



## Effect on cotton genotypes (*Gossypium hirsutum* L. var. Bt Cotton, Isoline, HART89M)

### 1. The net impact of individual and combined stress on plant growth

Crop: Cotton (*Gossypium hirsutum* L. var. Bt Cotton, Isoline, HART89M)  
 Stress 1: *Aphelenchus avenae*  
 Stress 2: *Fusarium oxysporum* f.sp. *Vasinfecum*  
 Stage of plant: plantlet

The table shows the impact of nematode and fungus alone and in combination on plant height, no. of nodes, no. of bolls, fresh shoot weight and fresh root weight of cotton genotypes.

		Plant response to stress (reduction over control %)				
		Type A parameters*				
	Treatment	Plant Height	No. of nodes	No. of bolls	Fresh Shoot weight	Fresh root weight
Bt Cotton	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	31.1↓	19.2↓	33.2↓	37.8↓	18.2↓
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	15.5↓	3.8↓	5.8↓	25.9↓	2.1↓
	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	9.9↓	8.7↓	7.9↓	3.7↓	18.9↓
Isoline	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	45.6↓	28.8↓	27.3↓	43.5↓	50.8↓
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	9.1↓	10.0↓	3.0↓	21.5↓	17.4↓
	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	8.0↓	0.6↓	3.6↓	9.2↓	33.3↓

HART89M	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	42.1 ↓	21.1 ↓	34.4 ↓	36.1 ↓	46.7 ↓
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	8.2 ↓	6.6 ↓	0.8 ↓	21.0 ↓	19.0 ↓
	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	8.3 ↓	6.6 ↓	2.4 ↓	-1.5 ↑	27.7 ↓

**Note:** Values presented in the table were calculated using the formula described below.

$$\text{Reduction over control (\%)} = \frac{(\text{Value Control} - \text{Value Stress})}{\text{Value Control}} \times 100$$

1) '↓'- indicates plant parameters affected by stress that lead to high susceptibility (higher the value more the damage).

2) '↑'- indicates plant parameters less/not affected by stress leading to improved resistance (higher the value lesser the damage).

'\*' - For more information on parameters classification, please refer to 'methodology' tab.

## 2. The interaction between nematode and fungal pathogen under combined stress at plant interface

The table shows the effect of fungal pathogen on nematode population and effect of nematode on fungal population, CFU/g of soil and CFU/g of stem under combined stress treatment

	Treatment	Response to combined stress**		
		Type B parameters*		
		CFU/g of soil	CFU/g of stem	No. of nematodes
Bt Cotton	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	1653	1516	NA
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	NA	NA	256

	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	1464	1407	390.7
Isoline	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	1668	1553	NA
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	NA	NA	267
	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	1350	1354	399.5
HART89M	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml)	1664	1622	NA
	<i>Aphelenchus avenae</i> (5000nematodes/plant)	NA	NA	252.2
	<i>Fusarium oxysporum</i> ( $10^6$ conidia/ml) + <i>Aphelenchus avenae</i> (5000nematodes/plant) Simultaneous stress	1474	1514	406.6

For raw data – Click here (.xlsx file)

Reference- Karuri HW , Amata R, Amugune N, Waturu C (2014) Interaction of *Fusarium oxysporum* f. sp. *Vasinfestum* and the fungal feeding nematode *Aphelenchus avenae* on BT Cotton. Journal of Plant Pathology 96(1):183-188

**Note:**

‘\*\*’ - Values are presented as it is from the source article without subjecting to the calculation.

‘\*’ - For more information on parameters classification, please refer to ‘methodology’ tab.

**Inference from the study:** Karuri HW et.al. (2014) studied the interaction of *Fusarium oxysporum* f. sp. *Vasinfestum* and the fungal feeding nematode *Aphelenchus avenae* on three cotton genotypes. Simultaneous inoculation of pathogens did not act additively when compared to single pathogen inoculation. Root/Shoot weight, no. of bolls, and plant height reduction was more under single stress combination of nematode and fungus compared to combined stress in all three genotypes. Fungus population under combined stress decreased whereas nematode population increased under combined stress in all genotype. **Thus, this pathogen combination did not act synergistically to cause severe disease complex.**