Abstract

Susceptibility to two storage insect pests [(*Cryptolestes pusillus* (Schönherr) and *Oryzaephilus surinamensis* (L.)] of eight commercial oat cultivars from the United States was determined in laboratory studies. Duration of insect development was shorter and number of progeny produced was greater on cracked than on whole oats. Simulations based on data from the study showed that insect populations would reach the threshold level for treatment in 2–3 months of storage at 30°C on cracked oats. Insect population development was slowest on the hulless cultivar Paul when the oat kernels were cracked. Simulations also indicated that all cultivars of whole oats tested could be stored for at least 1 yr at 30°C without reaching the threshold for treatment when infested with these two species of insects, and insect populations would decrease over time on the cultivars Don, Jerry, Milton, NewDak, Otana, and Valley. Analyses of oat grain quality characteristics, including kernel weight, groat hardness, and groat composition, provided little insight into the mechanism of observed differences in insect development among cultivars. Hardness of the kernels (as indicated by % broken groats after dehulling) may be related to near immunity to these two species of insects in whole Otana. Steaming whole oats to inactivate hydrolytic enzymes in the trichomes of the pericarp did not increase susceptibility to these two species of insects, suggesting that enzymes in the trichomes were not responsible for insect population development being slower on whole oats than on cracked oats. Although we were unable to identify the factors that determined relative susceptibility in this study, the results will be useful for selecting commercial oat cultivars for planting that will be less susceptible to insect pests in storage and suggest that the economics of cleaning oats before storage to reduce insect population growth should be investigated.