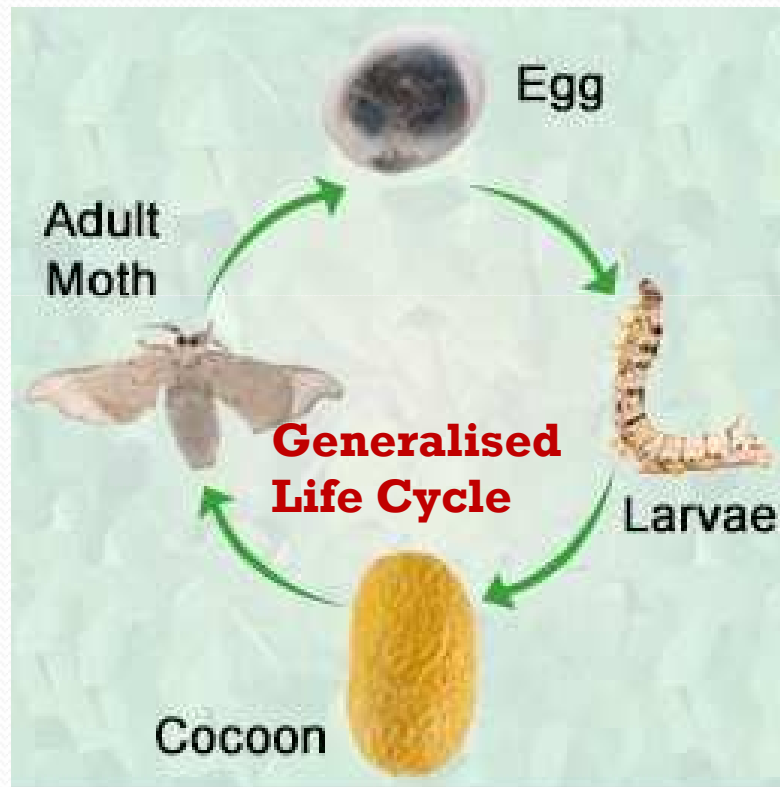




# **COCOON STIFLING**

**Dr. Mahesha H B**  
**Professor and Head**  
**Department of Sericulture**  
**Yuvaraja's College,**  
**University of Mysore, Mysuru, India.**

**The process of killing the pupae and drying of cocoons is known as stifling of cocoons.**





**Cocoon stifling includes the following methods, *i.e.*,**

**Sun Drying**

**Steam Stifling**

**Hot Air Conditioning**

# SUN DRYING



- **Sun drying consists in killing and drying the pupae by prolonged exposure of cocoons to scorching hot sun.**
- **Sun dried cocoons can be preserved for any length of time.**
- **Method: Immediately after the harvest of cocoons they are thinly spread out on mats and kept in the hot sun from sunrise to sunset every day for several days till the pupae are killed and the cocoons completely dried.**
- **Sun dried cocoons are very light and when shaken make a rattling sound.**

# Merits and Demerits of Sun Drying

- **No Cost**
- **Can not regulate the sun light**
- **UV rays damages the filament**

## **Steam Stifling**

**Killing the pupa in the cocoon by exposing the fresh cocoons to the direct action of very hot wet steam for the required period.**

