

Effect of various crop associations on the health and reproductive success of the European hamster (*Cricetus cricetus*)

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The current loss of biodiversity is particularly pronounced in agricultural areas, where intensive farming practices have greatly modified the ecosystems. In Alsace, this has led to the recent rapid decline of the European hamster, a once widespread hibernating rodent species. Previous work by the IPHC has linked the disappearance of hamsters to a reduced reproductive capacity due to poorly diversified diets. Indeed, it has been shown that maize and wheat monocultures, the two most common crops in Alsace, induce vitamin B3 and protein deficiencies respectively, with direct effects on the hamster reproductive success.

To address this issue, we tested three crop associations characterized by high nutritional benefits for hamsters and of economic and technical interest for farmers. The first crop association, *rapeseed and faba beans*, is rich in lipids. The second, *maize and lablab bean*, is rich in proteins. The third, *wheat and soybean*, is intermediate. These three associations were compared with a control group only fed with *wheat*. 32 females and 12 males were submitted to these diets throughout their hibernation (8 females and 3 males per diet). We monitored their food and water intake, mass changes and hibernation patterns. The hamsters were released in April into outdoor enclosures seeded with the same crops they were fed in winter. There, we measured their reproductive success throughout the breeding season, by capturing, marking and weighing the pups.

Overall, we obtained good but contrasting reproductive success among the four groups. Hamsters from the rapeseed and faba beans group had the best reproductive output with a mean of 14.4 pups per female. The other groups had means of 11.1 (wheat and soybean), 7.5 (wheat) and 6.7 (maize and lablab) pups per female. In the latter group, we observed a delay of one month in the date of emergence of the first pup. These results underline the necessity of a well-diversified and energetically rich diet in the hamsters' habitat. A genetic study will allow further analyses of the reproductive output and testing the effects of the diets on early growth and pup survival.

