NCERT Solutions for Class 12 Biology Chapter 9 Strategies for Enhancement in Food Production

Q1. Explain in brief the role of animal husbandry in human welfare.

Answer:

Animal husbandry refers to the process of management of livestock scientifically for human welfare. The process of animal husbandry includes feeding, breeding and control of diseases for raising the livestock populations. The livestock generally reared includes cattle, pig, sheep, poultry birds, bees etc. These animals are reared for various products such as milk, meat, eggs fibre, honey etc. Through scientific and effective animal husbandry practices, the production of animal products can be increased. An increase in the production of these products will ultimately be beneficial for human welfare. Therefore, animal breeding plays an important role in human welfare.

Q2. If your family owned a dairy farm, what measures would you undertake to improve the quality and quantity of milk production?

Answer:

Dairy farm management or dairying refers to the process of managing animals for milk and its products for consumption by humans. It deals with systems that can increase the yield and improve milk quality. The major prerequisite of increasing quantity and quality of milk by cattle is the quality of breeds. Therefore, if your family owned a dairy farm, the measures that can be undertaken to improve the quality and quantity of milk production must involve betterment of farm animals. Some of these measures are as follows:

1. Selection of good breeds with desirable characters.

2. Proper cleanliness and maintenance of cattle sheds. Sheds should be spacious, roofed and well ventilated.

3. Feeding of animals must be carried out scientifically and special care should be taken with regard to the quantity and quality of fodder

4. The cattle should be properly bathed, cleaned, brushed etc.

5. In the cattle sheds, proper sanitation must be provided.

6. For the growth of cattle, vaccination and proper medical treatment are essential.

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Q3. What is meant by the term ‘breed’? What are the objectives of animal breeding?

Answer:

The term 'breed' refers to a group of animals that are related to each other by means of descent and are similar in most of their characteristics characters like general appearance, features, size, configuration etc. Different breeds can be improved via processes of animal breeding The term animal breeding is the production of improved breeds of domesticated animals by improving their genotypes through selective mating.

Objectives of animal breeding

The process of animal breeding is carried out keeping in mind certain specific objectives as per the demand of breeders. Some of the main objectives of animals breeding are as follows:

1. For improving the growth rate

2. For increased production of milk, meat, egg, wool etc

3. For obtaining a superior quality of milk, meat, eggs, wool etc

4. For improving the resistance to various diseases

5. To increase productivity as well as reproductivity.

Q4. Name the methods employed in animal breeding. According to you which of the methods is best? Why?

Answer:

The term animal breeding refers to selective breeding of interrelated animals in order to create new combinations of characters. The methods of animal breeding are divided into two categories i.e. natural methods of animal breeding and controlled breeding experiments. The natural methods of breeding are as follows:

Out-breeding - It refers to the process of the mating of unrelated animals which may be between individuals of the same breed but having no common ancestor for 4-6 generations or between different breeds or different species.

Out-crossing - The term outcrossing is the mating of animals of the same breed with no common ancestor for 4-6 generations. The offspring produced in such a way is referred to as outcross.

Cross-breeding - In the cross-breeding superior male of one breed is allowed to mate with the superior female of another breed

Interspecific hybridisation- Interspecific hybridisation refers to the mating of individuals of different species.

The controlled breeding experiments may be carried out in two ways i.e. artificial insemination and multiple ovulation embryo transfer.

Artificial insemination- This is the process of artificially introducing the semen collected from a superior male is injected into the oviducts of a female. This method is used in case of complications

Multiple ovulation embryo transfer - In this method of animal breeding females are injected with FSH and LH hormones that cause superovulation (production of 6-8 eggs) in them. later on, these females are fertilised to form multiple offsprings through artificial insemination. The fertilised eggs are then obtained and induced in surrogate mothers so that superovulation can again take place. This method is used for improving the herd.

Controlled breeding experiments are considered better than natural methods as through them we can obtain animals with desirable characters.

Q5. What is apiculture? How is it important in our lives?

Answer:

Apiculture refers to the practice of keeping and rearing honey bee i.e. *Apis indica* in order to produce honey bee, beeswax and other products.

