References

APPEL, A.G. 1995. *Blattella* and related species, pp. 1-19. *In* M. K. Rust, J. M.Owens, and D. A. Reierson [eds.], Understanding and controlling the German cockroach. Oxford University Press, New York.

ATKINSON, T.H, KOEHLER, P.G., PATTERSON, R.S. 1991. Catalog and atlas o f the cockroaches (Dictyoptera) o f the North America north o f Mexico. Entomol. Soc. Am. Miscell. Publication. 78:1-86.

ISIKBER, A.A., OZTEKIN, S., 2009. Comparison of susceptibility of two stored product insects, *Ephestia kuehniella* Zeller and *Tribolium confusum* du Val to gaseous ozone. *Journal of Stored Products Research* 45: 159-164.

KIM, J.G., YOUSEF, A.E., KHADRE, M.A. 2003 Ozone and its current and future exposure in the food industry. Advances in Food and utrition Research 45: 167-218.

MULLEN, G., LANCE, D., CAMERON, C., DANIEL, P., LYNSEY, L., MICHAEL, G., REBECCA, E. 2002. Medical and Veterinary Entomology. Academic Press. 0-12-510451-0. ss. sf.32. Amsterdam.

ROBERTS, J. 1996. Cockroaches linked with asthma. Br Med J. 312 (7047): 1630.

RUST, M.K., D.A. REIERSON, AND B.C. ZIECHNER. 1993. Relationship between insecticide resistance and performance in choice tests of field collected German cockroaches (Dictyoptera: Blattellidae). J.Econ. Entomol**.** 86: 1124–1130.

Does the lower concentration of anticoagulants affect the efficacy of rodenticide baits?

Marcela Frankova, Radek Aulicky, Vaclav Stejskal

Crop Research Institute, Drnovska 507, Prague 6, CZ-16106;
*Corresponding author: frankova@vurv.cz

DOI 10.5073/jka.2018.463.231

Extended abstract

Rodents belong to dominant synanthropic pests in agriculture environment, where cause wide range of damages by feeding on crops, gnawing of materials and faecal/urine contamination (Frankova et al. 2016, Stejskal et al. 2016). Rodents are predominatly controlled by anticoagulant-based rodenticides (AR) with the chronic mode of action (e.g. Frankova et al. 2017). Their delayed efficacy prevents rodents to connect the consumption of the bait with subsequent toxic effects and thus, favours them over other chemical rodenticides. On the other hand, application of ARs is permitted under strict regulation (Regulation (EU) No 528/2012) as ARs are considered as PBT (i.e. persistency, bioaccumulativity and toxicity) substances which pose environmental risks.

In addition, EU Commission recently adopted reclassification of ARs products (Commission Regulation (EU) 2016/1179; shall apply from 1 March 2018) - rodenticides with anticoagulant of 30 ppm or more must be labelled as "toxic to reproduction" and will be available to professional use only. Currently, it concerns seven of the eight approved anticoagulants, which contain 50 ppm of active substance. This Regulation leads manufacturer to produce rodenticide baits with a decreased concentration of anticoagulants to avoid a reclassification of products.

We focused on the testing efficacy of standard (50 ppm) and lower (25 ppm) concentration of anticoagulant in two brodifacoum-based baits in wild house mouse (Mus musculus). The laboratory no-choice feeding tests showed 100% mortality (mean survival time was 5.3 ± 2.1 days) for both concentrations. The consequent field experiments confirmed the previous laboratory results for the new baits with the lowered concentration (i.e. 25 ppm): during the three-week application period we found a significant decrease of both the tested bait and monitoring non-toxic bait consumption. Our study shows promising efficacy of products with the lowered concentration of brodifacoum. Nevertheless, there is a work ahead rodent scientists to illuminate the new baits efficacy in rodent populations with the decreased physiological sensitivity or increased resistance to anticoagulants.

Acknowledgement

This study was supported the Ministry of Agriculture of the Czech Republic (project No. RO 0418).

References

COMMISSION REGULATION (EU) 2016/1179 of 19 July 2016 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures

FRANKOVA, M., STEJSKAL, V. AND R. AULICKY, 2017: Suppression of food intake by house mouse (*Mus musculus*) following ingestion of brodifacoum-based rodenticide bait. - Crop Protection **100**:134-137.

FRANKOVA, M., STEJSKAL, V., RODL P. AND R. AULICKY, 2016: Current threats of rodents and Integrated Pest Management (IPM) for stored grain and malting barley. - Kvasny prumysl **62**(10): 306–310.

REGULATION (EU) NO 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products

STEJSKAL, V., RODL, P. AND R. AULICKY, 2016: Pestilental activities of rodents at farms and in stores of agro-food commodities. - International Pest Control **58**(2): 90–95.