Featured expert of the month...

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Mycotoxins: Still many lessons to learn.

Mycotoxins are natural toxins produced by fungi imperfecti, commonly called moulds. These moulds are an inevitable, and often invisible, part of our environment, which fulfil many important biological functions in the ecologic homeostasis. However, some of these fungi invade living plants and produce toxins causing losses in plant production and affecting animal health and productivity. While these principal features have been recognised by scientists for more than 50 years, many of the changes recently observed in Europe are yet to be explained. For example, we discovered that some *Fusarium* species such as *F. graminearum*, migrated successfully to the West and in the last 10 years, have become one of the most prevalent species in North and Central Europe. As a result, so-called '*Fusarium* years' which previously occurred only occasionally when poor weather conditions delayed harvests, now occur almost every second year in Europe.

We are still working to understand the following:

- The complex signals between a plant and its endophytes
- Why endophytes are moving North - now present in the grasslands of Norway
- The next group of toxins to be identified to impair animal health and productivity
- Why Claviceps species (*Claviceps purpurea*) are re-emerging - we thought that subsequent sorting of grains had eradicated ergotism in animals and in man

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The simplest answer, but certainly not the only one, is that global climate changes are responsible for alterations in the distribution of moulds and mycotoxins in Europe and on a global scale. It is imperative that farmers should select plant strains that are resistant to fungal invasion, and that they should take all measures (including tillage methods and early harvesting) to reduce mould invasion of their crops. However, while considering this, we already know that pre-harvest fungal invasion and mycotoxin formation can not be stamped out without creating a biological vacuum that will be filled by other micro-organisms.

Therefore, it remains mandatory to seek and apply strategies to prevent the toxic effects of mycotoxins in animals and, in certain parts of world, we even need to implement strategies to prevent human mycoses. Genetic engineering of plants to armour them with resistance genes is one alternative, and the use of feed additives that sequester mycotoxins and prevent their absorption from the gastro-intestinal tract, is one of the most prominent alternatives. In recognition of the continuing and never-ending silent battle in nature between moulds, yeast and bacteria, we have to copy the techniques of either party to fight the others.

Through observation, we have already learned that many yeast-derived feed additives successfully reduce the adverse effects of mycotoxins, and that the application of selected bacteria in animals can reduce the mycotoxin burden and improve gut health. However, there might be other targets, such as the immune system, that suffer directly and indirectly from toxin exposure. This implies that general measures, such as the prevention of cellular oxidative stress, will help the animal to beat the mycotoxin menace. Given the fact that there are several hundred mycotoxins, of which more than a dozen are regular feed contaminants, it is necessary to acknowledge that there is no single compound that can handle them all. The future challenge is the development of tailor-made nutritional concepts to combat the adverse effects of mycotoxins and to stimulate optimal performance of our animals, at different ages, under different conditions, and in all parts of the world.