

Grass-legume intercropping

helps in livestock development

Sushil Kumar¹ and Deepesh Machiwal²

Central Arid Zone Research Institute, Regional Research Station, Kukma, Bhuj (Gujarat) 370 105

To provide enhanced quality of fodder from 4.92×10^6 tonnes and its resources, there is a need to study the grass-legume intercropping in arid land of Kachch. Therefore research work was done for good quality of fodder in adequate quantity for livestock development in the arid lands of Kachch.

Key words: Arid region, Grass, Intercropping, Legume



Cenchrus setigerus + *Clitoria ternatia* intercropping



Cenchrus ciliaris + *Stylosanthes hamata* intercropping

THE grass-legume intercropping, a low input-cost agriculture production system may be a good option for fragile arid ecosystem to increase good quality fodder production without adding any burden of additional input cost on resource-poor farmers of the district, as grasses-legumes intercropping have many advantages over monocultures of either grasses or legumes. Thus, looking into the climatic variability and scarcity of quality fodder production in the district, a research trial on the grass-legume as strip intercropping in 2:1 ratio was undertaken for 2 years with four grasses (*Cenchrus ciliaris*, *Cenchrus setigerus*, *Dicanthium anulatum* and *Sporobolus marginatus*) and two

legumes (*Clitoria ternatia* and *Stylosanthes hamata*) at Central Arid Zone Research Institute, Regional Research Station, Kukma, Bhuj for enhancing quality fodder production. The intercropping of grass and legume was recorded as higher crude protein yield, and dry matter yield. Other fodder quality parameters as well especially Ca than its sole counterpart from the same area with similar level of management. The dry matter yield recorded in sole and intercropping systems varied from 1,866 to 2,957 and 2,772 to 4,665 kg/ha, respectively. The reason for more production of dry matter in intercropping systems than sole may be the better utilization of space between plants and more enhanced

interception of light, *Cenchrus ciliaris*, *Cenchrus setigerus*; DA, *Dicanthium annulatum*; *Sporobolus marginatus*; *Clitoria ternatia*; *Stylosanthes hamata* especially nitrogen (N) and moisture in intercropping than sole system, which might have provided congenial environment to both the crops for growth and development. Apart from producing higher dry matter yield, the intercropping system also recorded more crude protein yield (Table 1) than sole system due to better utilization of resources namely sunlight, water and nutrients by both the intercrops. Moreover, intercropping system produced more balanced fodder with respect to fodder quality parameters compared to sole system of either grass or



Dicanthium anulatum + *Clitoria ternatia* intercropping



Dicanthium anulatum + *Stylosanthes hamata* intercropping

Table 1. Performance of grasses and legumes with respect to dry matter yield and fodder quality parameters in sole and intercropping system under arid conditions of Kachchh.

Treatment	Dry matter yield (kg/ha)	Crude protein yield (kg/ha)	Crude fiber(%)	Ash (%)	Ca (%)
<i>Sole</i>					
<i>Cenchrus ciliaris</i> (CC)	2,180	143	33.91	10.00	0.17
<i>Cenchrus setigerus</i> (CS)	2,021	138	31.33	10.16	0.13
<i>Dicanthiums annulatum</i> (DA)	2,957	170	29.21	10.66	0.14
<i>Sporobolus marginatus</i> (SM)	2,280	118	27.32	10.35	0.18
<i>Clitoria ternatia</i> (CT)	2,329	461	29.10	9.83	0.55
<i>Stylosanthes hamata</i> (SH)	1,866	292	25.43	7.66	0.73
<i>Intercropping</i>					
CC+CT	3,364	472	30.57	8.83	0.66
CC+SH	3,129	345	28.90	13.00	0.41
CS+CT	3,429	442	27.97	10.16	0.31
CS+SH	3,447	422	33.79	11.50	0.35
DA+CT	4,665	685	29.06	8.66	0.52
DA+SH	4,622	668	29.65	11.83	0.59
SM+CT	2,772	494	28.10	9.66	0.33
SM+SH	3,022	387	28.53	10.83	0.53
CD (P=0.05)	674	174	NS	NS	0.17
SE(M)	230	59	2.32	1.01	0.06

NS, Nonsignificant

legume. In general perception, grasses are rich in carbohydrate and crude fibre. However, legumes are abundant in crude protein and thus,

feeding excessively any one type of fodder to livestock will result is animals health problems either bloating or dietary indigestion due to



Cenchrus setigerus sole cropping

availability of more protein and crude fibre content in legumes and grasses fodder, respectively. With respect to crude protein yield, all the intercropping systems that included *Clitoria ternatia* legume as inter crop recorded more

crude protein yield than the *Stylosanthes hamata* legume based intercropping systems. The minimum and maximum crude protein yield among the intercropping systems was recorded for *Sporobolus marginatus* + *Stylosanthes hamata* (387 kg/ha) and *Dicanthium annulatum* + *Clitoria ternatia* (685 kg/ha) intercropping, respectively. However, in sole system, crude protein yield ranged from 118 to 461 kg ha⁻¹.

SUMMARY

The performance of grasses and legumes in intercropping over its sole counterparts for the enhanced quality fodder production in the arid region of Kachchh, India was studied. The results showed that without adding any extra inputs cost on resource poor farmers of arid eco-system, intercropping of grass-legume yielded more quality fodder over its sole counterparts. Thus, it may be said that grass-legume intercropping system may be the best viable option for enhanced quality fodder production for the arid condition of the Kachchh for overall development of livestock sector. The findings of the study are applicable to all the arid regions of the world because enhanced quality fodder is main requirement for the arid system, wherein agriculture systems are livestock-centric and livestock remains main source of livelihood for the inhabitants.

¹Scientist, ²Senior Scientist (Agronomy). Corresponding author e mail: sushilangaru@gmail.com.