Chapter - 14

Economic Importance of Plants and Animals

14.1 Economic importance of plants

There are some fundamental requirements for human life like food, cloth, shelter etc. Cereals, pulses, oil, sugar etc for food, fibres for cloth and wood used for making shelter are obtained from plants. All the living organisms of whole biosphere directly or indirectly depend on plants, therefore plants are very important for human kind.

Study of economically important plants and their products is called **economic botany.**

Economically important plants are divided into following categories-

1. Food Plants: Cereals, pulses, oil, spices, beverages, vegetables, fruits etc.

2. Medicinal Plants: Ashwagandha, opium, sarpgandh, guggal, safed musli etc.

3. Timber and fibres related plants: Teak, shisham, rohida, khejri, cotton, jute etc.

14.1.1. Plants of food Importance

Energy is required for various vital activities of organisms. This energy is obtained from food. Some important food plants are as follows-

14.1.1.1 Cereals

This is the most important group of food plants. They are members of grass family (Graminae or Poaceae). They are the main source of starch which is used as a respiratory substrate in human body. Some of the important cereals are as follows-

(i) **Wheat:** *Triticum aestivum*- It is sown as Rabi crop. Some of the improved varietes of wheat are- Sonalika, Kalyan Sona, Sharbati, Sonara etc.

Fig 14.1 Wheat

(ii) **Rice:** *Oryza sativa*- It is sown as a Kharif crop. India is at the top in the world in rice production. Some improved varietes are- Basmati, Swarndana, Jaya, Ratna, Sona etc.

Fig. 14.2 Rice

(iii) **Maize:** *Zea mays* - It is also sown as a Kharif crop. Some improved varietes are- Vijay, Shakti, Ratan etc.

Fig. 14.3 Maize

(iv) **Pearl-Millet:** *Pennisetum typhoides*- It is also shown as a Kharif crop. It is an important millet cereal.

Fig. 14.4 Pearlmillet

14.1.1.2 Pulses: They are good source of protein. They are the members of family leguminosae. Some important pulses are as follows-

(i) Gram- (*Cicer arietinum*) - It is a crop of Rabi. India is at the top in the world in production of gram. It is known as king of pulses.

Fig 14.5 Gram

(ii) Red gram (*Cajanus cajan*)

Fig 14.6 Red gram

(iii) **Pea** (*Pisum sativum*)

Fig 14.7 Pea

(iv) Ground nut: *Arachis hypogea* - India is the largest producer of ground nut in the world.

Fig. 14.8 Ground nut

(v) Soyabean : *Glycine max* - It contains the highest protein.

Fig 14.9 Soyabean

14.1.1.3 Oil yielding plants

They are complex organic compounds which are made up of hydrocarbon, ester, alcohol, aldehyde etc.

(i) **Edible oil-** Oil of ground nut, oil of sesamum, oil of coconut, oil of soyabean, oil of alsi, oil of sunflower etc.

Fig 14.10 Oil

(ii) **Non-edible oil-** Oil of castor, oil of terpentine etc.

(iii) **Perfumed oil-** Kapoor, sandal, clove, khas oil etc.

14.1.1.4 Important spices

Black pepper, cumin, redchilli, fennel, coriander, clove, ajwain, turmeric, asafoetida, ginger, dalchini (cinamon) cardamom etc.

Fig 14.11 Spices

14.1.1.5 Beverages

Tea and coffee are the most commonly used beverages.

Tea- *Camellia sinensis* obtained from young leaves of plants and coffee (*Coffea arabica*) is obtained from roasted seeds of plant.

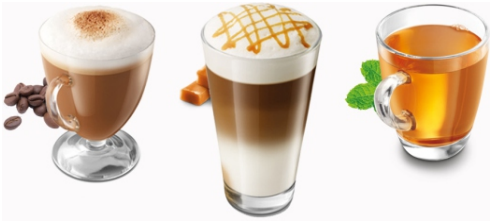

Fig 14.12 Beverages

14.1.1.6 Vegetables

Vegetables are also an important part of human balanced diet, like cereals and pulses. They are the chief source of vitamins, minerals, fibres, water etc. They may be obtained from various parts of plants like root, stem, leaf, flower, fruit, seed etc. Some important vegetables and their botnical names are as follows-

