

Chapter-3 How Do Organisms Reproduce

Notes

★ Reproduction - Reproduction is the process by which organisms produce young ones of their own kind & multiply in numbers.

★ Need Of Reproduction -

- Continuation of Life
- Preservation of species
- Replacement of dead individuals
- Role of evolution

★ Modes Of Reproduction

→ There are two types of reproduction.

- Asexual Reproduction
- Sexual Reproduction

Asexual Reproduction When reproduction occurs without the formation & fusion of gametes, it is called asexual reproduction. It is called asexual reproduction because it does not involve special cells called sex cells or gametes.

Characteristics Of Asexual Reproduction

i) Asexual reproduction is uniparental.

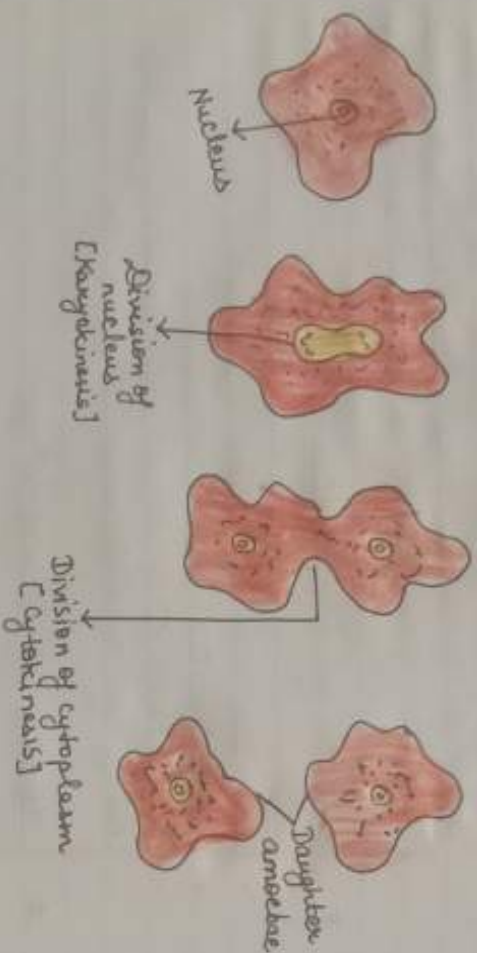


fig → Binary Fission

- i) It does not involve fusion of gametes.
- ii) All the cell divisions are mitotic or amitotic.
- iii) It is a method of rapid multiplication.

Different forms of Asexual Reproduction

A. ASEXUAL REPRODUCTION IN UNICELLULAR ORGANISMS

- 1) Fission is the simplest and common method of asexual reproduction in unicellular organisms such as protozoa & bacteria.
Fission is of two types:-

(a) Binary Fission:-

In binary fission, the parent organism splits into two small but identical daughter organisms. It usually occurs in amoeba, paramecium, zebrafish & bacteria.

(b) Multiple Fission:-

During multiple fission, organism secretes a protective covering, the cyst around the cell. Inside the nucleus divides several times to form a number of daughter nuclei. Each daughter nucleus gets surrounded with a bit of cytoplasm.

On the arrival of favourable conditions the cyst ruptures & single-celled daughter individuals are set free. Multiple fission occurs in paramecium. It produces about 1000 daughter organisms.

2)

Budding:-

Budding is the formation of new organisms as an outgrowth of parent organism. In yeast & Hydra in a Hydra, a bud develops as an outgrowth. Due to repeated cell division at one specific site, these buds develop into tiny individuals & when fully mature, detach from the parent body & become new independent individuals.

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ASCENDANT REPRODUCTION IN MULTICELLULAR ORGANISMS

1)

Budding:- Organisms such as Hydra use

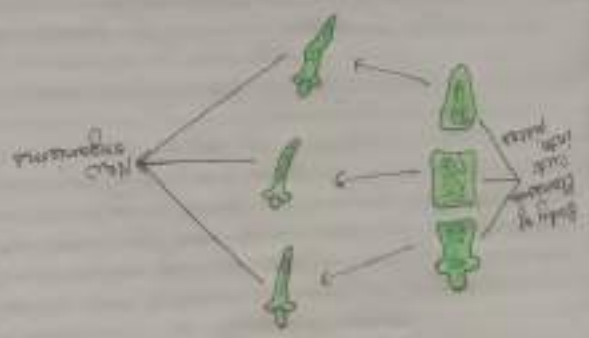
vegetative cells for budding. In Hydra, the bud arises from the body surface as an outgrowth. It enlarges & develops tentacles. The fully formed bud separates from parent body & starts an independent life.

2)

Sporic formation:- In fungi like Rhizopus,

thrust like structures called sporophores develop on the head. The base of each sporophore is called sporangium. The sporangium contains numerous dark-colored spores. The spores are liberated by the rupture of sporangial wall.

Types of Propagation in Plants



2)

Fragmentation - Fragmentation is the process of breaking up the body of an organism into two or more fragments & each of which growing into a new individual.

