Effect on potato cultivars (*Solanum tuberosum L. cv. Katahdin, Kennebec, Abnaki*)

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

Crop: Potato (*Solanum tuberosum* L. cv. Katahdin, Kennebec, Abnaki)
Stress 1: *Pratylenchus penetrans*
Stress 2: *Verticillium albo-artum*
Stage of plant: At sowing

The table shows the impact of nematode and fungus alone and in combination on shoot weight, root weight, number of tubers/plant, and mean tuber weight of potato plants.

		Type A parameters			
	Treatment	**Shoot weight**	**Root weight**	**No. of tubers/plant**	**Mean tuber weight**
Katahdin	*Pratylenchus penetrans (1000 nematode/ml)*	7.0 ↓	9.8↓	20.0↓	7.3↓
	Verticillium albo-artum (10^6 conidia /ml)	54.4↓	68.9↓	73.3↓	79.3↓
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	36.8↓	72.1↓	66.7↓	82.7↓
Kennebec	*Pratylenchus penetrans (1000 nematode/ml)*	5.6↓	-3.9↑	-25.0↑	6.0↓
	Verticillium albo-artum (10^6 conidia /ml)	48.1↓	72.5↓	91.7 ↓	97.8↓
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	25.9↓	60.8↓	0.0	98.5↓
Abnaki	*Pratylenchus penetrans (1000 nematode/ml)*	0.0	16.1↓	-12.5↑	-8.7↑
	Verticillium albo-artum (10^6 conidia /ml)	12.0↓	21.4↓	0.0	-11.3↑
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	6.0↓	1.8↓	25.0↓	2.6↓

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).
3) "0.0" value indicates plant parameter behaved similarly under control and stress condition (no 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 in soil and per gm root and mean symptom and senility index under combined stress treatment

	Treatment	Response to combined stress** Type B parameters*		
		Mean symptom and senility index	Nematodes/gm soil	Nematodes/gm root
Katahdin	*Pratylenchus penetrans (1000 nematode/ml)*	1	25	261
	Verticillium albo-artum (10^6 conidia /ml)	1.1	N/A	N/A
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	2	4	108
Kennebec	*Pratylenchus penetrans (1000 nematode/ml)*	1	24	237
	Verticillium albo-artum (10^6 conidia /ml)	1.8	N/A	N/A
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	1.8	4	103

Abnaki	*Pratylenchus penetrans (1000 nematode/ml)*	1	23	185
	Verticillium albo-artum (10^6 conidia /ml)	1	N/A	N/A
	Pratylenchus penetrans (1000 nematode/ml) + Verticillium albo-artum (106 conidia /ml) 10 days later (Sequential stress)	1	18	223

For raw data – Click here (.xlsx file)
Reference - Burpee LL, Bloom JR (1978) The Influence of *Pratylenchus penetrans* on the Incidence and Severity of *Verticillium Wilt* of Potato Journal of Nematology 10: 95-99

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: Burpee LL et.al. (1978) studied the interaction of *Pratylenchus penetrans* and *Verticillium dahliae* in three potato cultivars katahdin, kennebec, Abnaki. Plants were then analysed shoot weight, root weight, the number of tubers/plant and mean tuber weight. Sequential inoculation of the two pathogens resulted in an additive decrease in the mean tuber weight of potato plants in all three cultivars. Other plant growth parameters studied did not show an additive reduction under combined stress treatment. The mean symptom index also increased under sequential stress treatment in cultivar katahdin, but decidedly less affected in the other two cultivars. Nematode population decreased under combined stress treatment. **Thus, this pathogen combination acts synergistically to cause a severe disease complex under combined stress treatment in cultivar katahdin.**