

# MEDIA INFORMATION

Institute for Farm Animal biology

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## Goats like mental exercise

Scientists investigated the learning ability of goats in a German-Swiss project

**A study funded by the Swiss National Science Foundation shows that goats like to earn a reward with an effort, even if they can get it much easier. This peculiarity could contribute to the improvement of animal-friendly husbandry.**

The study is part of a joint venture project between the Institute for Farm Animal Biology (FBN) in Dummerstorf (Germany) and Agroscope in Tänikon (Switzerland). This project investigates the learning abilities of different goat breeds and the effects of long-term cognitive environmental enrichment on the stress resistance of goats. The project leader from the FBN side is Dr. Jan Langbein and his postdoc Dr. Christian Nawroth. Investigations concerning the behavioural phenomenon "Contrafreeloading" in dwarf goats have already been studied at the FBN in the context with the learning behaviour of the animals.

### Dairy goats surprisingly motivated

When faced with a challenge, goats do not turn away, but react positively. As part of a joint project funded by the Swiss National (SNSF) and the German Research Foundation (DFG), goats of two breeding lines - dairy goats and dwarf goats – were simultaneously offered two reward variants: One was freely available; the other had to be earned by opening a door. "In this experimental set-up, the goats of both breeding lines decided in nearly half of the cases for the second option. So they like to face such challenges," said both of the study leaders - Dr. Nina Keil, specialist for animal-friendly husbandry, and Katrina Rosenberger, PhD student, both at Agroscope. The results of their work was just published in the journal *Scientific Reports*\*.

The researchers were able to observe that both the dairy and the dwarf goats willingly participated in the experiment and were motivated to open a sliding door with their mouths to receive a reward. Out of the 57 goats observed, at least 53 chose once in ten trials to eat the reward behind the closed door, although the reward was also freely available at the same time. However, the behaviour of the two breeding lines was different in the course of the experiment: In case of the dairy goats, the interest in the closed door always remained the same. Generally, they also move more quickly towards the closed door than towards the open one, which can be evaluated as a hint for an increased motivation. The dwarf goats, on the other hand, were first hesitant to choose the closed door but finally increasingly more often chose the closed door. This shows that both breeding lines seem to like solving problems, but the pygmy goats may need more time to face this task.

"We have expected the interest of the dwarf goats, because we already observed this at a similar experiment," Katrina Rosenberger explained. She refers to a Study at the Institute for Farm Animal Biology in Dummerstorf, the German Research partner in the project. "On the other hand, we were surprised by the dairy goats: We have expected that farm animals, bred for high milk yields, would save their energy and would be less motivated to work hard for a reward. Especially when the same reward is available without any effort."

"In previous studies at the FBN, we could show by using teaching machines that pygmy goats want to work for a resource. The present study now provides evidence that this phenomenon also exists in a feed-context and that dairy goats - which are primarily kept as livestock - are also motivated to work for their food instead of maintaining it without effort," Jan Langbein also emphasised.

### Control over the environment satisfies

The results rest upon the principle of so-called contrafreeloading. "This term describes the behaviour of animals to prefer to exert themselves in order to obtain a coveted resource than having them for free," explained Nina Keil. This phenomenon is known both in domesticated animals - cows, pigs, goats and chickens - as well as in wild animals, kept in a zoo, for example. It is unknown whether it

could be observed in wild animals in the wild. "We assume", Nina Keil continued, that the animals show this behaviour because solving a task and the associated control over their environment triggers positive feelings. They draw probably a satisfaction from it, which outweighs the extra effort."

Should this form of satisfaction be taken into account when keeping goats? Nina Keil: "Yes, because animal-friendly husbandry should also meet the cognitive needs of animals. Our results are a first step. We must now continue the experiment under real conditions on a farm and over a longer period of time to see how the animals' motivation develops". If it turns out that such measures should be implemented in general husbandry, it should of course be ensured, that they can be easily integrated into the daily work routine.

## **Background**

### **Goats choose between open or closed door**

For this study, 30 dairy goats bred for high milk yield (Saanen goats and chamois-coloured mountain goats as well as crosses of the two breeds), and 27 Dwarf goats, not bred for productivity were tested at Agroscope in Tänikon (TG).

The animals had free access to food so that their behaviour would not be affected by hunger during the experiment. They were also already accustomed to open a sliding door with the mouth through previous experiments. This movement also corresponds to their natural behaviour, as goats do not only graze but also prefer to browse through bushes to get the leaves.

The goats were placed individually in a room with access to two Exits with Sliding doors. One door was open, the other closed, in between there was a Partition wall. Behind both doors, a piece of uncooked pasta lays as a reward. They had to push the closed door aside with their mouths to get the pasta behind it. The closed door was randomly alternating left or right. The Experiment was repeated ten times with each goat.

The researchers evaluated the results for each individual animal in: not participating (if the animal had not approached either door after 30 seconds), fetch the reward behind the closed sliding door (according to contrafreeloading) or fetch the reward behind the open sliding door. It was also recorded whether the goats moved quickly or slowly towards the doors.

\*Goats work for food in a contrafreeloading task. Scientific Reports (2020)

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<https://doi.org/10.1038/s41598-020-78931-w>

Link to the video of the study

[www.nature.com/articles/s41598-020-78931-w#Sec11](http://www.nature.com/articles/s41598-020-78931-w#Sec11)

Link to the study in dwarf goats

[www.sciencedirect.com/science/article/pii/S0168159109002287](http://www.sciencedirect.com/science/article/pii/S0168159109002287)

Photo 01: Agroscope

The horned obviously love a challenge - Dr. Nina Keil (from left) and Katrina Rosenberger (both Agroscope, Switzerland) as well as Dr. Jan Langbein and Dr. Christian Nawroth (both FBN, Germany) investigated together the learning abilities of goats.

Photo 02: Nordlicht/FBN

The Dummerstorf scientists have been working with goats for many years and are surprised repeatedly by the intelligence of the animals.

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