



Algemene gegevens	
PPS-nummer	AF-14225
Titel	Forecasting mycotoxins in grains See more information online: http://www.wageningenur.nl/en/project/Voorspellen-mycotoxinen-in-granen.htm
Roadmap/Koepel	-
Uitvoerende kennisinstelling(en)	RIKILT Wageningen University & Research BU Toxicology, Novel food & AgriChains
Projectleider onderzoek (naam + emailadres)	HJ van der Fels-Klerx (RIKILT) Ine.vanderfels@wur.nl
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Startdatum	2015
Einddatum	2018
Korte omschrijving inhoud	This project aims to develop various forecasting models for mycotoxins in grains. These models aim to provide a prediction, during the growing season, of the contamination of the grain at harvest. Models will be developed for the most important mycotoxins, for various grains and at various scale levels (field, region, country, Europe).

Highlights
<ul style="list-style-type: none"> - Literature Review: A literature review has been done to investigate <i>Fusarium</i> infection and the factors influencing <i>Fusarium</i> infection and mycotoxin production in barley. This review will serve as the basis for the decision on what type of model to develop for mycotoxins in barley. - Field survey: In 2016, more than 880 questionnaires have been sent out to the farmers. The response rate was between 7%-9% depending on the crop type (wheat, barley, maize). <u>Wheat</u> 26 out of the total of 35 wheat harvest samples contained DON in levels above 50 ppb. None of them were above the guidance level for feed or the legal limit for food. In total, three samples were contaminated with HT-2 toxins above 20 ppb. In total, two samples were contaminated with Zearalenone (ZON) above 50 ppb. One of them (360ppb) was above the guidance level for food. The DON levels in the pre-harvested samples was not statistically different from the DON levels in the samples that were collected at harvest. <u>Barley</u> Among all the barley samples, 11 out of 15 were detected with DON levels above 50 ppb. One (1340ppb) of the samples exceeded the guidance level for food. No

T2/HT2 toxins were found in the barley samples. Four samples were detected with ZON above 50 ppb. One of them (190ppb) contained ZON in levels above the guidance level for food.

Maize

This year maize samples were not contaminated with any mycotoxin, except for one sample contained DON at a level of 150 ppb.

- **Modelling:**

A Bayesian network model was developed to estimate the presence of a feed ingredient being contaminated with a defined mycotoxin.

Three modelling approaches has been set up to predict DON contamination levels in wheat in the Netherlands:

1. The existing empirical model (van der Fels-Klerx et al., 2010) was updated with new monitoring data and different statistical method to improve the model performance.
2. A Bayesian network model was developed.
3. Inspired by a mechanistic modelling approach developed by Rossi et al., 2003, we are working on the adaptation of this model to fit for Dutch farms.

Barley data were collected and the modelling type was decided for developing the barley model in 2017.

Aantal opgeleverde producten in 2016			
Wetenschappelijke artikelen	Rapporten	Artikelen in vakbladen	Inleidingen/ workshops
2	-	-	4

Bijlage: Titels van de producten of een link naar de producten op een openbare website

Wetenschappelijke artikelen:

- Van der Fels-Klerx, H. J., Liu, C., & Battilani, P. (2016). Modelling climate change impacts on mycotoxin contamination. *World Mycotoxin Journal*, 9(5), 717-726. <http://www.wageningenacademic.com/doi/abs/10.3920/WMJ2016.2066>
- Van der Fels-Klerx, H. J., & Camenzuli, L. (2016). Effects of Milk Yield, Feed Composition, and Feed Contamination with Aflatoxin B1 on the Aflatoxin M1 Concentration in Dairy Cows' Milk Investigated Using Monte Carlo Simulation Modelling. *Toxins*, 8(10), 290. <http://www.mdpi.com/2072-6651/8/10/290/htm>

Rapporten:

- RIKILT report: Influence factors on *Fusarium* infection, quality of the grain and presence of mycotoxins in barley (in draft).

Inleidingen/ workshops:

- SELAMAT workshop in Nigeria
Presentation:
Predictive modelling of mycotoxins in cereals
Cheng Liu, Ine van der Fels-Klerx, 2016
- Project meeting "PPS Voorspellen mycotoxinen in granen"
Presentations:
- Modelling DON in tarwe in the Netherlands

- Literature Review on Barley
- Resultaten veldstudie 2016