Fig 14.13 Vegetables

(a) Obtained from roots

(i) Carrot- *Daucus carota*

(ii) Radish- *Raphanus sativus*

(iii) Turnip- *Brassica rapa*

(vi) Sweet potato- *Impomoea batatas*

(b) Obtained from stem

(i) Potato- *Solanum tuberosum*

(ii) Arbi- *Colocasia esculenta*

(c) Obtained from leaf

(i) Spinach- *Spinacia oleracea*

(ii) Fenu greek- *Trigonella foenum-graecum*

(iii) Bathua- *Chenopodium album*

(d) Obtained from inflorescence

(i) Cauliflower- *Brassica oleracea var botrytis*

(e) Obtained from fruits

(i) Tomato- *Lycopersicon esculentum*

(ii) Brinjal- *Solanum melongena*

(iii) Lady's finger (Bhindi)- *Abelmoschus esculentus*

(iv) Clustar bean (Guar)- *Cyamopsis tetragonoloba*

14.1.1.7 Fruits

Structure formed from fertilization of ovary of a flower is called fruit. Some important fruits are as follows-

(i) Mango- *Mangifera indica*

(ii) Banana- *Musa para disiaca*

(iii) Orange- *Citrus reticulata*

(iv) Guava- *Psidium guajava*

(v) Papaya- *Carica papaya*

(vi) Custard apple- *Annona squamosa*

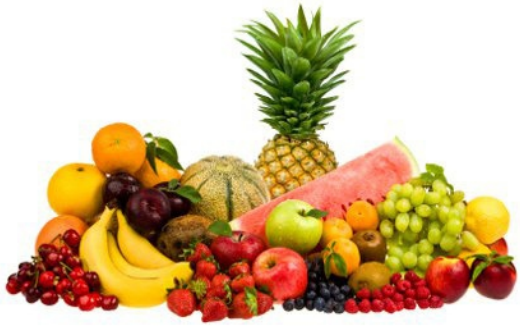

Fig 14.14 Fruits

14.1.2 Medicinal plants

Chemical substances of medicinal value are found in various parts of plants like root, stem, leaf, flower, fruit, seed etc. Some medicinal plants of them are as follows-

(a) Obtained from stem

(i) Turmeric- *Curcuma longa*

(ii) Ginger- *Zingiber officinale*

(iii) Garlic- *Allium sativum*

(iv) Guggal- *Commiphora wightii* etc.

(b) Obtained from root

(i) Serpent root (Sarpgandha)- *Rauwolfia serpentina*

Fig 14.15 Serpent root

(ii) Chlorophytum (Safed musli)- *Chlorophytum tuberosum*

Fig 14.16 Safed musl

(iii) Ashvagandha- *Withania somnifera*

Fig. 14.17 Ashvagandha

(c) Obtained from bark

(i) Quinine- *Cinchona officinalis*

(ii) Arjun- *Terminalia arjuna*

(d) Obtained from leaf

(i) Aloe (Gwarpatha)- *Aloe vera*

(ii) Ocimum (Tulsi)- *Ocimum sanctum*

(iii) Brahmi- *Centella asiatica*

(e) Obtained from fruit

(i) Opium- *Papaver somniferum*

Fig 14.18 Opium

(ii) Emblic (Anvala)- *Emblica officinalis*

14.1.3 Plants of constructional importance

Various parts of plants are used to obtain furniture, windows, doors, clothings, strigs, broom, mattresses etc. Fibres and wood related some plats are as follows-

14.1.3.1 Fibre yielding plants

Various parts of plats like stem, leaf, seed etc. have thick walled tissues, from which clothing, packing bags, ropes are made, called as fibres. Some fibres yielding plants are s follows-

(i) Jute - *Corchorus capsularis*

(ii) Cotton- *Gossypium* spp.

