



Trainers' Training: Session 1

Measures to prevent DON contamination

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Introduction

- Mycotoxins: enormous impact on public health and agricultural practices
- continuously prevent and control the incidence of **mould infections** and the associated **mycotoxin production**

The cereal production chain





No DON without Fusarium Head Blight

- **the prevention and control of mould infections start in the field with good agricultural practices
→ GAP**



No DON without Fusarium Head Blight

- **The main ideas behind GAP**
 - to reduce the amount of inoculum
 - to prevent the dispersal of inoculum



Conidia

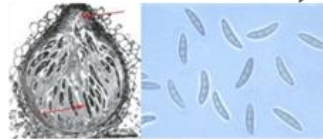
- *F. avenaceum*
- *F. culmorum*
- *F. graminearum*
- *F. poae*
- *M. nivale*



Splash dispersal

Ascospores

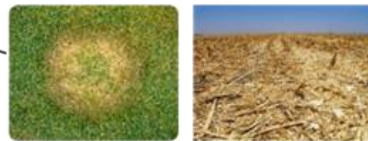
- *G. avenacea*
- *G. zeae*
- *M. nivalis*



Wind dispersal



Seed infection



Fungus overwinters on
crop residues, grasses and
as chlamydospores in soil



Blighted seedling



1. Choice of variety

- **Only use varieties recommended for a certain region**
- **Choose a variety with a know host resistance for FHB**

- database of HoGent :
 → more than 100 varieties classified in five risk classes

Highly resistant	Moderately resistant	Moderately susceptible	Susceptible	Highly susceptible
Akteur	Altigo	Azzerti	Baltimor	Agami
Campari	Altos	Bermude	Belcast	Alsace
Carenius	Celebration	Biscay	Brando	Anthus
Harald	Centenaire	Challenger	Buccaneer	Caphorn
Henrik	Contender	Claire	Deben	Glasgow
Melkior	Corvus	Compliment	Dekan	Homeros
Omart	Dream	Einstein	Hastings	Maestro
Sahara	Edgar	Expert	Hyperion	Ordeal
Sokrates	Elixer	Florett	Ketchum	Raglan
Winnetou	Fortis	Folio	Lexus	Robigus
Zebedee	Hourra	Hattrick	Napier	Rosario
Zohra	Impression	Inspiration	Oakley	Samurai
	Julius	Intro	Ovation	SW Tataros
	Koreli	Istabraq	Ozon	Tobak
	Lear	Kaspart	Raspail	Toisonдор
	Legat	Katart	Solstice	Tuscan
	Lincoln	Limes	Tapidor	Vivant
	Lion	Linus	Viscount	



2. Crop rotation

- **Alternating crops which are host for Fusarium with crops which are no hosts**
- **Maize → Wheat** **HIGH RISK**
- **Potato → Wheat** **LOW RISK**



3. Crop planning

- **Avoid high temperatures and drought stress during seed development and maturation**
- **Avoid wet periods during early flowering**
- **Delaying harvest of infected crops may increase mycotoxin content**
- **Planning to harvest the crop at low moisture content and full maturity**

