost effective and improved crop varieties. The farmers face fodder deficiency in winter when they have only dry stalks of summer cereal fodders or dry summer grasses. In order to increase in productivity per unit area there is need to develop and identify varieties having higher forage yield potential and quality (Ahmad et al. 2005).

In the present investigation 10 *Avena sativa* genotypes including two checks *viz*., SKO-20, SKO-90, SKO-96, SKO-98, SKO-117, SKO-148, SKO-160, SKO-166, SKO-167, SKO-176, Sabzaar and Kent were evaluated through mother trial evaluation system to identify the most appropriate genotypes on the basis of preferences of the farmers and to find the varietal specification to bred in future in consultation with farmers. There were three Mother trials laid out in the farmers field including three Grandmother trials laid at Mountain livestock Research institute (MLRI), KVK-Malangpura and Experimental Farm of Division of Genetics and Plant Breeding, SKUAST-Kashmir (Shalimar). The experiment was laid in Randomized Complete Block Design (RCBD) with three replications during *rabi* 2013.

Participatory varietal selection always has three phases: a means of identifying farmers' needs for a cultivar, a search for suitable material to test with farmers, and experimentation on farmers' fields. Farmers' needs were identified through participatory rural appraisal (PRA), which was conducted before laying out of the trails to identify background information, production constraints as well as the farmers perception about varietal specification of fodder oats. Participatory Varietal Selection (PVS) approach has been employed to evaluate, identify and disseminate different genotypes on farmer's field as per farmer's tastes regarding various traits and their perception and aspirations about varietal specification.

PVS assumes that varieties exist that are better than those currently grown, but which farmers have not had the opportunity to test. In PVS, farmers are given varieties to test in their own fields. These varieties are chosen carefully to save time and to ensure that seed is available we have used seed of cultivars that have already been released, not only from the target region but also other regions or countries.

In present investigation twelve genotypes including two checks were evaluated through Grandmother/Mother trial evaluation system and based on farmer's skill and knowledge preferential ranking was carried out at all six locations including the trials laid out by the farmer's in their own fields and Grand Mother trails at research stations/units. Just one week before harvest, at respective locations Focal Group Discussions (FGD) and farmer walks were organised to evaluate the trails. Based on the methodology of PRA at village Manduna (Pulwama) highest preferential scoring i.e. lowest rank value was recorded for genotype SKO-90 (1) followed by SKO-96 (2) and SKO-98 (3) (Table 1). The lowest preference was recorded for SKO-117 (11) and SKO-176 (12). Similarly at village Trenz (Shopian) maximum scoring was recorded for genotypes SKO-96 (1) followed by SKO-90 (2) and Sabzaar (3) and the minimum for SKO-167 (11) and SKO-176 (11). The maximum number of farmer's votes was recorded for genotypes SKO-96 (1) followed by SKO-90 (2), SKO-98 (3) and SKO-160 (4) and so on at village Gandarbal, while as maximum number of negative votes was recorded for SKO-176 (11) and SKO-167 (12). At MLRI, Manasbal; KVK, Malangpora and Experimental Farm of Division of Genetics and Plant Breeding, SKUAST-K, Shalimar most preferred variety/genotypes were SKO-90 (1) and SKO-96 (2) followed by SKO-98 (3) and Sabzaar (4). The variety/genotype that received minimum number of negative votes was SKO-176 (11). There was significant interaction between varieties/genotypes and locations as observed from the data of preferential ranking. Most of the variations in ranking between sites are for the lower ranked entries. The reasons for the preference of genotype/varieties were related to many traits including highest number of tillers, high green fodder yield, grain yield, early maturity, good plant height, thin culm diameter, high protein and ash content and low content of ADF and NDF. Table 2 gives the picture of rank summation preferential data for different test entries as collected from six mother trials and evaluated by 113 farmers including the ones who grow the trials on their farm. Lowest cumulative rank that is the most preferred variety was recorded on SKO-90 with mean preference rank of 1.33 and SKO-96 identified as second best (1.8) and followed by SKO-98 (3.3) and Sabzaar (3.83). Clearly shows that SKO-90, SKO-96 SKO-98 and Sabzaar were statistically at par in term of rank summation index and mean preference ranking and significantly different with the test entries SKO-20, SKO-160, SKO-166, SKO-148 and Kent which among themselves could be

Table 1. Farmers preference ranking (scoring) of different test varieties of oats at six locations

