

IS THERE A BENZOXAZINONE-MEDIATED POTENTIAL FOR WEED-SUPPRESSION IN *TRITICUM* L. SPP. AND *SECALE CEREALE* L.?**Belz R. G., Hurle K.***University of Hohenheim, Institute of Phytomedicine 360, Department of Weed Science, 70593 Stuttgart, Germany*

Heterocyclic 1,4-benzoxazin-3(4H)-ones (HX), which belong to the unique class of benzoxazinones, are major components in plant chemical defense in grasses, and they are also believed to be part of an allelochemical system involved in the interference with other plants *via* root exudation. *Triticum* L. spp. and *Secale cereale* L. release HX *via* root exudation, but a causal involvement of HX in allelopathic trait expression at natural release rates is still to be verified. The objective of this study was to evaluate the significance of a HX-mediated allelopathic potential of root exudates.

A biological screening assessed the variation in phenotypic allelopathic activity in 146 cultivars of four HX-producing grass species (*T. aestivum* L., *T. durum* Desf., *T. spelta* L., *S. cereale*). The bioassay was conducted on a plant-by-plant basis under laboratory conditions as a dose-response assay in hydroponic culture with *Sinapis alba* L. as a receiver species. A simultaneous chemical screening collected root exudates by trap solution technique to quantify HX by HPLC-DAD. The observed biological response (ED₅₀ = donor plant density causing 50 % inhibition in root growth of *S. alba*) was linked with the actual exudate concentration of HX to quantify the level of correlation. Finally, the phytotoxicity of exudate concentrations of HX was evaluated in pure compound bioassays to verify the statistically estimated correlation.

Cultivars differed significantly in their ability to suppress *S. alba* and could be differentiated by cluster analysis into 6 allelopathic divergent clusters, whereby only few possessed a marked high or low allelopathic activity. The chemical screening revealed that DIBOA and DIMBOA were the prevailing HX detectable. While in root exudates of 12-d-old *T. aestivum* and *T. spelta* only DIMBOA occurred, exudates of *T. durum* and *S. cereale* contained DIMBOA and DIBOA. For all species, the total amount of HX exuded by different cultivars significantly correlated with the growth inhibition in the bioassay, with a species-specific capacity accounting for the test-plant bioassay response of 48-72 %. Equivalent concentrations of pure HX had phytotoxic effects on *S. alba*, which were in the range of the statistically estimated degree of correlation.

These findings provide strong evidence that the differential exudation of HX contributes to the overall allelopathic activity of root exudates of wheat and rye and is most likely one of the determining factors of crop allelopathy in these species.