**Steam stifling includes**

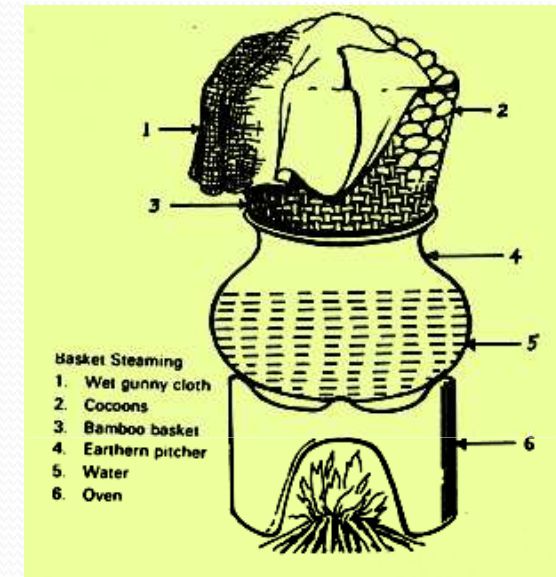
**Basket steaming.**

**Barrel Steaming.**

**Chamber steaming.**

## Basket Steam Stifling

- 10-15 kg of fresh cocoons are loosely filled in a bamboo basket.
- A thick wet cloth is then tightly stretched over the top of the basket, and tied at the sides leaving the bottom free.
- **The basket thus filled with cocoons is placed over the mouth of a vessel in which water is boiled. The hot steam fills the basket and stifles cocoons.**
- **Steaming is stopped when dense steam starts coming out of the basket through the sides of the basket and emits a smell peculiar to the freshly steamed cocoons.**



## **Barrel Steam Stifling**

**In this method, When the water starts steaming, the basket loaded with about 15-20 kg of fresh cocoons is placed on the platform in the barrel and the barrel lid securely closed to prevent escape of steam. Due to increasing temperature and pressure of steam building up, cocoons are stifled in ten to fifteen minutes.**



**Stifling Under Process**



**Removal of Stifled Cocoons**



## Chamber Steaming:

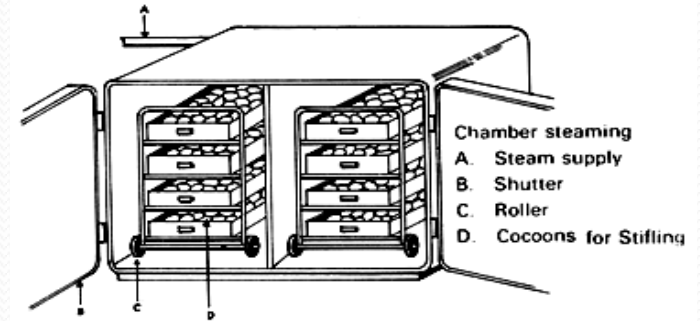
**In large reeling organizations specially designed large sized chambers are used for stifling.**

**These chambers are provided with steam pipes which are connected to the steam boiler.**

**In some types of chambers, shelves for keeping the fresh cocoons are permanently fixed while in certain other types, the chambers are provided with movable shelves on wheels.**

**The trays filled with fresh cocoons are placed in the shelves and after closing the chamber door, the steam under pressure is let into the chamber. After about fifteen to twenty minutes, the steam supply is shut off, the chamber door opened and the cocoon trays removed for airing. The next load of fresh cocoon trays will be kept in the vacated shelves in the chamber and the steaming process repeated**

### Chamber Stifling with movable Shelves on Wheels



### Chamber Stifling with Fixed Shelves

# Advantages/Disadvantages of Steam Stifling

**Advantages: Investment is less**

**Disadvantages:**

- 1. Steam stifling only kills the pupa inside and does not dry it.**
- 2. Steamed cocoons, are preserved in thin layers in trays.**
- 3. Additional labour is employed for giving frequent turnings to the cocoons in storage in order to prevent mould attack.**
- 4. If humidity in the store room increases; leads to mould attack.**
- 5. The damaged wet pupae decompose rapidly .**
- 6. Prolonged exposure of fresh cocoons to wet hot steam also denatures sericin in the cocoon.**
- 7. Steamed cocoons cannot be reeled immediately.**
- 8. Hence the cocoons are aired at least for 2-3 days for seasoning before storing.**

