

Hello everyone, I'm Harshada Gauns

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For this session we're going to learn

about Ex-situ, methods of Wildlife

Conservation. In this session.

At the end of the session you will

be able to define what is ex-situ

conservation and what are its objectives

and you will be able to explain

different types of methods which are.

Part of Ex-situ conservation,

its advantages and disadvantages.

So let's begin.

So what is ex-situ

Conservation?

Ex-situ means literally offsite conservation.

Ex is something which is outside

its natural space.

That means in this process of protecting

an endangered species of plants or

animals outside of its natural habitat,

for example by removing part of the population from a threatened habitat.

And placing it in a new location,

which may be a wild area

or within care of humans.

So what is the purpose of ex-situ conservation?

First is to rescue threatened species

of plants and animals, to produce

material for conservation biology

research and 3rd to supply material

for various purposes to remove or

reduce pressure from while collecting.

Now let's see what are the different types

of ex-situ conservation methods and the

first one and the simplest one is seed

or embryo storage conservation.

So what happens in this

conservation techniques? Let's see.

So first, seeds and embryos as we know

Are the natural dispersal or storage or

generative organs of majority of species.

Now here in this technique sample
is collected from individuals.
And mostly this is related to plant,
since we're talking about states
or population and then transferred
to a GenBank for storage,
and this is usually stored below subzero
temperature that means they are freezed.
This makes available material
for conservation,
education and display and produce
material for re-introduction
reinforcement and habitat restoration
and management of the species collected.

Now, as I said,
the procedure used for the bulk
of Orthodox seeded plant species is
to dry the seeds or embryos to a
suitable moisture that is generally
to 5 to 6% before freezing it.

But this method is only suitable

for the species that can be dried

and stored at lower temperatures

without losing its viability.

That means it should not die and it

can be used for future processes.

So there are several advantages and

disadvantages of this technique and

the advantage is it is efficient and

reproducible and feasible for short,

medium and long term secure storage.

But there are several disadvantages as well,

and those are there are problems

in storing recalcitrant seed.

That means seeds that do not dry,

so there are problems in storing

such type of plant species.

The latter species cannot be dried and

frozen. In the way used for orthodox seeds.

So what is difference between

recalcitrant seed, and orthodox seeds is,

recalcitrant, recalcitrant.

Seeds

Cannot dry easily

Orthodox seeds can be dried easily

because they rarely produce seeds.

The latter species cannot be dried and frozen in a way used for orthodox seeds, because they rarely produce seed or are normally clonally propagated.

The next type of Ex-situ conservation is

Botanical Garden and zoological park.

So here in case of botanical

garden or Zoological Park whole living

collection of species that were

collected in a particular location and

move to the garden to be conserved.

So mostly here the habitat which is

generated for the species are man made

and it is taken care by human beings

and there are several advantages.

For example gardens do not have

the same constraint.

As many of the other conservation agencies,

like for example,

they have the freedom to focus on

the wild species that may otherwise

not be given significant or

sufficient priority for conservation.

But there are disadvantages as well,

like for example the number of species

that can be genetically conserved,

in a botanical or a zoological

garden will always be limited

because of the available space.

The majority of these gardens

are located in urban areas in

temperate countries and at the

present site most expansion would

be prohibitively expensive.

And the majority of botanical.

An animal diversity is

located in tropical climates.

Yet because most botanical and

zoological garden are in temperate countries,

the collection must be kept in expensive

green houses or other facilities,

which also limits the space available.

Which means whenever we try to inbreed

or whenever we try to rescue any

animal from its natural spaces may not

compensate with the environment that

we provide them in an artificial venue.

Which makes them very expensive.

And there are very few individuals

of each species can be held and

this severely restrict the range

of genetic diversity found in.

While that is protected.

However, if the target species is

very near extinction and only one

or two specimen remain extant.

This objection, of course do not hold.

So after Zoological Park or Botanical

Gardens we have in-vitro conservation.

Now in-vitro conservation involves

the maintenance of explants.

In a sterile pathogen free environment,

and it is widely used for vegetative,

propagated and recalcitrant seeded species.

This method offers an alternative

to field gene Banks,

and it also involves the establishment

of tissue cultures on a nutrient Agar and

their storage until controlled condition

of either slow or suspended growth.

And there is advantage to this technique

that is the solution to the long

term conservation problems of recalcitrant
sterile or clonally

propagated species.

But what are the disadvantages?

Let's see.

So there is a risk of somaclonal variation.

The need to develop individual maintenance

protocol for the majority of species

and the relatively high level technology

and high cost that is required.

So the next one is field Gene Bank

or livestock park conservation.

In this type of conservation

of germplasm in the field,

genebanks or livestock parts involve the

collecting of plant or animal specimen

from one location and the transfer

and conservation at second sight.

Here species are easily accessible

for utilization.

An evaluation can be undertaken while

the material is being conserved,

but there is a disadvantage that

the material required is restricted

in terms of genetic diversity.

It says susceptible to pests, disease and

vandalism and many require large area of land.

The next type of conservation technique

in Ex-situ is Polan/ Semen/ Ovule,

DNA conservation,

so the storage of pollen grains is possible under appropriate conditions that allow their subsequent use for crossing with living plant material.

It may also be possible in the future to regenerate haploid plant routinely from Pollen cultures, but no generalized protocols have been developed yet.

Now the development of artificial insemination techniques in recent years has made semen and Ovary storage routine, especially for domesticated animals, which has been a successful technique in terms of ex-situ conservation.

Now the storage of DNA under prescribed condition can easily and inexpensively be achieved given the appropriate level of technology, but the region, region of entire Organism from DNA

cannot be envisaged

At present,

although a single or small number of

genes could be subsequently utilized

and to this technique also there

are advantages and disadvantages.

First,

is it is low cost and a simple technique.

However, only paternal material can

be conserved, and with DNA storage

there are problems with subsequent

gene isolation cloning and transfer.

So that's it for this session and

we will learn about in-Situ

conservation in the next session.

Till then, maybe you all can refer

this references for further studies.