

# Compost Induced Disease Suppression

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## Introduction

Pot experiments were conducted to determine suppressive effect of compost against major soil-borne pathogens. The contribution of compost biological attributes to disease suppression was determined comparing gamma sterilized compost with non-sterile compost.

## Material and Methods

The pea variety Santana, subterranean clover and summer vetch were grown in autoclaved sand, sand amended with 20% v/v gamma sterilized and non-sterilized Yard Waste compost. At sowing pots were inoculated with *Fusarium avenaceum*, *F. oxysporum*, *F. solani* and *Phoma medicaginis* at  $2 \times 10^4$  spores  $g^{-1}$  substrate. Plants were harvested after 28 days and the level of damage on external and internal tissue was assessed on a 0-8 scale. A disease index (DI) was calculated based on the score means, and fresh weight was measured.

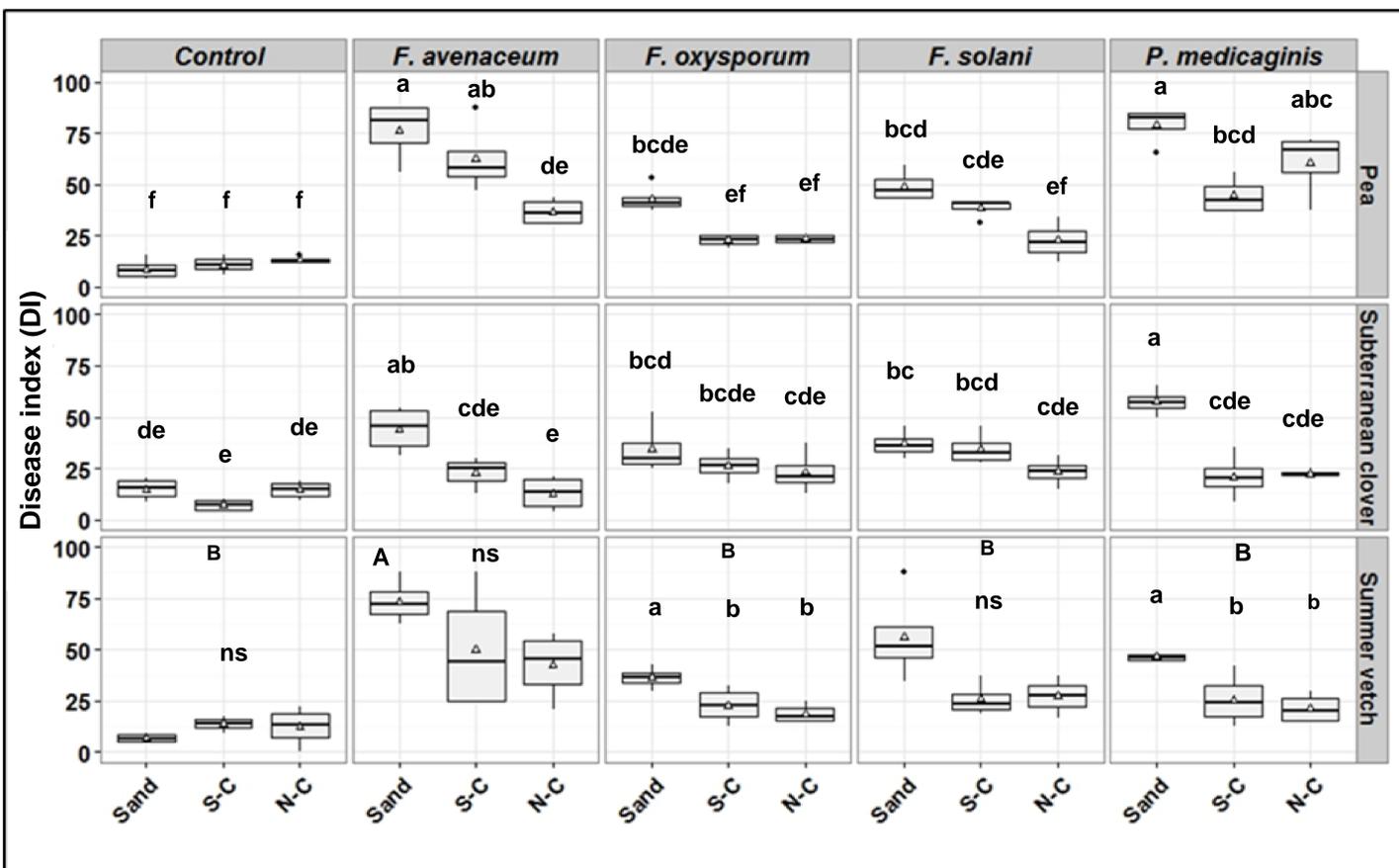


Figure 1. Disease index (0 – healthy, 100 – dead plant) of the three species inoculated with *F. avenaceum*, *F. oxysporum*, *F. solani* and *P. medicaginis* grown in sand, sand amended with gamma sterilized (S-C) and non-sterilized (N-C) compost. Different letters within plant species are indicating significant differences in DI,  $P < 0.05$  (Tukey's HSD test).