Importance of apiculture

1. Apiculture is used to produce honey which is a highly nutritious product used as an indigenous system of medicines. Honey is also useful for the treatment of ailments such as cold, flu and dysentery.

2. Through apiculture, beeswax is also obtained. It is used in the production of cosmetics, polishes and a few medicines

3. Apiculture is a huge industry that has generated huge employment for people.

Q6. Discuss the role of fishery in enhancement of food production.

Answer:

The fisheries industry deals with catching, processing and marketing of fishes and other aquatic animals that are economically important. Prawns, crabs, lobsters etc are some economically important aquatic animals. The fisheries industry has a major role in the Indian economy as well as in the enhancement of food production in India. A large part of India is dependent on fishes and other aquatic animals for their food requirements. Both marines, as well as freshwater species of fishes, are used for this purpousThus, expansion of the fisheries industry leads to enhancement in food production. Fisheries also being a huge industry tends to generate employment for people of coastal areas.

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Q7. Briefly describe various steps involved in plant breeding.

Answer:

Plant breeding is the process of crossing two genetically different varieties of plants in order to produce a new hybrid variety that combines selective characteristics of both the parent varieties. Plant breeding is done to induce disease resistance, increased food production, resistance to insect/pest etc in plants, adaptability etc. The process of plant breeding gets completed in certain steps. These steps of plant breeding are as follows:

1. Collection of variability- The first step of plant breeding is to collect all the genetic variability present in wild relatives of cultivated varieties of plants. The collection of diverse alleles of a gene in a crop is called germplasm collection. From this collection, breeders can select desired characters.

2. Evaluation of germplasm and selection of parents- The collected germplasm is then evaluated and desirable genes are selected. The plants having desirable genes are selected to be parents and are allowed to hybridise.

3. Cross-hybridisation of parents- The selected parents are allowed to hybridize. to facilitate hybridisation, bagging, tagging and emasculation like techniques are used. During cross-hybridization, unwanted pollination is always avoided.

4. Selection of superior hybrids- The hybrid progenies are evaluated for the desired combination of characteristics through a scientific process. The selected progenies are self-pollinated to maintain homozygosity.

5. Testing, release and commercialisation of new cultivars- The new cultivars are tested and evaluated for factors like yield, resistance to diseases, adaptability etc. These are grown in different countries in different seasons multiple times and their growth is tested. After the successful testing, new varieties are provided to farmers for growing in fields.

Q8. Explain what is meant by biofortification.

Answer:

Biofortification is the process of developing crops having a higher content of vitamins, minerals, proteins, fats etc. Biofortification has been proved to be a method for improving public health. It is undertaken to improve the content and quality of proteins and oils. Atlas 66 is a biofortified wheat variety having high protein content than the existing wheat. Similarly, biofortified varieties of rice, carrot, spinach have also been produced.

Q9. Which part of the plant is best suited for making virus-free plants and why?

Answer:

In order to make virus-free plants, apical and axillary meristems are used. These regions of diseased plants do not catch virus infection. Thus from diseased plants, disease-free plants can be obtained by growing their apical and axillary meristems.

Q10. What is the major advantage of producing plants by micropropagation?

Answer:

Micropropagation refers to producing a number of plants simultaneously through tissue culture. This process is advantageous for the following reasons

1. It helps in propagating a large number of plants in a shorter time span.

2. New plants produced are exactly identical to the parent plant

3. micropropagation results in the production of healthier and disease resistance plants

Q11. Find out what the various components of the medium used for propagation of an explant in vitro are?

Answer:

Propagation of explants in vitro requires the following components in the medium

1. Carbon source such as sucrose

2. Inorganic Salts

3. Vitamins

4. Amino acids

5. Agar-agar

6. Water

7. Growth hormones like auxins and cytokinins.

Q12. Name any five hybrid varieties of crop plants which have been developed in India.

Answer:

The five hybrid varieties of crop plants which have been developed in India are

1. *Sonalika* and *Kalyan sona* of wheat

2. Jaya and Ratna of rice

3. *Pusa komal* of cowpea

4. *Pusa swarnim* of mustard

5. *Pusa shubra* of cauliflower