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Effects of direct drilling on *Fusarium* DNA levels

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Our work is part of the projects, monitoring mycotoxin and *Fusarium* levels in Finland during 2004-2006 (Finmyco and Safety Indicators). We have found a highly significant correlation between *Fusarium graminearum* DNA and deoxynivalenol (DON) levels in Finnish oats, barley and spring wheat. The correlation between *F. langsethiae*/*F. sporotrichioides* DNA and HT-2+T-2 levels was highly significant in oats. The correlation between *F. poae* DNA and NIV was also significant in both barley and oats. In addition, a significant correlation was found between *F. avenaceum* DNA and enniatins in spring wheat, barley and oats and between *F. avenaceum* DNA and moniliformin (MON) in barley and spring wheat (Yli-Mattila et al. 2008a,b).

Grain samples collected before harvesting were obtained from Päivi Parikka (MTT) and they were grown in a tillage experiment field in Jokioinen in 2004-2006. DNA and mycotoxin levels were determined as described by Yli-Mattila et al. (2008a,b).

Fusarium DNA levels started to increase after flowering. In 2006 this increase continued till harvesting, but in 2005 TMLAN (*F. langsethiae* + *F. sporotrichioides*) levels decreased before harvesting; this was probably caused by other *Fusarium* fungi which overgrew *Fusarium langsethiae*. *F. poae* DNA levels were higher in plots with tillage (including ploughing) as compared to those without tillage (direct drilling) in 2005 and 2006 in both oats and barley; the difference was greater a few weeks before harvesting than during it. TMLAN DNA levels were higher in plots without tillage in 2004 in oats two weeks after flowering and in 2006 during harvesting in both oats and barley. Changes in *F. poae* and TMLAN levels were in agreement with changes in NIV and HT-2/T2 levels, respectively, while low *F. graminearum* DNA levels were in agreement with low DON levels. (Yli-Mattila et al., 2008b). So, it might also be possible to predict risks for high mycotoxin levels by measuring *Fusarium* DNA levels in grains a few weeks before harvesting.

Yli-Mattila, T., Paavanen-Huhtala, S., Parikka, P., Hietaniemi, V., Jestoi, M., Gagkaeva, T., Sarlin, T., Haikara, A., Laaksonen, S. & Rizzo, A. (2008a) Real-time PCR detection and quantification of *Fusarium poae*, *F. graminearum*, *F. sporotrichioides* and *F. langsethiae* as compared to mycotoxin production in grains in Finland and Russia. – Archives of Phytopathology and Plant Protection 41: 243-260.

Yli-Mattila, T., Parikka, P., Lahtinen, T., Ramo, S., Kokkonen, M., Rizzo, A., Jestoi, M. & Hietaniemi, V. (2008b) *Fusarium* DNA levels in Finnish cereal grains. In “Current Advances in Molecular Mycology (Ed. by Y. Gherbawy, R. Mach and M. Rai) (in press).
<http://www.sci.utu.fi/kasvimb/phylo.html>