

# CHAPTER: 3 FIBRE TO FABRIC

## Animal Fibres (Wool and Silk)

Out of these two animal fibres wool comes from animals like sheep, goat, yak etc. and silk comes from silk worms. Animal fibres are made up of proteins (complex compound that form a major part of bodies of all animals).

## Wool

Wool is the most used animal fibre. Wool is used for knitting sweaters, weaving shawls and other woven cloths.

Wool comes from the fleece (hair) of animals like sheep, goat, yak and some other animals. These animals bear hairs on their body. Hairs of wool yielding animals trap lot of air. Air is a poor conductor of heat. So hairs keep these animals warm by shielding their body from cold during winter.

Note:- Due to this reason hairs of these animals are removed only once in a year at the beginning of summer season. Their hairs grow again by the time winter arrives.

Wool is most commonly obtained from sheep.

The fleece of a sheep consists of two types of fibre:-

1. The coarse beard hair
2. The fine and soft under hair (hair that grows close to skin). These under hairs are used for making the wool.

## Selective breeding:-

The process of selecting parents for obtaining special characters in their offspring, such as soft under hairs in sheep, is called selective breeding.

There are several breeds of sheep found in our country. Apart from sheep there are many other animals for obtaining wool. Some examples are

1. Yak wool is common in Tibet and Ladakh.
2. Angora wool is obtained from angora goats found in hilly regions (Jammu and Kashmir).
3. Under fur of Kashmiri goats is soft and is used to weave fine Pashmina shawls.
4. Fur of camel and Alpaca (found in South America) also yield wool.

## From Fibres to wool

In market wool we generally get is the wool obtained from sheep. In order to obtain wool, sheep are reared. Their hairs are then cut and processed into wool.

## Rearing and breeding of sheep

### Question : What is rearing?

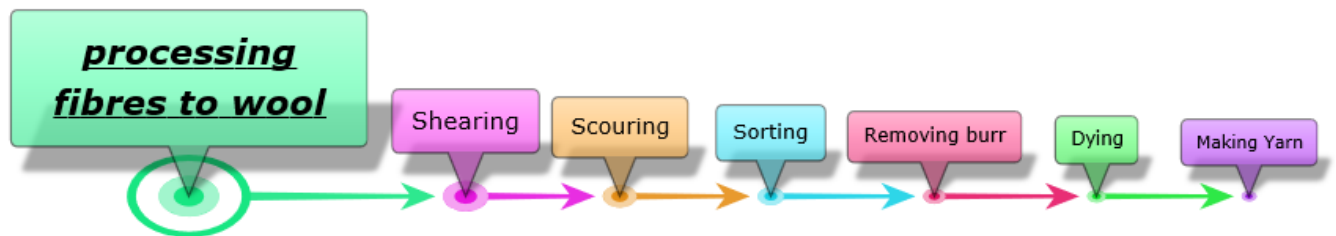
**Answer :** By rearing of sheep or any other animal we means to look after it by providing them food, shelter and healthcare. The persons who look after sheep are called **shepherds**.

Sheep are reared mainly for wool. They are reared in areas with low rainfall. In India you would be able to see **shepherds** taking their herds of sheep to grazing in plains of states like Haryana, Punjab, Rajasthan, and Gujarat. You can also find herds of sheep to grazing in hilly states also for example Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Arunachal Pradesh and Sikkim.

Sheep have a lifespan of 10 to 12 years. Sheep are herbivores and prefer grass and leaves. Apart from this reared sheep are also fed on mixture of pulses, corn, jowar and minerals. In winters they are kept indoors and are fed on dry fodder, leaves and grains.

### Processing fibres into wool

Processing fibres into wool involves the following steps:-



#### Step 1:- Shearing

The removal of wool from sheep is called shearing. It can be done manually with large razor or with a shearing machine. Shearing is usually done during hot season. It is important to note that *shearing does not hurt sheep because uppermost layer of the skin of sheep is dead.*

#### Step 2:- Scouring

The sheared hair is thoroughly washed in tanks to remove dust, dirt and grease. This process is called scouring. It is then passed through series of rollers and dryers.

#### Step 3:- Sorting

Clean hairs are then sent to factory where hairs of different textures are separated or sorted. This process is called sorting.

#### Step 4:- Removing burr

Burrs are soft fluffy fibres in the wool. These burrs are picked out from the hair.

#### Step 5:- Dyeing

The natural fleece of sheep is white, brown or black. These fibres are dyed in different colors.

### **Step 6:- Making Yarn**

In this step the wool is straightened, combed and spun into yarn. After spinning the wool is either woven or knitted. Longer fibres are made into wool for sweaters.

## **Occupational Hazards**

**Occupational Hazards** are the risks faced by people working in any industry due to the nature of their work.

Wool industry gives employment to many people in our country. But sorter's job is risky as they sometimes get infected by a bacterium **anthrax**, which causes fatal blood disease called **sorter's disease**.

## **Silk**

Silk fibres are also animal fibres. Silk is a fine, strong, soft and shining fibre produced by silkworms in making their cocoons (something that covers or protects some insects while they grow). Silk is a naturally lustrous fibre. Silk does not conduct heat so it is a good insulator. It keeps person warm in winter and cool in summer.

The rearing of silkworm for obtaining silk is called **sericulture** (or silk farming). It is a very old occupation in India. India produces plenty of silk on a commercial scale. The silk thread is obtained from the cocoon of silk moth. There are varieties of silk moths which yield different types of silk yarn such as tassar silk, mooga silk, kosa silk, mulberry silk etc. The most common silk is the mulberry silk.

