Title	Modelling stored product ecosystems using the postharvest aeration and storage simulation tool (PHAST) with realistic boundary conditions.
Authors	Maier, D. E., Ileleji, K. E. and Montross, M. D.
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Abstract

A previously developed finite-element model of the heat, mass and momentum transfer during aerated and non-aerated grain storage was used to investigate the traditional theory of moisture migration (i.e. the movement of excessive moisture in a grain mass during non-aerated storage, which can lead to spoilage). Very little moisture accumulation at the exposed top surface of the bulk (less than 0.1 percentage points) was predicted for a non-aerated bin with a diameter of 5.5 m and an eave height of 11.0 m in Indianapolis, Indiana, USA, during 12 months of storage. The model used permeable boundaries that allowed natural convection currents to originate and flow into the headspace and plenum air. It was determined that moisture "migration" in the traditional sense did not occur. Instead, a more realistic theory of moisture equilibration between the grain mass and headspace and plenum air was developed. Moisture accumulation in the upper portions of a grain mass occurred primarily due to natural convection currents that entered and exited the headspace. By controlling the equilibrium relative humidity of the headspace, moisture accumulation at the grain surface of a bin could be minimized.