

Prof ANIL KUMAR (Zoology)

B.Sc HONS Part-III Paper-VII

Topic - Isolation and their role in evolution

Prof ANIL KUMAR

Associate Professor (Zoology)

R.R.S College MOKAMA (P.P.U)

Q. Q. Give an account of isolating mechanism and their role in evolution.

Ans. Sympatric species do not inter breed because one or more isolating mechanisms keep them separated isolating mechanism.

Isloating mechanisms that prevent sympatric species from freely interbreeding are of the following types :

(i) Ecological Isolation : The ecological nice is particular combination of microhabital and biotic relation required for the existence of a species. The niche of a species is defined by the features of the substratum and micro climate to which that species in peculiarly adjusted, the time of day and season of year when it is mainly active, the type of shel for cover it requires. The manners in which it used vegetation is its reproductive performance, the type of food it consumes, and the predators that prey on it.

Animals particularly higher types, have more or less stereotyped behaviour patterns associated with their restriction to particular niches. These behaviour patterns may, be genetically inherited and subjected to evolutionary development, or they may be transmitted to succeeding generation through training or conditioning of the young.

Communities commonly have a predominance of a few species composing the bulk of the populations. Communities in extreme habitats have fewer species than those in fertile or favourable ones closely related species tend to be segregated into different but adjacent regions speparated by barriers, Since communities in various parts of the world are fundamentally similar in organization structure, species occupying similar sicheus in them make similar adjustment.

(ii) Ethological Isolation : The pre requisite for sexual union is that the sexes meet and perform a series of acts that precede and enable fertilization to occur. These acts are described under court ship. The males of evey species have specific courtship reactions and only females of the same species are receptive to these display. These specific behaviours of moles towards females are known as species recogintion. The act of mating is completed only when there is appropriate exchange of stimular. Therefore ethological isolation refers to the barrires to mating among the individuals of different species due to difference in their court ship behaviour.

(iii) Mechanical isolation : The complex structure of genitalia in many animals do not permit copulation among different species. According to Leon Dufour (1844) the genitalia in insects are developed on lock and key principle and that inter specific crosses in *Drosophila* and also in *Glossina* may cause injury or even death to the female. No doubt mechanical isolation was considered to be an effective barrier to crossing in some organisms, but is not applicable to all. Even sporadic occurrence of copulation between insect species with markedly different genitalia has been observed.

(iv) Physiological Isolation : Certain species are established only on the basis of some physiological difference developed between them. For example, in certain species of *Drosophila*, mating among the members of different species is not possible, because vaginal mucous membrane swells up after copulation.

(v) Geographical Isolation : In geographic isolation two populations are separated by some physical barriers. These barriers might be mountain ranges, thick forests, land bridges or water connections etc.

Observable differences in structure, function and behaviour between individuals belonging to the same species are common. Actually, no two individuals, except identical twins, have exactly similar characteristics. Modern geneticists are nearly unanimous in the view that it is the gradual accumulation of small variations over many generations which eventually gives a population, reproductive isolation and species identity.