Fig 14.19 Cotton

(iii) Sun hemp- *Crotolaria juncea*

(iv) Coconut- *Cocos nucifera*

14.1.3.2 Timber

Out of three fundamental needs of human beings like food, cloth and shelter, timber plays very important role to fulfil the need of shelter. Secondary xylem of perennial dicotyledons and gymnosperm plant is known as wood. Some important timber yielding trees are as follows-

(i) Teak- *Tectona grandis*

Fig 14.20 Teak

(ii) Saal - *Shorea robusta*

(iii) Shisham- *Dalbergia sissoo*

Fig 14.21 Shisham

(iv) Rohida or Marwar teak- *Tecomella undulata*

Fig 14.22 Rohida

(v) Khejri (State tree of Rajasthan)- *Prosopis cineraria*

Fig 14.23 Khejri

(vi) Deodar - *Cedrus deodara*

14.2 Economic importance of animals

Man has domesticated the animals and used them for obtaining food and other useful products. The rearing of new species of these animals has become much simpler and more beneficial due to the development of new technology. The brief description and rearing of different animals like honey bee, silkworm, lac culture, pearl culture, corel and corel reefs, fish, cattle etc and their superior breeds are as follows-

14.2.1 Apiculture

Honey bees are the most important insects for pollination in plants. Apiculture has dual advantage for human. The yield of crop is increased because of the easy process of pollination due to apiculture. The honey bees have been used for obtaining honey for thousands of years. It is high energy food material therefore, it has also been used as medicine. Pure honey does not destroy for a long time, therefore, it is used as a preservative.

Fig. 14.24 Apiculture

Honey and honey bee was obtained from honey combs or hives found in nature from ancient time. Nowadays large amount of honey is obtained from artificial honey hives of apiculture.

14.2.2 Sericulture

We are rearing sericulture from thousands of years to obtain silk. The weaving of cloth from silk was first started in china. Now,. it has become small scale industry in many countries of the world.

Introduction of silk worm

Those insects which produce thread like silk are called silk worm. Out of them, *Bombyx mori* which feed on mulberry leaves, is the main species. Now-a-days. India is third in position after China and Japan in the field of silk production. *Bombyx mori* belongs to

Lepidoptera order and good quality of silk is produced by this silk worm.

In India 2 to 7 generations of the insect can be developed in one year. After the incubation period, the larva hatches out of the egg known as **caterpillar**. Larva has one pair of salivary glands, known as **silkglands.**

Fully developed silk gland becomes five times longer than larva. Silk is secreted in the form of liquid which hardens on exposure to the air.

The full grown larva or caterpillar is 7.5 cm in length. It stops feeding and after that starts cocoon formation. It secretes thread of silk around the body and closed fully inside threads. The inactive larva closed inside cocoon is called **Pupa**. Cocoon is made up of approximtely 1000-1200 meter long thread of silk. The weight of one cocoon is about 1.8 to 2.2 gm. Silk is made up of protein. Its inner part is made up of **fibrin** and outer part is made up of **sericin** protein for sericulture. It is necessary to have mulbery gardens.

Fig 14.25 Sericulture

14.2.3 Lac culture

The scarlet resin substance secreted by glands of lac insects is called **lac**. The rearing of lac insects for commercial production of lac is called **lac culture**. India produced 80% part of lac of total production of lac in the world.

Scietific name of lac insect is *Lccijer lacca.* It is minute crawling scale-insect which is enclosed by covering of lac secreted by itself. This covering protects lac insect. Male lac insects are smaller in size then female and pink in colour. They produce lac in nymph stage only. Female lac insect is large in size and produce more lac. They start to suck the juices when stick with soft twings and starts the formation of lac around the body. There are four crops of this every year in country. 50% part of lac production in India is obtained Rangini crop.

Fig. 14.26 Lac insects

Two methods for lac productions are as follows -

(i) Old common method

(ii) Modern method

(i) Old common method: This method used by tribals is ancient and non-scientific. In this method lac is collected by harvesting the plants of lac insects. There is a great loss of next crop in this method due to the loss or dmaging of insects.

(ii) Modern method: This is a scientific method in which next crop is not more harmed because lac is obtained in intervals not continuously. Research about lac is done at Indian research institute, Ranchi, Bihar.

14.2.4 Fishery

Fish is an easily available proteinaceous, highly nutritious and easily digestive food resource,therefore, fishery has been done by human for breeding and production of fishes. Now-a- days the position of India in world is sixth in case of sea food production. In west Bengal, bihar and orrisa about 1500 years old fish industry is present.

Fishery is more floureshed in freshwater as compared to saline water. For fishery in fresh water, native fishes like Rohu (*Labeo rohita*): Catla (*Catla catla*) mrigal (*Cirrhinus mrigala*) etc. are

being produced. In fishing industries fexotic fishes like common carp (*Cryprinus corpi)* are cultured. The land with clay soil is considered good for construction of a pond. The temperature, light, Oxygen, water flow of this pond are regulated for the maximum production of fishes. The natural food given to fishes are like-microscopic aquatic plants, animals and artificial like husk of rice, bran of wheat, pieces of grain etc.

