Course- M.Sc. Semester III

E-content- Online class 28/8/20 & 4/9/20

Ecosystem structure

Grassland Ecosystem

According to Ecological Society of America (1952), “grassland is a community dominated by grasses or grass like plants. This occupies about 24 % of the earth surface. Usually tropical grassland may have more than 200 different plant species, whereas in temperate regions there are about 50 species. Two or three species of grasses dominate over other species and constitute about 60 % of the biomass.

Grasslands are natural, semi natural, and cultivated. Natural grasslands occupy large areas of continental landmasses, including the prairies and plains. Natural grasslands develop in the regions having rainfall between 250 and 750 mm (10 and 30 inch) ,a high rate of evaporation and seasonal and annual droughts. Tropical grasslands develop in the regions with marked wet and dry seasons. On the peripheral areas of these climatic regions fire is important in maintaining grasslands by preventing the encroachment of forests in moist regions and desert shrubs in semi arid regions.

Semi natural grasslands result from the deforestation and develop in the areas with sufficient moisture. These are also called as successional grasslands. Cultivated grassland ,such as pastures and hayfields are artificially planted and developed. They usually have very few (one or two) species of grasses and legumes such as clover or alfalfa. The favourable conditions for development of a stable grassland are frequent rainfall and sufficient warmth during the growing season. Grasslands do not form a prominent feature of vegetation in tropical part of India because of the following reasons :

(i) In the moist lowlands, grasses face very tough competition from trees and shrubs.

(ii) In the dry areas, the conditions are so severe that they do not permit the extensive development of grasslands. In India, grasslands have developed secondarily under the influence of two factors, namely edaphic and biotic. In most cases, grasslands are maintained in their present seral stage due to biotic influences. Grazing and fire are two important factors governing the development of grasslands in forest area. There are many grassy plains of seral nature in Nilgiri, Khasi hills, Naga hills.

At higher altitudes about 1800 metres, species belonging to Cyperaceae are in abundance.

Grassland soils are inherently fertile. Due to low rainfall, the soluble nutrients in the soil have not washed away, and due to the absence of a tree canopy, the flourishing grasses have built up organically rich top soil. As a result the native grasslands of north temperate regions have been converted to grain crops such as wheat and corn.

Grassland ecosystem structure is suitable for herbivores such as grasshoppers, insects, rabbits, as primary consumers. The native grazing herbivores have been replaced by domestic cattle and sheep, and the large predators have been destroyed.

Natural grasslands support a diverse fauna. Associated with such mammals are herbivores rodents, including prairie dogs and mice; seed eating birds; hawks; snakes; and insects, especially grasshoppers.

Following are the components of grassland ecosystems-

Abiotic components- These include nutrients present in soil and the atmosphere like elements (C,H,O,N,P,S,etc.).These are supplied by natural environment.

Biotic component-

Producers- These include grasses (Dicanthium, Cynodon, Desmodium, Dactyloctenium,Digitaria, Setaria, Sporobolus,etc.) and shrubs.

Consumers-
Primary consumers- These are herbivores feeding on grasses (grazing animals cows,buffaloes, goats,sheeps deer, rabbits,mouse and other rodents., insects,(Leptocorisa, Dysdercus, Oxyrhachis, Cicindella, Coccinella), termites and millipedes which feed on grasses.

Secondary consumers- These are Snakes, Lizards,birds jackals, fox, etc. They feed on primary consumers.

Tertiary consumers- These are hawks, Owls and other carnivores feeding on secondary consumers.

The tropical grasslands of India may be classified into the following types :-

1. Xerophilous grasslands-These are found in dry regions of North-West India under semi desert condition. Common species of xerophilous grasslands are *Andropogon contortus, Cenchrus ciliaris*, *C. barbatus*, etc.

2. Mesophilous grasslands- These are also called as Savannahs.They are extensive grassy flats or grassy plains typically occurring in moist deciduous forests of UP. Dominant species are Saccharum munja, S. Narenga, etc.

3. Hygrophilous grasslands- These are called wet Savannahs. They are very wet grasslands.

Grasslands are heavily affected by the human activities and forest fires. Seasonal fluctuations are also one of the important factors to influence the growth and development.

In india, grasslands are divided into eight different types dominated by representative species.

Grassland types	Regions of distribution
1. Schima- Dichanthium	Hyderabad(AP),Mumbai,MP, Tamil Nadu,S E UP
2. Dichanthium-Cenchrus	Punjab, Delhi, Rajasthan, Gujarat, Cutch, Eastern U P,Bihar
3. Phragmites-Saccharum	Terai of UP, Bihar, Bengal, Assam.
4. Bothriochloa	Lonavla (Maharashtra)
5. Cymbopogon	W.Ghats, Vindhyas, Aravali ranges,Orissa

6. Arundinella	W.Ghats, Nilgiris, Himalayas, E.Punjab, Himachal Pradesh
7. Deyeuxia	Himalayas, Kashmir, UP,Bengal, and Assam
8. Deschampia-	Himalayas,Kashmir, above 2500 metres.