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Greenhouse Condition for Vegetables Production in Winter Season

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Research Paper

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ABSTRACT

In this present paper, we have talked about maintaining the appropriate temperature for vegetables plants by maintaining the north, south, floor and fraction angle of the greenhouse for vegetables grown in cold climates. To overcome the heat loss, a brick wall of 27.5cm thick is built on the northern side inside the greenhouse. The controlled environment greenhouse may be the better option for vegetable production to meet the national need. Higher crop productivity can be achieved, in addition to other factors, by maintaining a favourable environment in a greenhouse.

Introduction-:

Due to reduction in heat loss by the northern wall and northern roof, the temperature inside the greenhouse during the winter season is observed to be about 10-13$^{\circ}c$ higher than the outside air temperature during day time. Temprature inside greenhouse was 40$^{\circ}c$ higher at night during months of winter season.There are various types of greenhouse, which can be classified on the basis of shape and size. Some of them are even and uneven span, saw tooth and hillside (Tiwari and Goyal, 1998). In even and uneven span type greenhouses, the solar radiation falling on the north wall inside the greenhouse after transmission through a canopy cover is further transmitted to atmosphere. This thermal loss can be retained by providing a brick north wall instead of canopy cover on the north of a greenhouse. It can also act as a thermal storage wall.

Research methodology-:

Each point on the north wall was located in central part of each zone having equal area. These arrangements cover the availability of solar radiation falling on the north wall. The solar radiation falling on the floor of the greenhouse was measured along the central length and breadth of the greenhouse.

Sorlimeter was used to measure the direct scattered solar energy falling on the lower wall,floor of the greenhouse. Experiments have been generally conducted every week starting from 7 am. to 5 am., on the hourly basis.

For a given south wall, a ray making an angle equal to incidence (normal to the south wall) at top view has been made by using Auto-CAD for a time of the day.A line was draw further from the ground which at the same time represented equal angle to horizontal from the right view.Parallel lines were drawn at