HIGH RISK

LOW RISK



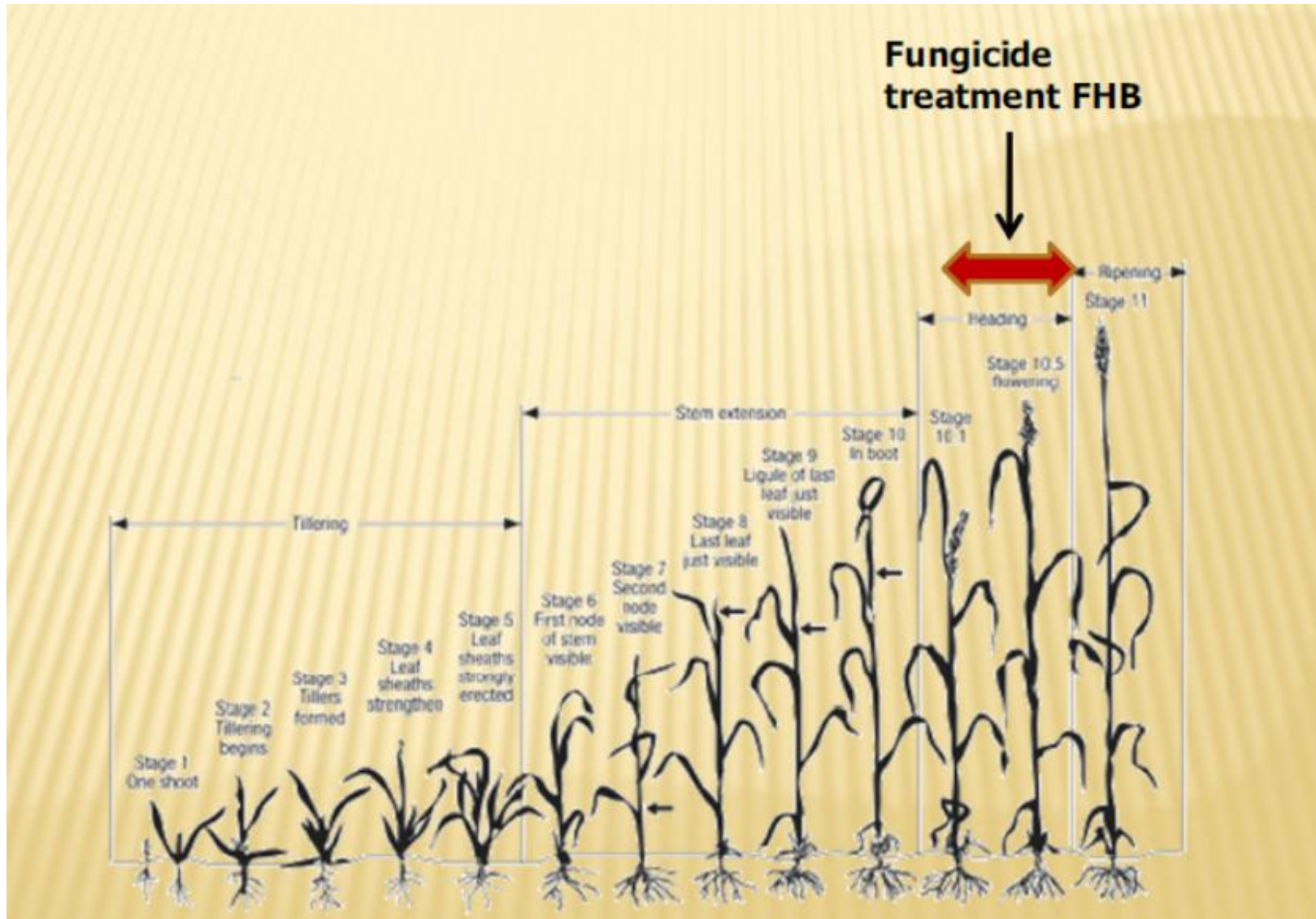
4. Soil and crop management

- **Crop residues** **HIGH RISK**
- **Removal, destruction or burial of infected crop residues**
- **Ploughing should especially be considered between two Fusarium susceptible crops** **LOW RISK**



4. Soil and crop management

- **Plant stress: drought, humidity, insects** **HIGH RISK**
- **Correct plant nutrition**
- **Correct irrigation**
- **Avoid insect damage**
- **Fungicide treatment** **LOW RISK**





5. Harvesting

- **Moisture content**
- **FHB infected parts of the field**
- **Pre-harvest DON score**
- **Segregation of food/feed**
- **Difference clamp/clean/dry**

