

Biology Notes

Topic: Reproduction 1 – Asexual reproduction

Objectives: At the end of this topic, the students should be able to:

1. *Define the terms reproduction, asexual reproduction and sexual reproduction*
2. *Name the two types of asexual reproduction.*
3. *Describe examples of asexual reproduction.*
4. *Identify the advantages and disadvantages of asexual reproduction.*

What is reproduction?

Reproduction is the process of producing a new offspring. This can take place sexually or asexually.

Sexual reproduction involves two individuals normally a male and a female each contributing a sex cell or gamete to the process. The resulting offspring will have features that are characteristic of both individuals.

Asexual reproduction occurs without the help of another individual. The resulting offspring will have features that are characteristic of only of the individual it came from.

Types of asexual reproduction

Asexual reproduction can be **natural** or **artificial**.

The natural methods of asexual reproduction include

- binary fission (characteristic of bacteria)
- spore production (characteristic of fungi)
- tuber formation (vegetative reproduction- characteristic of plants e.g. potato)
- budding (characteristic of yeast)

Binary fission

Binary fission means splitting in two. This method is used by single-celled organisms such as Amoeba and bacteria. When it is ready to reproduce it simply splits into two starting with the nucleus and then the rest of the body. Each new 'piece' develop separately and when fully grown splits again.

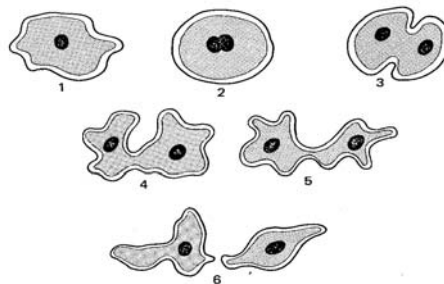


Fig 8.7 Binary fission in Amoeba

Spore production

A spore is a tiny spherical cell that will grow into a new individual. The spores are produced and released from a spore case and are then carried by wind. Once they land on a suitable medium, they will grow into a new individual. e.g. pin mould, mushroom, mosses, ferns.

Tuber formation

A stem tuber is a swollen underground stem. A single Irish potato (*Solanum tuberosum*) is an example of a stem tuber. A single plant will produce several tubers and each tuber can give rise to a new plant. The tubers are able to remain in the ground during periods that are unfavorable for growth e.g. winter. When conditions become favorable lateral buds (eyes) develop from the surface of the tuber which develop into a new shoot and grows out of the soil to form a new plant. The new shoots use up the starch reserves in the tuber which eventually withers and decays. New tubers are formed and the reproductive cycle repeats itself.

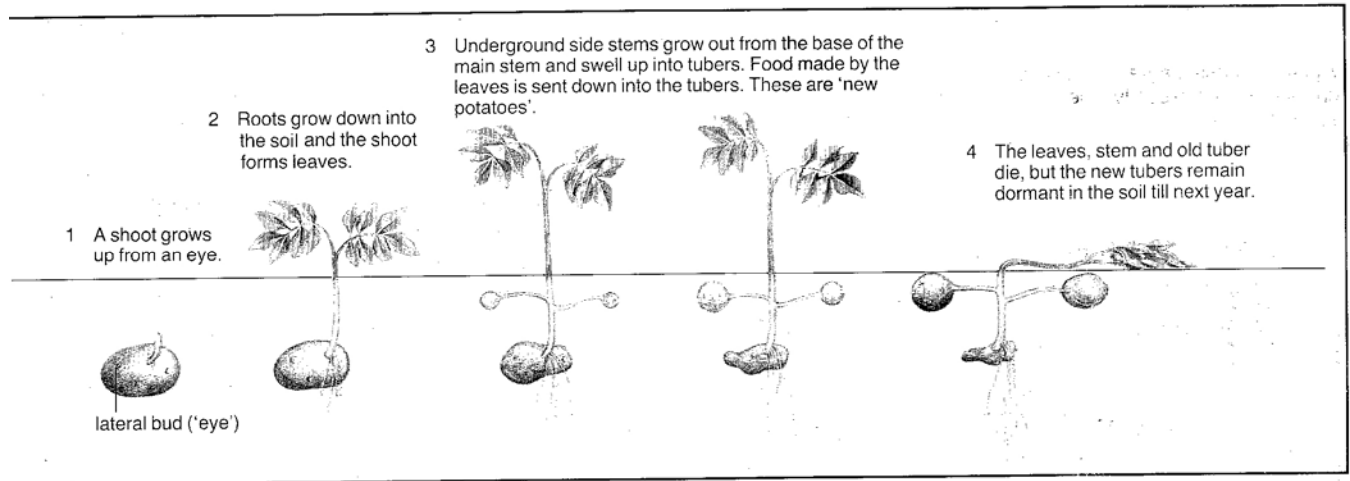
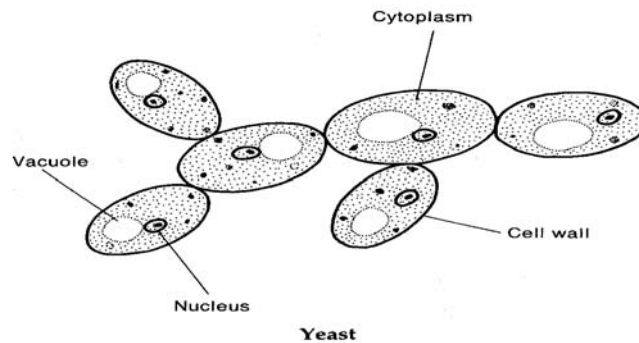