Fig 14.27 Fishes

14.2.5 Animal husbandry

The branch of agriculature which deals with the study of food of domesticated cattle, habitat, health breedig etc is know as **animal husbandry**. Animal husbandry has special importance in Indian economy, in which maximum contribution is of milk production.

Fig. 14.28 Animal husbandry

India has the 55 percent buffalo and 15 percent cows of world's total number. 53 percet milk production of country is obtained from buffalo and 43 percent from cows. India ranks first in milk production in the world. Population of goats is second in the world, third in population of sheeps and seventh in population of fowls. These small cattle play an important role in the economic development of poor people.

14.2.5.1 Dairy industry

Humans are using domestic animals to obtain milk since ancient times, Now-a-days milk production become a major and beneficial business of dairy industry. Buffaloes are more important for milk production point of view. Some good breeds of buffalo are as follows. Jaffarabadi, Murrah, Surti, Bhadawari, Mehsana etc. Similarly some good breed of cow are as follows- Gir, Sahiwal, Sidhi, Devki, Haryana etc. In some states goats are also domesticated for milk production. Sirohi, Bar-bari, Kashmir pashmina, Jamuna pari etc are the good breeds of goat.

14.2.5.2 Poultry

The tradiation of poultry for eating eggs and meat (Chicken) is since ancient times. This industry fulfils a major part of protein requirement as a food substance. India ranks 5th position in the world in egg production point of view. For good growth and to maintain good health, it is essential to provide protected habitat and nutritious food to fowls. The poultry feed includes maize, barley, pearlmillet, wheat, jowar etc.

14.2.5.3 Wool industry

A large number of sheeps are domesticated in north India to obtain wool. Wool is prepared from hair of sheep. The colour of wool depends on the species of sheep and the climate of that region. Some indigeneous breeds of sheep like-Lohi, Nali, Marwari, Patanwadi etc. are domesticated. Rajasthan is an important state of country in wool production point of view.

14.2.6 Coral and coral reefs

Single or colonial polyp animals of mollusca phylum secrete $CaCO_3$ skeleton, know as Coral. Most of the corals secreted by members of class Anthozoa of phylum Colentrata.

The calcareous rocks or mounds of shell like structures formed from continuous budding in polyps of coral colonies are called as coral reefs.

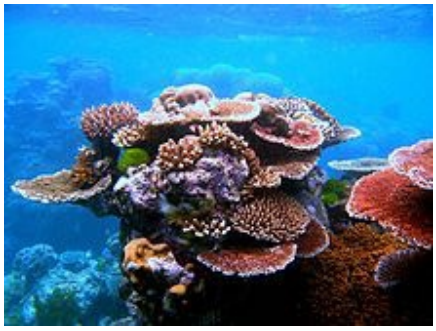

Fig. 4.29 Coral reefs

14.2.7 Pearl culture

Animals of phylum Mollusca are economically very important for humas. They are useful for business point of view because Button, Pearl and Cowrie are obtained from these animals. Pearls are considered to be valuable as gems and beads since ancient times. The thousands of tons of mollusca are use every year for this purpose. Very beautiful, attractive and valuable pearls are obtained from pearl oyster.

Fig. 14.30 Pearl culture

The process to obtain pearl from rearing of sepia by artificial technology method is called **Pearl Culture**. Pearl is cosidered as a valuable gem which is usually white, shiny, rounded structure which secreted by mollusca like oyster under the shell of itself for their protection.

This technology was first developed in Japan. Lingha pearl are considered as best which are obtained from sea oyster. Pearl are also obtained from sepia of fresh water are less valuable.

Other uses of animals

In addition of honey, wax, silk, lac etc. other uses of animals are as follows-

(i) Colour - Tanin and cochinol colours are obtained from dry body of some scaly insects which are present on cactus. These are used in cosmetics.

(ii) Scavenger - Some insects decompose body of dead plants and animals to prevent stink and decay or acts as a scavenger like- Termite, cockroach etc.

