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Mycotoxins DON and T2 HT2 : wheat and maize occurrence and field management

Mycotoxins Forum
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Introduction

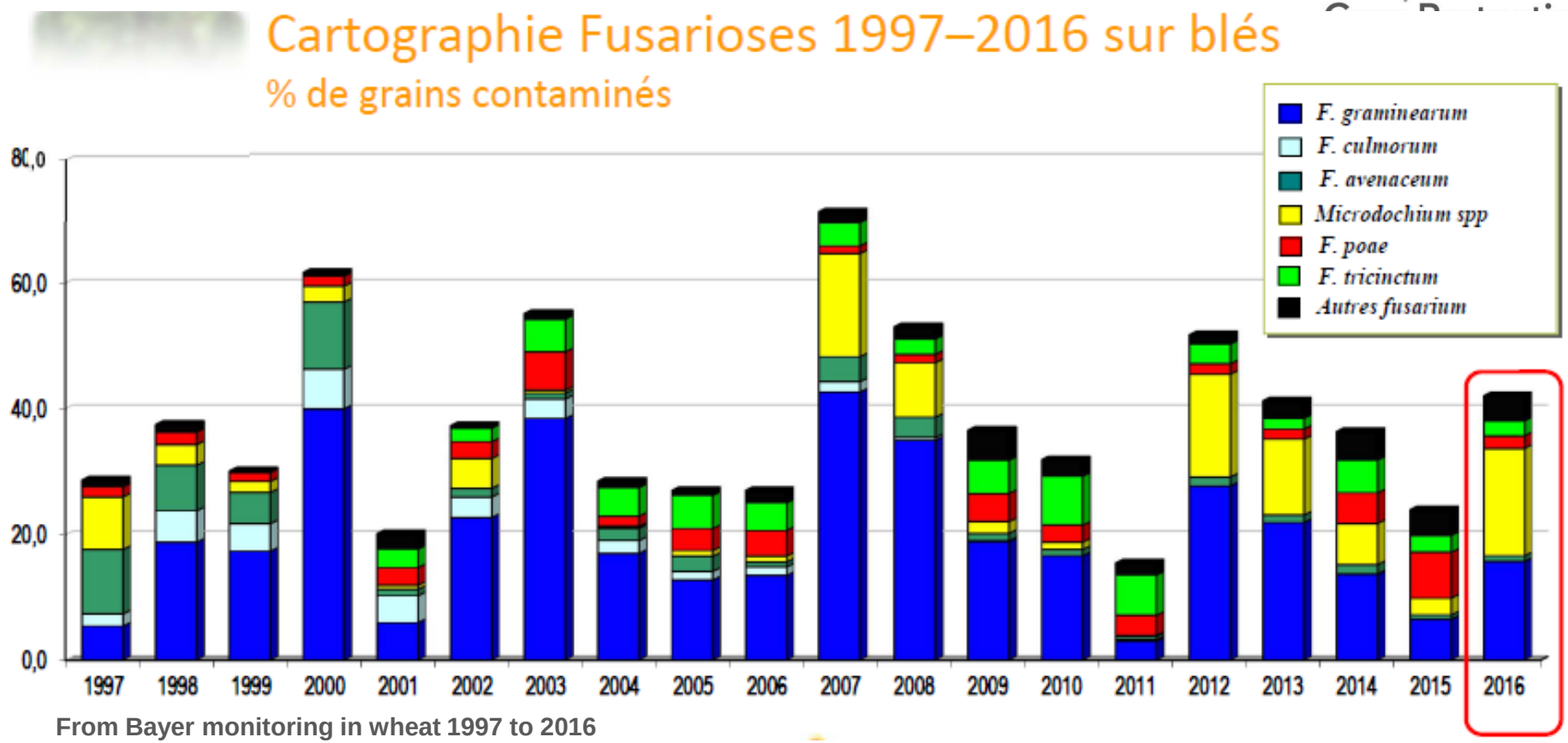
- Mycotoxins harmful effects and food safety issue
- ECPA members to promote crop protection best practices for field management of pathogen fungi producer of toxins
- Be engaged with stakeholders to secure a competitive sustainable EU agriculture

