COOKING TIME IN SLOW VS. REGULAR DARKENING PINTO BEANS

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BACKGROUND

1533-15 is a slow darkening (SD) pinto bean developed at the University of Saskatchewan. It cooks faster than its close relative, the regular darkening (RD) CDC Pintium, whether it is stored under ideal (cold and dark) or typical (room temperature and light) conditions (Fig. 1). A population of RILs derived from a cross between CDC Pintium and 1533-15 has been developed and SD is controlled by a single recessive gene (Junk-Knievel *et al.* 2008). To establish whether the difference in cooking time between 1533-15 and CDC Pintium is related to the SD trait or a different factor, a set of SD and RD RILs were tested for cooking time following harvest and after storage.

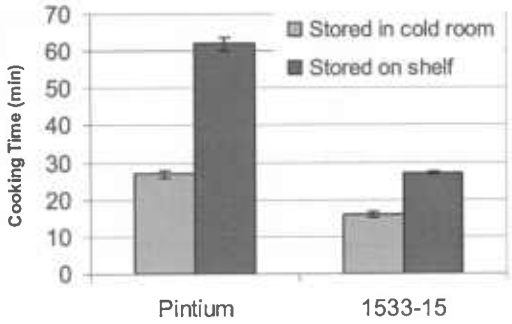

Figure 1. Cooking times of CDC Pintium (RD) and 1533-15 (SD) stored for 8 months in a darkened cold room or on a shelf and exposed to light.

MATERIAL AND METHODS

Plants were grown in a two rep test near Saskatoon in the summer of 2006. Harvested seed samples were cleaned and placed in a humidity-controlled chamber for several days to equilibrate the moisture content of the samples. Samples of each RIL were divided into three groups: one for immediate cooking (fresh), one for storage in the freezer (freezer) and one for storage on the shelf at room temperature (shelf). RILs were assessed for darkening phenotype using the Hunter Lab colorimeter L-values measured after exposing the samples to UV light for 48h (Junk-Knievel *et al.*, 2007). The 9 lightest RILs and the 10 darkest RILs were selected for cooking tests.

Seeds were weighed then soaked in tap water for 4 hours. Soaked seeds were strained and re-weighed to determine hydration coefficient (soaked weight/dry weight; HC). Twenty-five randomly chosen seeds were nicked and placed in a Mattson cooker filled with boiling water. Cooking time was recorded when 20/25 seeds were punctured by the probes of the cooker. HCs were calculated for stored seeds 10 months after harvest to simulate 'old crop'.

RESULTS

The HC for fresh seeds was highly negatively correlated with cooking time (-0.94). 1533-15 had a higher HC and a corresponding faster cooking time than CDC Pintium (Fig. 2). While there

were large differences amongst the RILs for HC and cooking time following harvest, it could not be attributed to the darkening phenotype (RD vs SD) (Fig. 2). Interestingly, segregation of the RIL population for shiny and matte seed coats, independent of the darkening phenotype, led to the finding that shiny seed coat was correlated with lower HC and longer cooking time (Fig. 3).

No significant difference between SD and RD RILs for HC following storage under either condition was observed ($p = 0.35$ and 0.96 for freezer and shelf, respectively). Shiny RILs always had significantly lower HC than matte RILs (Fig. 3). Storage did not appear to affect HC for any phenotype (Fig. 3).

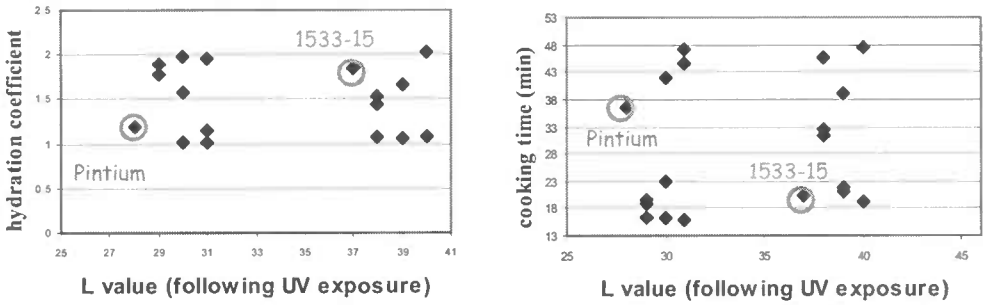

Figure 2. Hydration coefficient (left) and cooking time (right) for SD (high L-value) and RD (low L-value) RILs and parents following harvest. Average of two reps.

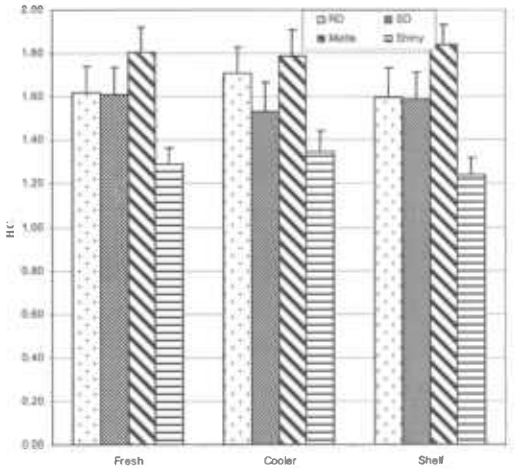

Figure 3. Average HC for RILs classified according to their seed coat darkening phenotype (RD or SD) or luster (shiny or matte). Data from one rep only.

CONCLUSIONS

Based on data from one year, the SD phenotype had no significant effect on cooking time, but seed coat luster had a significant effect with shiny beans having longer cooking times.
Seed coat luster and darkening phenotype are not correlated. A second year of testing is underway to confirm these results.

ACKNOWLEDGMENTS

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REFERENCES

Junk-Knievel *et al.* 2007. Crop Sci.47: 693-700.
Junk-Knievel *et al.* 2008. Crop Sci. 48: 189–193.