Regeneration - The process of getting back a lost organism from the left parts of an organism is called regeneration eg Hydra & Planaria.

* VEGETATIVE PROPAGATION

Vegetative propagation is a form of asexual reproduction where part of the plant body serves as root when in leaf etc. develops into a new plant.

- Vegetative propagation is of two types:
 - a) Natural vegetative propagation
 - b) Artificial vegetative propagation

(B) Natural Methods of Vegetative Propagation

(a) **Vegetative propagation by roots** - Some of some plants like sweet potato, Dahlia & Carrot develop adventitious roots from their roots which are planted in the soil. New plants are produced.

(b) **Vegetative propagation by stems** - It takes place in subterranean & underground stems. For example in grasses, wheat, ground along the surface of soil & produces roots.

where it touches the ground. The lateral branch of such a stem that runs horizontally is called a runner.

(c) Vegetative Propagation by Leaves -
Fleshy leaves of certain plants like *Bryophyllum* and *Begonia* bear adventitious buds in the notches present along the margin of their leaves. These adventitious buds develop into plantlets under favourable conditions. When leaves fall on the ground, plantlets & buds develop into new plants.

(d) Vegetative Propagation by Bulbils - In *Agave*, *Oxalis* and *Dioscorea*, fleshy buds separate from the parent plant & grow into new plants.

(B) Methods of Artificial Vegetative Propagation

⇒ Artificial propagation of plants methods are used in agriculture for raising crops, & in horticulture for cultivation of vegetables, fruits & flowers.

i) Cutting Cutting is a common man-made method of vegetative propagation in plants. Stem cutting, root cutting & leaf cutting are the methods used for artificial vegetative propagation.

(ii)

Layering-

In layering, new plants are produced from the parent stem without detaching it in the initial stage.

It is done in two ways-

- Mound layering- It is induced by bending the lower branch to the ground & covering it with moist soil. After some time, adventitious roots develop from node. These branches are cut from the parent plant & planted. It is practised in Jasmine, Strawberry etc.
- Aerial Layering or Air layering or gootee- This method is used in plants like Orange, guava, Litchi etc. In such plants about one inch bark around stem is removed and it is covered with moist grass wrapped with a polythene sheet. An earthen pot with a hole at the bottom is hung from the branch above the ring to supply water. When adventitious roots appear, stem is cut below the level of roots & planted.

(iii)

grafting- The technique of joining shoot system of one plant over the stump of another related plant to form a composite plant is known as grafting.

The plant whose root system is taken is called stock and the plant whose shoot

system is taken is called ~~scion~~ ^{scion}.

★ TISSUE CULTURE: MICROPROPAGATION

- This is a technique of propagating plants by culturing cells or tissues in a culture medium. When vegetative propagation is not possible in a plant, its bud, shoot apex or some other part is used for micropropagation.
- Advantages Of Tissue Culture
 - i) It provides rapid propagation of identical individuals.
 - ii) Very small explants can be used for micropropagation.
 - iii) It can be carried out throughout the year.
 - iv) Only a small space is required for tissue culture.

★ Sexual Reproduction

Sexual reproduction involves formation & fusion of haploid male & female gametes to form a diploid zygote, from which adult organism is formed. These gametes are produced in male & female gonads called testes & ovaries respectively.

Bisexual flowers - Flowers with both male & female organs present in ^{one} the flower is called bisexual flower.

According to their parts:-

It consist of four parts-

- Calyx
- Corolla
- Androeicum
- Gynoecium

(i) Calyx:- It is the first part of the flower. They are generally green in colour. Their unit is sepal.

(ii) Corolla:- They are second part of the flower. They are coloured. Their unit is petal. Due to their colour they attract insects towards them.

Note Calyx and corolla essecary whorls of the flower.

Male Reproductive organ:-

(iii) Androeicum - They are male reproductive organ of the flower. Their unit stamen.

It consist three parts-

- Anther
- Filament
- Connective
- Inside the anther pollen grains are present which help in pollination.

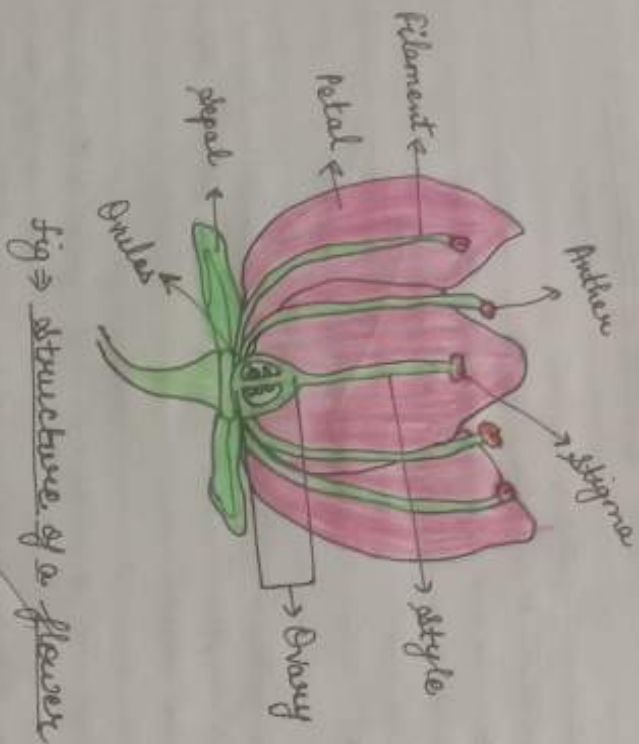


fig → structure of a flower

(iv) Gynaeceum:- They are female reproductive part of flower. Their unit is pistil / carpel. It consist three parts:-