Main Fungi producing mycotoxins

Fungi	species	Mycotoxins
Aspergillus	*A. flavus and A. parasiticus* *A. ochraceus and A. carbonarius*	**Aflatoxins** **Ochratoxin A** **Patulin**
Fusarium	*F. poae, F. langsethiae, F. sporotrichioides, …* *F. graminearum, F. culmorum, …* *F. graminearum, F. avenaceum, …* *F. verticillioides, F. proliferatum, …* *F. tricinctum, F. avenaceum, …*	Trichothecens A : **T2-HT2**, DAS, … Trichothecens B : **DON**, NIV, … **Zearalenon** **Fumonisins** Enniatins
Penicillium	*P. verrucosum*	**Ochratoxin A** **Patulin**
Claviceps	*C. purpurea*	Ergot alkaloids*
Alternaria		Alternariol (AOH) Alternariol Methyl Ether (AME) Ac Tenuazonic (TA), …

In bold mycotoxins regulated or with recommendation limits in EU
* : Regulation announced for harvest 2022

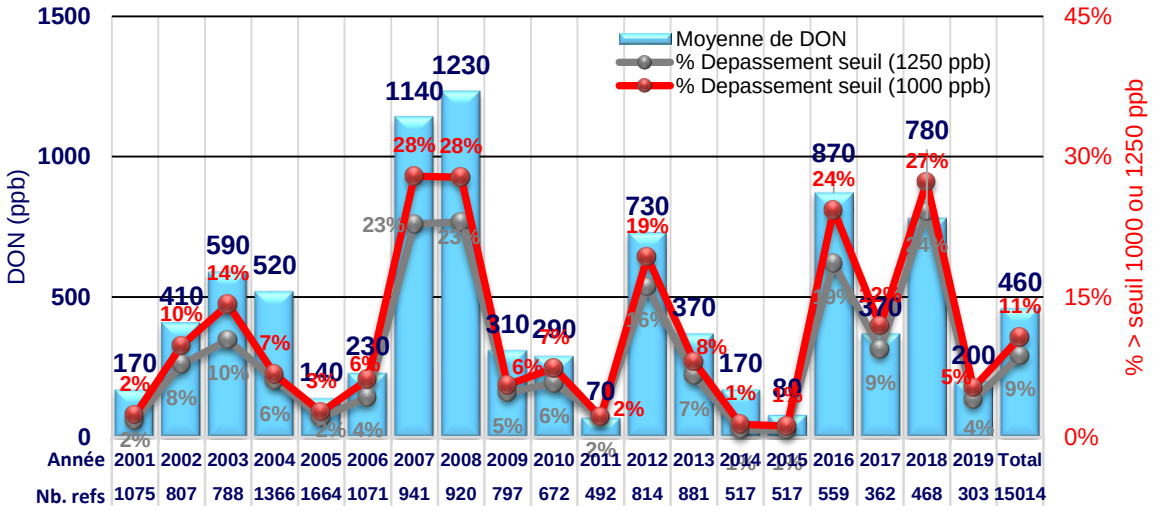
Fusarium

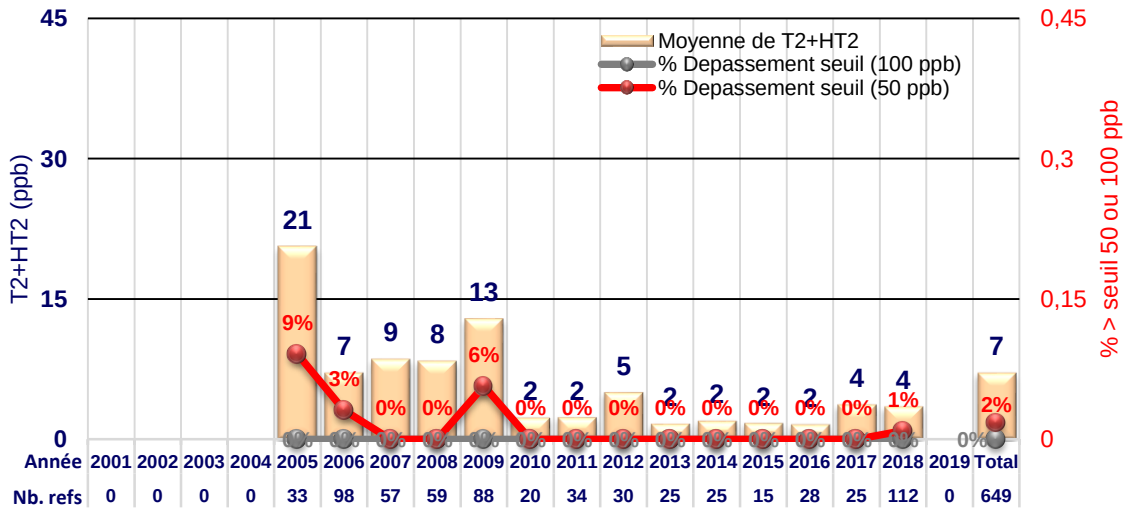


From Bayer monitoring in wheat 1997 to 2016

- Different type according to climate condition
- *F. graminearum* dominant
- Interest of field management for yield and grain quality : specific weight, mycotoxins, …

Common wheat
mycotoxins DON and T2 HT2 monitoring



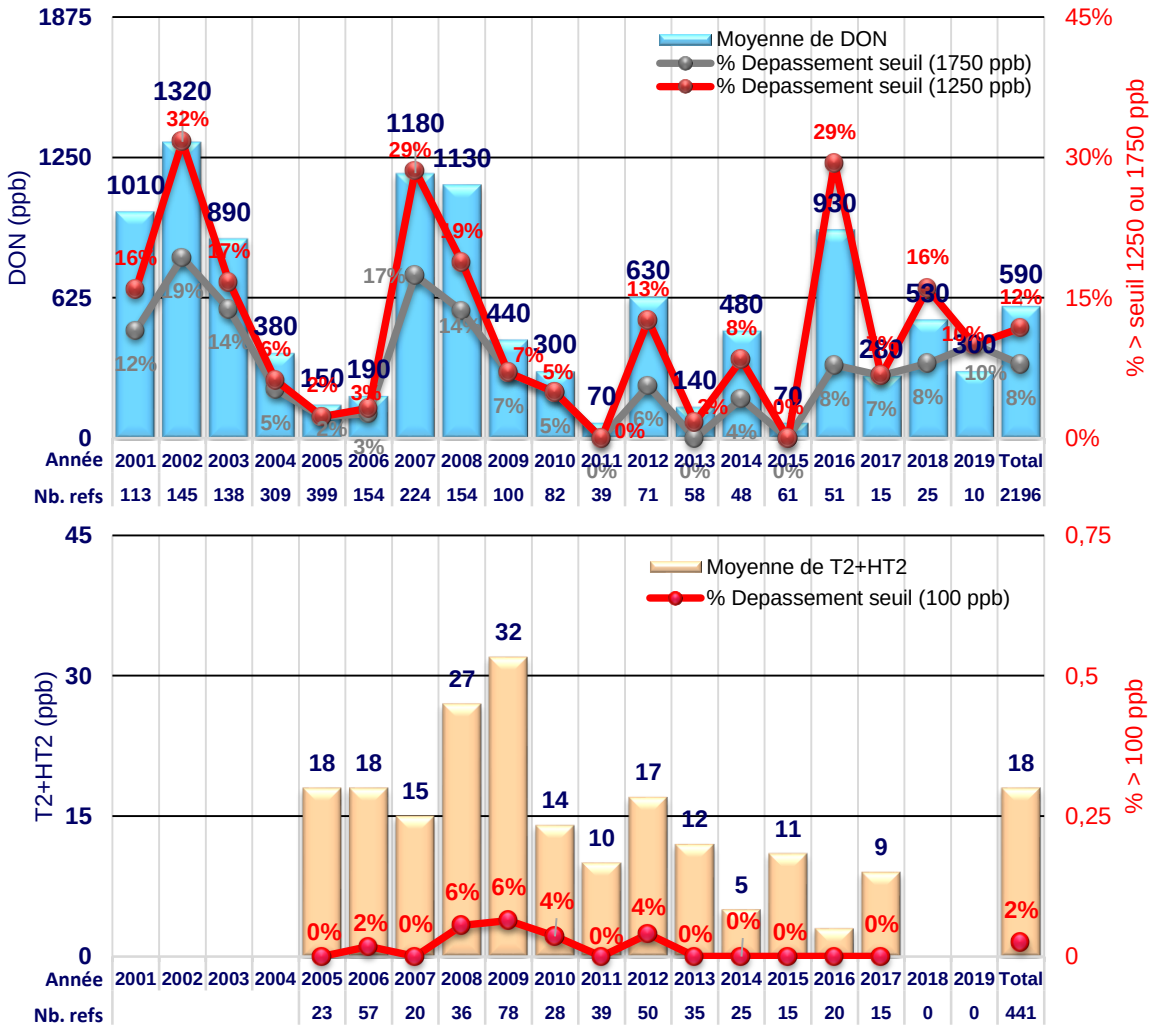


- Database of **15 014 samples from 2001 to 2019**
- Occurrence concern of DON in grain
- New proposal limit makes the difficult years more complicate to manage with 3 years almost 30 % above the threshold.