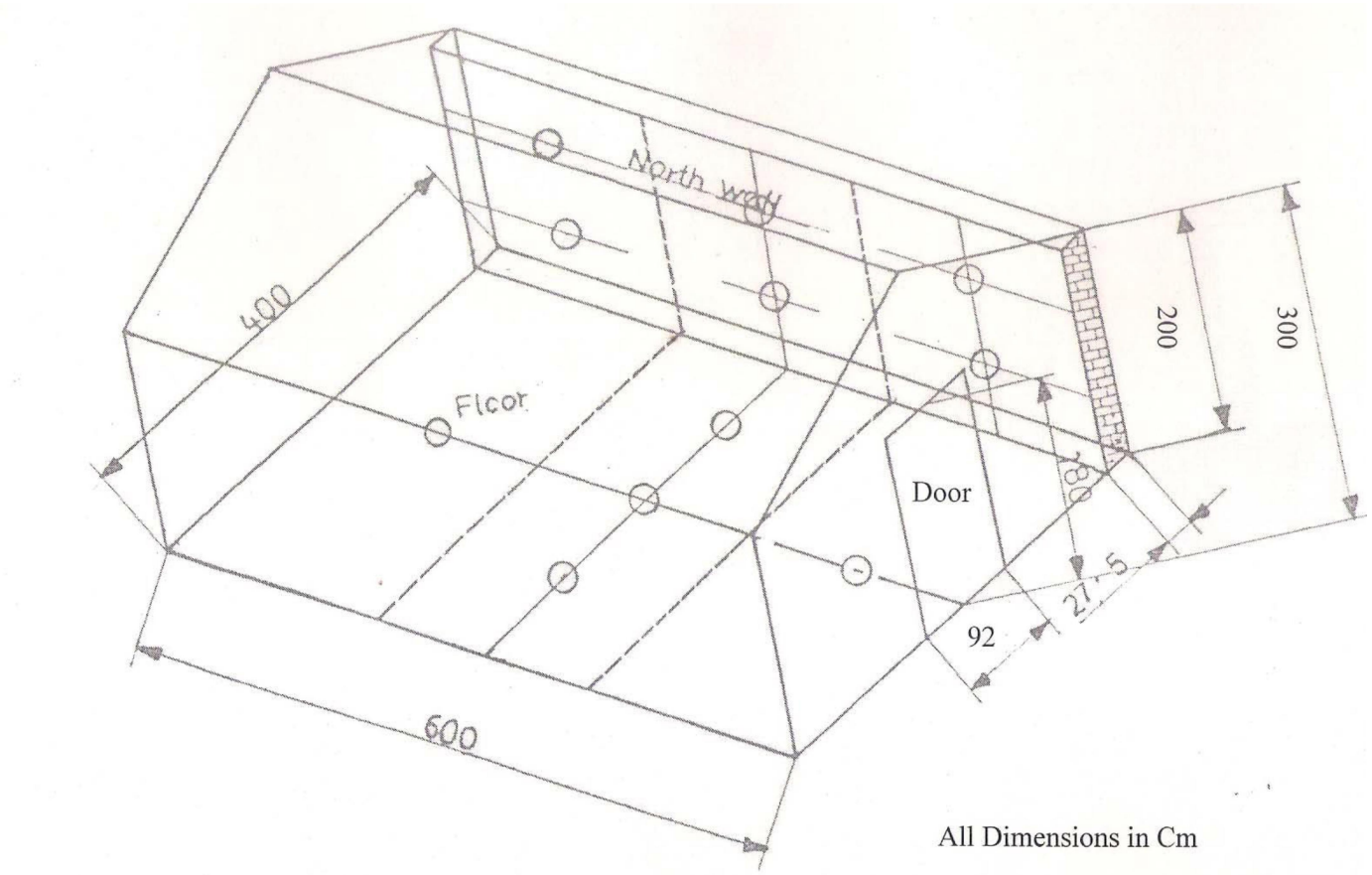


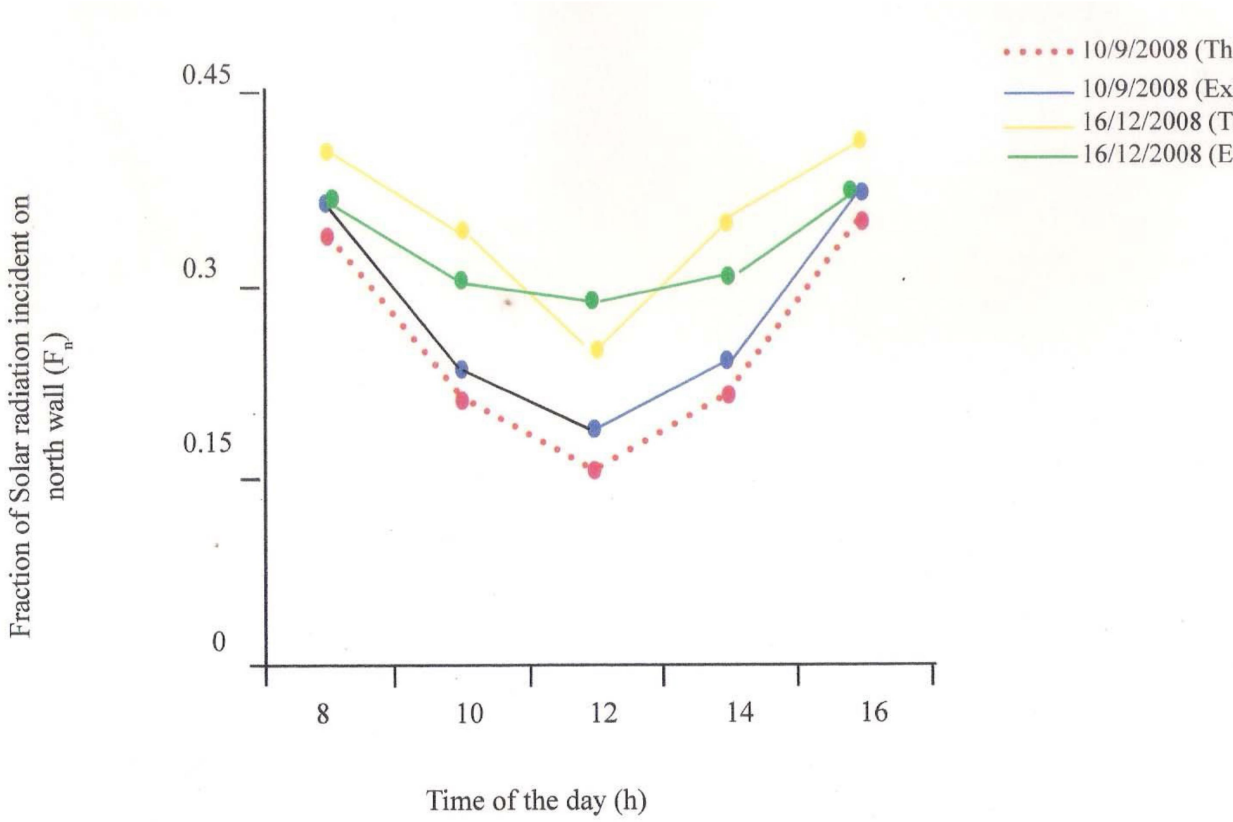
Fig. 2.5

Experimental model greenhouse with measurment of solar radiation at different points

top and bottom of south wall.

Result and Discussion-:

The hourly variation of solar fraction (Fn) for different days (10/9/2008, 16/12/2008, 10/3/2009 and 17/6/2009) of the year has been shown in Fig. 3.8 and 3.9. These Figs. Indicate that the values of solar fraction (Fn) are same (i) for 8 am. and 4 pm. and (ii) 10 am. and 2 pm. In these cases, incidence angle (i) at 8 a.m. on east and 4 pm. on west wall are equal. Similarly, incidence angle (i) for east wall at 10 a.m. and 2 pm. for west wall are also equal.



Conclusion-:

According to this research paper we have discussed the utility of solar fraction (Fn) for north wall in the design of greenhouse for a given location.This will also help in maintaining the different temperature zone in the large greenhouse by providing concrete north wall for higher temperature zone.

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