Synopsis of thesis

Assessment of Reproductive Potential of Grasses & Legumes growing in two reserved grasslands (vidis) of East Gujarat & Enhancement of their Forage Value

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By

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The term grassland is used to refer the ecosystem in which the dominant vegetative component is comprised of nearly 20% of the landscape of herbaceous species. Plant communities dominated by grasses account for about 24 percent of the Earth's vegetation, and legumes over 12 to 15 percent. As used in the general sense, grassland includes both grasses and legumes which occupy land continuously for more than one year. Those grasslands used for grazing which occur in humid regions are usually termed "pastures" and those which occur in sub humid or semiarid regions are usually designated as "ranges". The conservation value of grasslands is becoming well known, although the mere presence of grass does not constitute conservation, the grasslands used for hay, silage, and pasture, when properly managed, are exceedingly effective in controlling soil and water losses and in restoring the soil's capacity to take in and store moisture for use by other crop roots. Perennial grass and legume roots are effective in increasing the porosity and ventilation of the soil for all vital activities of the crop roots, and for the activities of beneficial micro and macro organisms of the soil.

The improvements that are possible by application of experimental and practical findings to grassland management are as spectacular and significant as for any type of crop production. The improvement of grasslands was limited to the attention given to hay crops until about 25 years ago. During the last quarter-century, recognition has been growing as to the value of all pastures and ranges and the possibilities of improving the total supply of feed, its seasonal distribution, and its nutritive value.

Natural grassland is a plant community in which the dominant species are perennial grasses, there are few or no shrubs and trees are absent or less in numbers. Usually associated with the dominant grasses, there are less abundant grass species and variety of other herbaceous plants, both annual and perennial types, which at certain times of the year give a characteristic aspect to the plant community. A large number of legumes are seen very closely associated with the grasses among the herbaceous members. In Gujarat, mostly the areas covered by the Grasslands are Saurashtra and Kachchh. But in past few years the grasslands have started to expand in the North-East Gujarat also.

In the selected vidis, wide variety of grasses is present. In the plantation programmes it has been observed that propogation of many grasses is not very satisfactory because of failure in seed germination many a times. Therefore there is a need to critically asses the reproductive

potential of these species and to view and improve the aspects related to seed handling. This study includes a series of the procedures beginning with selection of the best quality of seed source through collection, processing, storage and pretreatment to germinate. For several species, improper harvesting and collection, short viability period, problems in extraction, dormancy, immaturity and other handling difficulties limit their use in plantation programmes. In present study, these aspects will be taken care off. Legumes are well known natural nitrogen suppliers, their role in increasing soil fertility and productivity of associated plants is well documented. In the selected vidis no attempts has been done to promote legume growth. In present study effort will be done to grow selected palatable grasses with their natural associates legumes. This will help in increase of biomass of grass and mixing of legumes will increase the nutritive value of forage.

By keeping above mentioned points in mind following objectives were proposed for present study.

- To document the grasses and other associated species in the area.
- To find out the reproductive potential of selected species.
- To select a simple and economical harvest & cleaning technique for grasses.
- To assess the seed quality.
- To promote grass productivity of selected palatable grasses intense by mixing with legumes and by the supplementation of the essential minerals.
- To assess nutritive value and palatability at different stages.
- To assess the impact of storage on palatability.

STUDY AREA

The grasslands selected in the present study fall in two major forest divisions of Gujarat which are Godhra and Baria. The two main grasslands studied are Bandheli (Godhra forest division, Panchmahals district) and Rampur (Baria forest division of Dahod district). Bandheli grassland is situated 16 km away from Godhra town and it comprises of 754.04 ha (22^0 50′-22^0 51′ N, 073^0 42′-073^0 43′ E). Rampur grassland is a protected area, which is situated on the left side of Dahod-Godhra highway, and it includes mainly three grasslands. Kalitalai (658.68 ha), Muvalia (750.43 ha) and Rozam (378.40 ha). The total area is 1987.81 ha (Forest Dept., Gujarat Goverment). These are commonly known as Rampura grassland, situated near Dahod (N: 22^0 53′ E: 74^0 19′), Dahod District, Gujarat.

METHODOLOGY

Documentation of species composition & ecological status of the selected grasslands was observed by random sampling. The plant authentification was done at 'The Blatter Herbarium', St. Xavier's College, Mumbai for authentification. Ecological study was carried out to measure Phenology, Abundance, Species Diversity, Species Frequency, Species Density, Species Richness and IVI.

The reproductive potential for selected grasses and legume species was observed by recording the different phenological stages in the vegetative as well as reproductive growth. For this study parameters like No. of Flowers /Inflorescence, No. of Fruits / Inflorescence, Seed output / plant, Seed output / unit area, Average Plant height (cm), Maximum stem diameter (mm), No. of roots, Maximum root diameter (mm), No. of Seeds / fruit, etc were recorded.

Seed processing for selected species was done using normal protocol for harvesting, seed collection, post harvest seed conditioning, seed drying, seed cleaning, seed extraction and seed storage. Seed cleaning was performed by two ways: Geometric and Mechanical, for this sieve stand and seed thresher were designed specifically.

Seed quality testing was done by testing the seeds for different attributed with standard methods. The attributes tested were Physical purity, Seed density (Weight per gm), Maturity index, Viability, Germination, Vigor, Seed lot screening.

The study areas have some most abundant and palatable grasses along with their natural nitrogen supplying associated legumes. We tried to promote the productivity of those grasses by mixed cropping with selected legumes as well as by applying urea as the most acceptable fertilizer.

The palatability as well as nutritive quality assessment was performed for the selected grasses. Here, grass selection was done on the basis of grass consumption done by cattles for the particular species. These evaluations were done for the different stages of plant growth and the comparison was also done for the stored and fresh materials.

Along with all above objectives an additional work was carried out on the temporal changes occurred during three year survey of the selected grasslands. The effect of fluctuating environmental changes on plant growth and vegetation structure was evaluated.

Ecological assessment of the studied grasslands revealed that out of all identified species *Apluda mutica, Cymbopogon martinii, Dichanthium annulatum, Heteropogon contortus* and *Themeda triandra* are the main dominant species. With the help of phenological studies and seed quality assessment, proper time for seed harvesting could be identified. On the basis of assessment of physical properties of seeds, separation of grass seeds, even minute grass seeds could be done successfully by using specifically designed sieve stand and seed thresher. Detailed results and interpretation will be included in the thesis. Thesis will also take an account of appropriate statistical analysis and relevant current literature.

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