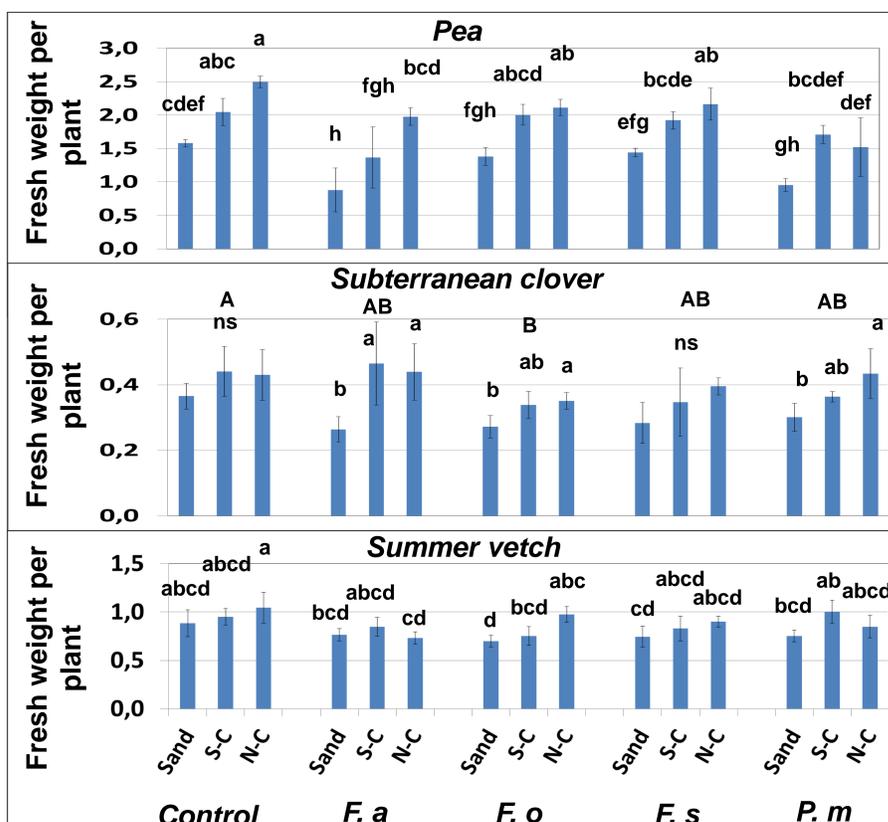


Figure 2. Fresh weights in sand, sand amended with gamma sterilized (S-C) and non-sterilized (N-C) compost of three species inoculated with *F. avenaceum* (Fa), *F. oxysporum* (Fo), *F. solani* (Fs), and *P. medicaginis* (Pm) grown. Different small letters indicate significant differences between compost and pathogen treatments,  $P < 0.05$  (Tukey's HSD test). Different capital letters: significant difference between pathogens. Error bars:  $\pm 1$  SD.

## Results

DI in non-sterilized compost was constantly lower compared to sand and sterilized compost, with exception of pea - *P. medicaginis* pathosystem, where sterilized compost had the lowest DI. Variation in DI was often high leading at times to non-significant effects of composts (Fig. 1).

Pea and vetch were similar in susceptibility except that vetch was less affected by *P. medicaginis*. Subterranean clover was least affected by all pathogens with highest DI for *P. medicaginis* (Fig. 1).

In all treatments, DI corresponded with the plant fresh weights. In pea non-sterilized composts significantly increased fresh weights of plants in all treatments compared to unamended sand. In subterranean clover and summer vetch compost effects were rare (Fig. 2).

## Discussion

Compost effects were pathogen specific. Thus, the higher biomass of peas with *F. avenaceum* in non-sterilized compost and lower DI suggest that disease suppression is mainly biological in origin. In contrast, with *P. medicaginis* a lower DI was measured in sterilized compost, and in the treatment with *F. oxysporum* both compost types were effective in reducing DI, suggesting disease suppression is achieved due to combination of abiotic and biological characteristics of compost.