

The effect of temperature on time to emergence in giant pumpkin

Joe Ailts, 2015

Most gardeners with experience under their belts understand that warmer temperatures make seeds and plants grow faster. Inevitably, however, this leads one to question to what extent temperature has an effect and what is the optimum for accelerating seedling germination & emergence.

An experiment was undertaken to compare the effects of two temperature environments on the time to emergence for pumpkin seeds allowed to pre-soak at various time intervals. The data suggest that temperature is a fundamental factor in time to emergence, with far greater effect than seed soaking time. Further, a combination of an 8 hour seed soak in a 90 degree F environment results in the fastest time to emergence.

Previous experiments have demonstrated that the time to emergence for various seed soak intervals at 75 degrees resulted in the following outcomes:

Soak time (hrs)	0	1	4	8
Average hours to germination	143	129.75	129.75	118.75
% difference		-9%	-9%	-17%
hours difference		-13.25	-13.25	-24.25

As expected, an 8 hour soak before potting resulted in the shortest time to emergence at 75 degrees F by a significant margin, 118.75 hours (5 days) compared to 143 hours with no soak.

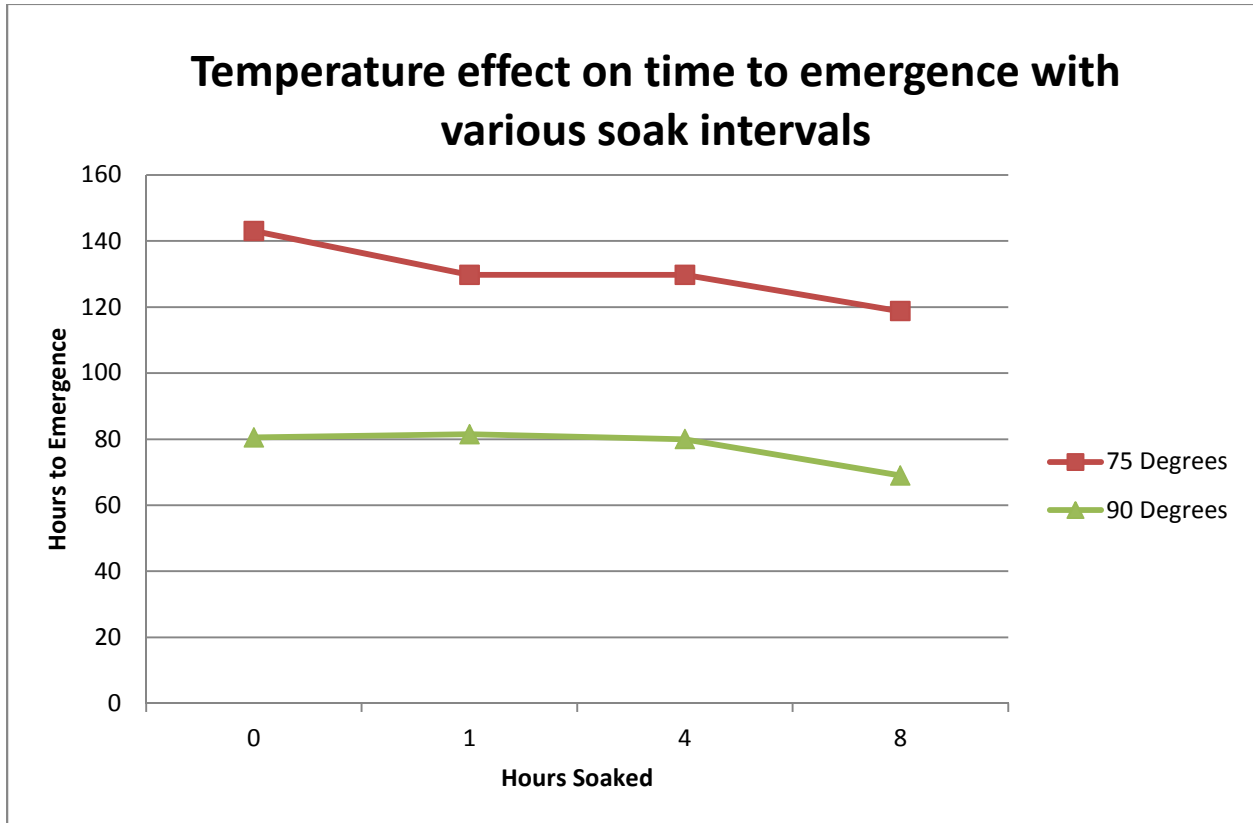
Data for the same experimental setup, conducted in a 90 degree F environment, produces results that also demonstrate an 8 hour soak decreases time to emergence compared to no soak:

Soak time (hrs)	0	1	4	8
Average hours to germination	80.5	81.5	80	69
% difference		1%	-1%	-14%
hours difference		1	-0.5	-11.5

It is interesting to note that in a high temperature environment (90 degrees F), the only soak interval that resulted in significant shortening of time to emergence was the 8-hour soak group.

Of particular relevance is the comparison of data sets on the basis of temperature. The data reflect a substantial shortening of time to emergence in the 90 degree environment as compared to the 75

degree environment, with the 8-hour pre-soak group producing the shortest interval to emergence, 69 hours (2.9 days).



The 8 hour soak, 90 degree group, which averaged 69 hours to emergence, was 107% (over 2 times) as fast to emerge as the no-soak, 75 degree group. Further, the 8 hour soak, 90 degree group was 72% faster than the comparable 8 hour soak, 75 degree group, a margin advantage of 49.75 hours (2.1 days).

In conclusion, soaking seeds for 8 hours in a 90 degree water bath and germinating them in a 90 degree environment can significantly reduce time to emergence. The data also show that increasing temperature has a more significant effect on reducing germination time than seed soak interval, but that both soaking an increased temp combine to produce the shortest interval. For reference, the shortest time to emergence recorded in the 96 total seeds tested was 49 hours, not surprisingly in the 8 hour soak, 90 degree experimental group.