Grasspea: A Potential Fodder and Feed Resources

Ashutosh Sarker
International Center for Agricultural Research in the Dry Areas, India

Pooja Sah
International Center for Agricultural Research in the Dry Areas, India

Vijay Kumar Yadav
Indian Grassland and Fodder Research Institute, India

M. M. Das
Indian Grassland and Fodder Research Institute, India

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Ashutosh Sarker*[1], Pooja Sah[1], V. K. Yadav[2], M. M. Das[2]
[1]International Center for Agricultural Research in the Dry Areas (ICARDA) New Delhi, India
[2]ICAR-Indian Grassland & Fodder Research Institute, Jhansi, India
*Corresponding author e-mail: A.SARKER@cgiar.org

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Introduction

Grasspea (*Lathyrus sativus* L.) is a an important legume crop grown in India, Bangladesh, China, Ethiopia, Nepal, and Pakistan for human food, animal feed and soil health improvement. In India, grasspea is grown in about 521,100 ha, mainly in Chhattisgarh, Bihar, Jharkhand, Maharashtra, Orissa, Assam, West Bengal, and eastern Uttar Pradesh. Grasspea cultivation is low-cost and easy. Inherently grasspea possesses resistance to drought, excess moisture, salinity, diseases, and insect pests. As grasspea has an ambivalent reputation due to ODAP content in its plant parts, efforts are on to develop low or ODAP-free grasspea varieties with high biomass for dual purpose for human food and animal feed. A number of such varieties are now available in India, Bangladesh, Nepal and Ethiopia. Grasspea is known as excellent feed and fodder crop for centuries as a main concentrate for horses (Anonymous, 1894). Livestock is a key component of farming systems in South Asia and in Africa, and most particularly with small and marginal farmers, estimated about 678 million, and indicates importance of livestock to their livelihoods (ILRI, 2000).

Materials and Methods

In India, low ODAP and high biomass grasspea varieties along with recommended production packages are being up-scaled among farmers of Assam, Bihar, Chhattisgarh, Uttar Pradesh and West Bengal. In these states, demonstrations were conducted with low ODAP and high biomass varieties, Nirmal, Prateek, Mahatoera and Ratan with the active participation of 6769 farmers from 17 districts of 517 villages covering an area of 2350 ha. Farmers grew grasspea mainly as relay crop. Nutritional analysis of grasspea fodder is done at Indian Grassland & Fodder Research Institute, Jhansi. Samples were collected at 50% flowering stage and analysed for various chemical components. Feeding trials were also conducted on small ruminants to know the effect of feeding of grasspea fodder and grain-based concentrates.

Results and Discussion

The demonstrations have been conducted at farmers' fields and it was observed that improved varieties performed well as compare to local cultivars. On an average, improved varieties with site-specific production technologies provided 49% higher seed yield than local cultivar and farmers' practice. Field performance on biomass showed excellent fodder and seed production with the variety Nirmal with slightly higher biomass yield at 50 % flowering compared to the variety Ratan, and ranged from 250 to 278 q/ha. The variety Ratan was found to be better seed yielder than Nirmal. However, large scale demonstration over locations indicated that both the varieties are equally suitable for dual purpose use (grain and fodder). For fodder analysis, samples were collected at 50% flowering showed crude protein content between 14.80 to 16.48 % which was at par with superior legume fodder, viz. Egyptian clover and Stylosanthes, etc. While most important parameter to decide the usability as fodder was ODAP content, was below detectable limits (<3.5 ppm), indicating suitability and safety of grasspea to be used as fodder.

Nutrient utilization and growth performance of Jalauni lambs with grasspea grain supplemented diet: The effect of supplementation of grasspea seed in the diet of lambs was studied for a period of 90 days. In control group (T_1) the animals were fed *ad lib* green chaff of M P Chari with concentrate mixture as per requirement whereas in the T_2 and T_3 the crude protein of Groundnut cake was replaced @ 50% and 100% with lathyrus seed protein in the concentrate mixture. DM intake as percentage of body weight was comparable among the groups and ranged from 3.31% to 3.39%. Digestibility coefficients of DM, OM and CP was 63.30, 65.54 and 63.04% in T_1, 64.57, 66.82 and 66.79% in T_2 and 62.40, 64.86 and 63.26% in T_3, respectively. NDF digestibility was also similar among the groups (49.81 vs 48.36 vs 49.01%). DCP intake (g/d) was 52.40, 53.13 and 55.43, respectively whereas TDN intake (g/d) was 393, 366 and 425 among the respective groups. DCP content of the diet ranged from 8.44 in T_1 to 9.22% in T_2 and TDN content varied from 63.12% in T_1 to 61.08% in T_3.

Table 1: Average seed yield gain pf grasspea in West Bengal and Chhattisgarh under NFSM-Pulses project (2011-13)

State	District	Variety	Average yield of improved variety (kg/ha)	Average yield of Local (kg/ha)	% increase over local
West Bengal	Cooch Behar	Nirmal	1100	670	63.4
	Nadia	Ratan	1077	860	25.2
		Nirmal	1049	860	22.0
	Murshidabad	Ratan	1907	1285	48.3
		Nirmal	1786	1285	39.0
Chhattisgarh	Durg	Prateek	998	578	72.61
		Mahateora	984	590	66.72
	Bilaspur	Prateek	925	596	54.99
		Mahateora	917	585	56.57
	Raipur	Prateek	899	598	50.17
		Mahateora	992	571	73.46
Average			1148	770	49

Table 2: Fodder and seed yield in farmers' field demonstrations

	Jhansi (U.P.)			Lalitpur (U.P.)			Datia (M.P.)			Tikamgarh (M.P.)		
	GFY (q/ha)	DMY (q/ha)	Seed (q/ha)	GFY (q/ha)	DMY (q/ha)	Seed (q/ha)	GFY (q/ha)	DMY (q/ha)	Seed (q/ha)	GFY (q/ha)	DMY (q/ha)	Seed (q/ha)
Min	130	18.9	9.5	140	39.5	9.2	145	19.5	11.5	150	40.5	10.2
Max	390	98.5	20.5	360	95.3	18.3	350	99.5	21.5	285	100.5	17.3
Avg	240	65.2	14.3	265	62.5	14.4	255	66.2	13.5	210	66.2	13.9
Nirmal	250	60.2	15.2	278	61.2	15.4	260	62.5	14.5	255	61.2	14.0
Ratan	230	58.5	14.2	245	59.2	16.2	245	68.5	16.4	245	58.1	15.2

Table 3: Chemical composition of low ODAP varieties of grasspea

Parameter	DM%	N.D.F.%	A.D.F.%	Cellulose %	Lignin%	Ash%	OM%	CP%	ODAP (ppm)
Min	14.73	33.29	26.11	21.20	5.16	7.94	89.58	14.80	-
Max	18.86	46.15	36.61	29.19	8.09	10.42	92.07	16.48	-
Mean	17.03	41.04	31.73	24.88	6.59	9.14	90.90	15.65	-
SD	1.91	3.75	3.10	2.58	0.95	0.73	0.78	0.54	-
Ratan	17.50	39.91	30.04	23.31	6.49	8.94	90.75	15.97	<3.5*
Nirmal	16.57	42.17	33.42	26.45	6.71	9.34	91.79	15.32	<3.5*

Conclusion

Grasspea is increasingly recognized as an important feed and fodder crop by the resource poor farmers of semi-arid and dry areas. Acceptability of low ODAP varieties by the farmers of non-traditional grasspea growing areas and high nutritional composition makes the grasspea a perfect dual purpose for crop securing food, feed and fodder security in the region.

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