Maintaining Dry Bean Grain Quality in Storage

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Dry bean grain quality deteriorates in storage. With time, seeds become harder, increasing cooking time, and light-colored seedcoats tend to darken, compromising appearance. Growers are interested in on-farm storage to improve marketing options, but need information on proper storage conditions to maintain quality. This research was conducted to quantify the effects of harvest moisture content, storage temperature and moisture content, ultraviolet light exposure, and time on bean quality. Pinto bean variety Maverick was sown at the NDSU Carrington Research Extension Center in 1999. Samples were harvested periodically during drydown to determine quality deterioration in the field. The bulk of the crop was straight-combined at 19% grain moisture and transported to the NDSU Agricultural Biosystems and Engineering Department laboratory for imposition of storage treatments.

After 120 days at 18, 16, or 14% moisture, beans stored at 80^{o} F were darker than those stored at 40^{o} F. The degree of darkening increased with moisture content. Beans stored at 18% moisture and 40^{o} F were lighter-colored than those stored at 14% moisture and 80^{o} F, indicating the importance of temperature in maintaining color.

Ultraviolet light dramatically darkened the beans within two weeks. These results indicate a need to minimize exposure to light in storage and possibly even before storage. Approximately 70% of bean handlers use flat storage, which exposes a large surface area to potential discoloration by light. Slight darkening occurred in the field as the beans dried from 20 to 13% moisture, but no precipitation events were recorded during this period. The amount of bean damage occurring during harvest increased drastically as the harvest moisture content decreased. 1

Relative darkening of beans during storage.

80^{o}F 18% moisture	**80^{o}F 14% moisture**	**40^{o}F 14% moisture**	**40^{o}F 18% moisture**