Title The importance of moisture changes at the grain surface.

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Abstract

Studies are presented on seasonal changes in moisture content at the grain surface, diurnal changes in relative humidity (rh) and surface moisture uptake, effect of aeration on surface moisture uptake, effect of bulk moisture content and sealing on surface moisture uptake, and effect of bulk moisture content on mite populations, particularly those conducted on wheat and barley. To evaluate whether surface uptake could be limited to control mite (*Acarus siro* and *Lepidoglyphus destructor*) populations, bins containing 25 kg of wheat were held at constant conditions of 15 deg C and 80% rh, and sealed with shrouds of nylon woven tarpaulin, plastic sheeting (nylon polythene laminate) or butyl rubber, or left uncovered as a control. The controls steadily absorbed moisture and had a median surface mc of 16.3% after 18 weeks. The shrouded replicates also steadily absorbed moisture but the uptake was reduced by 0.5-1%, depending upon the material. The plastic sheeting resulted in the lowest mc and mite infestation (a reduction of approximately 10-fold for *A. siro*) after 18 weeks.