

PD2) The effects of temperature on vegetative growth, flowering, fruit development and fruit quality of pepper plants

Soonja Oh · Eun Young Song · In-Chang Son · Seung Hwan Wi ·
Kyung Hwan Moon · Seok Chan Koh¹⁾

Agricultural Research Institute for Climate Change, National Institute of Horticultural and Herbal Science

¹⁾Department of Biology and Research Institute for Natural Sciences, Jeju National University

1. Introduction

Pepper (*Capsicum annuum* L.), belonging to the Solanaceae family, is economically important in Korea and consumed widely around the world as a spice crop. During the growing season, various climatic and soil factors, including air temperature, light intensity, and precipitation, and soil conditions, have impacts on the growth and development of pepper plants. Particularly, the temperature is one of most major environmental factors impacting on processes such as flowering, fruit set, and fruit growth. In this study, we investigated the impact of temperature stress on the vegetative growth, fruit development, and the fruit quality of pepper plants for establishing the temperature limit for producing high-quality fruits.

2. Materials and Methods

Seeds of pepper 'Muhanjilju' were sown in 50-cell plug trays filled with commercial bed soil. During the experiment, air temperatures within the chambers were kept constant for each temperature regime (15, 20, 25 or 30°C), where randomly selected 10 acclimated seedlings were placed. The impact of temperature stress on the vegetative growth, fruit development, and fruit quality of the pepper plants were determined after 100 days under temperature regimes.

3. Results and Discussion

The temperature ranges of 20-25°C was optimum for the vegetative growth and fruit development of plants. On the other hand, the high temperature (30°C) reduced generally the fruit development such as the fruit-set and fruit growth, although enhanced the vegetative growth. The low temperature (15°C) caused the short shoot height, and the small number of main branches, whileas resulted in the elongate fruits, and the long green fruit period. Under conditions of optimum temperature (20-25°C) and high temperature (30°C), the fruit development was advanced by 15 and 20 days, respectively, compared to that of the plants at low temperature (15°C). Furthermore, the fruit color change was significantly advanced in the optimum temperature (20-25°C) and high temperature (30°C). However, high temperature (30°C) not only reduced the number of total fruits, but also increased the number of short or malformed fruits. Total free sugar contents of red-ripe fruits were significantly higher in the optimum temperature (20-25°C), while capsaicinoid contents of red-ripe fruits increased with the rise of temperature in the range of 15 to 30°C.

4. References

- Oh, S., Moon, K. H., Son, I. C., Song, E. Y., Moon, Y. E., Koh, S. C., 2014. Growth, photosynthesis and chlorophyll fluorescence of Chinese cabbage in responses to high temperature. Kor. J. Hort. Sci. Technol., 32(3), 318-329.
- Song, E. Y., Moon, K. H., Son, I. C., Kim, C. H., Lim, C. K., Son, D., Oh, S., 2014. Impact of elevated temperature in growing season on growth and fruit quality of red pepper (*Capsicum annuum* L.), Kor. J. Agri. For. Meteor, 16(4), 349-358.