PREFACE

Grasses are among the world's most widespread plants. They are an economical livestock feed and when associated with legumes, through the rhizobium/pasture/animal symbiosis, maintain and improve soil fertility while sustaining animal production.

In developing countries like India, where Agriculture is main occupation, the increasing population of man and bovine has created food as well as economic crises in present decade. Both industrialization and urbanisation resulted a considerable decrease in grazinglands. However in our country grassland covers about 25.5 m.ha. of land which comprises 8.1% of the total land. There is only one percent irrigated grasslands. Even now man is engaged to utilize this grassland area for cultivation and to fulfil his other interest.

At present, the grassland area which is decreasing day by day will be inadequate to meet the high demand of forage for large number of animals (about 40 millions). The major task which attracted man (scientists and farmers both) is to protect the remaining grazing lands for the continous supply of nutritious and balanced food adequately to livestock, as they provide us milk, meat, manure etc.
In Bundelkhand Region the socio-cultural profile is unique. Uncertain and erratic rainfall pattern and vagaries of weather are responsible to its low productivity, recurrence of drought and famine. The soil of this region is of very lean in fertility as it is highly eroded containing a thin layer overlain on a rocky substratum. This region covers about 59.52 thousand sq.km. area, only about 11.4 thousand km. is available for grazingland and for cultivation about 1500 ha. There is only 25% supply of grazing resources to livestock in this region.

Although there is surplus production of green fodder during the monsoon, but scarcity of grazing materials occurs during other months of the year. Moreover, the forage of this region is very poor in nutritional quality and show deficiency in crude protein, carbohydrate, vitamins, minerals etc. Therefore, it is necessary to conserve the forage by pasture establishment, renovation and management of their pristine productivity and nutritive value in the region like Bundelkhand for continuous supply of nutritious feeds uniformly around the year to ensure economic livestock production.

In view to keep pace at fast rising human population, it is not only a scientific appraisal of primary production and its maximisation in natural and man-modified ecosystems is
necessary, but also the efficiency with which the energy trapped, accumulated and dissipated at different trophic levels, in the ecosystem are of great significance. Solar radiation is the only source of energy on this planet (earth). It is captured by green plants, converted into chemical energy and stored in the form of proteins, fats and carbohydrates etc. in their bodies. The productivity potential of different ecosystems depends much on the efficiency with which the vegetation accumulated this energy in the net primary production, which forms the ultimate source of caloric needs of all the animal and man.

Thus in context of the above facts, "Ecological investigations on seasonal variation in primary productivity, nutritive value and energy conserving efficiency of three important forage species of a grassland community in Bundelkhand region" was of urgent need to plan, to attain self-sufficiency in area, to meet out nutritious and energy rich forage requirement. With this idea, an attempt was made through this study for maximisation of animal products and thereby to improve the socio-economic condition of the rural man in the area.

Under this investigation three important forage species namely *Dichanthium annulatum* (Forsk) Staph.,
Iseilema laxum Hack. and Alysicarpus monilifer D.C. designated as forage species 'A', 'B' and 'C' respectively have been taken for detail standing biomass studies. Besides the above mentioned species the rest constituent species are categorised as 'other species'. In other words this study reveals primary productivity, nutritive value and energy conserving efficiency of the grassland community in general and of aforesaid three forage species in particular.

The description of the whole study is incorporated in to seven sections. The brief account of these sections is given below:—

Section I deals with the general introduction and review in which present status of grasslands and fodder and researches involved in developing and uplifting of present status of grasslands are included.

The description of study area, lithology, natural vegetation, climate and soil condition of research site are included in Section II.

In Section III materials used and methods adopted in the whole study are incorporated.

Section IV, the largest section of the study is divided in to three chapters namely community structure, standing biomass and community function.
In the first chapter species composition, life-forms, species diversity and seasonal change in other sociological attributes in the grassland community throughout the year (July 1987 to June 1988) are included. Second chapter deals with the phytomass values of *D. annulatum*, *I. laxum*, *A. monilifer* and 'other species'. An elaborated account of organic production and dry matter dynamics is presented in third chapter.

The fluctuation in nutritive value of three forage species and 'other species' is included in Section V. This nutritive value makes the base to evaluate whether the forage species are valuable for animals or not.

Section VI throws the light on the variation in caloric value, energy storage and energy conserving efficiency of three forage species and 'other species'.

Discussion about the study and conclusion of it is given 'at a glance' in Section VII.