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Mycotoxigenic potential and pathogenicity of *Fusarium* species isolated from sugar beet

In many economically important crops, *Fusarium* species cause yield and quality losses as well as mycotoxin contamination. They can also infect sugar beet in all growth stages and during storage. In a previous field trial at two locations in Germany, 13 different *Fusarium* species were detected in freshly-harvested and stored sugar beet. Isolates of all species were tested for pathogenicity to sugar beet following root dip inoculation. Re-isolation of all species from root tissue was possible, but only *F. graminearum* and *F. sambucinum* caused symptoms comparable to a *F. oxysporum* f. sp. *betae* control, suggesting a high infestation rate of sugar beet with endophytic *Fusarium* strains. Additionally, saprotrophic colonization of sugar beet tissue was evaluated in humid chambers and in the greenhouse. Plugs of *Fusarium* cultures were used for inoculation of sugar beet slices and growing sugar beets following mechanical injuries. In these assays, isolates of *F. cerealis*, *F. culmorum*, *F. graminearum*, and *F. sambucinum* induced rapidly severe rotting symptoms whereas for *F. redolens* and *F. oxysporum* only slight discolorations of beet slices and wound healing in growing beets was observed. The mycotoxigenic potential of 34 *Fusarium* strains isolated from sugar beet was characterized in rice culture in order to identify target toxins for future analysis of sugar beet and sugar beet products. A total of 26 mycotoxins were detected by LC-MS/MS, including trichothecenes, zearalenone, and especially high amounts of beauvericin, enniatins, and moniliformin. The known biological properties of these different secondary metabolites, their possible natural occurrence in sugar beets as well as the impact of sugar beet residues on crop rotation are discussed.