

Apple fruit moisture loss in storage: Influence of variety and cuticular damage in a season of extreme weather

Douglas Alt and Randolph M. Beaudry

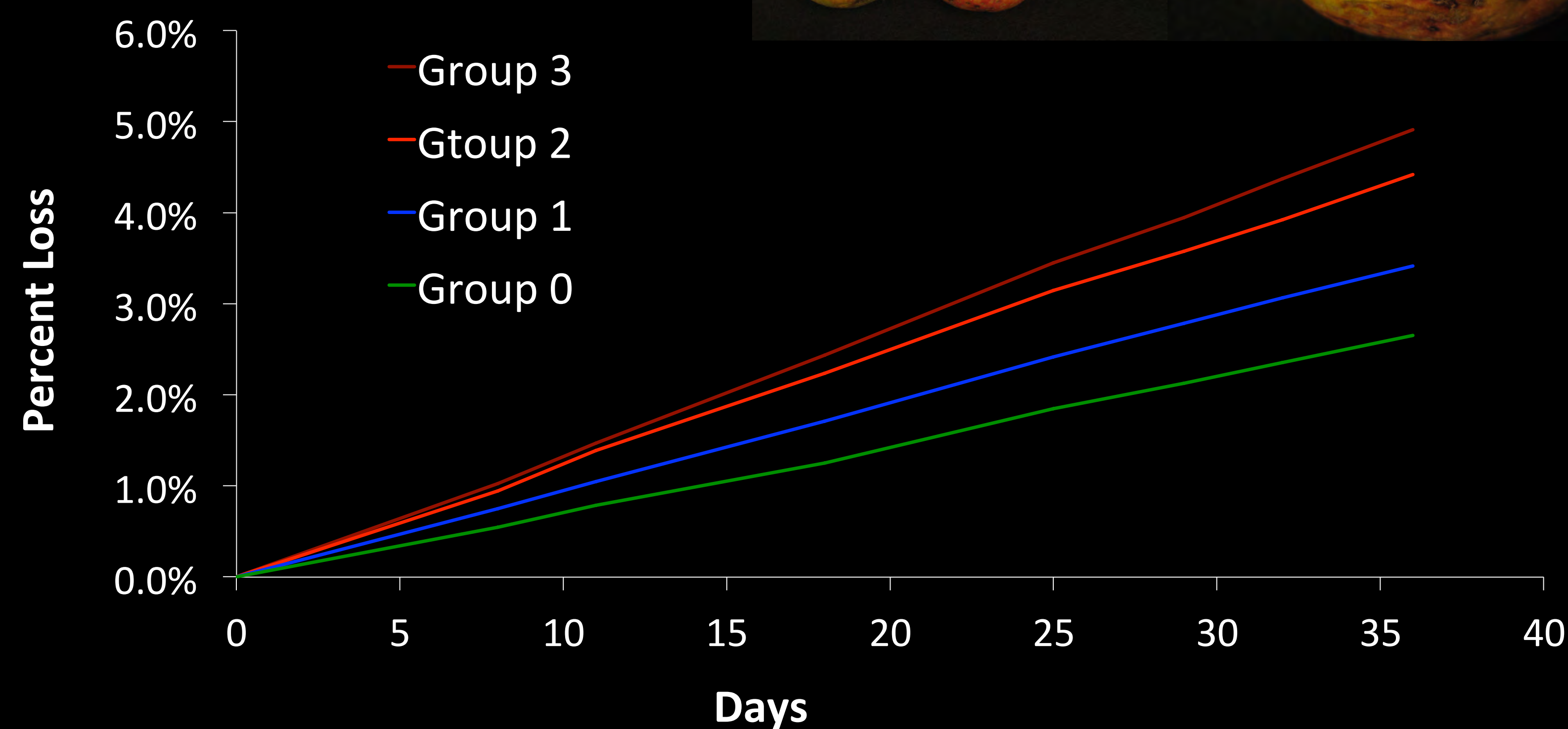
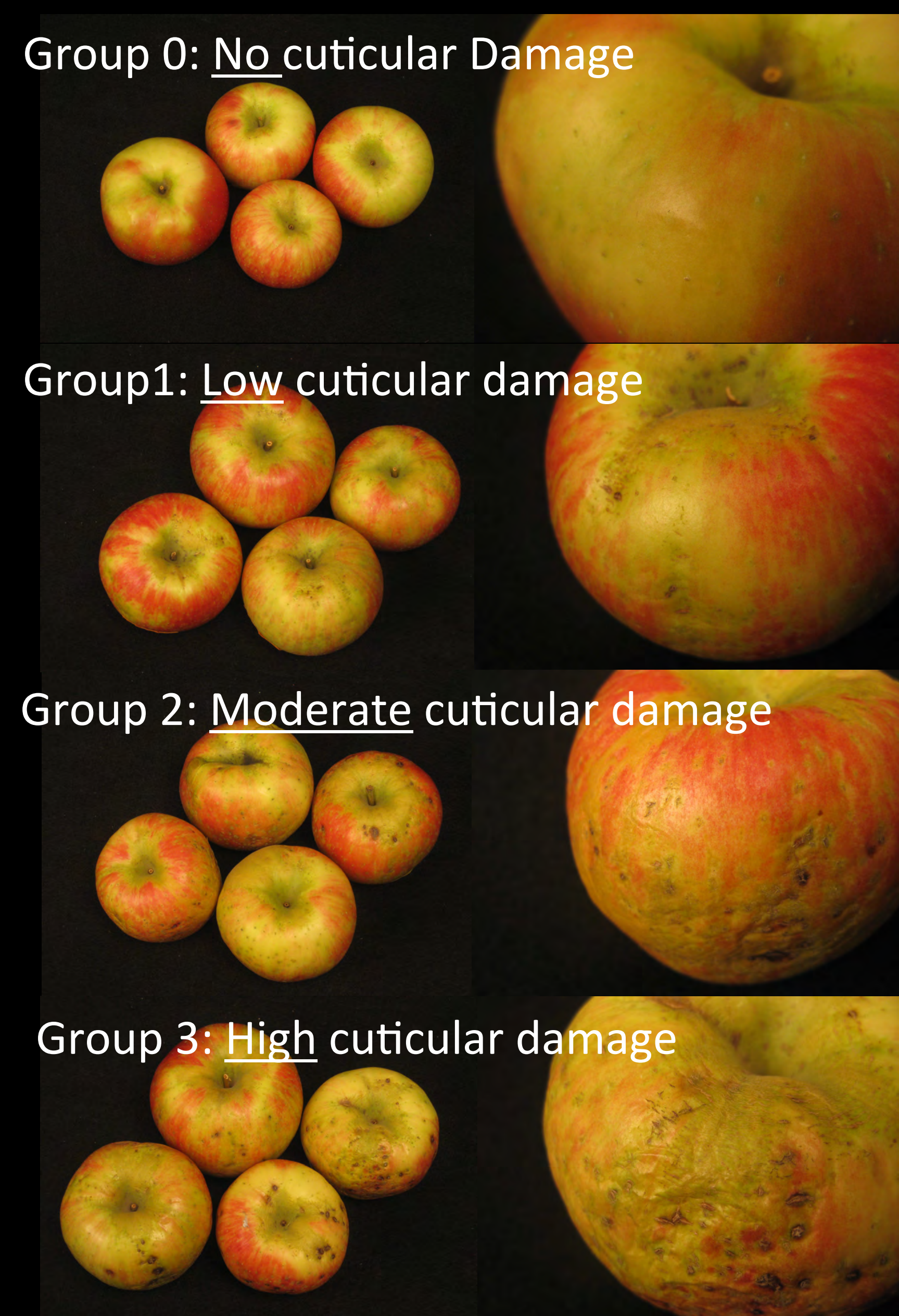
Michigan State University
Department of Horticulture
East Lansing, MI 48824



