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Enhancing forage production through silvipastoral system in arid regions

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Introduction

Livestock based farming system makes significant contribution for livelihood security of farmers in arid zone of India. However, availability of fodder for livestock is not sufficient due to water scarcity and land degradation leading to low productivity of grazing land. The arid zones are less suitable for crop production due to inherent soil constraints like low water retentivity, sandy texture, shallow depth, occurrence of rocks and stones, however some grasses and tree species of forage value and economic importance can grow well and help in augmenting forage production. Silvipasture offers a sustainable land use system which increases overall productivity of land and makes efficient utilization of natural resources. Silvipastoral system has special significance in arid and semi-arid region (Tiwari *et al*., 1999).

Materials and Methods

A participatory study was conducted on farmers field of Hasolav village of Nagaur district (Rajasthan) during 2011 to 2014 to assess the suitability and production potential of pasture grasses, *Cenchrus ciliaris* and *Cenchrus setigerus* in association with different fodder trees. The intervention was undertaken on 6 ha common grazing land. Trees and grasses were sown / planted with the onset of monsoon in the month of July. The soil of the site was shallow in depth and calcareous in nature. Trees saplings of *Ziziphus nummularia*, *Acacia tortilis*, *Azadirachta indica* and *Prosopis cineraria* were planted at 5mx4m, 6mx6m, 8mx5m, 3mx4m, spacing respectively and grasses were sown in inter space between tree rows and in pasture land without trees.

Results and Discussion

The maximum plant height (165cm) and survival percent (87%) was recorded in *Acacia tortilis* while plant height (49cm) and survival percent (40%) of *Prosopis cineraria* was the lowest. The growth and yield of grasses did not vary with trees species at initial stages of tree growth. This was attributed to least competition for below ground resources between trees and grasses (Patidar *et al*., 2008). Dry forage yield of grasses in silvipasture was higher compared to natural pasture (0.65 t/ha) but less than pure pasture of *C. ciliaris* and *C. setigerus* (Table 1). The forage yield of *C. ciliaris* and *C. setigerus* was comparable but the growth pattern in terms of plant height and number of tillers varied significantly. Patidar *et al.* (2011) also reported that mean plant height was more in *C. ciliaris* and no of tillers per meter row length were more in *C. setigerus* but dry matter yield was at par.

Table 1: Forage yield of grasses under silvipastoral system on common land of Gaushala at village Harsolav

S.No	Grass	Fresh yield (t/ha)		Dry yield (t/ha)	
		2013	2014	2013	2014
Pure pasture					
1	*Cenchrus ciliaris*	11.0	6.35	2.14	1.88
2	*Cenchrus setigerus*	9.82	6.00	1.98	1.46
	Mean	10.41	6.17	2.06	1.67
Silvipasture					
1	Ber+ grass	7.76	4.60	1.56	1.10
2	Khejri+ grass	6.14	4.50	1.31	1.04
3	Babul+ grass	6.38	4.02	1.34	1.01
4	Neem + grass	6.86	4.11	1.43	0.99
	Mean	6.79	4.31	1.41	1.04
Natural pasture					
	Natural grasses	2.60	2.3	0.65	0.58

Conclusion

The pasture grasses *i.e*., *Cenchrus ciliaris* and *Cenchrus setigerus* grown as a sole pasture or in association with trees increased the forage production on degraded grazing lands as compared to natural pastures. Hence, pasture and silvi-pasture system could be viable option for higher forage production from the degraded calcareous soils of Nagaur.

References

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