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TAXI-I AND TAXI-III XYLANASE INHIBITORS AND A *FUSARIUM GRAMINEARUM* XYLANASE INCREASE PLANT RESISTANCE TO PATHOGENS IN *ARABIDOPSIS* AND TOBACCO

TUNDO S.*,***, PACCANARO M.C.*, SELLA L.*, ELMAGHRABY I.*, MOSCETTI I.**, D'OVIDIO R.***, FAVARON F.*

*) University of Padova, Department of Land, Environment, Agriculture and Forestry (TESAF), Research Group in Plant Pathology, Viale dell'Università 16, 35020 Legnaro (Italy)
**) Tuscia University, Department of Ecology and Biology (DEB), Biophysics and Nanoscience Centre, Via S. Camillo de Lellis snc, 01100 Viterbo (Italy)
***) Tuscia University, Department of Agricultural and Forestry Sciences (DAFNE), Via S. Camillo de Lellis snc, 01100 Viterbo (Italy)

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During host plant infection pathogens produce a wide range of cell wall degrading enzymes (CWDEs) to break the plant cell wall. Among CWDEs, xylanases are key enzymes in the degradation of xylan, the main component of cell wall hemicellulose. Fungal xylanases can also induce necrosis in plants as shown for the *Botrytis cinerea* Xyn11A, a well known virulence factor of this fungus. Since the *Triticum aestivum* xylanase inhibitor-I (TAXI-I) has been shown to inhibit *B. cinerea* Xyn11A, we verified if TAXI-I and TAXI-III, another TAXI type xylanase inhibitor with similar inhibitory specificity, can be exploited to counteract *B. cinerea* infections. With this aim, we produced *Arabidopsis thaliana* transgenic plants constitutively expressing TAXI-I or TAXI-III and tobacco plants transiently expressing TAXIs by agroinfiltration. TAXIs agroinfiltrated tobacco plants showed a 20-25% reduction in symptoms caused by *B. cinerea*. This efficacy was confirmed by *B. cinerea* infection experiments of TAXI-III (20-25% symptoms reduction) but not of TAXI-I transgenic lines. Our results suggest that the increased resistance of TAXI-III transgenic line to *B. cinerea* seems to be related with the ability of TAXI-III to counteract cell death activity of Xyn11A. Since the *Fusarium graminearum* xylanase FGSG_03624 has been shown to induce defense responses in *A. thaliana* independently from its enzymatic activity, we also tested its ability to increase resistance against bacterial and fungal pathogens by transient expression and transgenic approach. *Arabidopsis* transgenic lines expressing an inactivated form of FGSG_03624 showed about 20% reduction of symptoms by *Pseudomonas syringae* pv. *maculicola* while no symptoms reduction was observed against *B. cinerea*. The efficacy in reducing (by about 45%) symptoms caused by *P. syringae* pv. *tabaci* was also confirmed by transient expression in tobacco through agroinfiltration.