

## Effect on tobacco (*Nicotiana tabacum*) cultivars

### The net impact of stress on plant growth

The table shows the effect of individual and combined ozone and viral infection on biomass and physiology of tobacco cultivars Yongding and Vam.

**Crop:** Tobacco (*Nicotiana tabacum*) cultivar Yongding  
**Virus:** *Potato virus Y*  
**Stress 1:** Ozone- Two levels of atmospheric ozone concentration, ambient (40 nl l-1) and elevated (80 nl l-1)  
**Stress 2:** Rub inoculation with viral extract  
**Stage of the plant:** Vegetative

| Cultivars | Stress treatments | Plant response to stress |  |   |  |                             |
|-----------|-------------------|--------------------------|--|---|--|-----------------------------|
|           |                   | Type A parameter*        | Type B parameter*                                      | Type C parameters*                                  |  |                             |
|           |                   | Biomass                  | Chlorophyll content <sup>#</sup> (mg g <sup>-1</sup> ) | Nicotine content <sup>#</sup> (mg g <sup>-1</sup> ) | Total protein content <sup>#</sup> (mg g <sup>-1</sup> ) | TNCs: Nitrogen <sup>#</sup> |
| Yongding  | PVY               | 16.8 ↓                   | 1.45   | 0.13  | 5.6  | 13.5                        |
|           | Ozone             | -7.8 ↑                   | 1.44   | 0.17  | 8.2  | 16                          |
|           | Ozone and PVY     | -7.1 ↑                   | 1.2  | 0.13  | 6.4  | 16.4                        |
| Vam       | PVY               | 20.6 ↓                   | 0.99   | 0.16  | 8.6  | 8.1                         |
|           | Ozone             | 29.3 ↓                   | 1.1  | 0.31  | 11.2   | 11.7                        |
|           | Ozone and PVY     | 33.7 ↓                   | 1  | 0.23  | 9.2  | 8                           |

TNCs: Nitrogen- Ratio of non-structural carbohydrate to nitrogen; Control- chlorophyll content – 1.72 (Yongding), 1(Vam), Nicotine content-0.19(Yongding), 0.31(Vam), Total protein content-8.4(Yongding), 9.3(Vam), TNCs: Nitrogen-13(Yongding), 9.9(Vam)

### Note:

The 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 affected by stress that lead to reduced susceptibility (higher the value less the damage).

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

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

### Reference-

Ye L, Fu X and Ge F (2012). Enhanced sensitivity to higher ozone in a pathogen-resistant tobacco cultivar. *Journal of Experimental Botany* 63(3):1341-7.

**The inference from the study:** Ye et al. 2012 investigated the effect of ozone stress on viral-plant interaction in tobacco cultivars, Yongding and Vam, differing in sensitivity to PVY. The authors found that PVY susceptible Yongding showed increased tolerance to combined stress,

whereas the resistant cultivar Vam was more negatively affected by combined stress as indicated by more significant reductions in biomass under combined stress. However, the chlorophyll and nicotine content was unaffected by combined stress in Vam. **The study indicates that the PVY resistant cultivar Vam was more sensitive to combined ozone and PVY infection than the susceptible cultivar Yongding.**