Figure 4 These diagrams show how a potato plant

Budding

Budding occurs when a single-celled organism e.g. yeast sends out a small outgrowth which gets larger and eventually breaks off as a new cell. Sometimes the new cell starts budding before it has broken away from the old cell giving rise to chains or clumps of cells.



Artificial asexual reproduction is normally applicable to plants and is also called **vegetative reproduction**. This occurs through the intervention of man. The most common methods include:

- grafting
- marcotting
- stem cuttings

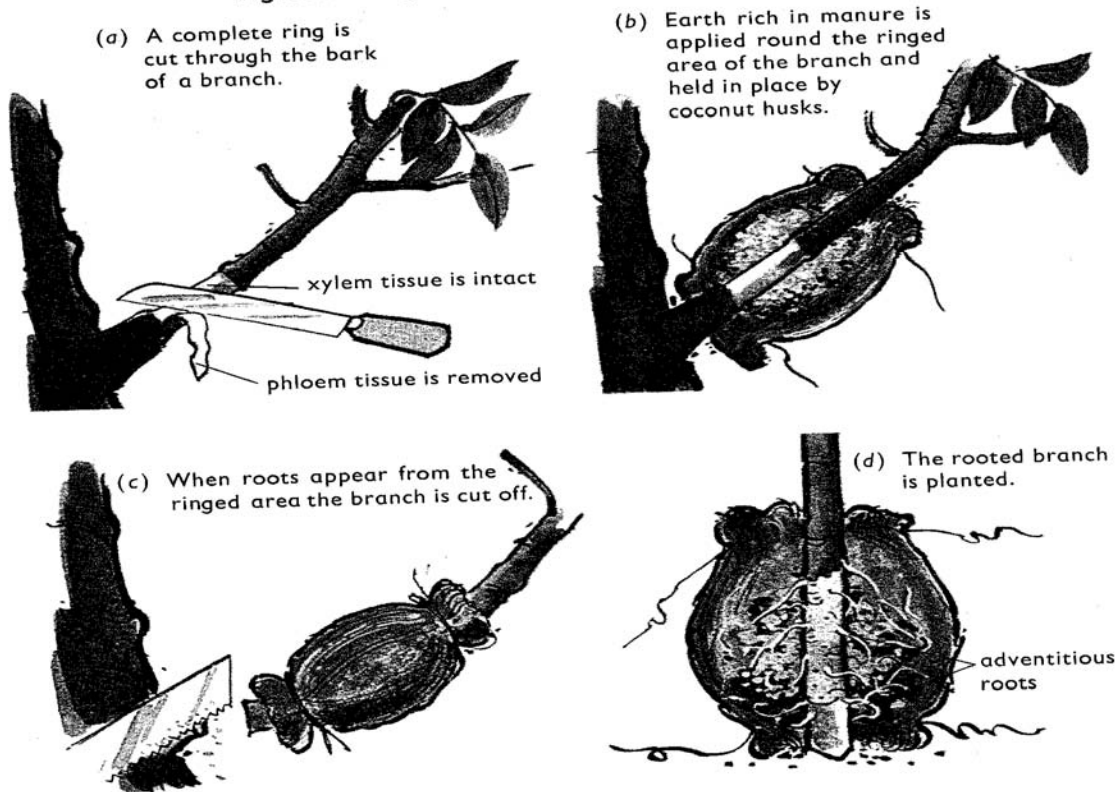
Grafting

Grafting is a special method of reproducing trees and is used a lot by gardeners. It involves placing the cut stem of two plants in contact with each other so that the tissues join together and become continuous.