- stigma
- style
- Ovary

→ stigma are sticky in structure. They are present at the top. It connects stigma to ovary by tubular structure called style. At the bottom ovary is present, it is swollen of the female reproductive organ. Inside the ovary egg shells are there.

Pollination:- Transfer of pollen grains from anther to stigma of the flower is known as pollination. It is of two types -

- self pollination
- cross pollination

Self pollination:- Transfer of pollen grains from the anther to the stigma of same flower is known as self pollination. It generally occurs bisexual flower.

Cross pollination:- Transfer of pollen grains from the anther of one flower to stigma of another flower of same species. It occurs in unisexual flower.

Fertilization:- Fusion of male and female gamete is known as fertilization. After fertilization cells start dividing itself &

embryo start developing its size which form fruit in the plants.

Double Fertilisation - Fertilization characteristic of seed plants in which one sperm nucleus fuses with egg nucleus to form an embryo and another fuses with polar nuclei to form endosperm.

Triple Fusion - Triple fusion is the fusion of the male gamete with two polar nuclei inside the embryo sac of the angiosperm. The process of fusion takes place inside the embryo sac. When pollen grains fall on the stigma, they germinate & give rise to the pollen tube that passes through the style & enters into the ovule.

Unisexual - If a flower contains only one reproductive part either male or female, then this type of flower is called unisexual flower.

★ SEXUAL REPRODUCTION IN HUMANS -

Male reproductive organ system

It consists of following organs -

- A pair of testes
- A pair of vas deferences (Sperm. Duct)
- Urethra
- Penis
- Accessory gland.

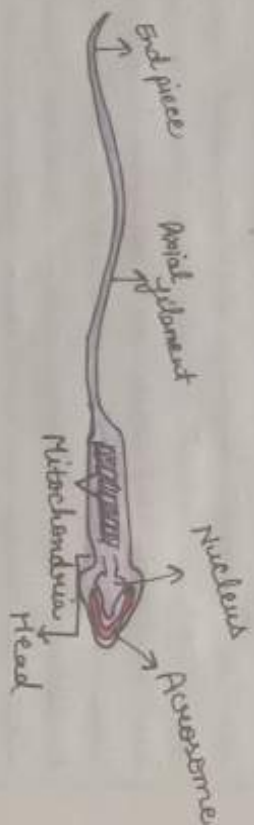


fig → A male sperm

- In male, oval shape testes present lower side of abdominal cavity which covered with scrotum sac.
- Left testis is slightly higher to the right testis.
- The temperature of testes is less than ~~the~~ ^{body} temperature ($2.5 - 3^{\circ}\text{C}$). Due to this temperature, male reproductive organ is present outside of the abdominal cavity.
- This temperature helps in motility and maturation of sperm.
- If we see the transverse section of testes we get a highly coiled structure called seminiferous tubules.
- After the seminiferous tubules a another highly coiled tube is present which is near 6 m long known as epididymis which help to store sperm.
- Sperm duct connect testes to urethra.
- Urethra is 15-20 cm long. It is common passage for urine & sperm.
- Penis is reproductive organ in male. It also provide common passage for urine & sperm.
- Three accessory glands are present:-
 - i) Prostate gland.
 - ii) Cowper's gland.
 - iii) Skene's gland.
- Seminal vesicle store sperm till maturation.
- Prostate gland provide alkalinity to the sperm.
- Cowper's gland secrete white viscous material which act as lubricant.

fallopian tube where gamete starts dividing itself and convert it into morula. After that fixing of morula towards uterus takes place which is known as implantation. When it attached into uterus wall it form a tube like structure named as placenta which provide nourishment passage for excretion. After 280 days this implanted morula convert itself a new born baby.

Note Between placenta and embryo a fluid is present which is called amniotic fluid. It protects fetus from external jerk.

Birth Control:- Due to increasing population of any country WHO decided some ways to stop the pregnancy by following ways:-

- i) By providing sex education
- ii) Increase the age of marriage
- iii) self control
- iv) Use some barrier method like Cervix loop, condom etc.
- v) Oral contraceptive pills (Saheli, Mala-D)
- vi) some chemical treatment (vasectomy & tubectomy)
- vii) Use MTP (Medical Termination of Pregnancy)

Signature