



THE HISTORY OF FUMONISINS

The discovery of fumonisins is well described in the publication by Marasas, 2001. According to Marasas, the predominant fungus isolated from moldy corn implicated in a field outbreak of equine leukoencephalomalacia (ELEM) in South Africa in 1970 was *Fusarium verticillioides* (*F. moniliforme*).

The same fungus was also prevalent in moldy home-grown corn consumed by people in high-incidence areas of esophageal cancer (EC) in the Transkei region of South Africa. Culture material on corn of *F. verticillioides* strain MRC 826, which was isolated from moldy corn in Transkei, was shown to cause ELEM in horses, porcine pulmonary edema (PPE) syndrome in pigs, and liver cancer in rats. A short-term cancer initiation/promotion assay in rat liver was used to purify the carcinogen(s) in the culture material. These efforts finally met with success when fumonisins B1 and B2, novel mycotoxins with cancer-promoting activity in rat liver, were isolated from culture material of *F. verticillioides* MRC 826. Following the identification of the chemical structure of the fumonisins, these carcinogenic mycotoxins were shown to occur naturally in moldy corn in Transkei. Shortly thereafter, high levels of fumonisins in the 1989 U.S. corn crop resulted in large-scale field outbreaks of ELEM and PPE in horses and pigs, respectively, in the United States.

Subsequently, the fumonisins were found to occur naturally in corn worldwide, including corn consumed as the staple diet by people at high risk for EC in Transkei and China. These findings, together with the fact that



the fumonisins cause field outbreaks of mycotoxicoses in animals, are carcinogenic in rats, and disrupt sphingolipid metabolism, resulted in lot of worldwide interest in these compounds during the first 10 years after the discovery of the fumonisins in 1988.



FUSARIUM VERTICILLIOIDES

Remember:

- *F. verticillioides* is one of the most prevalent seed-borne fungi associated with corn intended for human and animal consumption throughout the world.
- Fusarium ear rot of maize, caused by *F. verticillioides*, is an important disease affecting maize production worldwide. Apart from reducing yield and grain quality, *F. verticillioides* produces fumonisins.
- Vegetative compatibility tests confirmed that the *F. verticillioides* strain can survive for at least 630 days on the surface or in buried maize residue. These results demonstrated that maize residue can act as a long-term source of inoculum for infection of maize plants by this fusarium species.



Good to know:

The ROSA WET-S5 fumonisin test enables grain and feed producers to quantitatively and rapidly detect fumonisins utilizing ROSA (Rapid One Step Assay) lateral flow technology. The new WETS5 method uses an extraction powder added to the sample followed by water (e.g., bottled water) to extract mycotoxin. This Rapid One Step Assay is a quantitative lateral flow test that is read in the Charm EZ-M system. The ROSA WET-S5 Fumonisin Quantitative Test is GIPSA approved for detecting fumonisin in different commodities.

References:

1. Marasas Walter F.O.: Discovery and Occurrence of the Fumonisin: A Historical Perspective. Environmental Health Perspectives. VOLUME 109, SUPPLEMENT 2, May 2001.

