Diversity of Physical Grain Quality Traits in Tropical Sorghum Genotypes

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Abstract

The current study envisioned to assess the physical traits of sorghum grain for selected sorghum genotypes. Seed for the genotypes was sourced from the Lupane State University Gene Bank and grown during the 2022/23 agricultural season at Lupane State University Farm experimental plots. At maturity, laboratory tests on kernel/grain hardness, 100 kernel weight, bulk density, kernel diameter, colour and determination of presence of tannins through qualitative tests were done for all the 24 sorghum genotypes. Results from analysis of variance demonstrated highly significant differences ($P<0.001$) on kernel weight, kernel diameter, kernel hardness and grain hardness showing a great diversity of physical traits among all the 22 genotypes and 2 commercial varieties of sorghum. Mean 100 kernel weight was 2.59g, kernel diameter was 3.49mm, bulk density was 1.23g/cm3and kernel hardness was 28.9%. Visual assessment was done on grain colour and seed was classified under red, cream, white and brown sorghums, and mixed colours. A chi-square test found a significant relationship between grain colour and presence of tannins. Genotypes NPGRC3124, IS9405 showed moderate levels of tannins while IS13996, IS29925, NPGRC1699, NPGRC1156 and NPGRC1478 had high levels. A highly significant strong positive correlation was shown for sorghum genotype between kernel diameter and kernel weight ($r=0.81$ at $p\leq0.05$). Highly significant positive correlation was also observed between bulk density and kernel weight ($r=0.4173$ at $p\leq0.001$). Kernel hardness has a strong positive correlation with bulk density ($r=0.6242$). Quantification of tannins is recommended to prevent negative effects on human and livestock health.

Keywords: Color; kernel; hardness; tannins, shape