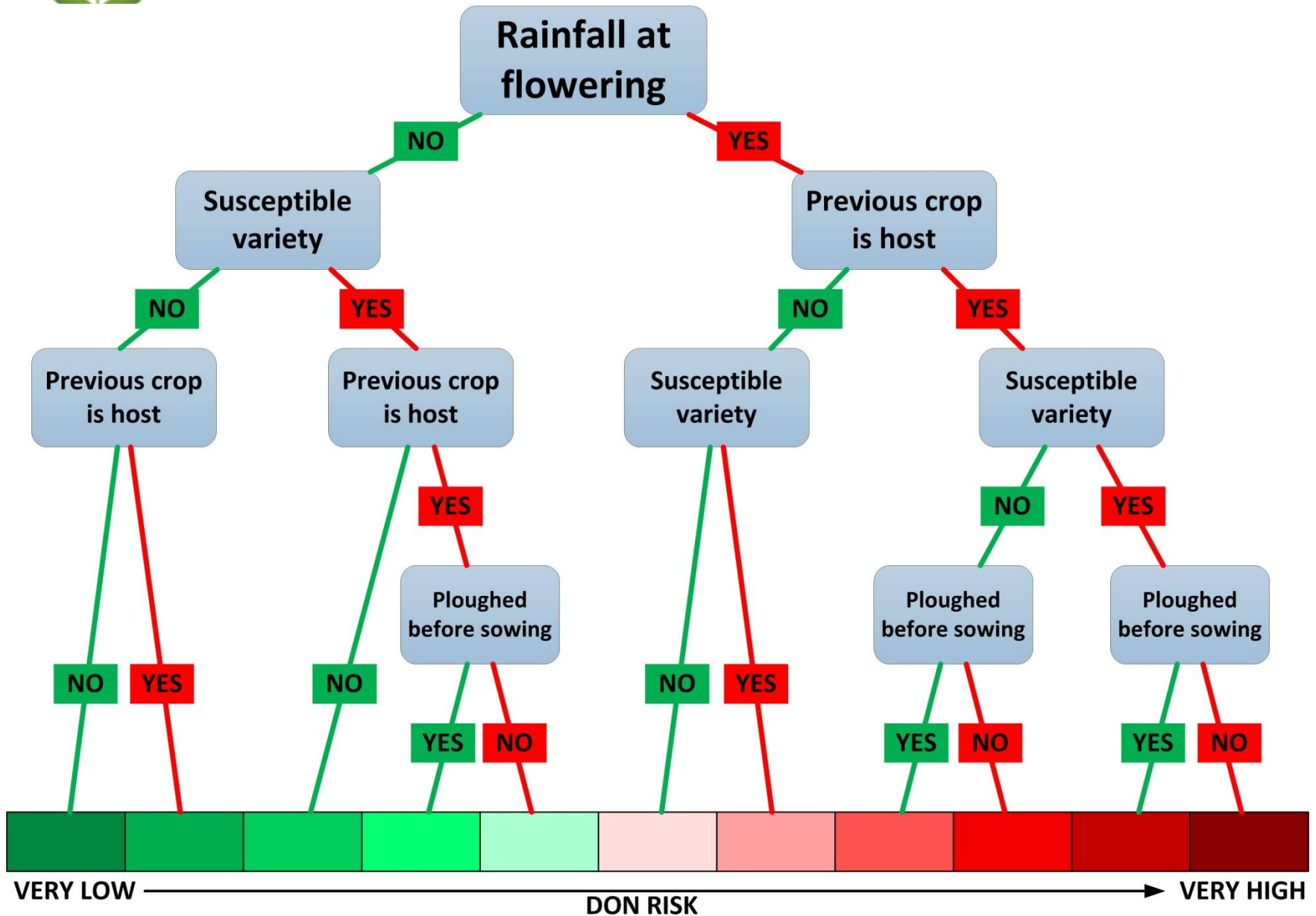
HIGH RISK

LOW RISK



Risk decision tree

- **Rainfall during flowering yes/no = most important risk parameter**
- **If no → ? Susceptible crop yes/no**
- **If yes → ? Host crop (crop rotation) yes/no**
- **If yes → susceptible cultivar yes/no**
- **If no → susceptible cultivar yes/no → ploughing yes/no**





COLLECTION

1. Pre-selection based on quality

before allocating in to a certain storage facility (silo):

- **avoid mixing of parties of highly different quality**
- **segregate based on the moisture content, protein content, hectolitre weight, crop data, presence of insects...**



COLLECTION

2. Traceability

- **Track and Trace**
- **Allocated Food – Feed**

Important for traders !



COLLECTION

3. Drying

- **Store grains with high moisture content**

HIGH RISK

- **Drying → moisture below $\pm 15\%$**
- **Method depending on moisture content at harvesting**

LOW RISK



STORAGE

Good hygienic practices during storage

- **Quality control at intake**
- **avoid contamination of stored products by the environment and cross-contamination between stored products**
- **Good storage conditions**
- **Pest control**
- **Adequate cleaning of premises**

LOW RISK



DISTRIBUTION

Good hygienic practices during transport

- **Clean and dry containers**
- **No residues**
- **Avoid rain**
- **No pests and rodents**

FOOD AND
FEED
PRODUCTION

Before processing cereals

- **Quality control at intake → yes/no**
- **Traceability check**
- **Sampling and analysis**



For more detailed information on each section see guidelines for prevention of DON contamination