- No T2-HT2 analysis > 100 ppb
- 2% T2-HT2 analysis > 50 ppb

From Syngenta French monitoring 2001 to 2019 in partnership with grain collectors
Mycotoxins analysis on grain without cleaning or grading

Durum wheat
mycotoxins DON and T2 HT2 monitoring

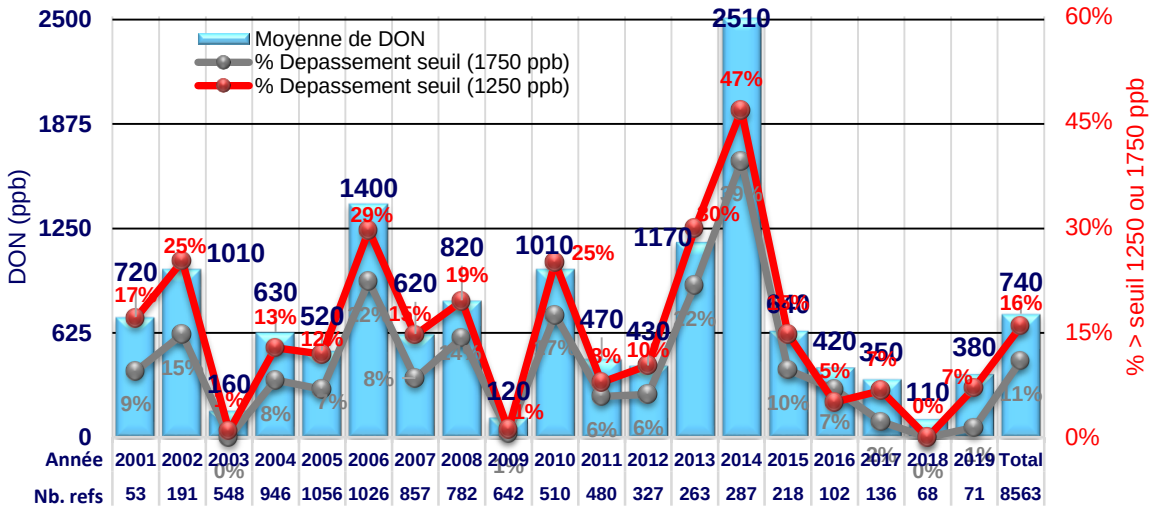


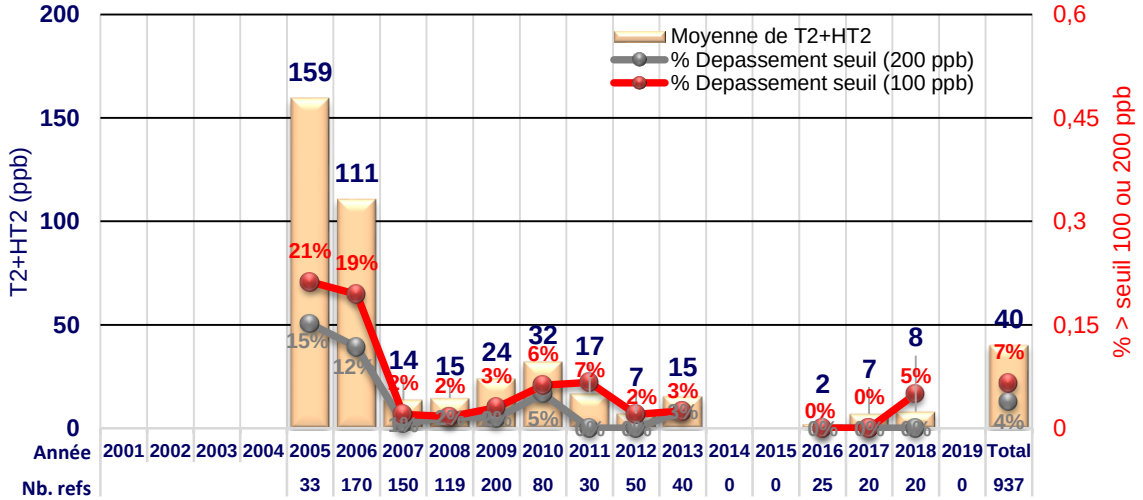
- Database of **2 196 samples from 2001 to 2019**
- Occurrence concern of DON in grain
- New proposal limit makes the difficult years even more complicate to manage with 3 years around 30 % above the threshold.

