

## Effect on pea cultivars (*Pisum sativum* L.) cv. Laxton's Progress & Dark Skin Perfection

**The net impact of individual and combined stress on plant growth**

**The table shows the combined effect of cadmium and nickel along with ozone stress on the growth of pea cv. Laxton's Progress & Dark Skin Perfection**

**Crop:** Pea cv. Laxton's Progress & Dark Skin Perfection  
**Stress 1:** 0, 1, or 10  $\mu\text{mol CdSO}_4$ , and 0, 10 or 1000  $\mu\text{mol NiSO}_4$   
**Stress 2:** Ozone- 50 pphm  
**Stage of the plant:** 6-days-after planting

Cultivars	Stress treatments	Plant response to stress (% reduction over control)		
		Type A parameter *	Type B parameter *	Type C parameter *
		Shoot dry weight	Ozone injury **	Heavy metal (Ni or Cd) content ( $\mu\text{g/DW}$ ) **
Laxton's Progress	10 $\mu\text{mol Ni}$	8.0 ↓	NA	9.9
	100 $\mu\text{mol Ni}$	-8.0 ↑	NA	53.7
	1000 $\mu\text{mol Ni}$	100.0 ↓	NA	NA
	Ozone	12.0 ↓	2.3	0
	10 $\mu\text{mol Ni}$ + ozone	20.0 ↓	2.7	35.3
	100 $\mu\text{mol Ni}$ + ozone	-60.0 ↑	2.8	62
	1000 $\mu\text{mol Ni}$ + ozone	100.0 ↓	NA	NA
	1 $\mu\text{mol Cd}$	23.1 ↓	NA	2.85
	10 $\mu\text{mol Cd}$	15.4 ↓	NA	12.8
	100 $\mu\text{mol Cd}$	42.3 ↓	NA	83.8
	Ozone	7.7 ↓	2.3	0.24
	1 $\mu\text{mol Cd}$ + ozone	19.2 ↓	2.6	2.64
	10 $\mu\text{mol Cd}$ + ozone	23.1 ↓	2.5	14.8
	100 $\mu\text{mol Cd}$ + ozone	42.3 ↓	0.6	129.4
Dark Skin Perfection	10 $\mu\text{mol Ni}$	-11.11 ↑	NA	8.5
	100 $\mu\text{mol Ni}$	0.00	NA	40.1
	1000 $\mu\text{mol Ni}$	100.00 ↓	NA	NA
	Ozone	25.93 ↓	2.6	0
	10 $\mu\text{mol Ni}$ + ozone	11.11 ↓	3.2	7.4
	100 $\mu\text{mol Ni}$ + ozone	3.70 ↓	3.6	24.1



## Stress Combination and their Interaction in Plants (SCIP) Database

Website link- <http://www.nipgr.ac.in/scipdb.php>

1000 µmol Ni + ozone	100.00 ↓	NA	NA
1 µmol Cd	11.11 ↓	NA	2.89
10 µmol Cd	11.11 ↓	NA	12.7
100 µmol Cd	77.78 ↓	NA	162.9
Ozone	18.52 ↓	NA	0.39
1 µmol Cd + ozone	11.11 ↓	3.6	3.52
10 µmol Cd + ozone	11.11 ↓	3.8	10.8
100 µmol Cd + ozone	70.37 ↓	0.3	105.7

Control- cd- 0.22 µg/g DW

**For processed data** – Click here (.xlsx file)

**Reference-** Ormrod DP. (1977) Cadmium and nickel effects on growth and ozone sensitivity of pea. *Water, Air, and Soil Pollution* 8(3):263-70.

**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).
- 3) "0.0" value indicates plant parameter behaved similarly under control and stress condition (no damage).

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

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

**The inference of the study:** Ormrod, 1977 study focused on understanding the combined effect of cadmium and nickel along with ozone stress on the growth of pea cv. Laxton's Progress and Dark Skin Perfection. Results showed a significant reduction in shoot dry weight under combined stress than individual stresses except under combined Ni (100 µmol) and ozone stress where shoot dry weight was increased in both the cultivars. Nickel 1000 µmol concentration very detrimental and caused a 100% reduction in growth both under individual and in combination with ozone treatment. Damage was concentration-dependent under both the heavy metal stresses. Among the cultivars, Dark Skin Perfection was more susceptible to stress compared to Laxton's Progress.