

Instrumental technique

Greenhouse technology and its components

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Lighting

- Horticultural lighting systems allow you to extend the growing season by providing your plants with an indoor equivalent to sunlight.
- There are three main types of horticultural indoor systems

High-Intensity Discharge (HID) Lamps

- Mercury (Hg) lamps, metal halide (MH) lamps, or sodium lamps.



Fluorescent Lamps:

- Cool white (commonly used), Warm white
- More frequently used for seed germination and producing plants in tissue culture systems



Incandescent Lamps:

- Photoperiodic control of floricultural crops



Ventilation

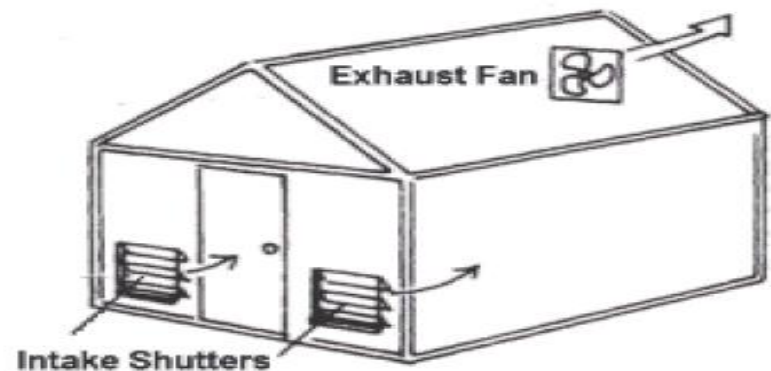
Providing fresh air, mainly carbon dioxide, to plants and cooling for the greenhouse. Greenhouses can be mechanically or naturally ventilated.

Natural or passive ventilation

- Requires very little external energy.
- It is based on the pressure difference between the greenhouse and the outside environment, resulting from the outside wind or the greenhouse temperature.

Mechanical ventilation

- Requires inlet openings, exhaust fans, and electricity to operate the fans.
- Fan setup to blow hot stale air out of the greenhouse and bring fresh cooler air inside the greenhouse via intake shutters mounted on the opposite end of the structure



Shading

- Shade screens are the principle measures taken to reduce incoming solar radiation
- Movable panels of fabric or plastic film used to cover and uncover the space enclosed in a greenhouse.
 - Cloth materials w/o aluminum tape
 - Whitewash
 - Infrared (heat)-reflecting plastic film
 - Plastic net



Plate 6

Thermal screen used for energy saving and greenhouse shading

Evaporative Cooling

- Additional cooling is required, when the natural ventilation and shading were not able to keep the greenhouse temperature at desired set point.
- Two evaporative cooling systems are commonly used in greenhouses:
 - Pad-and-fan
 - Fog system.



Fog nozzle delivering a small-droplet mist for evaporative cooling



Evaporative cooling pad installed along the inside of the ventilation inlet opening.

Irrigation

Watering

- Cuttings and seedlings are commonly watered with small overhead sprinkler or misting systems or mist nozzles

Drip systems

- Effective way to water larger plants without wetting the foliage.
- Use very little water



Thank you