## Root Temperature Affects Pepper Growth

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### Introduction

For good crop production, optimum conditions in the root zone need to be maintained. Because roots absorb water and nutrients and provide growth regulators, such as cytokinins, for top growth, a desirable root system is extensive and active. The temperature surrounding the roots plays an important part in obtaining good yields.

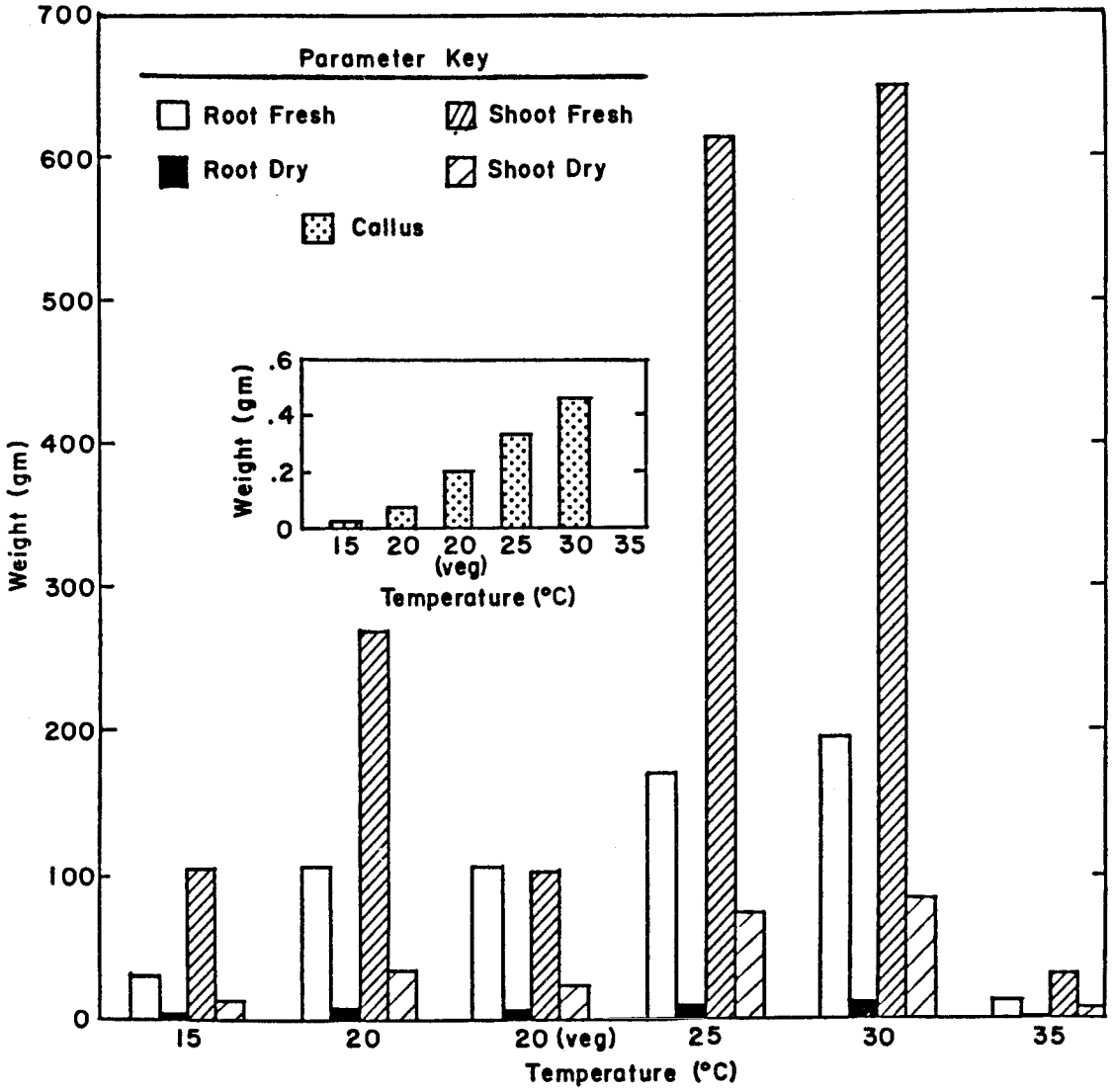
This experiment was designed to see what effect root temperature has on pepper growth and cytokinin production. Cytokinins are hormones synthesized in the roots and when translocated to the top, cause better growth even when aerial parts of the plants are under unfavorable conditions. The hypothesis is that, by providing optimum conditions for the roots, some adverse conditions can be overcome aboveground.

