Biology-Notes
Chapter-8: How Do Organisms Reproduce?
Grade-X

Reproduction: It is the process of producing new individuals of the same species by existing organisms of a species, i.e., parents.

1. Binary fission – it is the division of one cell into two similar or identical cells.

- In this method, the nucleus first divides into two, followed by the division of the cytoplasm.
- The cell finally splits into two daughter cells.
- In plants, binary fission can be seen in bacteria, yeast and euglena.
- Among animals, amoeba and paramecium reproduce through binary fission.

2. Multiple fission – in multiple fission, many individuals are formed from a single individual.

- The nucleus of the cell divides repeatedly, producing many nuclei.
- Each nucleus is surrounded by a small amount of cytoplasm and many daughter cells are produced within the cyst.
- The cyst breaks up under favorable conditions and small offspring are liberated.

E.g.: In plants – algae
In animals – plasmodium

3. Regeneration

It is the ability of the fully differentiated organism to give rise to new individual organism from its body parts.
E.g. – Hydra and Planaria.

4.Budding

In budding, a small part of the body of the parent grows out as a bud which then detaches and becomes a new organism.
Eg : hydra reproduces by budding using the regenerative cells .

VEGETATIVE PROPAGATION –

In vegetative propagation new plants are obtained from the parts of old plants like stems, roots and leaves without the help of any reproductive organ. The different types of vegetative propagation are:

a) **Cutting** – in this type of propagation any part of the plant root, stem or leaf is cut and buried partly in the moist soil. Eg: rose plant, chrysanthemum, grapes are propagated by means of cutting.

b) **Layering** – the adventitious roots are produced in the branch of the stem before the plant is detached from the parent plant. The branch of stem is called layer. This process is utilized in the propagation of plant and the phenomenon is called layering. The process is used in the propagation of plants like lemon, guava, hibiscus, bougainvillea, jasmine , raspberry , strawberry and many ornamental plants .

c) **Grafting** – in this method of reproduction, two plants of closely related varieties are joined together so that they live as one plant.
   - The portion of a plant that is grafted on the other plant is called scion and the plant in which grafting is performed is called the stock.
   - This method is applied to improve varieties of fruits like mango, apple, peas, citrus and guava.

ADVANTAGES OF VEGETATIVE PROPAGATION :

- Vegetative propagation is a cheaper, easier and more rapid method of propagation in plants than growing plants from their seeds .
- The traits or characters of the parent plant are preserved by vegetative propagation.
- Better quality of the plants can be maintained by this method.
- It results in propagation of those plants which do not produce viable seeds or produce seeds with prolonged period of dormancy.
- The plants generated from vegetative means require less time to grow and have the advantage of being more uniform and genetically similar to the parent stock.

DISADVANTAGES OF VEGETATIVE PROPAGATION :

- Vegetative propagation induces over – crowding
- There is no genetic variation so there is less adaptability to the environment.
- The disease of the parent plant gets transferred to the offspring.
- The plants lose vigor.
- New characters can neither be introduced nor undesirable characters be eliminated.

TISSUE CULTURE

It is the production of new plants from isolated plant cells or small pieces of plant tissue in a synthetic medium of culture solution.

- This technique is also known as micro propagation in vitro because it takes place outside the body of the parent plant in a test ube using an artificial environment.
- Micro propagation technique is being used for the production of ornamental plants like orchids, dahlia and carnation.

SPORE FORMATION

While a slice of bread is kept in moist dark place for a few days spore of Rhizopus present in air settle on the bread to form new fungus plants of Rhizopus.

SEXUAL REPRODUCTION

It is a type of reproduction in which the two sexes, namely male and female are involved.

- The male sexual unit is known as male gamete or sperm , while female sexual unit is termed as female gamete or ova .
- Thus the two major processes, i.e. , formation of gametes and fusion of gametes constitute sexual reproduction .

SIGNIFICANCE OF SEXUAL MODE OF REPRODUCTION

1. Sexual reproduction promotes diversity of characters in the offspring.
2. It results in new combinations of genes brought together in the gamete and this reshuffling increases genetic variation.
3. It plays a prominent role in the origin of new species.

The sexual mode of reproduction incorporates process of combining DNA from two different individuals during reproduction.

GAMETES –

The cells involved in sexual reproduction are called gametes. The male gamete in animals are called sperm or spermatozoan and the female gamete in animals are called ovum or eggs .

ZYGOTE

The cell which is formed by the fusion of a male gamete and a female gamete is called zygote , it is a fertilized ovum or fertilized egg .

EMBRYO

It is the stage of development between the zygote or fertilized egg and the newly formed offspring.

FERTILISATION

It is defined as the fusion of a male gamete (sperm) with a female gamete (ovum) to form a zygote during sexual reproduction.

FERTILISATION IN PLANTS –

Pollination is followed by fertilization in plants.

- After the plant lands on the suitable stigma, it has to reach the female germ cells in the ovary.
- The pollen tube grows out of the pollen grain through the style to reach the ovary.
- After fertilization, the zygote divides several times to form an embryo within the ovule.
- The ovule then develops a tough coat and gets converted into a seed.
- The seed contains the future embryo which develops into seedling.
- The ovary develops and ripens to form a fruit.
- The process of double fertilization occurs inside each embryo sac, in which two fusions, syngamy and triple fusion take place.
- When one male gamete fuses with the egg contained in the embryo sac of the ovule,this fusion is called syngamy and its product is the zygote.
- The other male gamete fuses with two polar nuclei and this process is called triple fusion, where three nuclei are involved in the fusion process, one male gamete and two polar nuclei.

SEXUAL REPRODUCTION IN HUMAN BEINGS:

Important Terms:

- **Fertilization**: In the fallopian tube only one sperm fertilizes the ovum to form a zygote. This is called fertilization.
- **Implantation**: The embedding of embryo in the thick inner lining of the uterus is called implantation.
- **Placenta:** A special tissue develops between the uterine wall and the embryo (foetus), called placenta, where the exchange of nutrients, oxygen and waste products takes place.
- **Gestation:** The time period from the development of foetus inside the uterus till birth is called gestation.
- **Parturition**: The act of giving birth of the fully developed foetus at the end of gestation period is termed as parturition.
  Menstruation: The breakdown and removal of the inner thick, and soft lining of the uterus along with its blood vessels in the form of vaginal bleeding is called menstrual flow or menstruation.
- **Reproductive health**: All those aspects of general health which help a person to lead a normal, safe and satisfying life.

- **Sexually Transmitted Diseases(STD**

  Through Bacteria

i) Gonorrhea-Caused by bacterium ***Neisseria gonorrhoe*a** infects the ureter in men and the cervix in women. Causes burning sensation during urination.

ii) Syphilis-Caused by bacterium ***Treponema palladium*** causes lesions in the mucous membrane of urinogenital tract and ulcers on genetalia.

Through Protozoa-**Trichomoniasis**

Through Virus-

i) AIDS (Acquired Immune Deficiency Syndrome)-Caused by a virus, **HIV (Human Immunodeficiency Virus)-**suppresses the body's immune system thereby making it susceptible to diseases.

ii) Warts

Methods to avoid Pregnancy:

Mechanical Barrier Methods-Use of physical devices such as condoms, diaphragm, and cervical caps by males.

Chemical Methods-specific drugs used by females which are of two types-oral pills and vaginal pills.

Surgical Methods:

a) **Vasectomy**-a small portion of Vas deferens in male is surgically removed.

b) **Tubectomy-**a small portion of fallopian tube in females is surgically removed or tied.