EXERCISE QUESTIONS

CHAPTER 9 STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

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

Ans - 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.

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

Ans - Dairy farm management deals with processes which aim at improving the quality and quantity of milk production. Milk production is primarily dependent on choosing improved cattle breeds, provision of proper feed for cattle, maintaining proper shelter facilities, and regular cleaning of cattle.

Choosing improved cattle breeds is an important factor of cattle management. Hybrid cattle breeds are produced for improved productivity. Therefore, it is essential that hybrid cattle breeds should have a combination of various

desirable genes such as high milk production and high resistance to diseases. Cattle should also be given healthy and nutritious food consisting of roughage, fibre concentrates, and high levels of proteins and other nutrients.

Cattle's should be housed in proper cattle-houses and should be kept in well ventilated roofs to prevent them from harsh weather conditions such as heat, cold, and rain. Regular baths and proper brushing should be ensured to control diseases. Also, time-to-time check ups by a veterinary doctor for symptoms of various diseases should be undertaken.

3. What is meant by the term 'breed'? What are the objectives of animal breeding?

Ans - A breed is a special variety of animals within a species. It is similar in most characters such as general appearance, size, configuration, and features with other members of the same species. Jersey and Brown Swiss are examples of foreign breeds of cattle. These two varieties of cattle have the ability to produce abundant quantities of milk. This milk is very nutritious with high protein content. Objectives of animal breeding To increase the yield of animals. To improve the desirable qualities of the animal produce. To produce disease-resistant varieties of animals.

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

Ans - Animal breeding is the method of mating closely related individuals. There are several methods employed in animals breeding, which can be classified into the following categories:

(A) Natural methods of breeding include inbreeding and out-breeding. Breeding between animals of the same breed is known as inbreeding, while breeding between animals of different breeds is known as out-breeding. Out-breeding of animals is of three types:

(a). Out-crossing: In this type of out-breeding, the mating of animals occurs within the same breed. Thus, they have no common ancestors up to the last 4-5 generations.

(b). Cross-breeding: In this type of out-breeding, the mating occurs between different breeds of the same species, thereby producing a hybrid.

(c). Interspecific hybridization: In this type of out-breeding, the mating occurs between different species.

(B) Artificial methods of breeding include modern techniques of breeding. It involves controlled breeding experiments, which are of two types:-

(a). Artificial insemination: It is a process of introducing the semen (collected from the male) into the oviduct or the uterus of the female body by the breeder. This method of breeding helps the breeder overcome certain problems faced in abnormal mating.

(b). Multiple ovulation embryo technology (MOET): It is a technique for cattle improvement in which super-ovulation is induced by a hormone injection. Then, fertilization is achieved by artificial insemination and early embryos are collected. Each of these embryos are then transplanted into the surrogate mother for further development of the embryo.

The best method to carry out animal breeding is the artificial method of breeding, which includes artificial insemination and MOET technology.

These technologies are scientific in nature. They help overcome problems of normal mating and have a high success rate of crossing between mature males and females. Also, it ensures the production of hybrids with the desired qualities.

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

Ans - Apiculture is the practice of bee-keeping for the production of various products such as honey, bee's wax, etc. Honey is a highly nutritious food source and is used as an indigenous system of medicines. It is useful in the treatment of many disorders such as cold, flu, and dysentery. Other commercial products obtained from honey bees include bee's wax and bee pollen. Bee's wax is used for making cosmetics, polishes, and is even used in several medicinal preparations. Therefore, to meet the increasing demand of honey, people have started practicing bee-keeping on a large scale. It has become an income generating activity for farmers since it requires a low investment and is labour intensive.

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

Ans - 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.

7. Briefly describe various steps involved in plant breeding.

Ans - 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.

8. Explain what is meant by biofortification.

Ans - Biofortification is a process of breeding crops with higher levels of vitamins, minerals, proteins, and fat content. This method is employed to improve public health. Breeding of crops with improved nutritional quality is undertaken to improve the content of proteins, oil, vitamins, minerals, and micro-nutrients in crops. It is also undertaken to upgrade the quality of oil and proteins. An example of this is a wheat variety known as Atlas 66, which has high protein content in comparison to the existing wheat. In addition, there are several other improved varieties of crop plants such as rice, carrots, spinach etc. which have more nutritious value and more nutrients than the existing varieties.

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

Ans - Apical and axillary meristems of plants is used for making virus-free plants. In a diseased plant, only this region is not infected by the virus as compared to the rest of the plant region. Hence, the scientists remove axillary and apical meristems of the diseased plant and grow it in vitro to obtain a disease-free and healthy plant.

Virus-free plants of banana, sugarcane, and potato have been obtained using this method by scientists.

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

Ans - 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

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

Ans - 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

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

Ans - 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