

Save Coal and Go Broke

When outside temperature is near the desired greenhouse temperature (50° outside and 50° inside), you are in trouble with condensation or very high humidity.

During the day your greenhouse is heated by the sun to a temperature considerably above the outside air. You probably open the vents to cool the house. Cold air comes in and is heated, which permits it to hold more water than when it entered. The relative humidity of the air is reduced.

Even if you don't open the ventilators, the humidity is low because the water condenses on the glass or in the soil, which in some parts of the house is colder than the air. This keeps the humidity from increasing in the house. You think the humidity is high because the benches, steel frame, door knobs and everything you touch is wet. They are wet because they were colder than the air or did not warm so fast as did the air.

The plants are receiving radiant energy from the sun and leaf temperature is from 1 to 15 degrees above the air temperature. They will transpire (give off water) even if the humidity were 100%. Water can't condense on them. You are safe.

THE SUN GOES DOWN and inside temperature reaches outside temperature and drops with it. Outside air is at near 100% relative humidity and inside air reaches 100% humidity also. You think it is fortunate the temperature didn't go low enough for steam until 9:30 at night. (You saved fuel, but you are in trouble.)

Condensation forms on the glass and on the plants. The glass cools below air temperature because it radiates heat to the sky (always cold). The plant temperature goes below air temperature because it radiates heat to the cold glass. Dew forms on the plants because the air immediately around the plant is cooled to super saturation. It cannot hold the water it did at the higher temperature.

If you want to learn how this works just jump out of the bath tub and take a look at the smokestack to see if the fire is still going. You radiate heat from your front side to the cold glass until you feel cold in front and warm behind. You are radiating heat to the cold glass. It is not the cold air striking you.