We noticed in years past that some varieties of apples emerged from storage with a significant percentage of shrivel, while others did not. We also noticed that some years the problem was worse than others, and when shrivel was excessive, there also seemed to be problems with the surface finish (e.g., russet and lenticel enlargement or breakdown). This season, the extreme weather (spring frosts, record high temperatures, and drought) lead to the development of poor surface finish for Honeycrisp, Gala, and Minneiska1914 (marketed as Sweet Tango), which allowed us to look into the problem further. In one experiment (Variety Experiment), we evaluated variation between cultivars. In the second experiment (Cuticular Damage Experiment), we evaluated the effect of surface defects on moisture loss in air storage.

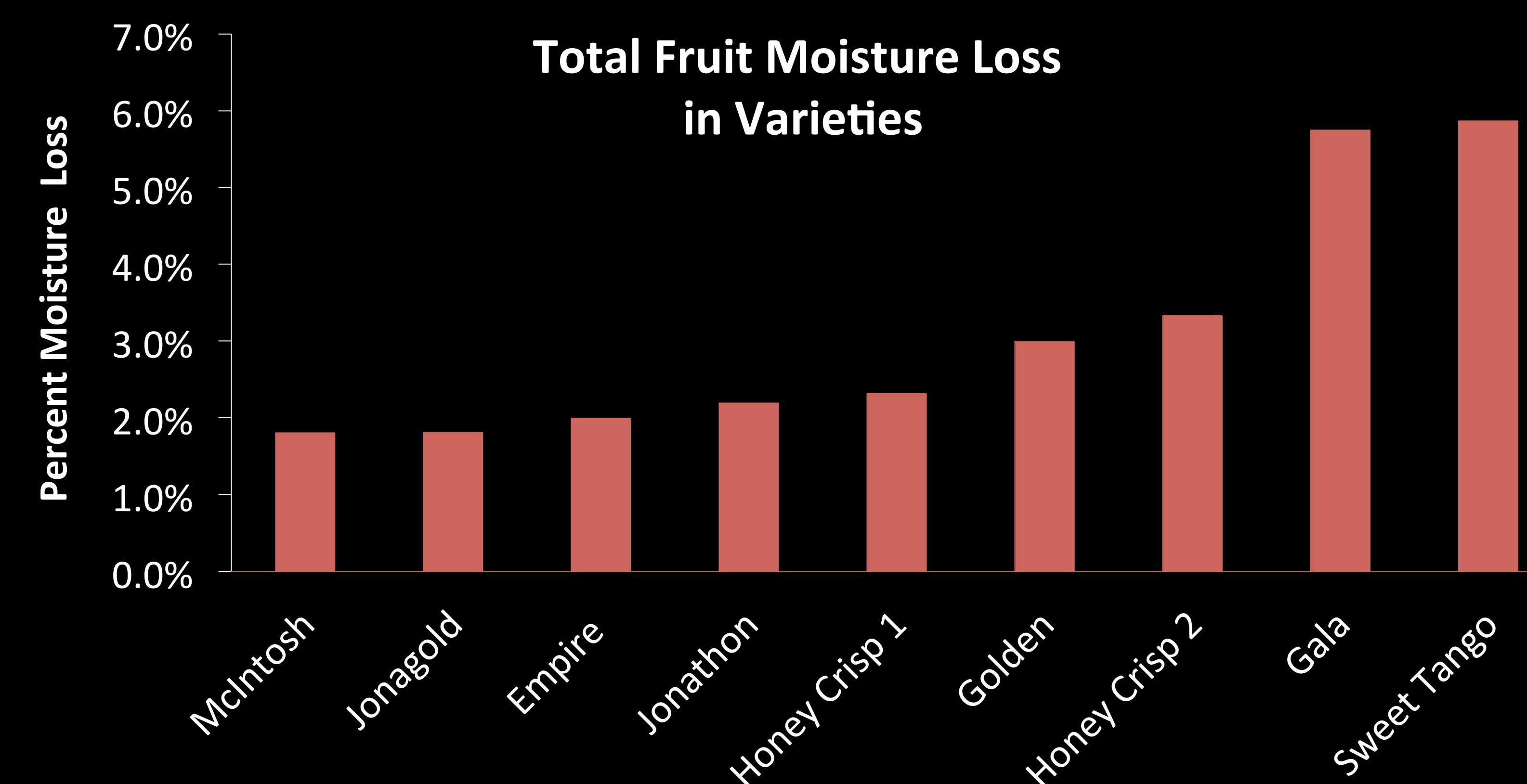
Cuticular Damage Experiment:

Honey Crisp apples where scored on a scale from 0-3 with 0 being no cuticular damage and 3 being a high level of damage. These apples were numbered, weighed to determine initial mass, then placed in a tray pack carton with a carton also topping the apples. The apples were stored in a cold storage room at 1.5°C and 65% relative humidity. Fruit were weighed every 3-7 days. The percent loss of weight was calculated to determine fruit moisture loss. The study was conducted for 36 days.

