

EX SITU CONSERVATION OF BIODIVERSITY

MBOTCC-8

M.Sc. Sem-II
(2018-20)

Unit-III
Introduction:

Ex situ conservation refers to off-site conservation of biodiversity which attempt to protect an endangered species, variety or breed of plants or animals outside its natural habitat. This involves conservation of genetic resources including wild and cultivated species and utilizes diverse techniques and facilities. Here natural dynamics of the managed population varies widely with the degree of human control. Individuals maintained ex situ exist outside an ecological niche and are not under the same selection pressures as wild populations.

Methods of ex situ conservation:

Several methods and techniques are used for ex situ conservation of biodiversity. They are as follows:

1. Cryopreservation -

(i) This method can be used for virtually indefinite storage of material without any deterioration.

(ii) Seeds, pollen, tissues or embryos are preserved at ultra low temperatures (-176°C , the temp. of liquid N_2).

(iii) Under such conditions, preserved materials do not undergo any physiological cytological or genetic changes and life remains at a standstill.

(iv) Seeds which can tolerate cryopreservation temperatures without any damage are called orthodox seeds, and those which are unable to withstand such ultra-low temperature treatments resulting in the death of their embryos are called recalcitrant seeds.

Thus cryopreservation of several species is prevented due to such limitations.

(v) It is also used for the conservation of livestock genetics.

2. Seed Banking -

(i) Seeds are stored in a controlled

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temperature and ⁽²⁾ moisture condition.

(ii) This technique is successfully used for taxa with orthodox seeds which tolerate desiccation.

(iii) Seed bank facilities vary from sealed boxes to climate controlled walk-in freezers or vaults

(iv) Taxa with recalcitrant seeds that do not tolerate desiccation are typically not preserved in seed banks for extended periods of time.

3. Field Gene Banking -

(i) In this practice an extensive open-air planting is followed to maintain genetic diversity of wild, agricultural or forestry species.

(ii) Those typical species which cannot be conserved in seed banks are conserved in field gene banks.

(iv) Field gene banks may also be used to grow and select progeny of species stored by other ex situ techniques.

4. Cultivation Collections -

(i) Here plants are kept under horticultural care in a constructed landscape, typically a botanic garden or arboreta.

(ii) This method is similar to field gene bank in that plants are maintained in the ambient environment, but the collections are typically not as genetically diverse or extensive.

(iii) Such collections are susceptible to hybridization, artificial selection, genetic drift, and disease transmission.

(iv) Such species which cannot be conserved by other ex situ techniques are often included in cultivation collections.

5. Inter situ -

(i) This method is primarily used for taxa which are rare or in areas with severely degraded habitat.

(ii) Here plants are maintained under horticultural care with the environment managed

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to near natural conditions.

(iii) This occurs with either restored or semi-natural environments.

6. Long term Captive breeding -

This technique involves capture, maintenance and captive breeding on long term basis of individuals of the endangered species which have lost their habitat permanently or certain highly unfavourable conditions are present in their habitat.

7. Botanical Gardens -

(i) In a botanical garden, various kinds of plants are grown and maintained for aesthetic beauty, environmental amelioration and educational purposes.

(ii) Several exotic plants are also maintained for research purposes.

Advantages of ex situ conservation:

(i) Useful for declining population of species

(ii) Endangered species can be successfully bred.

(iii) Extremely useful for research and scientific work on different species.

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