

# Comparison of dehusking experiments of laboratory mice and wild *Apodemus spec.* mice

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## Introduction

Concerning treated seeds, dehusking behaviour (the peeling of seeds before ingestion) of small mammals may reduce exposure to pesticides used as treated seeds. The active substance is mainly located on the husk and therefore dehusking can reduce the amount of active substance ingested. From anecdotal evidence found in literature it seems likely that *Apodemus spec.* mice generally dehusk seeds they feed on. So, they would ingest reduced amounts of the active substance absorbed to the seed coat by direct contact with mouth and tongue or by cleaning the paws after handling of treated seeds. This presentation aims to compare the dehusking behaviour of independent studies conducted with lab mice and wild caught mice of the genus *Apodemus* when feeding on maize or sunflower seeds.

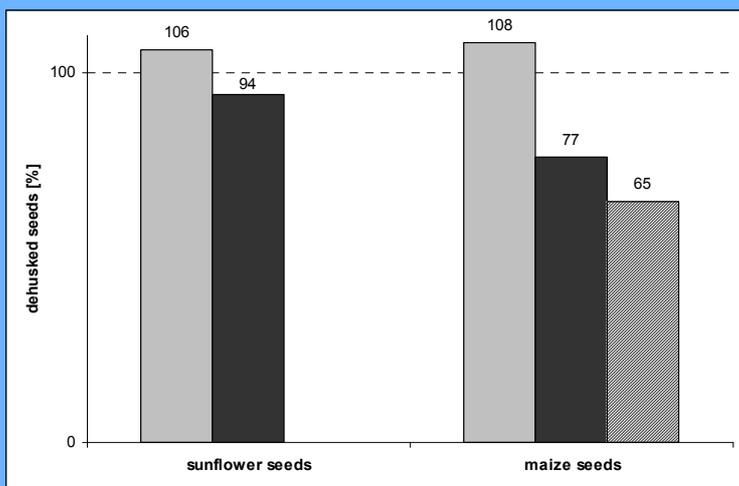
## Materials and Methods

Three feeding trials were conducted in the laboratory to explore and compare dehusking behaviour of laboratory mice (*Mus musculus*) and wild-caught *Apodemus spec.* mice as follows:

- To 5 laboratory mice were offered 10g of sunflower or maize seeds, respectively, on three consecutive days, however, the number of seeds given was not known (Trial A).
- A total of 12 wild *Apodemus spec.* mice were separated randomly in two groups of 6 animals each. To the first group 6g of sunflower seeds was offered on three consecutive days followed, after a break of 4 days, by 10g of maize seeds on three consecutive days. To the second group first maize seeds and then sunflower seeds were offered. Also the number of seeds given was known (Trial B1).
- To 10 yellow-necked mice (*Apodemus flavicollis*) were offered at the first day half of the average food intake known from the second feeding trial, on day two the normal food intake and on day three again half of the average food intake calculated from the second trial, and the number of seeds given was known (Trial B2).

In addition to evaluate the dehusking efficiency per seed, sunflower and maize seeds were dehusked by lab staff members to get a calibration value for 100% husk material. The dehusking efficiency was calculated as amount of husk remains / whole seeds eaten by the mice.

## Results



**Figure:** Percentage of sunflower (left) and maize seeds (right) dehusked by mice during the 3 trials. Please note that values above 100% (lab mice) are probably due to converting number of seeds (N) from amount seeds given (g)

- Laboratory mice (Trial A)
- Wild *Apodemus spec.* mice (Trial B1)
- ▨ Yellow-necked mice under food shortage (Trial B2)

**Table:** Dehusking efficiency per seed for the different seed types

Species	Sunflower		Maize	
	husk[mg] per seed	dehusking [%] per seed	husk[mg] per seed	dehusking [%] per seed
Peeled by hand*	20.0	100	16.9	100
Laboratory mice	21.1	106	17.7	105
<i>Apodemus spec.</i>	17.9	90	10.5	62
Yellow-necked mice	-	-	10.9	65

\* done by lab staff member

### Laboratory mice:

The percentage of seeds dehusked and the dehusking efficiency for sunflower and maize were > 100%. The reason for the overestimation seems to be the study design, where only weight of given food was noted and not the exact number of seeds. Due to the derived conversion factor the results therefore have to be carefully interpreted.

### *Apodemus spec.* mice:

Both seed types were regularly dehusked, however, percentage of eaten seeds dehusked and the dehusking efficiency per seed was higher for sunflower seeds than for maize seeds.

### Yellow-necked mice:

Even under food shortage app. 65% of the maize seeds were still dehusked and the dehusking efficiency per seed was on the same level.

## Conclusions and Outlook

All the individuals of the species tested dehusked maize or sunflower seed at similar levels suggesting dehusking is a common behaviour.

The captured wild *Apodemus spec.* mice dehusked nearly all sunflower seeds, and this could easily be shown due to the structure of the sunflower seed where the seed coat and the fruit coat are not grown together. Dehusking of maize seed was less effective, which might be attributed to the fact that in maize the outer layer of the seed is firmly adhered to the rest of the kernel. However dehusking was still a pronounced behaviour in *Apodemus spp.* mice because even under food shortage maize seeds were dehusked.

Further experiments with comparable study designs for laboratory mice and *Apodemus spec.* mice are needed to evaluate the role of laboratory mice as model organisms for dehusking behaviour of small rodents.



Laboratory mouse (*Mus musculus*)



Yellow-necked mouse (*Apodemus flavicollis*)