Marcotting

This method of vegetative propagation is successful with garden shrubs and fruit trees like lemon and mango. The diagram below shows how it is done.

Fig. 14.34 Vegetative propagation by marcotting



Stem cuttings

Stem cuttings are commonly used to reproduce plants such as Hibiscus, cassava, rose, Croton and Coleus. A healthy young branch is cut off from the plant just below a node. Most of the leaves are removed to reduce the rate of water loss. The cut end is then stuck into some good soil. Roots eventually grow on the cut end and the cutting becomes established as a new plant.

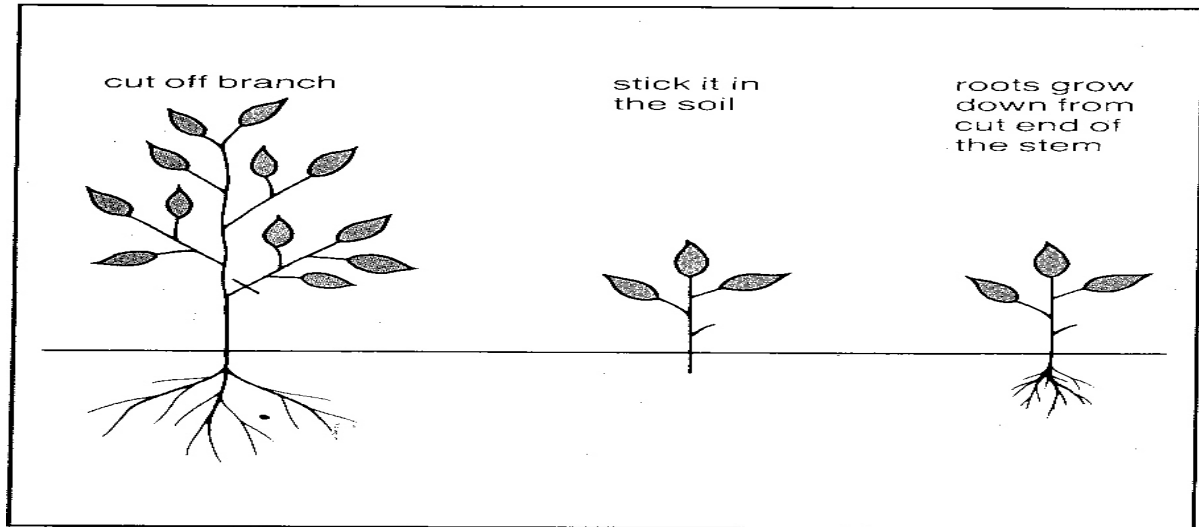


Figure 8 Taking a cutting.

Advantages / Disadvantages of asexual reproduction

Advantages

- new plants exactly resemble the plant they came from (parents)
- new plants mature faster than those produced by sexual means
- no need for pollination, fertilization and seed or fruit dispersal
- new plants are able to obtain nourishment from their parent plants and so are able to survive temporarily unsuitable conditions

Disadvantages

- undesired qualities and certain disease are passed on to the new offspring
- there is lack of variation in the offspring
- the strength and vigor of succeeding generations are reduced

Question

Study the diagram shown below of a potato plant in July and answer the questions which follow



A potato plant in July

- (a) Explain why the structure A is in a shriveled condition at this time of year? (1)
- (b) Assuming that all the tubers develop, how many new plants will this plant produce in the following spring? (1)
- (c) What would be likely to develop from structure B? (1)
- (d) Explain why all the new plants will be identical to the original plant.(2)
- (e) Food is stored in structure C.
 - (i) What type of food is stored? (1)
 - (ii) What chemical test would show the presence of this food? (1)
 - (iii) Where and how is the stored food made? (2)
 - (iv) How are the food products transported from the place where they are made to the tubers? (1)
 - (v) What happens to the stored food when the tubers start to develop in the spring? (1)
 - (vi) Why is the potato plant so important to humans? (1)