- 2% T2-HT2 analysis > 100 ppb

From Syngenta French monitoring 2001 to 2019 in partnership with grain collectors
Mycotoxins analysis on grain without cleaning or grading

Maize (grain)
mycotoxins DON and T2 HT2 monitoring



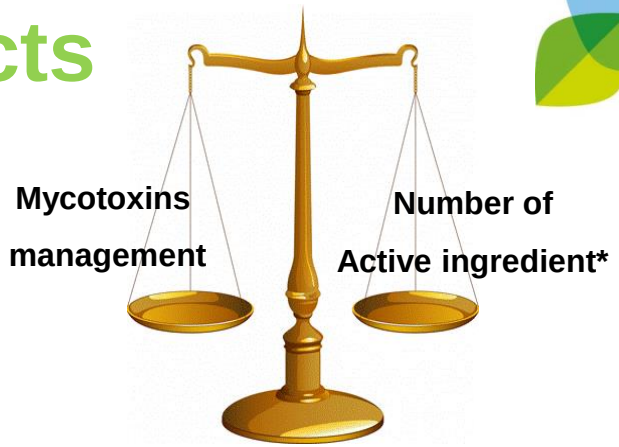


- Database of **8 563 samples from 2001 to 2019**
- Occurrence concern of DON in grain
- New proposal limit makes the difficult years even more complicate to manage with 2014 more than 40 % above the threshold.

- 7% T2-HT2 analysis > 100 ppb
- 2005 and 2006 average content of T2-HT2 > 100 ppb

From Syngenta French monitoring 2001 to 2019 in partnership with grain collectors
Mycotoxins analysis on grain without cleaning or grading

Crop Protection Products and mycotoxins



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* : Decreasing due to past Directive 91/414 and undergoing Regulation 1107/2009

- CP as one of the key factors for mycotoxins risk management with Good Agriculture Practices
- With the reduction of active ingredient higher risk of:
  - lack of efficient solutions
  - resistance development
- Need of new mode of action with efficacy on different Fusarium species
- Biocontrols R&D with field test undergoing (non toxinogen strains, micro-organisms, phenolic ac., …)

