

FROST CONTROL SUGGESTIONS

1. Maintain a sheltered minimum recording thermometer in the orchard. This temperature can be compared to area temperatures and used to adjust forecasts.
2. Soil preparation. Firm, bare moist soil absorbs more heat during the day and will release it more readily during the night. Recent cultivation, sod or weed cover impedes heat movement from soil to air and will result in a colder orchard. If sod or weed cover is present, it should be mowed as short as possible.
3. Running water can raise orchard temperatures. As the water cools, it gives up heat which will help warm the orchard. The warmer the water, the more heat will be given up. Well water is generally warmer than canal water. Water should be turned on well in advance of the expected low temperature and should run out the end of the row by the time the freezing temperature occurs and be left running until the temperature has risen above freezing.

Under-tree sprinklers are widely used and if properly designed, will give from 2° to 4° of frost protection.

Sprinkling water into relatively dry air (nights with low dewpoints) will result in high rates of evaporation and rapid temperature drop until the air becomes saturated. Consequently, sprinklers must be turned on enough in advance of the critical temperature to allow for this. Following is a table developed by Rick Snyder, UC Bioclimatologist, which can be used to determine minimum turn-on temperatures. When to turn off sprinklers can be determined by waiting until all ice has melted or by using the table.

Air temperature at which sprinkler systems should be turned on to prevent a rapid temperature drop below the critical temperature for freeze damage. In order to maintain wet-bulb temperatures above the critical temperature for various ranges in dewpoint temperature, turn on the sprinklers at or above the indicated air temperature.

Critical Temperature °F	Dewpoint °F	Minimum* Turn-on or Turn-off Temperature °F
32	16 to 21	41
	21 to 24	39
	24 to 28	37
	28 to 31	35
	31 to 32	33
30	15 to 20	38
	20 to 24	36
	24 to 27	34
	27 to 30	32
28	14 to 19	35
	19 to 23	33
	23 to 27	31
	27 to 28	29
26	10 to 16	33
	16 to 20	31
	20 to 24	29
	24 to 25	27

*Absolute minimum temperatures for turning on or off the irrigation system. It is recommended that the system be turned on or off 2°F or 3°F higher than the indicated minimums.

ALMOND VARIETY BLOOM HARDINESS

The table shows percent damage observed on several cultivars following artificial freezing of almond branches with bloom in the indicated stage of development. Values are based on temperature durations of 30 minutes. For clarity, actual percentages have been rounded off to 1, 5, or to the closest 10%. It is wise to be conservative in frost control practices, since a couple of degrees can make the difference between no damage and severe damage. The duration of low temperatures, flower stage and position, tree vigor, and weather conditions preceding a frost all have considerable influence on the amount of damage that will occur. Any increase in duration of cold temperatures beyond 30 minutes will increase the percentage of damage.

Temperature	30°	29°	28°	27°	26°	25°	24°	23°	22°	21°	20°
NePlus Ultra											
Pink Tip						1	10		20		20
Pink Bud					0	70	90	90	90	90	
Full Bloom			5	70	90	100					
Small Nuts	1	5	20	50	100						
Sonora											
Green Bud						1			5		5
Pink Bud						20	10	30	10	5	10
Full Bloom					70	80	70	80	90		
Small Nuts		1	5	60	100						
Peerless											
Green Bud						5			5		10
Pink Bud			0	1	50	100					
Full Bloom		0	5	90	100						
Small Nuts		0	5	60	100						
Nonpareil											
Pink Bud						20	40	40	30	50	40
Full Bloom				50	70	90	90	90			
Small Nuts	1	1	40	90	100						
Price											
Pink Bud						30	30	30	40	40	20
Full Bloom				50	70	90	100	100			
Small Nuts		0	30	80	100						
Carmel											
Pink Bud						40	50	40	70	40	70
Full Bloom				60	90	100	100	100			
Small Nuts	1	10	30	70	100						
Butte											
Pink Bud					40	80	70	80	90	90	
Full Bloom		0	0	60	90	100					
Small Nuts		1	5	80	100						
Padre											
Pink Bud					70	90	90	100	90		
Full Bloom		0	1	50	100	100					
Small Nuts		1	5	30	100						
Mission											
Pink Bud					90	70	90	80	100		
Full Bloom		0	1	80	100	100					
Small Nuts		0	40	90	100						