Role of Isolation in evolution

→ Isolation has been recognized as one of the most important factor in the process of speciation (formation of new species).

→ Various workers RENSCH (1923), MAYR (1942), SIMPSON (1945), LACK (1947) establish the importance of isolation.

→ Two modes of gradual speciation have been postulated (माने) :-

ⓐ Allopatric or Geographic speciation.

ⓑ Sympatric speciation.

ⓐ Allopatric speciation:-

Evolution of species occupying different areas. A species population usually has a discontinuous distribution. Even a more or less continuously distributed species having a wide range, does not form one large randomly mating population. A species is composed of a number of allopatric breeding populations, each physically separated to some extent from others and pursuing its own independent evolutionary path. Even though, initially the genetic composition of these populations may be very similar, no two environments are likely to be biologically or physically identical. Therefore, the selection pressures on these populations will inevitably. Selection plus the random aspects of mutation and in small populations the genetic drifts will

bring about divergence in the hereditary characteristics. If these populations remain separated for a long time, and if the interacting forces of evolution — particularly selection operate to produce divergence, allopatric species are formed from allopatric populations due to the establishment of reproductive isolation.

(b) Sympatric Speciation :-

Evolution of species occuring in the same area. It is based on two postulates : (i) The establishment of new populations of a species in different ecological niches within the normal cruising range of individuals of the parental population.

(ii) The reproductive isolation of the founders of the new population from individuals of the parental population. Gene flow between daughter and parental population is postulated to be inhibited by intrinsic rather than extrinsic factors. The concept of sympatric speciation is far older than that of geographic speciation and goes back to pre-darwinian days.

Allopatric Speciation

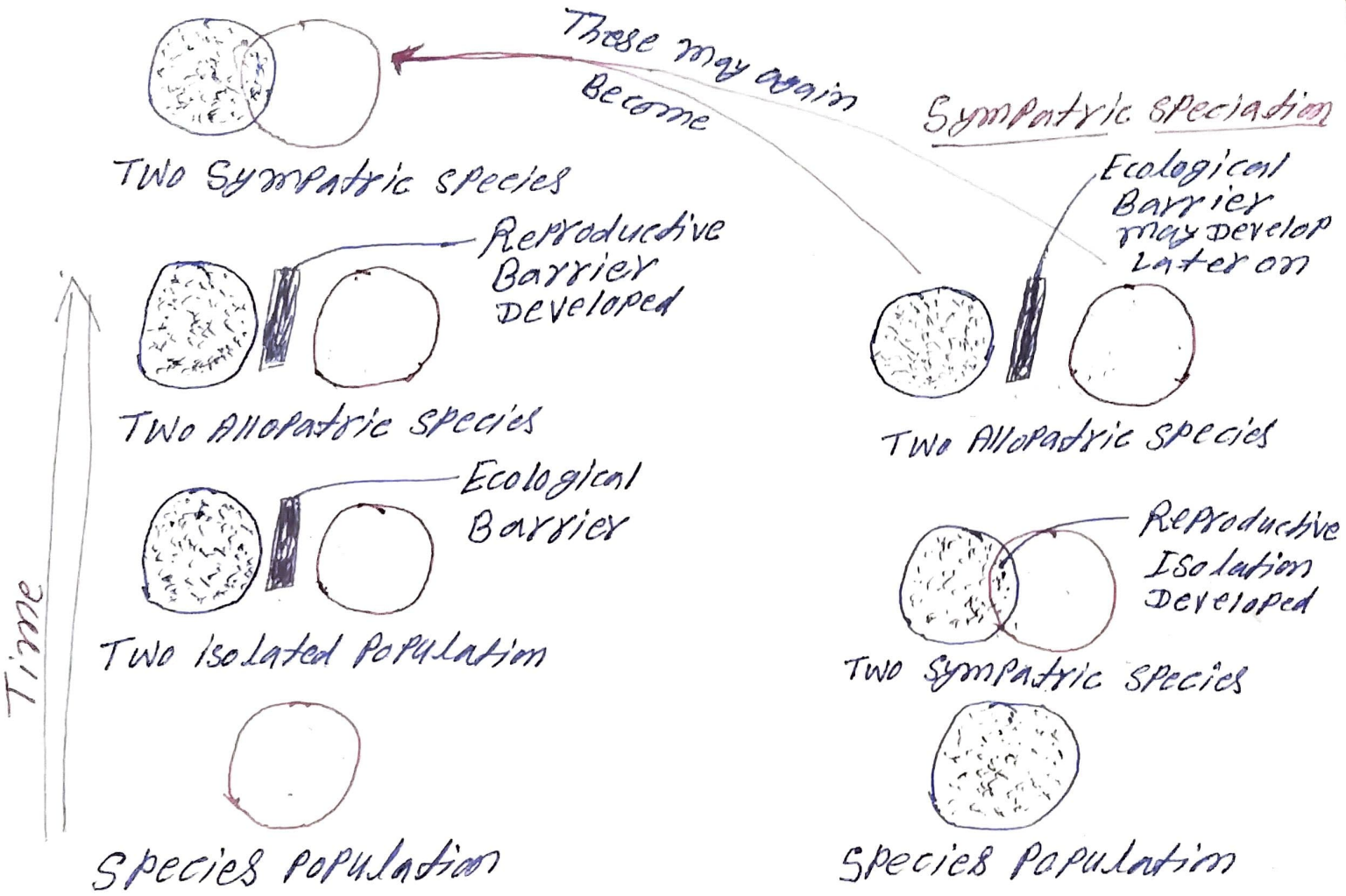

Fig: Speciation due to Geographical & Reproductive Isolation.