Genotypes	Distt. Pulwama farmers trail (n=33, f=25)		Distt. Ganderbal farmers trail (n=18, f=15)		Distt. Shopian farmers trail (n=19, f=15)		Distt. Srinagar station trail (n=25, f=20)		Distt. Pulwama station trail (n=20, f=16)		Distt. Bandipora station trail (n=22, f=19)	
	Positive votes	Preferential scoring	Positive votes	Preferential scoring	Positive votes	Preferential scoring	Positive votes	Preferential scoring	Positive votes	Preferential scoring	Positive votes	Preferential scoring
SKO-20	11	-0.12	5	-0.33	8	0.06	10	0	9	0.125	8	-0.15
SKO-90	22	0.76	13	0.78	13	0.73	19	0.9	15	0.875	18	0.89
SKO-96	21	0.68	14	0.86	14	0.86	18	0.8	13	0.625	17	0.78
SKO-98	20	0.6	10	0.33	11	0.46	16	0.6	14	0.75	15	0.73
SKO-117	9	-0.28	4	-0.46	5	-0.03	9	-0.1	7	-0.125	7	-0.26
SKO-148	14	0.12	6	-0.2	6	-0.2	8	-0.2	10	0.25	6	-0.36
SKO-160	15	0.2	8	0.06	7	-0.06	15	0.5	11	0.378	10	0.05
SKO-166	16	0.28	9	0.2	9	0.2	15	0.5	8	0	9	-0.05
SKO-167	10	-0.2	5	-0.33	4	-0.46	11	0.1	7	-0.125	5	-0.47
SKO-176	8	-0.36	3	-0.2	4	-0.46	7	-0.3	4	-0.5	4	-0.57
Sabzaar	19	0.52	7	-0.06	12	0.6	17	0.7	12	0.5	16	0.68
Kent	17	0.36	4	-0.46	10	0.3	12	0.2	5	-0.375	13	0.36

n = Number of farmers assembled; f = Effective number of farmers who participated in preferential scoring

Table 2. Cumulative/average ranks of genotype over six locations

Genotypes	Individual ranks						Cumulative rank	Average of ranks	Pooled preference score
	Mother trials			Grandmother trials					
	Distt. Pulwama farmers trail	Distt. Ganderbal farmers trail	Distt. Shopian farmers trail	Distt. Srinagar Shalimar (Expermental farm)	Distt. Pulwama Malangpora (KVK)	Distt. Bandipora Manasbal (MLRI)			
SKO-20	9	8	7	8	7	8	47	7.8	–0.415
SKO-90	1	2	2	1	1	1	8	1.33	4.935
SKO-96	2	1	1	2	3	2	11	1.8	4.605
SKO-98	3	3	4	4	2	4	20	3.3	3.470
SKO-117	11	9	10	9	9	9	57	9.5	–1.255
SKO-148	8	7	9	10	6	10	50	8.3	–0.590
SKO-160	7	5	8	5	5	6	36	6.0	1.128
SKO-166	6	4	6	5	8	7	36	6.0	1.130
SKO-167	12	8	11	7	9	11	58	9.6	–1.485
SKO-176	10	10	11	11	11	12	65	10.8	–2.390
Sabzaar	4	6	3	3	4	3	23	3.83	2.940
Kent	5	9	5	6	10	5	40	6.6	0.385
SE							5.43	0.90	0.64

SE = Standard error

categorized as one group. SKO-167, SKO-176 and SKO-177 were least preferred genotypes.

The interviews from most of the farmers revealed that the reasons for the preference for a genotype were related to many traits including highest number of tillers, high green fodder yield, grain yield, early maturity, tall stature, resilience to insect pests and diseases and high moisture content.

Participatory Varietal Selection (PVS) approach has been employed to evaluate, identify and disseminate different genotypes on farmer's field as per farmers tastes regarding various traits and their perception and aspirations about varietal specification by different authors through their studies across various regions and crops *viz*., (Ojehomon et al. 2012; Yadavendra and Witcombe 2013). PVS is a more rapid and cost effective way of identifying farmer preferred cultivars if suitable choices of cultivars exist. Compared to conventional plant breeding PPB/PVS approach is more likely to produce farmer acceptable products, particularly for marginal environments and disadvantageous pockets having different micro-climates/terrains and limited choice of varieties.

Refrences

Witcombe J. R., Joshi K. D., Gyawali S., Musa A. M., Johansen C., Virk D. S. and Sthapit B. R. 2005. Participatory plant breeding is better described as highly client-oriented plant breeding.1. Four indicators of client-orientation in plant breeding. Exp. Agric., **41**: 299-319.

Witcombe J. R. and Joshi A. 1995. Farmer participatory research for the selection of rainfed rice cultivars. Proceedings of the IRRI Conference. Fragile lives in fragile ecosystems. Los Banos: International Rice Research Institute.

Ceccarelli S., Grando S., Singh M., Michael M., Shikho A., Al-Issa M., Al-Saleh A., Kaleonjy G., Al-Ghanem S. M., Al-Hasan A. L., Dalla H., Basha S. and Basha T. 2003. A Methodological Study on Participatory Barley Breeding II Response to Selection. Euphytica, **133**: 185-200.

Ahmad M., Zaffar G., Jehangir I. A., Dar R A., Mehraj U., Lone A. A. 2015. Oat grain production for human consumption: Sustainable option under temperate climatic conditions of Kashmir valley. Int. J. Sci. Nature, **6**(4): 596-605.

Ojehomon V. E. T., Adewumi M. O., Omotesho O. A., Ayinde K. and Diagne A. 2012. Adoption and economics of new rice for Africa (NERICA) among rice farmers in Ekiti State, Nigeria. The J. Am. Sci., **8**(2): 423-429.

Yadavendra J. P. and Witcombe J. R. 2013. The impact of maize and rice varieties from client oriented breeding on the livelihoods of poor farmers in western India. J. Breed. Genet., **45**(1): 132-142.