→ Key to have a sufficient & diverse CP toolbox

Triazoles and DON content in wheat trials

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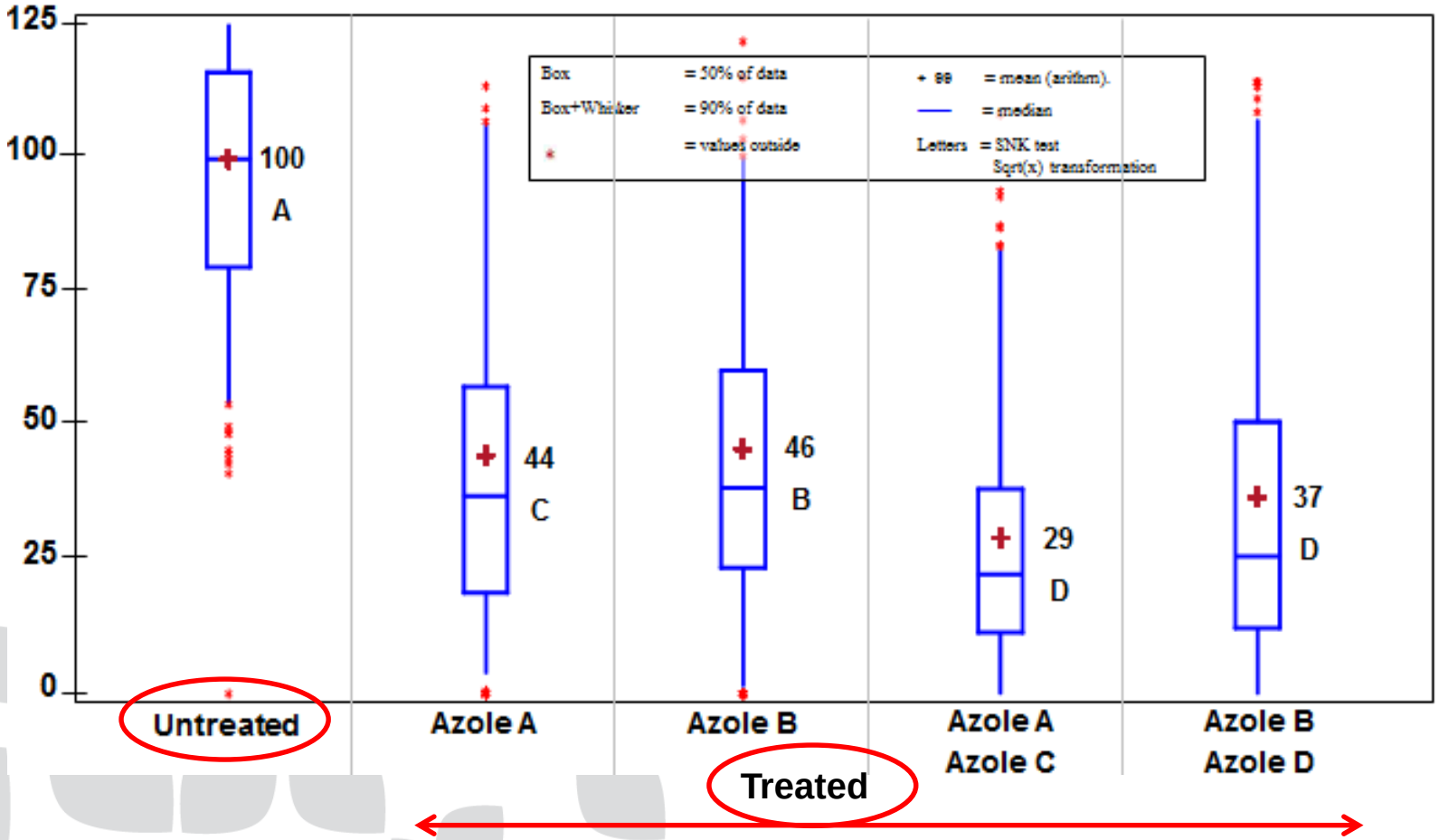
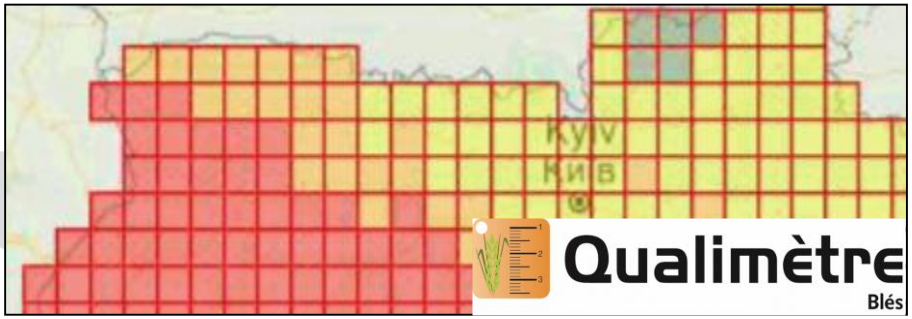
DON content [relative to untreated]; n = 50



BASF Wheat field trials Europe 2006-2011; 1 application at GS 61-65. DON content in untreated 0.1-65 mg/kg
Statistical analysis with absolute figures; box&whisker plot with relative values (compared to untreated mean)

Predictive tools

- Evaluate the risk before CP application
  - Helps farmer to manage sustainable application
- Evaluate before harvest the risks of mycotoxins
  - Helps prevention and grain collect management



Conclusion

- **Mycotoxins consider as food / feed safety issue**
  further research needed on the complex Fusarium – Mycotoxins

- **Crop Protection Products with Good Agricultural Practices**
  as one of the key tools for mycotoxins risk management :
  - → **Fungicides as contribution for Fusarium & mycotoxins control**
  - → **Weed control and ergot**
  - → **…**
  - → **Need of diverse CP toolbox with new mode of action**

- **We wish to work together with EU institutions, National authorities and stakeholders to further research and work on risk management tools.**

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Thank you
for your attention.