



Gibberella on maize, sorghum and wheat

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The three most important crops grown in South Africa are maize, sorghum and wheat. These crops are essential food sources (such as carbohydrates and vitamins) for humans and animals. They are also important in industrial products and therefore the cultivation of these crops are of economic importance. It assists in job creation, with export of products and helps to generate international currency.

Unfortunately, these crops can be infected by fungal pathogens that can influence the yield and also lead to economic losses. The whole plant can be infected – which can lead to root-, crown-, stem- and ear rot (maize), grain mould (sorghum) and head blight (wheat).

The fungal pathogens that most commonly occur on these crops and can cause severe damage, belong to the genus *Fusarium*. Recently in South Africa there has been an increase in the occurrence of the *Fusarium graminearum* species complex infection of these three crops. The diseases caused by the *Fusarium graminearum* species complex are also known as Gibberella rot.

Previously it was thought that the diseases were caused by *F. graminearum* s.s., but with recent molecular technology new species were found. Up to date there have been 16 different fungal species that occur in the *Fusarium graminearum* species complex.

Another reason why the *Fusarium graminearum* species complex is important lies in the fact that these fungal pathogens can produce toxic products known as mycotoxins. The toxins that are

produced are nivalenol (NIV) and deoxynivalenol (DON). Each fungal species in the *Fusarium graminearum* species complex can either produce DON or NIV and some species can even produce both toxins (Table 1).

It is possible that the health of people and animals can be negatively influenced when heavily mycotoxin-contaminated food-based products of maize, sorghum or wheat are ingested over a long period of time. Up to date there has been no way to remove mycotoxin from contaminated food crops and the best way to reduce or limit mycotoxins in food is to control *Fusarium graminearum* species complex.

The fungal pathogens occurring in the *Fusarium graminearum* species complex can also differ in virulence (degree to which disease severity can occur), plant part specificity (some fungal pathogens can only infect roots/crowns/stems or above ground plant parts) and then some species display geographical specificity (occur only in specific areas in South Africa).

Research information gathered will help producers to be more aware of the *Fusarium graminearum* species complex occurring in their fields, as well as how to better control and prevent the infection.

Symptoms

Maize

Studies found that the fungal pathogen most likely infecting maize ears was *F. boothii* (Table 2), however, *F. graminearum* s.s. was

TABLE 1: IN SOUTH AFRICA, THERE ARE SIX *FUSARIUM GRAMINEARUM* SPECIES COMPLEXES THAT OCCUR ON CROPS AND EACH PRODUCE DIFFERENT MYCOTOXINS.

FUSARIUM GRAMINEARUM SPECIES COMPLEX	MYCOTOXINS	
	DEOXYNIVALENOL	NIVALENOL
<i>F. acacia-mearnsii</i>	X	X
<i>F. boothii</i>	X	
<i>F. brasilicum</i>	X	X
<i>F. cortaderiae</i>	X	X
<i>F. graminearum</i> s.s.	X	X
<i>F. meridionale</i>		X

TABLE 2: THE DISTRIBUTION OF THE *FUSARIUM GRAMINEARUM* SPECIES COMPLEX ON MAIZE IN SOUTH AFRICA. *FUSARIUM BOOTHII* IS THE DOMINANT *FUSARIUM GRAMINEARUM* SPECIES COMPLEX ON MAIZE EARS.

PROVINCES (MAIZE)	FUSARIUM GRAMINEARUM SPECIES COMPLEX		
	<i>F. GRAMINEARUM</i> S.S.	<i>F. BOOTHII</i> *	<i>F. MERIDIONALE</i>
KwaZulu-Natal		X	X (roots)
Gauteng		X	
Mpumalanga		X	
North West		X	
Free State	X	X	

*Indicates the most frequent occurring *Fusarium graminearum* species complexes specie

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▲ 1: *Fusarium graminearum* species complex causing Gibberella ear rot of maize.

