

GENECOLOGY

MBOTCC-6

M. Sc. Sem-II

Unit-III

(2018-20)

PROLOGUE:

Genecology deals with genetic variation of species and communities compared to their population distribution in a particular environment. It primarily focuses on ecological perspective, looking at changes and interactions between species. Genecology provides the extensive links between genetics and plant ecology and combines ideas and methods from genetics, taxonomy and plant physiology.

Foundations of Genecology:

(i) Originally the idea of population differences or infra-specific variations of plants in relation to environment was conceived by Turesson (1922). He coined the term 'genecology' for these infraspecific variations correlative with their environment.

(ii) The basic propositions of genecology (1922, 1925, 1930) may be summarized as follows:

(a) Wide ranging plant species show spatial variations in morphological and physiological characters.

(b) Much of this infraspecific variation can be correlated with the habitat differences.

(c) To the extent that ecologically correlated variations are not simply due to a plastic response to environment, it is attributable to the action of natural selection in moulding locally adapted populations from the pool of genetic variations available to the species as a whole.

(iii) It was further argued by Turesson that ecologically correlated ... Contd. p. 2

(2)
inter-population variation is commonly genetically based rather than dependent upon direct modification of individuals. This conclusion led him to the concept of ecotypes.

(iv) The concept of ecotype implies that some population fraction can be demonstrated to be adaptively related in respect of certain features to particular environmental factors within a species range.

In ecotypic differentiation, adaptation refers to "any feature of an organism or its parts which is of definite value in allowing that organism to exist in the conditions of its habitat" (Daubenmire, 1959).

Relative significance of continuous and discontinuous variation is a matter of discussion till date (Clausen, 1951; Clausen et al., 1940; Fageri, 1937; Gregor and Watson, 1954, 1961; Langlet, 1959, 1963; Sinakaia, 1939).

(v) The material for race-ecological variation or gene-ecological ~~variations~~ investigations consists of ecological races and such of their properties as are of ecological importance (Langlet, 1971). In this way the influence of environment will prove to be inherited by population to produce adequately adapted properties which are more or less heritable. In terms of gene-ecology, population represents an ecotypic group of individuals which may or may not be genetically distinguishable, but can be certainly distinguished on the basis of their physiological behaviour, and will mean 'ecotypical population'.

Explanation:

(1) Variations may be of two types:
(a) Morphological and Physiological variations that

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(3)

are largely governed by variations in the local habitat conditions, resulting in the formation of a temporary form termed 'ecad' or 'ecophene'.

(b) Variable forms based on genetically fixed traits which are of permanent nature termed as 'ecotype'.

(2) Genealogy deals with intraspecific variations or population differences which are correlative with their environment. Thus, population differences constitute the subject matter of genealogy.

A plant community is a mixture of different populations. Even though plants belonging to the same species may apparently look similar, a close scrutiny will disclose intrinsic differences warranting large variations within the constituent individuals of a population (Pandeya and Rewal, 1967).

Concluding Remarks:

The study of the species and its hereditary habitat types form an ecological point of view; in other words, genealogy involves a necessary extension of the field of ecology hitherto pursued, viz., the fields covered by autecology (ecology of the individual organism) and synecology. When viewed from the standpoint of biology, at large the study of the species along its and related lines implies the foundation of an independent speciology alongside of idiobiology (Gane, 1918) and biosociology (Du Rietz, 1924).

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