

Soil Temperature Conditions for Vegetable Seed Germination

► Several factors can restrict seed germination. While the most discussed factor is soil water availability, soil temperature is also critical to ensure that the germination process starts. Particularly, optimum soil temperatures during the germination process increase plant emergence rate and growth.

In a vegetable greenhouse, soil temperature can be regulated by controlling the greenhouse air temperature, and it can be easily measured using thermometers (nonelectric thermometers, thermocouples, and thermistors). However, greenhouse soils can also be heated with biological material, water, and electronic products. Heating pads are the most common materials used to electronically heat greenhouse soil and can be easily found in agricultural supply stores. Maintaining optimum soil temperatures ensures plant root system development and aboveground growth. Under field conditions, optimum soil temperatures for seed germination can be achieved by selecting the proper planting date. See Alabama Extension publication “Vegetable Seasons in Alabama” (ANR-1165) at www.aces.edu. Growers can also use plastic mulching, cover crops, and other crop management practices to achieve the desired soil temperature.

Table 1 presents the optimum soil temperatures required for most vegetable crops grown in Alabama. The goal is to provide growers with information to optimize their growing systems.



References

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Table 1. Soil Temperature for Vegetable Seed Germination

Vegetable	Soil Temperature (°F)			
	Minimum	Optimum Range	Maximum	Optimum
Asparagus	50	60–85	95	75
Bean, Lima	60	60–85	85	85
Bean, Snap	60	65–85	95	80
Beet	40	50–85	85	85
Cabbage	40	45–95	100	85
Carrot	40	45–85	95	80
Cauliflower	40	45–85	100	80
Celery	40	60–70	85	70
Chard, Swiss	40	50–85	95	85
Corn	50	60–95	105	95
Cucumber	60	60–95	105	95
Eggplant	60	75–90	95	85
Lettuce	35	40–80	85	75
Muskmelon (Cantaloupe)	60	75–95	100	90
Okra	60	70–95	105	95
Onion	35	50–95	95	75
Parsley	40	50–95	95	75
Parsnip	35	50–70	85	65
Pea, English	40	40–75	85	75
Pepper	60	65–95	95	85
Pumpkin	60	70–90	100	90
Radish	40	45–90	95	85
Spinach	35	45–75	85	70
Squash	60	70–95	100	95
Tomato	50	70–95	95	85
Turnip	40	60–105	105	85
Watermelon	60	70–95	105	95



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