



Know Your Respiration Rates!

- After produce is harvested, it “respires.” It takes in oxygen and gives off water vapor, heat, and carbon dioxide during storage.
- The higher the respiration rate, the more perishable a crop is. Respiration rate will help dictate how you want to harvest and handle it for maximum quality and shelf life.
- You should know the respiration rates of your crops before you ever start thinking about particular post-harvest handling practices.

High-Respiration Crops *Harvest cool, store cold*

- These are the most perishable and should be harvested in the cool of the day if possible.
- They need to be stored in the cooler to have maximum shelf life.
- These crops will disintegrate or lose quality if not cooled rapidly. These crops will benefit from hydro-cooling or icing to bring their core temperature down rapidly.
- Keep humidity in: use ice, plastic box liners, pack wet.

Examples of high-respiration crops:	
Asparagus	Leafy Greens
Broccoli	Peas
Green Onions	Sweet Corn
Green-top root vegetables	Spinach
Kale	

Moderate respirators *Harvest cool, store cold*

These crops aren’t quite as sensitive, but still need to be taken care of – they don’t hold quality if they are left too warm.

Examples of moderate-respiration crops that need refrigeration:	
Apples Beets Cabbage Carrots Celeriac	Celery Parsnips Rutabagas Turnips

Low-respiration crops *Can harvest warm; cooling and storage conditions vary*

These crops are the easiest and most forgiving in terms of harvesting. Cool storage is ideal, but they are more tolerant of less-ideal conditions and can sometimes stay in good condition for weeks to months outside of refrigeration.

Examples of low-respiration crops:	
Garlic Onions	Potatoes Winter squash

Chilling-Sensitive Crops

Some low- and moderate-respiration crops are sensitive to cold storage temperatures, especially for long periods of time (over 24 hours and beyond). If these vegetables are allowed to get too cold, customers will notice quality problems once the vegetables return to room temperature.

Examples of chilling-sensitive crops:	
Basil Cucumbers Eggplant Green Beans/Wax Beans Melons	Peppers Potatoes Tomatoes Winter Squash Zucchini/Summer Squash

Acknowledgements

Authors:

Lisa Baker

Laura Frerichs

Editor:

Jane Grimsbo Jewett

Content advisors:

Cindy Tong, Dept. of Horticultural Science, Univ. of MN

Helene Murray, Minnesota Institute for Sustainable Agriculture

Annalisa Hultberg, University of Minnesota

Jan Joannides, Renewing the Countryside