### **Life Cycle of a silk moth**

There are four stages in the development of silk moth

1. Egg
2. larva
3. pupa
4. adult

#### **Stage 1:-**

In the beginning female silk moth **lays eggs** on mulberry leaves.

#### **Stage 2:-**

The eggs are hatched into very small **larvae within** a week. These larvae then feed on mulberry leaves. The larvae looks like a worm and are also called **caterpillars or silkworms**.

#### **Stage 3:-**

They then grow in size (over three inches) and then the caterpillar is ready to enter the next stage of his life called **pupa**. An adult silkworm first weaves a net to hold itself. Then it swings its head from side to side in the form of figure 8. During these movements the head of the caterpillar secretes fibre

made of a protein which hardens on exposure to air and becomes **silk fibre**. Soon the caterpillar covers itself completely by silk fibre. This covering is known as a **cocoon**. The cocoon is made by caterpillar to protect its development as pupa. The silkworm continues to develop inside the cocoon to form silk moth.

**NOTE:-** Pupa is the stage in the life history of silk moth when the caterpillar becomes encased in the hard shell of silk fibre (cocoon).

#### **Stage 4:-**

In this stage pupa which is encased in the cocoon, develops fully to form an adult silk moth. After the complete development the cocoon splits up and a beautiful silk moth comes out of it. This completes the life history of a silk moth.

It is important to note here that in order to produce silk, the silkworm developing inside the cocoon (pupa) is not allowed to mature into a silk moth. This is because breaking of cocoon causes damage to silk threads and this lowers the quality of silk. So to obtain good quality silk thread, as soon as cocoon is formed developing silk worm (or pupa) gets killed. Some silk worms are allowed to live and mature into silk moths so that they can lay eggs to produce more silk worms.

### **Production of silk**

To obtain silk, silk moths are reared and their cocoons are collected to get silk threads or fabric. We will now learn more about the process. For this mulberry trees are grown.

#### **(1) Rearing of silk worms to obtain cocoon:-**

Female silk moth lays hundreds of eggs at a time. These eggs are stored carefully on paper or cloth strips and are sold to silk worm farmers. The farmers keep eggs under hygienic conditions and under suitable conditions of temperature and humidity.

The eggs are then warmed to suitable temperature for hatching. When eggs hatch silkworms or caterpillars come out. Silkworms are then fed on mulberry leaves day and night. They then increase enormously in size.

The larvae are kept in clean bamboo trays along with young and freshly chopped mulberry leaves. After 25 to 30 days, silkworms stop eating and start spinning the cocoon.

#### **(2) Processing cocoons to obtain silk fibre:-**

The cocoons are collected and boiled in water to kill the pupa inside them. Hot water makes the silk fibres of cocoon separate out. This resulting fibre is called *raw silk*.

The process of taking out silk fibre from cocoons for use as silk is called **reeling**. Reeling is done in special machines which unwind the fibres of silk from cocoons.

#### **(3) Converting silk fibre into silk cloth:-**

Silk fibres obtained from cocoons are spun to form silk yarn which is then woven in looms by weavers to make silk cloth.

### **Exercise Questions**

**1. You must be familiar with the following nursery rhymes:**

**(i) 'Baa baa black sheep, have you any wool.'**

**(ii) 'Mary had a little lamb, whose fleece was white as snow.'**

**Answer the following:**

**(a) Which parts of the black sheep have wool?**

**(b) What is meant by the white fleece of the lamb?**

**Solution:**

a) Wool is obtained from hairy fibres of the sheep.

b) White fleece of the lamb refers to the white colour of their fur.

**2. The silkworm is (a) a caterpillar, (b) a larva.**

**Choose the correct option. (i) a (ii) b (iii) both a and b (iv) neither a nor b.**

**Solution:**

(iii) both a and b

**3. Which of the following does not yield wool?**

**(i) Yak (ii) Camel (iii) Goat (iv) Woolly dog**

**Solution:**

The answer is (iv) Woolly dog

**4. What is meant by the following terms? (i) Rearing (ii) Shearing (iii) Sericulture**

**Solution:**

i) Raising of domestic animals like sheep, goat, yak, cow and buffaloes for commercial purposes such as for milk and fur is known as rearing.

ii) Shearing is a process of removal of animal hair by using machines similar to those used by barbers.

ii) Rearing of silkworms to get silk is known as Sericulture.

**5. Given below is a sequence of steps in the processing of wool. Which are the missing steps? Add them.**

**Shearing, \_\_\_\_\_, sorting, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.**

**Solution:**

Shearing, **Scouring**, sorting, **picking of burrs**, **dyeing of fibres**, **making of yarn**.

**6. Make sketches of the two stages in the life history of the silk moth which are directly related to the production of silk.**

**Solution:**



Cocoon



Cocoon with developing moth

7. Out of the following, which are the two terms related to silk production?

Sericulture, floriculture, moriculture, apiculture and silviculture.

Hints: (i) Silk production involves cultivation of mulberry leaves and rearing silkworms. (ii) Scientific name of mulberry is *Morus alba*

**Solution:**

Sericulture and moriculture

## HOMEWORK

8. Match the words of Column I with those given in Column II:

Column-I	Column-I
1. Scouring	(a) Yields silk fibres
2. Mulberry leaves	(b) Wool yielding animal
3. Yak	(c) Food of silkworm
4. Cocoon	(d) Reeling
	(e) Cleaning sheared skin

