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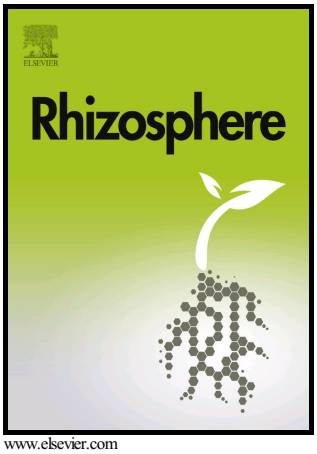

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Patterns of Fusarium wilt epidemics and bean production determined according to a large-scale dataset from agro-ecosystems

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Abstract

Fusarium oxysporum causing Fusarium wilt is one of major rhizospheric pathogens threatening bean production worldwide. Over two growing seasons in 2007 and 2008, infections of bean roots were described in 48 farmers' fields in Zanjan province, Iran. Root infection was measured based on frequency of fungal isolation from root at vegetative (V3), flowering-podding (R6-7) and pod maturity (R9) stages of bean growth. Area under disease progress curve (AUDPC), linear and quadratic coefficients for colonization regressed on time were also included in multivariate analysis. Two principal factors accounting for 77% of total data variance characterized root colonization. Factor 1 explaining 42% of variance included linear coefficient and isolation frequency at V3 stage. Factor 2 accounting for 35% of data variance was interpreted as AUDPC factor. Based on principal coordinates plots, fields were distributed normally according to pathogen-production-agro-ecosystem composition. Multiple regressions demonstrated significant associations of bean class, cultivation method, planting date, previous crop, soil clay and urea use with isolation frequency of *F. oxysporum* and seed

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