RESISTANCE - A THREAT TO THE USE OF CONTROLLED ATMOSPHERES FOR STORED PRODUCT PROTECTION?

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With the very limited number of stored product protection agents available today the danger of insecticide resistance is a serious threat and increases the need for a sound resistance management. Controlled Atmospheres (CAs) low in oxygen and/or high in carbon dioxide have been registered for stored product protection purposes in many countries during the last decade. Even though CA treatments require a high degree of gas tightness and technical skills their importance is growing partly due to the fact that they do not leave residues in the treated product, that minor leaks do not produce health risks to exposed people, and that there is no unforeseen environmental risk in the use of nitrogen or carbon dioxide.

So far there are no reports of resistance to practical CA treatments. A comparison of 8 lab and 2 field strains of the granary weevil *Sitophilus granarius* from six countries revealed no significant variation in susceptibility towards various CAs. However, in a comparison of the strains, medium adult body weight correlated with the relative tolerance to an atmosphere with 95 % CO_2 (rest air). Other lab studies proved that increasing commodity moisture contents or increasing residual oxygen contents correlate with insect survival. At high moisture contents individuals tolerant or even resistant to hypoxic or hypercarbic atmospheres could be selected for.

Lethal exposure periods to secure complete disinfestation at a given commodity temperature and commodity moisture content need to be identified for all major pests, in order to minimise the risk of resistance develoment.