

Pepper Stem Scald: A Physiological Problem¹

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Pepper Stem Scald

Planting pepper during August and September in Florida presents some interesting challenges. For example, we have all seen summer planted pepper develop a condition known by such names as "heat stress," "plastic damage," "heat girdling" or "stem scalding" (Figure 1). This often happens within hours of transplanting. The outward appearance is an hourglass like pinching in of the stem just above the plastic mulch that is usually discolored tan or light brown. The stem will eventually collapse so completely that the plant falls over. Depending on the severity of the condition, the plant (even fallen plants) may survive for several days before finally dying all together.

Many assume this phenomenon (Figure 2) is caused by the "flap" made by stretching the plastic mulch during the mechanical hole punching operation and hence the term "plastic damage." However, the phenomenon occurs quite nicely even in the absence of the plastic "flap." What than is causing this heat girdling?

A study designed to look at transplant plug moisture levels in the field proved fruitless as heat girdling occurred in all treatments regardless of plug



Figure 1. Under the summer heat transplanted pepper plants can develop, often within hours of transplanting a condition known by such names as "heat stress," "plastic damage," "heat girdling" or "stem scalding."

moisture levels. However, we realized that efforts to establish the treatments had taken so long that everything was transplanted between 11 a.m. and noon. As a result, another trial was established to test the effect of planting time on the incidence of heat girdling. Fully saturated, pepper transplants were set in a well-irrigated field at 9 a.m., 11 a.m., 1 p.m., and 3 p.m. on September 9, 1997. A water wagon was pulled across all plots at 4 p.m.

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Figure 2. Many assume transplant damage is caused by the "flap" made by stretching the plastic mulch during the mechanical hole punching operation. However, the phenomenon can occur even in the absence of the plastic "flap."

Plants set at 11 a.m. and 1 p.m. exhibited 40 percent and 25 percent heat girdling respectively compared to 3 percent and 8 percent for plants set at 9 a.m. and 3 p.m (Figure 3). In theory, plants set well before (9 a.m.) or well after (3 a.m.) the noon day sun were able to adjust their water usage to minimize heat girdling. Plants set during the peak sun hours basically bypassed the adjustment phase just trying to cool themselves (i.e., transpiration) and when the transplant plug ran out of water heat girdling occurred! Other factors must certainly be at play (air and soil temperatures, stem pressure potentials, drying winds, etc.) but time of day definitely makes a difference. Your production schedule may not allow you to discontinue planting from 11 a.m. to noon for example, but if you do, we believe your need for resets will be reduced.

Weather plays a dominant roll as well. Our efforts to establish how soon water should be applied following field setting were foiled. This happened because we set out our trial on a day when the solar insolation was only half that of the day we established the time of planting trial (though it seemed very hot and bright to us!). We were able to determine however, that using the water wagon sooner rather than later was much better and that bed wetness also affected heat girdling (more scalding on the road bed than on the ditch bed). These studies will be repeated this month and we will keep you posted.

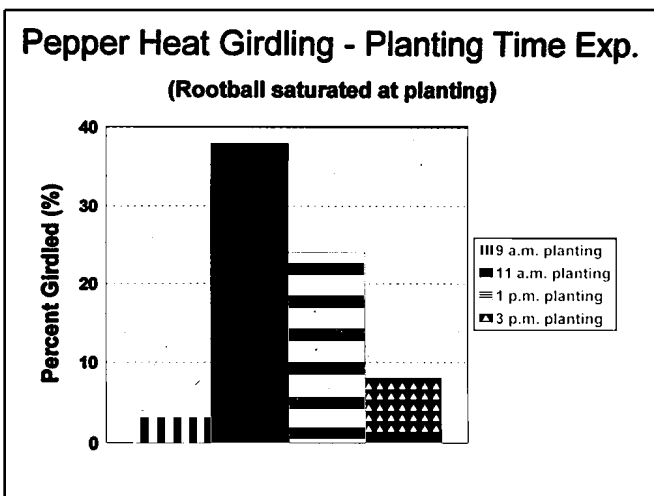


Figure 3. Effect of planting time on the incidence of heat girdling

But, the next time you are planting pepper in the summer you should take a cue from the old saying "only mad dogs and Englishmen go out in the noon day sun." Perhaps there's a lesson here for the pepper grower as well!