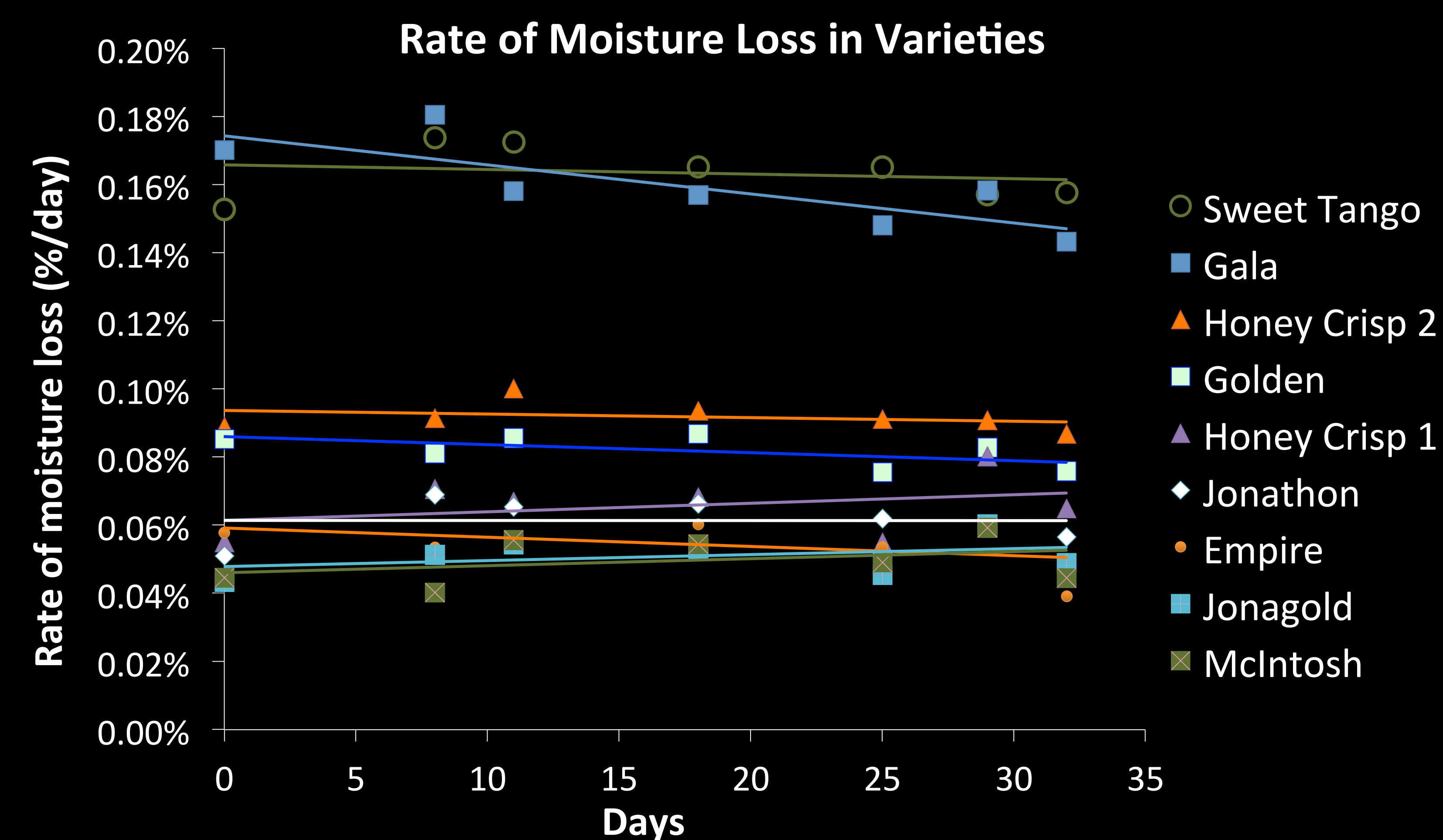


Results: The amount of moisture loss was directly related to the amount of cuticular damage on the apple. The more damage to the apples cuticle, the more moisture the apple lost.

Variety Experiment: Twenty apples were randomly selected per variety. The apples were weighed for an initial mass, then numbered and placed in a tray pack carton with a carton also topping the apples. The apples were stored in a cold storage room at 1.5°C and 65% RH. They were weighed every 3-7 days to determine the fruit moisture loss over a period of 36 days.



Moisture loss differed across varieties. SweetTango and Gala varieties lost significantly more moisture than the rest of the tested varieties. The older varieties such as McIntosh and Empire seem to have a thicker cuticle which would retain more water. The Jonagold variety seemed to secrete more wax onto the cuticle which would help lower moisture loss. SweetTango and Gala had surface defects, which would add to the amount of moisture lost.



Moisture loss slowly decreased with storage time, but differed between varieties. The Sweet Tango and Gala varieties had much higher rates of moisture loss than the other varieties for the duration of the experiment.

