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Effects of growing rye with berseem clover

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Two-week-old seedlings of rye (Secale cereal L.) inbred line D33 co-cultivated with berseem clover. Photo by Monika Rakoczy-Trojanowska.

Among cereals, rye shows the strongest allelopathic potential. This property is very well studied and is primarily associated with secondary metabolites—benzoxazinoids (BXs). However, until recently, little was known regarding if and how rye reacts to allelochemicals produced and secreted by other plant species, e.g., by berseem clover.

Based on metabolic and genomic analyses, new research in *Crop Science* demonstrates for the first time that co-cultivating rye with berseem clover considerably influences both the concentration of six BXs (HBOA, DIBOA, GDIBOA, DIMBOA, GDIMBOA, and MBOA) and the expression of seven related genes (*ScBx1–ScBx5*, *ScIgl*, and *ScGT*) in its roots and aerial parts.

Thus, BXs are not only a component of passive interactions between rye and the surrounding alien plant species, but also an important component of an active response. A particularly interesting reaction is an increased concentration of two BXs—GDIBOA and DIBOA—in roots of all tested genotypes after six weeks of co-cultivation with berseem clover. This may result in an improvement of the defensive capabilities of rye against rhizosphere-associated diseases and pathogens. The enhanced production and exudation of BXs from roots should also recruit beneficial microorganisms.

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Rakoczy-Trojanowska, M., Święcicka, M., Bakera, B., Kowalczyk, M., Stochmal, A., & Bolibok, L. (2020). Co-cultivating rye with berseem clover affects benzoxazinoid production and expression of related genes. Crop Science, 60.
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