

## **FROST PROTECTION FOR TROPICAL & TENDER PLANTS**

Phoenix and the lower Salt River Basin is historically subject to to at least one but sometimes several frosts that occur in the later half of December and early January killing tender plants and damaging many subtropical plants like citrus. But, in 1967, a severe, Valley-wide freeze killed to the ground every living thing in my yard. Microclimates occur all over this valley. If you are lucky enough to be in a warm-spot that allowed you to escape unscathed last winter, different atmospheric and climatic conditions in the next few months could wipe out years of hard work devoted to your laqndscape. The best defense is to start early to develop a plan of defense.

### **FROST PROTECTION**

The Salt River Basin, the area that roughly includes Phoenix and the flatlands that surround it, experienced three episodes of mild frost in December of 1997. The winter of 1998 had an almost identical record. 1999 had no frost except for a few "Outlying pockets" that, if you are in one of them, may have formed an ice film on your birdbath. These years are typical of the winter climate in the Salt River Basin. History warns us, however, that rare, killing freezes are possible through March. The seasoned rare fruit grower assumes this "rare" disaster will hit again during the present year and he plans accordingly for a worst-case scenario.

**A course of action:** Study every plant with a critical eye, determine what precisely needs be done to protect each one and record the information in a spiral notebook. Make a list of essential materials. Buy the stuff and be ready to put your plan into action on very short notice.

Do for trees and bushes the same thing you would do for yourself if you had to be outside on a cold night; don a warm hat and enough clothing to prevent your body heat from escaping into the atmosphere. Likewise, you must preserve the heat that has soaked into the soil and foliage during the day. The basic strategy for that is to cover all plants that you can reach with a material that can reflect the heat waves back into the tender, vegetative mass you are covering. Exactly the same mechanism takes place under a cloud cover. There are several types of effective frost cloth carried by plant nurseries. Covers that you can scrounge from your habitat include bed sheets, burlap and anything similar that can be placed over the plant to extend all the way to the ground. If the foliage and branches can't support the weight, put a stake or a couple of garden tools in the center to hold it up. Plastic covering is okay but it should **not** contact the foliage. The objective of cover is to conserve the heat already there. An extended freeze may kill the foliage anyway, covered or not, but for added protection, place a heat source beneath the temporary structure.

If you can't cover the plants, the second line of defense is to import heat from any source available. As a last resort, if you can drive the hood of your car underneath a valued tree, start the engine when the temperature approaches 32F and let it idle until danger passes. Seriously! You may want to weigh that action, however, against the price of gasoline. But, use any heat source you can find: Electric heaters, Christmas tree lights are quite efficient, any light bulbs, flood lamps, heat and sun tan lights that you can safely lay or hang will help. If feasible, cover the plants as well for double protection. When it freezes in the Salt River Basin, the air is always dry and electrical shorts caused by moisture are generally not a concern. It will never freeze in the Phoenix area when the humidity is high or when it is overcast and raining. When using electricity, observe carefully all safety precautions at all times.

During our freezes, the air is usually dead still except on slopes where the denser, heavier air drifts by virtue of its weight to a lower level. On that slope where the air is actually flowing, it will be warmer. Friction created from movement of air molecules generates heat. Where it puddles in a basin, against a wall or building, it will be colder. A third main line of defense is to create air movement with the use of electric fans. Direct the wash into the foliage. In many commercial citrus growing areas, trees and crops are protected with large propellers usually powered with diesel fuel or aviation gasoline. Good oscillating industrial shop fans on a stand cost \$40 to \$80.

There are other precautions that hardly need mentioning. Containerized plants can be dragged inside or parked under the dense foliage of another tree. Locate them beneath extended eaves, under a patio or ramada, adjacent to south facing concrete structures. Beware of cold air traps described above. Remove all mulch. **Dry, hard ground and dry foliage--not saturated with water, that is, increase chances of survival according to some horticulturists.**

Mist systems and overhead, oscillating sprinklers and foggers can help but the mechanics need clarification and research and may not be feasible in a home garden. This grower's only such experience resulted in four adult citrus trees and an area of about 4000 square feet covered in places with an inch of ice but not a leaf nor a piece of fruit suffered damage. The oscillator eventually seized but the water continued to flow.

Most of us grow bananas and papayas having very tender leaves. More than one year old, most are too tall to cover. A freeze severe enough to damage roots is not likely. I don't waste time protecting them except to keep the root zone as dry as possible to prevent rot. Tender stems will suffer damage but are easily protected with wrappings of blankets, jackets or old sweaters. You can also wrap the trunks with Christmas tree lights. Do anything you can to save the stems and foliage except irrigate: Cold, wet soil will kill them.

If other woody evergreen plants are defoliated by frost, direct sun will damage previously shaded bark. Paint the trunks and main

branches immediately with white latex to protect against sunburn, even in the winter. Leaves will return when weather warms up. I have never seen stem sun damage on defoliated bananas or papayas.

Finally, we need to investigate the relatively new field of anti-transpirant sprays. The literature claims the material will prevent some frost damage but my own back yard tests have not been conclusive. A degree or two of frost protection is, however, worth a lot in most of the Salt River Basin where the low is rarely below 31 for only short periods. Get a bottle of it at your local nursery and tell us how it worked for you. The directions I've read insist that all surfaces of foliage be coated. I find that task to be virtually impossible for me to accomplish without a high-pressure sprayer or fogger.

Hardiness Zone 10 is defined as an area with lows from 40 to 30 degrees F with rarely more than 6 freezes of short duration. That places the Salt River Basin squarely in that category. But, growth in most warm climate plants native to areas that never or rarely ever drop below 70 nor rise above 80 is practically shut down when soil temperatures drop into the 40s during winter months when excessive moisture in the root zone from excessive irrigation kills more trees than the low temperature itself.

Material written by Dick Gross, Secretary, for the Arizona Rare Fruit Growers Newsletter.