

GREENHOUSE HEATING AND VENTILATING

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Studies of soil temperature have been made when heating coils are along the sides of the bed, a common location for pipes in houses with ground beds. Temperature readings of the soil have shown that it rises above what many growers consider optimum for roses. Also, heating coils so placed are unable to combat down drafts and cold spots. Overhead heating coils do eliminate these two objections. Since not every grower can afford to repipe, other solutions to soil heating and down drafts are under investigation.

To date, no solution is offered for the down drafts. Reducing the soil temperature has definitely been obtained. Coils lying along the side of the bed have caused the soil temperature to reach 80°F. in spots when the air temperature was 60°F. in the rose house of Cornell University.

Not only is there this high temperature, there is a large temperature differential from one side of the bench to the other. When one side was 80°F. the coolest part has registered 68°F, it depends on the size of the bench and the heating arrangement. Insertion of small blocks of wood between the pipe and the bed, to move the pipe out about two inches, dropped the soil temperature maximum to 70°F. Also there was a more even distribution of heat.

This 70°F. soil temperature is caused by the pipes radiating heat to the beds and consequent temperature rise of the soil. A radiation shield was installed between the pipe and the bed. This was a piece of aluminum foil 6 inches wide. No particular pains were taken in the installation except that it did not touch the pipe or the wall too much. Temperature readings showed the maximum was 66° at one time. Also, the difference between the hottest and the coolest point in the bench was only 3 to 4°. Compared to a bench with no heating coil, a very small heating effect is caused by a shielded coil.

Studies to reduce the maximum temperature within the greenhouse in the summer have been undertaken. Paint shading, methods of humidification, ventilation, and water spray in the roof have all been studied. These have been reported on previously. In the case of the shading, the paint cannot be removed when not wanted for a cloudy spell. To solve this, shading by cheesecloth within the

house has been tried. The cloth was strung on wires the length of the house and rigged for pulling out of the way when not wanted. The cloth was installed about 18 inches below the glass. It was believed that this would give a chimney effect for cooling the glass and thus the whole house. This has not proven as satisfactory a method of the lowering of temperature as was hoped. A cooling is obtained but is not as great as that by other methods.

Other experiments on the problems of greenhouse engineering are being undertaken and will be reported upon as the results become known.

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