Paper ID: 1057
Theme 4. Biodiversity, conservation and genetic improvement of range and forage species
Sub-theme 4.1. Plant genetic resources and crop improvement

Assessment of fodder production potential of Lucerne (*Medicago sativa* L.) genotypes for sustainable live stock production

T. Shashikala[1*], M. Shanti[1], R. Suseela[1], M. Anuradha[1], R. V. T. Balazzii Naaiik[1], V. Chandrika[2]
[1*]PJTSAU, Hyderabad, India
[2]ANGRAU, Thirupati, India
[*]Corresponding author e-mail : tshashikala69@gmail.com

Keywords: Fodder production, Genotypes, Livestock, Lucerne

Introduction

Lucerne (*Medicago sativa* L.) is a temperate perennial legume capable of producing high quality forage throughout the year. The plant also contains sufficient concentrations of vitamins and most minerals for all classes of livestock. Livestock production can be substantially increased by using lucerne. It is a persistent, productive as well as heat and drought resistant crop which provides better and wet seasons. It tolerates short spell of drought but not water logging and high humidity in the rainy season. Cultivated lucerne is an out crossing auto- tetraploid plant developed by combining different *M. sativa* and *M. falcate* germplasm sources in order to maximize heterosis and to secure multiple pest resistance (Gherardi *et al*., 1998).

Materials and Methods

Nine genetically diverse and improved perennial cultures of Lucerne along with two national checks were studied in randomized block design with three replications at AICRP on Forage Crops, Hyderabad continuously for three years *i.e.* from Rabi 2010-11, 2011-12 and 2012-13.The national checks include Anand-2 and RL-88. The soil was sandy loam in texture with pH of 8.13, low in available Nitrogen and medium in available phosphorous and available K_2O. The crop was supplied with recommended dose of fertilizer 20-50-40 kg N, P_2O_5 and K_2O/ha. sown in row to row spacing of 30 cm with solid row planting. The crop was harvested at 10% flowering stage in all the cuts during the study period. The first cut was made at 65 days after sowing while later cuts were obtained at 21 days interval during winter season and at 30 days interval during Kharif & summer seasons. Five hundred grams of green samples from each plot was drawn for dry matter percentage and then ground in a willey mill and used for quality analysis. The crude protein was estimated as per the method of India Standard Institute. The recorded data was analyzed through the standard procedure of analysis of variance according to the Randomized Complete Block Design.

Results and Discussion

Entries registered highly significant differences among themselves for all the characters except crude protein content in all the years. The results of Rabi 2010-11 presented in Table 1 revealed that the entry RLH-4 recorded highest green fodder yield of 237.4 q ha^{-1} over the best check variety Anand -2 (229.1 q ha^{-1}) followed by RLH-5(233.2 q $ha^{-1)}$. For dry fodder entry RLH-5recovered superior yield performance of 82.5 q ha-1 as against the best check variety Anand-2 (72.8 q ha^{-1}). Even though non-significant variation was observed among the entries for crude protein content, the entry CAP-3-2 recorded high crude protein content of 23.2% between two check varieties the mean performance of Anand was found to be superior for all the characters studied in 1st year. The results of Rabi 2011-12 mentioned in Table 2 showed the increased green fodder yields irrespective of genotypes from 1st year to 2nd year of evaluation which attributes that the plants produce more tillers as cuttings progress. Among the genotypes studied, the highly significant green fodder, dry fodder and crude protein yields were recorded by RLH-4 (297.1 q ha^{-1} , 62.5 q ha^{-1}& 13.4 q ha^{-1}) over the best check variety RL-88(240.2 q ha^{-1}, 50.7 q ha^{-1}& 11.1 q ha^{-1}) respectively. The same trend of significant superiority was maintained by RLH-4 in 3rd year of testing for green fodder (273.5 q ha^{-1}) dry fodder (57.5 q ha^{-1}) and crude protein (12.2 q ha^{-1}) yields over the best check RL-88.Between two check varieties RL-88 showed superior performance in 2nd and 3rd year of testing for all the characters. This reveals the perennial nature of RL-88 with high regeneration capacity. Purushotham *et al.* (1997) also observed superior performance of RLS-88 and Anand -3 varieties of lucerne as they were tall in nature and had regeneration capacity.