## **Hot Air Dryer**

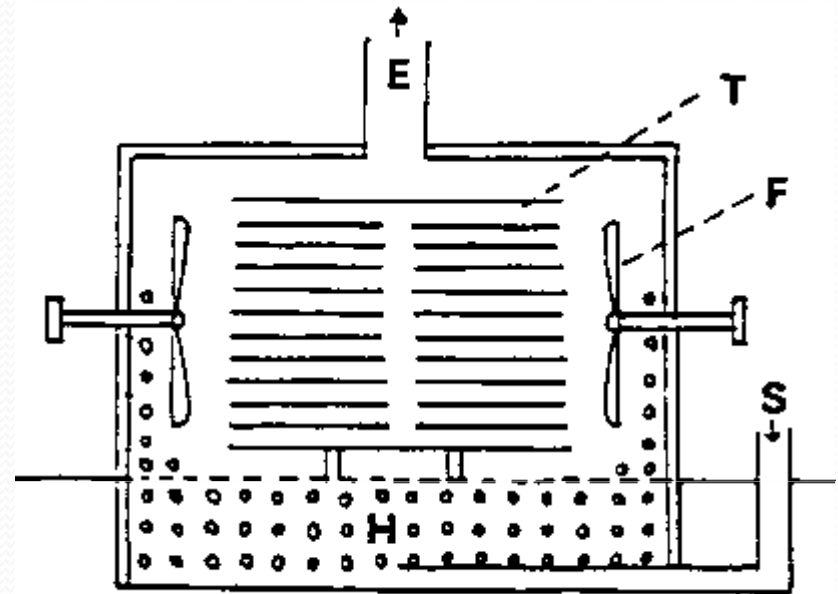
**In the sericulturally advanced countries, stifling of cocoons by steam has been largely replaced by hot air which also **dries** the stifled cocoons. This method of stifling and drying the cocoons is known as hot air conditioning.**

**Hot air conditioning is carried out in specially designed chambers with the twin objectives of killing the pupae and drying them either fully or partially.**

## 1. Shelf carrier / Cabinet type

**Shelf carrier type drying performs the drying operations in a chamber which has shelf carrier with many trays. The cocoons are dried by the flow of hot air current.**

**These types of dryers are very much convenient for small reeling establishments, cocoon testing laboratories and research institutes.**



**Cabinet Type Hot Air Drier**

## **ii. Conveyor Type:**

**In the Yamato dryer, there are eight conveyor platforms - one in each chamber – arranged one below the other in zig-zag fashion.**

