

# Screening for resistance to *Fusarium* head blight in spring wheat cultivars

Olga E. Scholten<sup>1</sup>, Greet Steenhuis-Broers<sup>1</sup>, Aart Osman<sup>2</sup> & Esther Bremer<sup>2</sup>

## Introduction

*Fusarium* head blight (FHB) of wheat is caused by a number of *Fusarium* fungi. These fungi cause problems both in organic and conventional farming systems. Infection leads to decreases in yield and seed quality and the production of mycotoxins, e.g. deoxynivalenol (DON) in the kernels. Breeding for resistance is considered as the best way to handle the disease. Resistance to *Fusarium* is based on a number of mechanisms that prevent or reduce the infection by the fungus and the DON production. The aim of the research was to study levels of resistance in a number of spring wheat cultivars and to obtain more knowledge on resistance mechanisms involved.

## Materials and Methods

In 2002, 2003 and 2005 field trials were performed at organic farms in the Netherlands. Spring wheat cultivars were obtained from breeding companies and others. Inoculations were carried out at flowering time using a spore suspension of *F. culmorum*. Head blight ratings (FHB-index) were determined as the % of infected heads \* the % of infected spikelets per infected head. In 2005, yield losses, DON content and amounts of fungal DNA were also investigated.

Table 1. *Fusarium* head blight ratings observed in spring wheat cultivar trials inoculated with *Fusarium*.

Cultivar/year	2005	2003	2002	Average over three years
Pasteur	8	15	15	13
Thasos	24	17	5	15
Lavett	25	16	9	17
Minaret	24	17	11	17
Melon	24	21	26	24
Quattro	21	43	33	32
Zirrus	40	37	nd	38
Paragon	27	53	44	41
Baldus	47	57	21	42
Tybalt	34	46	59	46
Monsun	51	62	28	47



## Results and Discussion

- Clear differences were found in susceptibility to FHB between cultivars (Table 1 gives a summary of the cultivars, which were tested over three years).
- In 2005 a high correlation was found between FHB and yield loss ( $r = 0.85$ ).
- Highest yields were found in control plots of LP689.02, LP724.3.03 and Zirrus. In the *Fusarium* field trial these yields were 30-50% less (Figure 1).
- In the *Fusarium* field trial highest yields were found for Lavett and Thasos (7% less than control), Melissos, Torka and Trappe (15% less).
- In some cultivars more and in other cultivars less toxin was produced than expected on the basis of the amount of fungal DNA. This may be an indication for resistance to toxin production or fungal accumulation.
- The large differences found between cultivars indicate possibilities for breeding against FHB using existing cultivars in which different mechanisms of resistance are actively involved.

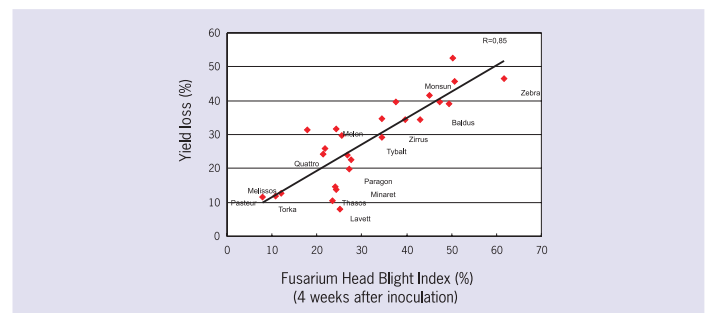


Figure 1. Relationship between yield loss and resistance to *Fusarium culmorum* in a field trial in 2005.

