Comparison of Greenhouse Types for Tomato Culture

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Summary

Four glasshouse types (illustrated in Fig. 1) were compared for tomato production over a 5-year period. Equal areas of about 6000 square feet were in each of the glasshouse types listed below:

*Vwh - a Venlo-block with a wooden roof, a span width of 3.20 meters and a roof slope of 20°.

*8K - a glasshouse of hot-dip galvanized steel with 8 spans of 3.28 meters width and 30° roof slope.

*4K - the same construction as the former except with 4 spans of 6.56 meters width.

*2K - the same as the former two except 2 spans of 13.12 meters.

Orientation of all glasshouses was E-W, while the plant rows were N-S, across the houses. The comparisons were made on the basis of equal air and soil temperatures and the same cultural treatments for all houses.

In each glasshouse two groups of 4 elements in series connection were installed for temperature control, one group for the heating and one for the ventilation. The elements were regularly distributed along the north to south center strip of 3.2 meters, or every 4 plant rows.

The temperature distribution within the glasshouses varied with the type and outside weather dis-

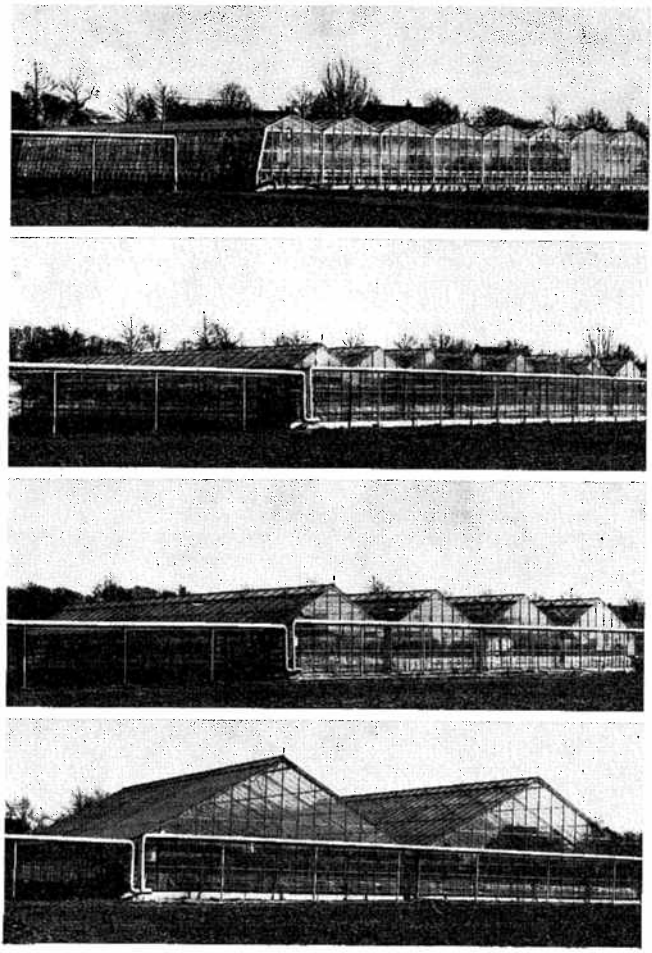

Fig. 1. The four glasshouse types which have been compared: Vwh, 8K, 4K and 2K, respectively.

tribution. To avoid most of the variations in temperature the comparison was based on cropping results for the center portions of the houses.

The results and conclusions from the experiments for years 1961-1965 inclusive are summarized as follows:

There were obvious glasshouse-type effects on size of trusses, date of opening of first flowers and fruit-setting, with the 2K type being the best followed respectively by 4K, 8K and Vwh. These effects early in the crop are reduced or even lost later, probably as a result of less favorable growing conditions.

Favorable temperature effects such as earlier flowering mostly gave unfavorable after effects such as smaller truss sizes.

Where plant rows crossed the gutters yield reductions were observed for the higher trusses. This gutter effect was stronger with the lower gutters. When the gutters of the Vwh and 8K houses were raised from 2.1 and 2.2 meters to 2.5 meters the difference in yield between these two houses practically disappeared, while formerly the 8K house was giving better results. For the steel houses both the yield in kilograms and the returns in money increased

in the sequence 8K-4K-2K. The magnitude of the difference varied yearly.

A higher yield is mainly the result of a greater number of flowers per truss and/or better fruit setting, which for the lower trusses is especially attributed to better light conditions. For the higher trusses, other factors besides light must be considered.

While yield increased with larger span width, the differences were relatively small. In an economic comparison, the Venlo-block (a much cheaper house) gave the highest net returns per unit of capital invested. Highest net returns per unit of area came from the 2K, or largest house.

The authors suggest more fundamental research in the field of climatology and ecology within the several structures.

Your editor,

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