Table-1: Mean performance of Lucerne genotypes studied during Rabi 2010-11

Sl. No.	Name of entry	GFY (q ha^{-1})	Rank	DMY (q ha^{-1})	Rank	CP%	CPY (q ha^{-1})	Rank
1	RLH-5	233.2	2	82.5	1	21.0	17.3	1
2	CAP-3-2	191.6	8	66.2	6	23.2	15.3	3
3	ALP-1-1	199.9	7	62.2	8	22.3	13.8	6
4	Anand-2©	229.1	3	72.8	2	21.1	15.4	2
5	ACP-3-1	215.9	5	69.5	4	21.9	15.2	4
6	RL-88©	183.3	10	63.1	7	21.4	13.2	8
7	BRB-07-1	223.5	4	67.0	5	21.9	14.7	5
8	RLH-4	237.4	1	71.9	3	21.4	15.3	3
9	Anand-23	209.6	6	58.7	9	22.8	13.3	7
10	RRP-5-4	184.6	9	54.9	10	21.4	11.7	9
11	ACP-1-2	166.6	11	54.8	11	20.1	11.2	10
	GM	**206.8**		65.8			**14.2**	
	SE+-	**14.2**		**5.0**			**1.1**	
	CD at 5%	**41.8**		**14.6**			**3.4**	
	CV%	**11.9**		**13.1**			**13.9**	

Table-2: Mean performance of Lucerne genotypes studied during 2011-12

Sl. No.	Name of entry	GFY (q ha^{-1})	Rank	DMY (q ha^{-1})	Rank	CP%	CPY (q ha^{-1})	Rank
1	RLH-5	247.1	4	56.2	3	21.2	11.9	3
2	CAP-3-2	271.6	2	57.2	2	23.2	13.2	2
3	ALP-1-1	220.7	9	48.2	7	22.6	10.9	6
4	Anand-2©	224.9	8	47.5	8	21.8	10.3	8
5	ACP-3-1	210.3	10	44.5	10	21.3	9.5	9
6	RL-88©	240.2	6	50.7	5	22.1	11.1	5
7	BRB-07-1	233.2	7	49.7	6	21.9	10.9	6
8	RLH-4	297.1	1	62.5	1	21.4	13.4	1
9	Anand-23	254.1	3	51.0	4	22.8	11.6	4
10	RRP-5-4	245.0	5	50.7	5	21.4	10.8	7
11	ACP-1-2	197.1	11	45.4	9	21.7	9.9	8
	GM	**240.1**		**51.3**			**11.2**	
	SE+-	**17.3**		**3.9**			**0.9**	
	CD at 5%	**51.2**		**11.5**			**NS**	
	CV%	**12.0**		**13.0**			**15.0**	

Table-3: Mean performance of Lucerne genotypes studied during 2012-13

Sl. No.	Entry Code	Name of entry	GFY (q ha^{-1})	Rank	DMY (q ha^{-1})	Rank	CP%	CPY (q ha^{-1})	Rank
1	LP-10-1	RLH-5	229.1	2	48.8	2	20.3	10.0	2
2	LP-10-2	CAP-3-2	211.0	6	41.8	6	21.7	9.1	6
3	LP-10-3	ALP-1-1	188.8	8	39.6	8	21.7	8.6	7
4	LP-10-4	Anand-2©	187.4	9	38.9	9	22.2	8.6	7
5	LP-10-5	ACP-3-1	187.4	9	38.8	10	20.7	8.1	9
6	LP-10-6	RL-88©	216.6	5	44.8	3	20.7	9.2	5
7	LP-10-7	BRB-07-1	220.7	3	44.2	5	21.0	9.3	4
8	LP-10-8	RLH-4	273.5	1	57.5	1	21.3	12.2	1
9	LP-10-9	Anand-23	219.4	4	44.5	4	21.7	9.6	3
10	LP-10-10	RRP-5-4	201.3	7	40.3	7	20.3	8.2	8
11	LP-10-11	ACP-1-2	177.7	10	38.5	11	21.0	8.1	9
	GM		**210.3**		**43.4**			**9.2**	
	SE+-		**14.1**		**3.3**			**0.8**	
	CD at 5%		**41.7**		**9.9**			**2.6**	
	CV %		**11.6**		**13.5**			**17.4**	

Conclusion

Based on the green fodder, dry fodder and crude protein yield, performance of the entries studied over three consecutive years revealed that the two entries *viz*., RLH-4 and RLH-5 were suitable to cultivate in the region. The results also inferred that the check variety Anand-2 is suitable to cultivate as annual fodder legume, while RL-88 occupies place in perennial fodder legumes.

References

McDonald, W., A. Nikandrow, A. Bishop, M. Lattimore, P. Gardener, R. Williams and L. Hyson, 2003. *Lucerne for pasture and fodder* . *Ag fact* P_2.2.25, third edition.

Gherardi, M., B. Mangin, B. Goffinet, D. Bonnet and T. Huguet. 1998. A method to measure genetic distance between allogamus populations of alfalfa (*Medicago sativa*) using RAPD molecular markers. *Theor. Appl. Genet*. 96: 406-412.

Purushotham, S. K., Naga Raja and R. SiddaRaju 1997. Performance of Lucerne varieties under irrigation. *Current Research* 26: 226-227.