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News Release

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Physiology in a field trial

What happens when wild boars and fallow deer snack on genetically modified corn?

Deer stew, roast of wild boar, venison ragout – come fall, all varieties of game are in season for gourmets. However, ever since the worldwide surge in genetically modified corn, critical consumers' appetites have abated somewhat. After all, it was not clear precisely how wild animals digest transgenic corn and whether or not residues actually accumulate in meat, for example. Molecular biologists from the Technische Universität München (TUM) have shown that there is no need for concern – also with regard to the inadvertent dispersal of genetically modified corn via wild animal feces.

Only a few weeks ago we could still observe them: whole families of wild boar rummaging in the corn fields in early fall, feasting on corncobs. Corn – or maize, as it's known to scientists – is a high-energy delicacy for local game, which is why it is used specifically for winter feeding and to divert animals from farmers' fields. Today, with GM (genetically modified) maize acreage increasing worldwide, biologists are discussing a highly controversial question: What happens when a wild boar takes a snack in a transgenic maize field or when deer feed on imported GM maize in winter? Molecular biologists at the TUM can now provide answers to these questions.

With funding from the German Federal Agency for Nature Conservation, a research team from the TU München examined in detail how fallow deer (*dama dama*) and wild boars (*sus scrofa*) metabolize GM maize and whether they inadvertently disperse germinable transgenic seeds in the landscape via their feces. To find answers to these questions, the scientists working for Prof. Heinrich H.D. Meyer from the Chair of Physiology selectively fed fallow deer living in outdoor enclosures and wild boars kept in pens genetically modified corn chaff and grain corn for several weeks in a row. The respective control groups were fed conventional maize over the same time period. All the while the scientists collected samples of feces from every group to be analyzed for germinability at a later point in time.

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After completing the experiment, the TUM physiologists took a number of samples from all of the wild animals: from the digestive tract, all internal organs, blood, muscles and other kinds of tissue. They then applied immunological techniques and polymerase chain reaction to look for transgenic components. They found them only in the digestive tract of GM-fed wild boars: Here they found evidence for small fragments of the gene that had been introduced into the GM maize. However, outside of the gastrointestinal tract the scientists found no trace whatsoever, neither in the tissue of wild boars nor in that of the fallow deer. Hence, there is no need to worry when enjoying a game dish: “The meat of the animals we examined was entirely free of transgenic components,” said Prof. Meyer.

Organic farmers and environmentalists are much more concerned about the uncontrolled spread of GM maize via wild animal feces. Yet here, too, Prof. Meyer can ease everyone’s worries. His team examined the collected samples of feces for intact maize corns capable of germination. A truly insignificant number makes it through the gastrointestinal passage at all: For wild boars a mere 0.015% of the conventional and 0.009% of the transgenic maize kernels were excreted intact. Only one single maize plantlet could then be grown under standard laboratory conditions, and one further seedling showed abnormal growth. The fallow deer were even tougher on the maize: Not a single intact and thus germinable maize corn could be found in their feces.

However the digestion process is not as effective for all seeds and all animal species, as the scientists were also able to show. They had additionally fed all examined animal groups with conventional rape. They found not a single intact rape seed in the wild boar feces – but in those of the fallow deer there were plenty, and 13.6% of those were capable of germination. “This shows that such studies need to be conducted separately for all genetically modified plants,” summarized Prof. Meyer.

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