

Factors Involved in Palm Hardiness (or “What determines Plant Hardiness”)

Plant response to harsh winters can be somewhat puzzling to say the least. It becomes readily apparent that absolute minimum temps over the winter do not necessarily correlate with the plant damage revealed in the following spring. I have listed below some of the many factors that can play a part in the ultimate survival and recovery from harsh winter conditions. The details provided deal predominantly with palms but will apply in varying degrees to a broad range of our favorite exotics.

ASPECT	COMMENTS
Cold Spell Duration	Overnight freeze vs. cumulative freezing day and night
Cold spell Recurrence	Single arctic outflow vs. repeated arctic events during the winter.
Cold Spell Timing	Arrival of first arctic event. Late fall vs. mid to late winter. Are plants saturated or dry when arctic event arrives?
Wind & Cold	The rate of heat loss is greatly increased with even a moderate cold wind & results in faster freezing.
Humidity & Cold	Low humidity and freezing temps can cause freeze-drying of tissue. Challenging to then rehydrate (supply needed moisture to frozen plants).
Plant & Soil Moisture	Saturated plant tissues take longer to chill than desiccated tissue however damage to plant cells is worsened with high moisture levels.
Soil Cover (Mulch/Snow)	Several inches of mulch or snow covering the soil around the plant significantly slows the rate of heat-loss from the soil to the cold air.
In-Ground Plant Maturity	3 or more years are required for development of the full root structure necessary for an optimally winter-robust plant. During the interim years, there is a greater risk of winter damage.
Plant Crown Mass & Volume	Palms re-use the crown foliage tissues to resupply the palm heart with nutrients. Insufficient crown can result in a shortage of "repair nutrients" to feed the palm after major winter damage causing palm death.
Exposure to Warming Sunlight	Direct sunlight on the trunk can allow the growing palm heart to warm significantly even while air temps are below freezing.
Overhead Canopy Protection	The "free protection" from overhead canopy can make a significant difference in tender plant survival.
Previous Stress	Unbalanced annual rainfall encourages many plants to develop roots in the top soil levels during the wet autumn and spring months. When the rains stop in summer, the upper roots dry and the resulting summer stress can weaken the plant for the following winter.
Fertilizer & Plant Health	The boosting of overall health and vigor of planted palms through the application of optimal fertilizers is critical to supply the plants with sufficient nutrients to fend off the harsh conditions of winter.
Plant Maturity	Mature, robust, physically large plants will have some inherent advantages in tolerating harsh winter conditions.
Previous Exposure to Cold	Though not well understood, it is commonly observed that previous exposure and recovery from a harsh winter will significantly enhance future cold winter tolerance. You may learn more about this odd finding when talking 'palms' with long time palmophiles.
Plant Provenance/Plant Source	Possibly the most important piece of plant information is the provenance of the specific specimen for sale. Though rarely provided, there are exceptions as when plants are purchased at a Palm Society sale where the plant has been grown from seed from known adult trees. This aspect see several adjacent seemingly identical trees randomly succumb to a harsh winter in identical growing and microclimate conditions.

Hopefully, the above list will serve as food for thought as you design, plan and install your garden palms. I am sure that there are other criteria involved in Palm Hardiness and perhaps in the coming years, we will learn more on this topic.