Chile Crop Water and Nitrogen Demand

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10 July 2024

In arid and semi-arid regions, water is our first limiting factor in a crop production system, followed closely by bio-available nitrogen (N). Thus, our management of water and N are critically important to produce a healthy crop with good yields and quality.

Water and nutrient demands coincide with the fruiting cycle and efficient management of irrigation water and plant nutrients is enhanced by tracking crop development in the field. The use of heat units (HUs) with 86/55 ^{o}F upper and lower thresholds can be applied to warm season crops in the desert Southwest in relation to the thermal environmental impacts on the development of all crop systems (Brown, 1989), including chiles, (Figures 1 and 2).

Crop Phenology Relationship to Water and Nitrogen Demand

Phenological guidelines have been developed for many crops, including New Mexico type chiles (Soto-Ortiz and Silvertooth, 2007 and Silvertooth, et al, 2010; Figure 1). This phenological guideline can be used to identify or predict important stages of crop development that impact physiological requirements. For example, a phenological guideline can help identify stages of growth in relation to crop water use (consumptive use) and nutrient uptake patterns (Figure 3).

This information allows growers to improve the timing of water and N inputs to improve production efficiency. For some crops or production situations HU based phenological guidelines can be used to project critical dates such as harvest or crop termination. Many other applications related to crop management (e.g., pest management) can be derived from a better understanding of crop growth and development patterns.

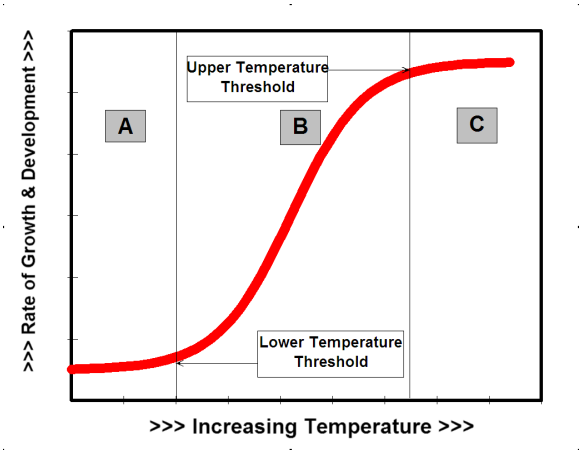

Figure 1. Typical relationship between the rate of plant growth and development and temperature. Growth and development ceases when temperatures decline below the lower temperature threshold (A) or increase above the upper temperature threshold (C). Growth and development increases rapidly when temperatures fall between the lower and upper temperature thresholds (B).

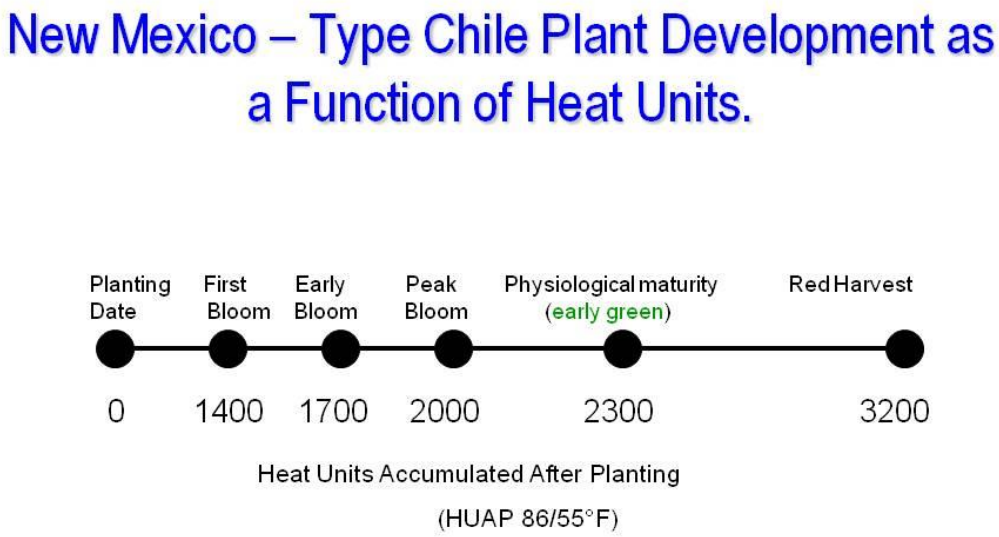

Figure 2. Basic phenological guideline for irrigated New Mexico-type chiles.

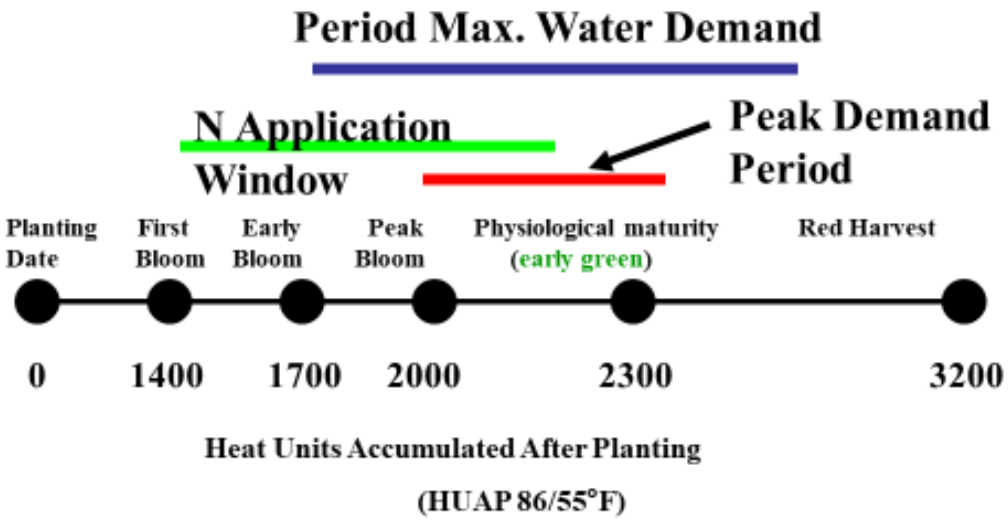

Figure 3. Basic phenological guideline for irrigated New Mexico-type chiles with periods of peak water and nutrient demand, including optimum N application window.

References

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Silvertooth, J.C., P.W. Brown, and S. Walker. 2010. Crop Growth and Development for Irrigated Chile (Capsicum annuum). University of Arizona Cooperative Extension Bulletin No. AZ 1529

Soto-Ortiz, R. and J.C. Silvertooth. 2007. A Crop Phenology Model for Irrigated New Mexico Chile (Capsicum annuum L.) The 2007 Vegetable Report. Jan 08:104-122.