



Effect on rice cultivars (*Oryza sativa* cv. Melrose, Nova 76, Saturn)

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

Crop: Rice (*Oryza sativa* cv. Melrose, Nova 76, Saturn)
 Stress 1: *Aphelenchoides bessey*
 Stress 2: *Magnaporthe salvinii*
 Stage of plant: 15 day old seedling

The table shows the impact of nematode and fungus alone and in combination on weight of rice plants

	Treatment	Plant response to stress (reduction over control %) Type A parameters*
		Plant weight
Saturn	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	12.4 ↓
	<i>Magnaporthe salvinii</i> (0.5g/plant)	14.0 ↓
	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	8.3 ↓
Melrose	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	28.0 ↓
	<i>Magnaporthe salvinii</i> (0.5g/plant)	21.5 ↓
	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	57.9 ↓
Nova 76	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	-5.7 ↑
	<i>Magnaporthe salvinii</i> (0.5g/plant)	28.5 ↓
	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	52.6 ↓

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

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

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 parameter classification, please refer to the 'methodology' tab.

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

The table shows the effect of the fungal pathogen on nematode population per plant and the effect of the nematode on fungus induced disease index under combined stress treatment

	Treatment	Response to combined stress** Type B parameters*	
		<i>M. salvinii</i> (disease index)	<i>A. bessey</i> (no./plant)
Saturn	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	0	1540
	<i>Magnaporthe salvinii</i> (0.5g/plant)	1-2	N/A
	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	2	1365
Melrose	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	0	1295
	<i>Magnaporthe salvinii</i> (0.5g/plant)	3	N/A
	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	2-3	1190
Nova 76	<i>Aphelenchoides bessey</i> (350 nematodes/plant)	0	1085
	<i>Magnaporthe salvinii</i> (0.5g/plant)	3	N/A

	<i>Magnaporthe salvinii</i> (0.5g/plant) + <i>Aphelenchoides bessey</i> (350 nematodes/plant) Simultaneous stress	5-6	3047
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For raw data – Click here (.xlsx file)

Reference- McGawley EC, Rush MC, Hollis JP (1984) Occurrence of *Aphelenchoides besseyi* in Louisiana Rice Seed and Its Interaction with *Sclerotium oryzae* in Selected Cultivars. Journal of Nematology 16(1) : 65-68

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: McGawley et al. 1984 studied interaction of *Aphelenchoides besseyi* and *Sclerotium oryzae* in three rice cultivar Saturn, Melrose, Nova76. Pathogens were inoculated singly and simultaneously. Rice plants were then analysed for their plant weight, which upon simultaneous inoculation of pathogens was reduced additively in cultivars Melrose and nova76 but not in cultivar Saturn. Disease index was also high in cultivars Melrose and nova76 upon simultaneous inoculation but not in cultivar Saturn. Although, the nematode population was reduced under combined stress condition in Saturn and Melrose but not in nova76. **Thus, rice cultivars Melrose and Nova76 are susceptible to this pathogen combination and show a synergistic effect of two pathogens. Still, cultivar Saturn is tolerant and does not show a synergistic effect.**