**1<sup>st</sup> platform-93-95°C**

**2<sup>nd</sup> platform- 84-85°C**

**3<sup>rd</sup> platform- 80-82°C**

**4<sup>th</sup> platform- 77-80°C**

**5<sup>th</sup> platform-74-75°C**

**In the succeeding three shelves the temperature is as follows**

**6<sup>th</sup> platform-65°C**

**7<sup>th</sup> platform- 54°C**

**8<sup>th</sup> platform- 60°C**

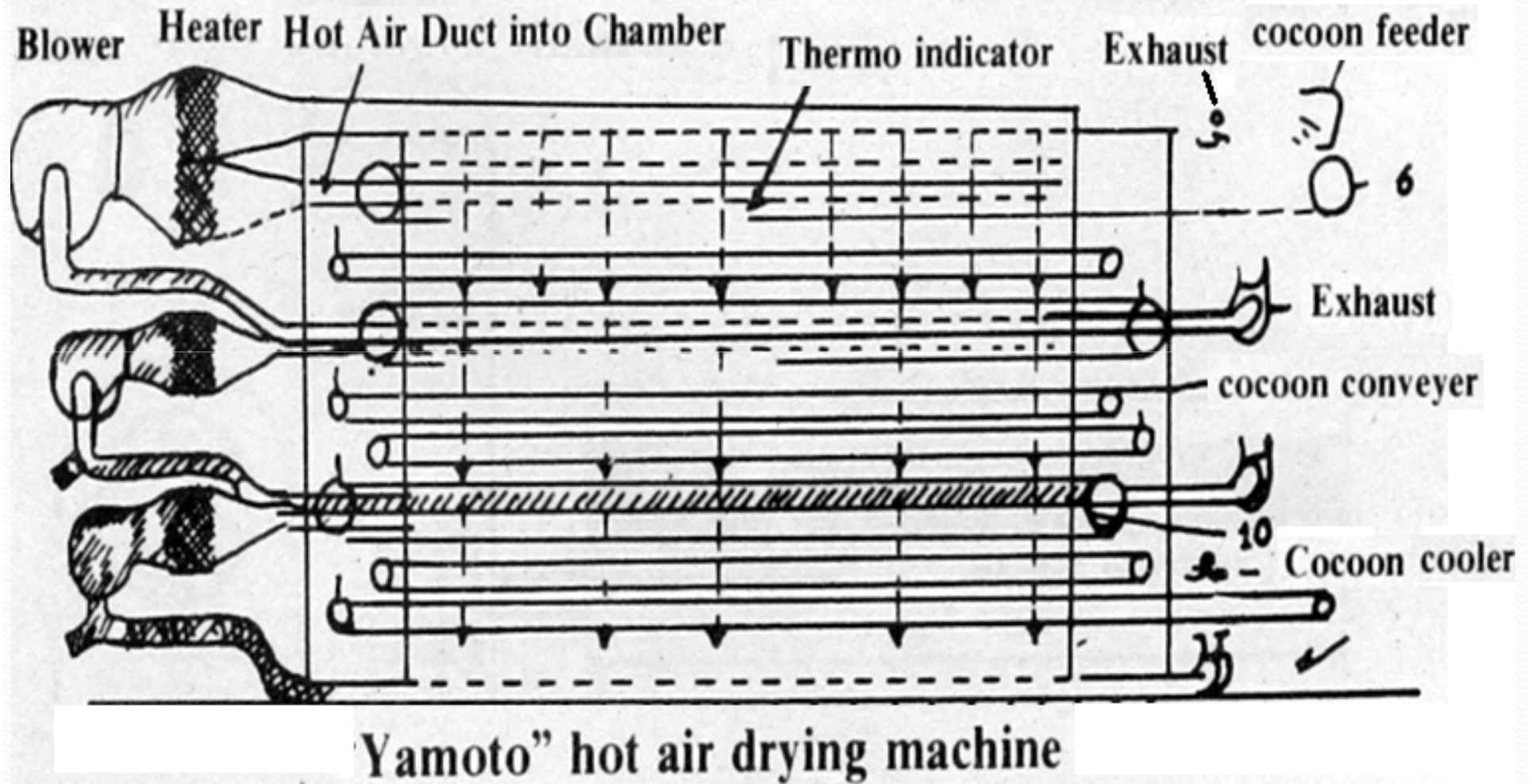
**And here the gradual cooling of the cocoons occurs along with drying of the remaining moisture in the cocoons.**

**The total time taken for the whole process from **charge to discharge** is eight hours.**



**Conveyor Type (Yamato Hot Air Drier )**

## Diagram of the HOT AIR DRYING MACHINE



## **Other Methods Cocoon Stifling**

- i. Infra red rays**
- ii. Cold air killing**
- iii. Radio wave killing**
- iv. Poisonous gases etc.,**

# Cocoon Storage and Preservation

**Storage of Cocoons :** An important problem especially when the stifled cocoons have to be stored for a very long period as in the case of univoltine areas, or when the seasonal conditions are unfavourable.

***Dermestes beetle.*** This beetle feeds on the fat contents of the pupae and to do so it cuts the silk shell and damages the cocoons.

**Precautions to prevent Damage due to moulds:**

- (1) Complete desiccation of cocoons.**
- (2) RH does not rise above 70%.**
- (3) The store room must have good ventilation.**
- (4) Cocoons should be given regular and frequent turnings. When fumigants are used care should be taken to keep the doors and windows open until all the traces of fumigants are removed.**



Fig. 4: Cocoon storage racks. (With ant well)



# Sorting of Cocoons

Although the rearers sort out the defective cocoons before taking the cocoon produce to the market, there may still be a small percentage of defective cocoons.

