

THE EFFECT OF MODIFIED ATMOSPHERES ON THE JUVENILE  
STAGES OF SIX GRAIN BEETLES

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The adult emergence after the exposure of the juvenile stages of six species of grain beetle, *Cryptolestes ferrugineus* (Stephens), *Oryzaephilus surinamensis* (L.), *Rhizopertha dominica* (F.), *Sitophilus granarius* (L.), *S. oryzae* (L), and *Tribolium castaneum* (Herbst), to three modified atmosphere mixtures (MA) was assessed at 15°C and 70% r.h.. The use of this low temperature was important as it is representative of the conditions prevalent in grain stores at the start of the U.K. storage season.

The juvenile stages were exposed to three separate MAs, based on nitrogen, simulated burner gas and carbon dioxide, with 0.5 or 2% oxygen. The internal grain feeders, *R. dominica*, *S. granarius* and *S. oryzae* were able to emerge even after lengthy exposures to the MAs and of these, *S. granarius* was the most tolerant. Of the other species, *T. castaneum* was the most tolerant and its pupae required 10 days exposure to prevent emergence. Carbon dioxide was the most effective of the MAs, followed by simulated burner gas and then nitrogen.