(iii) Medicinal use - Cantheridine medicine is obtained from some insects like blister beetles. It is used to **prevent hair fall**. Honey obtained from honey bees is used to cure ulcer. Carminic acid obtained from cochineal insects is used to cure whoopig cough and nerve pain of face and head.

(iv) As a food - Carnivorous humans used frogs, lizards, snakes, fishes etc as a food.

(v) Pollination in plants - Pollinnation process is very essential for fertilization in flowering plants many insects like butterfly, ants, honeybee, fly, wasp etc help in pollination from one flower to another flower.

Important Points

1. The study of economically important plants is known as economic botany.
2. Fundamental needs of human like food, cloth and shelter are fulfilled by plants or their products.
3. Economically important plants are divided into following classes like food related plants, medicinal plants and construction related plants etc.
4. Vegetables are obtained from roots, stem and leaves of some plants.
5. Spices usually obtained from stem and fruits of plants.
6. Medicine is formed from roots of ashvagandha and safed musli.

7. State tree of Rajasthan is khejri and state flower of Rajasthan is Rohida or marwar teak.

8. Human starts to obtain product from domesticcation of animals since ancient time,

9. Sericulture increases the yield of crops as well as nutritions and medicinal value based honey and beewax are obtained.

10. Silk is obtained from rearing of silk worm.

11. Rearing of fishes by making artificial ponds has become a good business, fish culture is now become easier in fresh water.

12. Indigenous and foreign good breeds of buffaloes, cow and goat are domesticated from the point of view of milk production.

13. Deshi or indigenous and foreign breeds of fowl are domesticated to obtain eggs and meat (Chicken).

14. Some indigenous breeds of sheep in north india are domesticated to obtain wool.

Practice questions

Objective type questions

1. Which one of the following is not a cereal-

(a) Wheat (b) Rice

(c) Barley (d) Gram

2. Timber (Wood) is which part of plant

(a) Primary phloem

(b) Secondary phloem

(c) Primary xylem

(d) Secondary xylem

3. Which part of opium is of medicinal value

(a) Root (b) Stem

(c) Flower (d) Fruit

4. State tree of Rajasthan is

(a) *Prosopis cineraria*

(b) *Prosopis chilensis*

(c) *Acacia senegal*

(d) *Tecomella undulata*

5. Vegetable obtained from inflorescence is

(a) Potato (b) Cauliflower

(c) Lady's finger (d) Tomato

6. Honeybee culture is called

(a) Sericulture (b) Silviculture

(c) Apiculture (d) All of the above

7. How many types of bees are present in hive of honeybee

(a) One (b) Two

(c) Three (d) Four

8. Silk is obtained from

(a) Adult insect (b) Pupa

(c) Cocoon (d) Egg

9. Poultry is the main product of

(a) Egg (b) Wool

(c) Milk (d) All the above

Very short type questions

10. Write the name of one cereal sowing as a rabi crop.

11. Write the name of two improved varieties of wheat.

12. Write the name of protein rich pulse.

13. Write the name of two vegetables obtained from root and stem.

14. What is timber.

15. Write the botanical name of two medicinal plants.

16. Which is the state flower of rajasthan.

17. Write the two indigenous good breeds of buffalo.

18. Write the two products of Apiculture.

19. Silk worm is reared on leaves of which plant.

20. Which water is considered as more suitable for fish culture.

21. What is fowl rearing.

22. Write the name of one indigenous good breed of sheep.

Short type questions

23. Write the botanical name of two cereal yielding plants.

24. Write the name of four spice yielding plants.

25. What is wood ? Write the name of one timber yielding plant.

26. Write the name of two plants of medicinal value.

27. Write the name of two oil yielding plants.

28. Why animal husbandry is necessary.

29. Explain the method to obtain silk.

30. Write the name of diseases in fowls.

31. Write the two indigenous breeds of buffalo and cow.

32. Write the name of bees found in hive of honey-bee.

Essay type questions

33. Write an essay on food related plants.

34. Describe the important medicinal plants.

35. Describe the fibre yielding and timber yielding plants.

36. Write an essay on dairy industry.

37. Explain the division of labour in honey bee culture and its importance.

38. Describe the formation of silk from silkworm.

39. Explain the importance of fish culture and poultry.

Answer key

1. (d) 2. (d) 3. (d) 4. (a) 5. (b) 6. (c) 7. (c)
8. (c) 9. (a)