### Methods

Bell peppers cv. 'Yolo Wonder' and chili peppers cv. 'New Mexico 6-4' were grown in hydroponic tanks in a greenhouse at the University of Arizona Environmental Research Laboratory. Temperatures in the greenhouses were about 24-27°C in the day and 15-18°C at night. The desired temperatures of the nutrient solutions were controlled by heaters and a refrigeration unit. Temperatures of 15°, 20°, 25°, 30°, and 35°C were maintained as treatments for the roots. One set of plants at 20°C was kept vegetative by removing flowers and buds. About 60 days after transplanting, plant growth was measured by fresh and dry weights of roots and shoots. Cytokinin produced was measured by callus on a soybean assay.

### Results

Root temperatures of 25° to 30°C seem optimum for pepper growth and cytokinin production (Fig. 1 and 2). Activities at temperatures above and below are significantly less. Plant growth was severely inhibited at 35°C. These results confirm the importance of root zone temperature to plant processes and crop production. Cultural practices which modify these temperatures should be understood and used.




20 (veg) Plants were grown vegetatively by removing the buds and flowers.

**Figure 1. Weights of Callus, Roots and Shoots of Green Bell Pepper as Affected by Temperature**

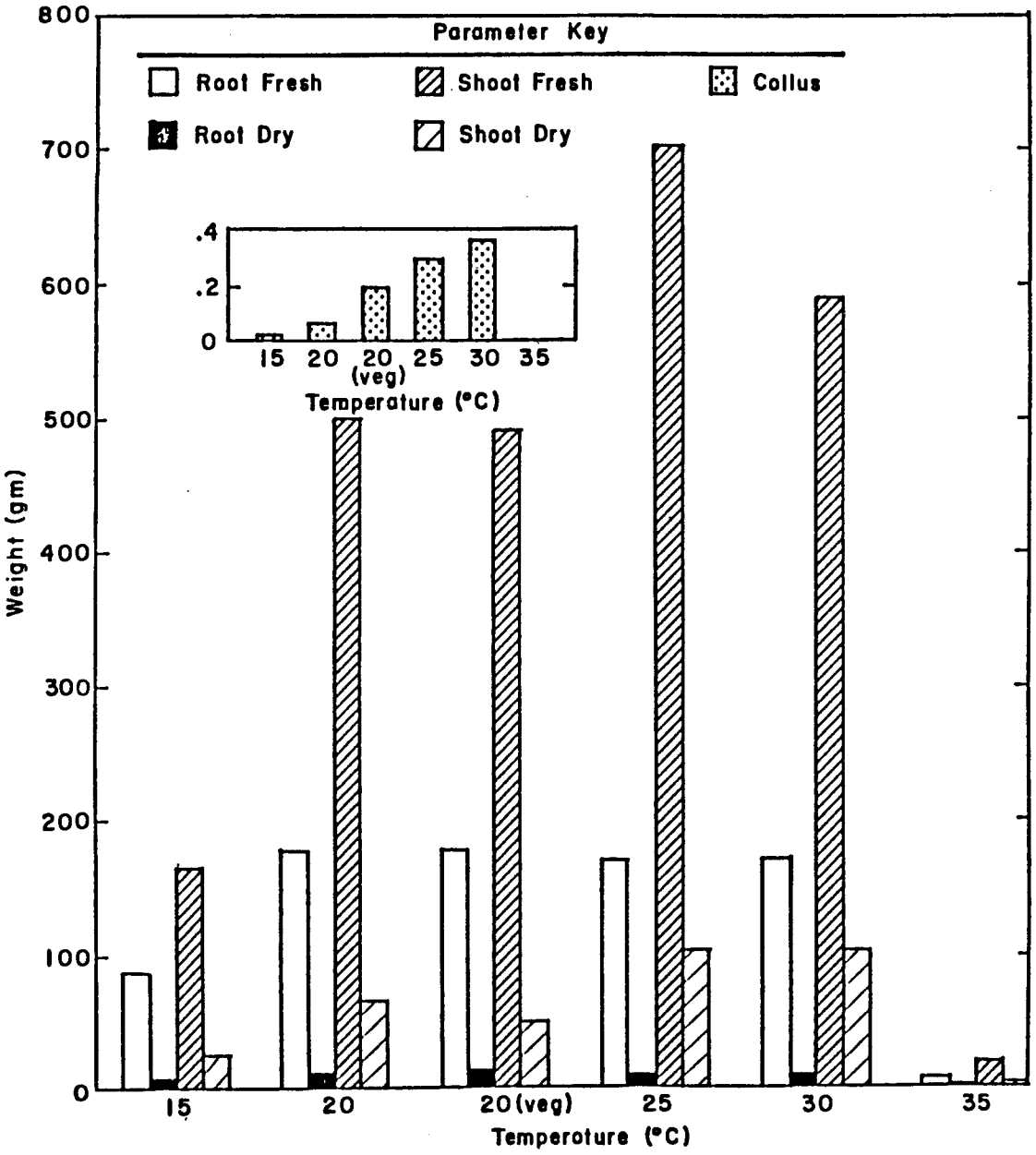



**Figure 2. Weights of Callus, Roots and Shoots of Chili Pepper as Affected by Temperature**