



# COOPERATIVE EXTENSION

*Bringing the University to You*

---

Fact Sheet-03-71

## Hardening Off Plants

Rodney Davis, Extension Educator

Angela O'Callaghan, Ph.D., Area Extension Specialist

Change can be difficult for anyone...plants are no different. This is especially true of tender young plants moved from comfortable surroundings in the greenhouse or shade house and immediately set out to face the extreme conditions of life in a Nevada landscape. Low humidity, high and low temperatures, wind and alkaline inorganic soils that may be from a clay to a sand may shock young plants. Life can be tough for a plant in the Silver State. Survival can be as difficult for purchased and newly planted trees and shrubs as it is for tender vegetable and bedding plants. As with people, a little time and care can help plants adjust and survive their new surroundings.

### Why is this so?

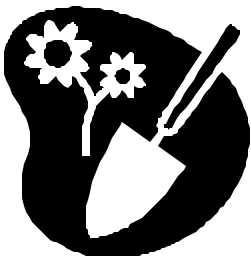
Seedlings that have been started in a cold frame or greenhouse have been protected from harsh conditions. Starting successful crops requires sufficient, but not excess, water, sun, warmth and soil nutrients, and these are usually the conditions under which we plant seeds. Under ideal conditions such as these, plants tend to be more tender and succulent. Their stems do not have the capacity to withstand strong winds and need time to adjust and acclimatize. Biological reactions that permit the plant to respond to different environmental cues and difficult conditions help plants adjust, but several days to weeks may be needed for this to happen.

### How long will it take?

Avoid the disappointment of seeing your new transplants wilt, scorch, or even die by taking a little time to gradually acclimate them to their new environment. How long this takes depends upon:

- The conditions under which a plant was grown.
- The conditions under which the plant was marketed.
- The conditions or site into which it will be planted.
- The environmental conditions under which the plant evolved. A tropical plant may never acclimate to outdoors Nevada.

The more protected their original growing conditions, whether it is in the nursery or the retailer, and the harsher the soil and climate conditions of their new surroundings, the longer the acclimation process will take. For most plants this process will take between a week and ten days.



***"Life can be tough for a plant in the Silver State."***

## What to do?

Remember that the purpose is to gradually introduce the newcomer to the conditions in its final location. There are no hard and fast rules, however. Let the condition of the plant be the guide. The procedure for hardening seedlings is somewhat different from that used for older, larger ornamental plants.

## Seedlings and Young Herbaceous Plants

- ◆ Lower the water levels applied, but **do not let the plants dry out.**
- ◆ Do not fertilize during the hardening-off period.
- ◆ Lower the temperature by about 10 - 15°, but it must remain above freezing.
- ◆ If possible, expose the plants to light or moderate wind.
- ◆ After about 7-10 days they should be sturdy enough to transplant outside.

## For older ornamentals:

- ◆ Begin by placing the plant into a location that is similar to one that will be its eventual home for an hour or two each day.
- ◆ Increase this time gradually each day over the course of the next week or so until the plant is able to withstand a full day under those conditions without showing any signs of stress.

## Remember

Plants in small containers and in peat transplanting pots can dry out very rapidly in the direct sun and/or wind. Monitor them carefully for signs of wilting, scorch or

sunburn, and adjust water and protection accordingly. Protect small or non-woody plants from high winds.

## Houseplants

Many gardeners move their favorite houseplants to the patio or porch to enjoy during the summer months and then back into the house for the winter. The same process of “hardening off” needs to be followed anytime you dramatically change the growing conditions of plants. This is as true in the fall for moving plants indoors as well as in spring.

## Conclusion

It is not difficult to move plants from one environment to another if the plants are given a period to become acclimated to their new conditions.

## References:

Aegerter, Steve, Colorado Master Gardener. *Get Ready to Harden Off Your Transplants. Hardening Off Isn't Hard.* Colorado State University Cooperative Extension, Denver County, Colorado.

Kennel, Holly S. WSU Extension Agent. King County. *Hardening Off.* Michigan State University Extension. Ornamental Plants plus Version 2.0 - 00001574, 1/01/98.

Maynard, D.N. and G.H. Hochmuth. 1997. *Knot's Handbook for Vegetable Growers*, 4<sup>th</sup> edition. John Wiley and Sons, New York.

Zriba, Narjess, Plant Pathologist, Iowa State University. *Hardening Off Transplants, Get Ready to Harden Off Your Transplants.*