

Wind Chill and Plants

All of us are used to checking the temperature before dressing and leaving home in the morning. We also are used to not only seeing what the true temperature is but also what the “wind chill” temperature is. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind speed increases, it draws more heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it feel much colder than air temperature. Modern wind chill calculations take into account the air temperature, humidity, wind speed, the heat transfer theory for heat loss from the body to its surroundings, and the effects of solar radiation due to cloudy, partly cloudy or clear skies. Additionally, the wind chill charts provide an estimate of the exposure time at certain wind chill temperatures that lead to frostbite.

When you get up in the morning and the temperature is 45°F and calm, you may need a light jacket. If it is 45°F with a 20-mph wind, then you will definitely need a heavy coat.

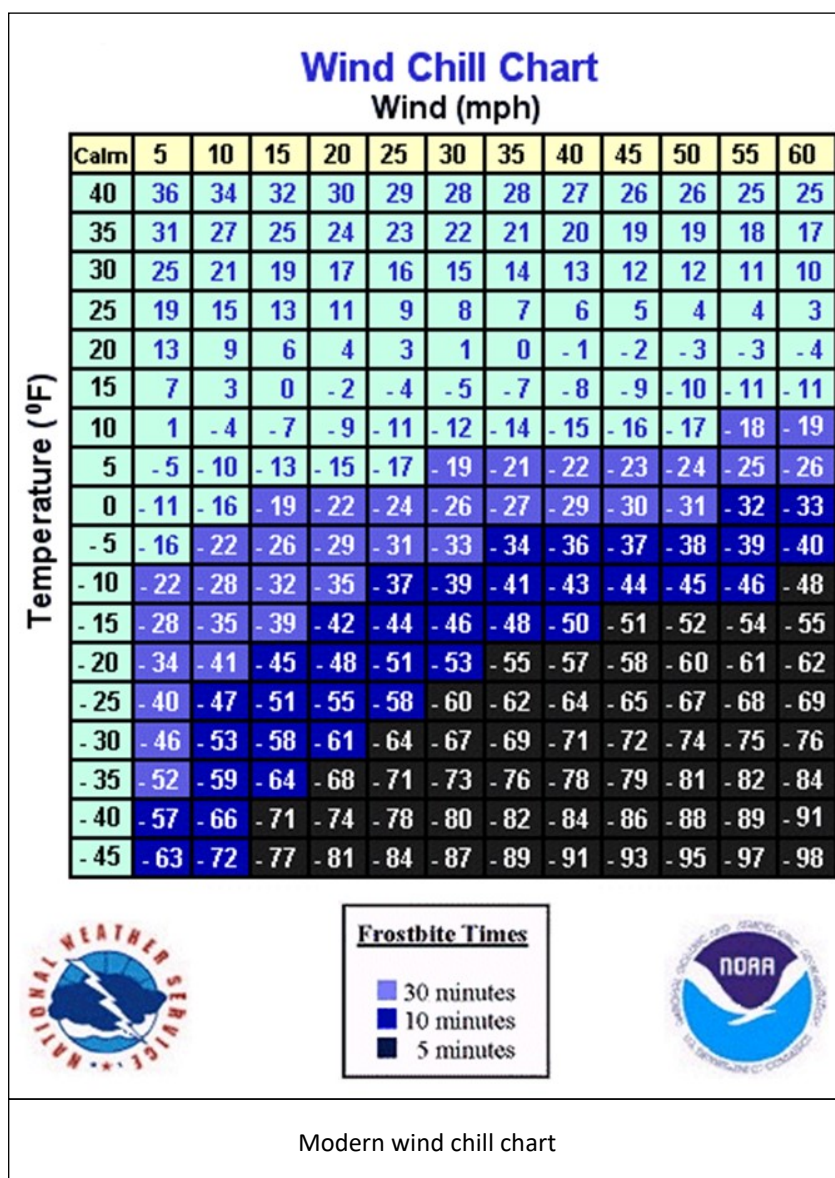
But suppose you see that the nighttime low will be 40°F with a wind chill temperature of 28°F due to a 35-mph wind. Do you need to throw a frostblanket over your Meyer lemon tree and maybe put some incandescent Christmas lights on it to keep it from freezing? The answer to that is no. Meyer lemons are considered cold sensitive and only tolerate temperatures into the high 20’s. The evening low will be 40°F and your lemon isn’t affected by wind chill. So, it should be acclimated to withstand the evening temperature dip.

In simple terms, the wind chill effect is due to the wind causing evaporative cooling and removal of heat from the area surrounding a heat source. If there is a slight breeze and you hold up both your hands, one wet and one dry, the wet hand will feel much colder because the wind is causing the moisture to evaporate from that hand. That’s the whole reason for sweating when it’s hot outside. Our body produces external moisture that has a cooling effect as it evaporates from the skin. And consider, if you are gathered round the campfire and the air is still, you can easily feel its warmth. If there is a breeze blowing, you must get closer to the fire to feel the warmth. That’s because the wind is carrying away the heat energy being produced by the fire before it reaches you.

I say all that to say this, the wind chill effect only applies to humans and other mammals that produce their own heat internally. Plants do not have an internal mechanism of heat production. When you cover your plant to protect it from freezing, you are capturing the heat given off by the earth that absorbed energy during the day. You aren’t trying to help the plant keep itself warm.

Now, your plants can suffer windburn damage during the winter.

Cold winter air is dry because it holds less moisture than warm air. Because wintertime humidity is low, what little moisture that is around is quickly sucked up into the air. Winter winds can dry out the succulent parts of our plants resulting in windburn. This can look like frost or freeze damage but is really dehydration. Therefore, it is important to keep our plants watered even in the wintertime. We needn’t water as often but it is still important to keep them



hydrated. Early morning watering is one method of protecting our plants from wind and cold. The plants get fully hydrated and the moist soil absorbs more heat energy during the day than dry soil.

So, the wind chill may mean that we put on an extra layer of clothing before going out for the day, but it’s the actual air temperature that our plants feel. That’s the temperature we should check to see if we need to throw a blanket over our sensitive plants for the evening.

~Dr. Joe W. Willis

Selected References:

Cappiello, P. 2020. Ever wonder how plants handle winter weather like wind chill? The answer? It's about water. Courier Journal. <https://www.courier-journal.com/story/life/home-garden/2020/01/31/why-plants-arent-impacted-winter-weather-like-wind-chill/4568657002/>

Myers, M. 2022. Wind Chill and Plants. <https://www.melindamyers.com/audio-video/melindas-garden-moment-audio-tips/lawn-landscape-design/wind-chill-and-plants>

New Wind Chill Temperature Formula. 2001. Golden Gate Weather Service. <https://ggweather.com/windchill.htm>

Wind Chill Chart. 2022. National Weather Service. <https://www.weather.gov/grb/windchill>

Wind Chill Questions. 2022. National Weather Service. <https://www.weather.gov/safety/cold-facts#:~:text=Wind%20chill%20is%20based%20on,makes%20it%20FEEL%20much%20colder.>