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Evaluation of cactus as alternate fodder resource in semi arid region of India

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Introduction

Cactus (*Opuntia ficus-indica* (L) Mill) is spineless and offers several benefits to both man and livestock. It is a succulent, xerophytic, spiny or spineless plant of multiple uses (Felker *et al.*, 1997). Cactus is a drought resilient feed, introducing cactus as alternate livestock feed in dryland ecosystems fulfill the deficiency of feed to livestock. Cactus requires little moisture which used to gets from the rainy season to produce large quantities of forage. It has a higher carrying capacity than any other drought tolerant fodder in arid and semi-arid areas. It remains green and succulent during drought thus supplying the much needed energy, water and vitamins to livestock in drought periods. It withstands severe defoliation and has good regeneration ability. A unique anatomic and physiological character of cactus makes to withstand a wide range of soil types as well as harsh climatic conditions. Some of these unique features make it a perfect plant to incorporate into productive forage based systems. The soils of Budelkhand region of India are medium to low in fertility with low organic matter content and poor water holding capacity that limits the fodder and food productivity. Rainfall is also erratic, unreliable and scarce, so non-conventional forages are urgently required. Therefore, Cactus could be a good source of food and water for livestock during drought. Keeping this in view, ICARDA-IGFRI collaborative project is initiated to utilize the *Opuntia* species as an alternate source of feed and fodder in different land use management systems and enabling the stake holders to increase the agricultural production and profitability in dry areas.

Materials and Methods

The present studies were undertaken at the Central Research Farm of the Indian Grassland and Research Institute, Jhansi. Fifteen accessions of cactus obtained from ICARDA were planted at IGFRI central farm in April, 2013 and maintained in three multiplication blocks (Table 1). The soil of the experimental site was sandy loam. The annual average rainfall is 900 mm in the Jhansi region. During summer, temperature goes as high as 47°C in May and June. The winter season is very cold and temperature goes 7°C in December and January, with occasional rains. The cactus accessions were planted in ridge and after planting in nursery survival percentage, average length and width and moisture content of these accessions were recorded. After getting sufficient multiplication of good performing accessions the cactus would be evaluated for growth, biomass yield in different cuts, quality and performance in livestock.

Results and Discussion

After planting in nursery for multiplication in three blocks, survival percentage was recorded in all the accessions. Yellow San cono and White Rocca Palumba survived 100% while others survival was in the range of 30-80% (Table 1). Data revealed that Yellow Rocca Palumba, Trunzara Red Bronte and Yellow San cono produced an average length of pads 32-33 cm and width 15cm. The moisture content was maximum with Yellow San cono (97.1%) followed by Zastron (96.41%) and Trunzara Red Bronte (96.33%). By and large, the moisture percentage in cladodes ranged from 93.0-97.0%. This indicates the suitability of material to be used in arid and semi-arid region for supplementation of water requirement of the livestock, up to some extent. It is also clear from the data that after one year and six months, the cladode number gone up to 208 in Yellow San cono and 206 in Zastron. In some of the accessions like Yellow Rocca Palumba, Trunzara Red Bronte, Yellow Santa Margherita Belice and White Rocca Palumba the cladode numbers ranged 140-160. The lowest cladodes were recorded with Red Rocca Palumba which has lowest survival percentage as well. The growth rate of cactus accessions makes them for selection to multiply and use in feeding of livestock. The variation in average length was higher in the tested accessions ranging from 25-34.5 cm. in contrast to this the variation in average width was very less and the range remained in between 10-15 cm. Variation in *Opuntia* establishment behavior was also recorded by Singh, (2003) while reviewing the establishment and performance evaluation of *Opuntia* grown for multipurpose. The best performing cactus accessions will be grown under different land use systems like degraded land, silvipasture blocks, rainfed food-fodder based system for providing the fodder to livestock during lean and dry period. The system developed so will also be evaluated for sustaining the targeted livestock population of small and marginal farmers of semi-arid region of Bundelkhand (India)

Table 1: Survival and growth of *Opuntia* accessions at Jhansi, India

S No.	Accession name	Survival (%)	Average length (cm)	Average width (cm)	Moisture content (%)	No. of cladodes obtained	Performance rank on cladode basis
1	Yellow Rocca Palumba	40	28.5	15.25	96.06	140	8
2	Trunzara Red Bronte	80	33	15	96.33	158	6
3	Yellow San cono	100	32	15	97.10	208	1
4	Algerian	60	28.5	12.25	95.55	182	3
5	Yellow Santa Margherita Belice	60	25.5	15.5	94.52	175	4
6	Zastron	40	33.5	12	96.41	206	2
7	Red Rocca Palumba	33	27.5	14.25	95.56	15	15
8	White Rocca Palumba	100	26.75	13	93.10	162	5
9	Red San Cono	30	25	13.5	95.77	41	14
10	White San Cono	50	27	12	95.14	80	11
11	Seedless Rocca Palumba	100	25.5	10.25	95.44	81	10
12	Morado	66.7	27.75	14.75	95.25	110	9
13	Roly poly	66.7	34.5	14.25	96.27	152	7
14	White S cono	33.3	28.5	13.75	95.31	52	13
15	Blue Motto	33.3	24	10.25	93.43	74	12

Conclusion

Among the different accessions received from ICARDA Yellow San cono performed better with 100% survival and average length and width are 32 cm and 15 cm respectively. Zastron, Algerian, Trunzara Red Bronte and Yellow Santa Margherita Belice also performed well with survival of 40-80%. The selected accessions will be grown under different land use systems (degraded lands, silvipasture, rainfed food-fodder system as alleys) to supplement the fodder requirement of dry areas.

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