They are as listed below

1. Inner side Stained cocoons
2. Outer side stained
3. Thin End
4. Double
5. Deformed
6. Loose Shell etc...

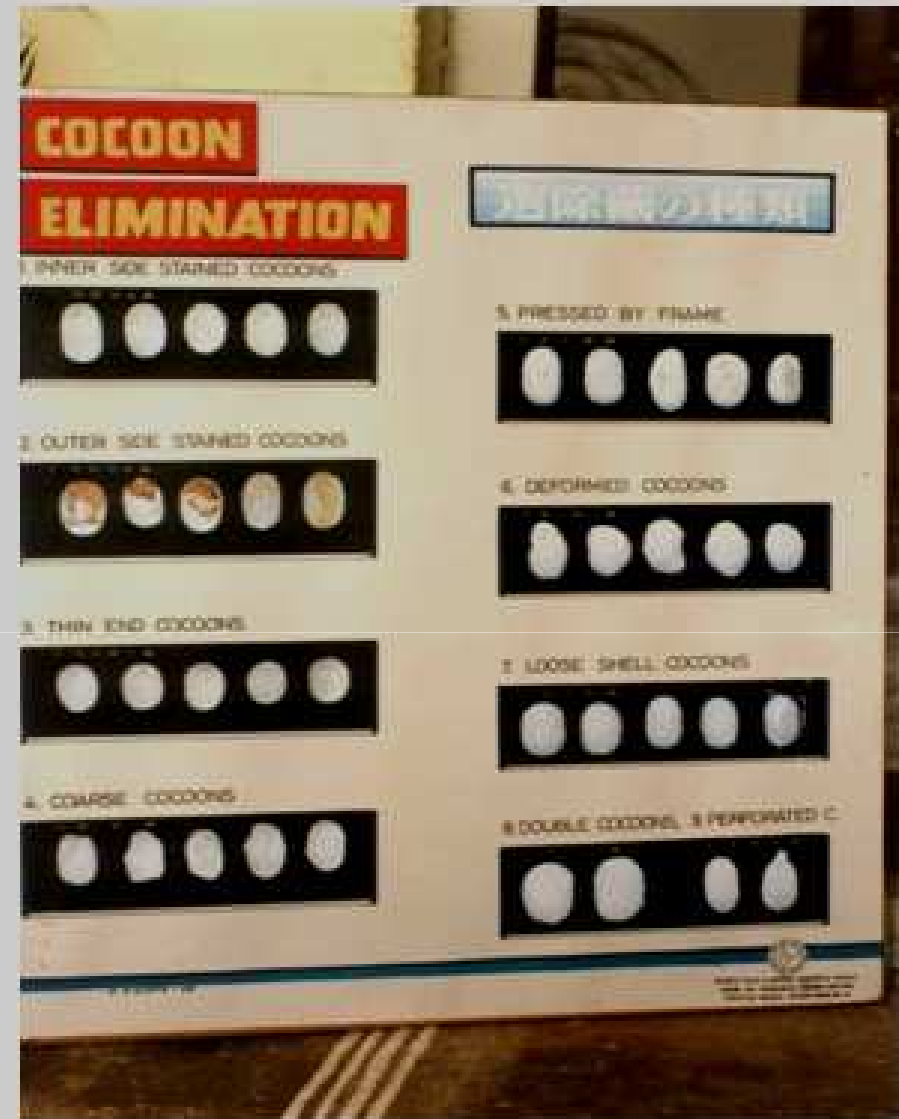


Fig. 5: Various types of defective cocoons



## **Acknowledgements**

**to**

**I. INTERNET**

**II. SERICULTURE MANUAL 3, FAO PUBLICATIONS**