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Cadmium Concentration in Grains of Japanese Wheat Cultivars : Genotypic Difference and Relationship with Agronomic Characteristics

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Abstract: The contamination of cadmium (Cd) into the food chain can be harmful because Cd causes chronic health problems. To evaluate the breeding potential reducing the Cd concentration in wheat grain, we compared Cd concentrations in 237 wheat genotypes including Japanese landraces, Japanese cultivars and introduced alien cultivars for breeding using grain samples collected from upland fields in 2004-5 and 2005-6 growing seasons. The Cd concentration in wheat grain significantly varied with the growing seasons and with the experimental fields. Cultivars bred in northern Japan, including the recent Japanese leading cultivar 'Hokushin', tended to have a low Cd concentration in grain compared with that bred in central and southern Japan. Simple correlation analysis between Cd concentration in grain and agronomic characteristics revealed that the Cd concentration in grain showed significant negative correlations with stem number, culm length and spikelet number per spike, and showed significant positive correlation with SPAD value (chlorophyll content) of flag leaf. Stepwise multiple-regression analysis showed that the genotypic variation of Cd concentration in grain was associated with the culm length and spikelet number per spike. This study clarified the geographical pattern of genotypes with different Cd concentrations in grain in Japanese wheat cultivars. Cultivars originating from northern Japan may be useful genetic resources to develop cultivars with a low Cd concentration in grain to be grown in the areas where Cd accumulation in wheat grain is a problem.

Keywords: [Cadmium](#), [Genotypic variation](#), [Grain](#), [Heavy metal](#), [Soil contamination](#), [Triticum aestivum](#), [Wheat](#)

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