



NATIONAL VETERINARY INSTITUTE

Alternaria mycotoxins in Swedish feed grain

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Wheat with *Alternaria* infections





Germinating kernels with *Alternaria* spp.



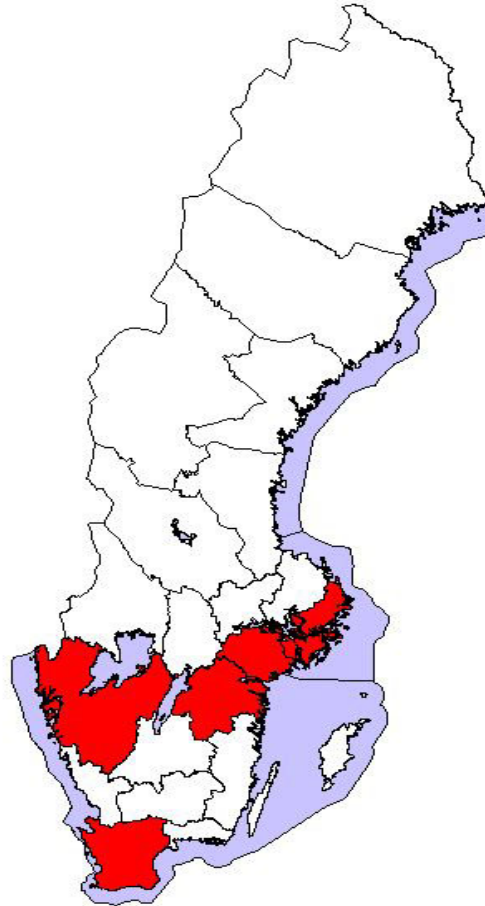


Alternaria spp isolated from wheat





Grain samples from pig farms (n= 40)





Alternaria mycotoxins

- Large number of mycotoxins
- Most well known:
 - Tenuazonic acid, TeA
 - Alternariol, AOH
 - Alternariol methyl ether, AME
 - Altertoxin I, ATX-I
 - Altenuene, ALT





Isolated species of *Alternaria* from cereals and their metabolite profiles

- *A. arborescens* sp-grp (AOH, AME, altenusin, altenuene)
- *A. tenuissima* sp-grp (TeA, ATX -I, AOH, AME)
- *A. infectoria* sp-grp (infectopyrone)





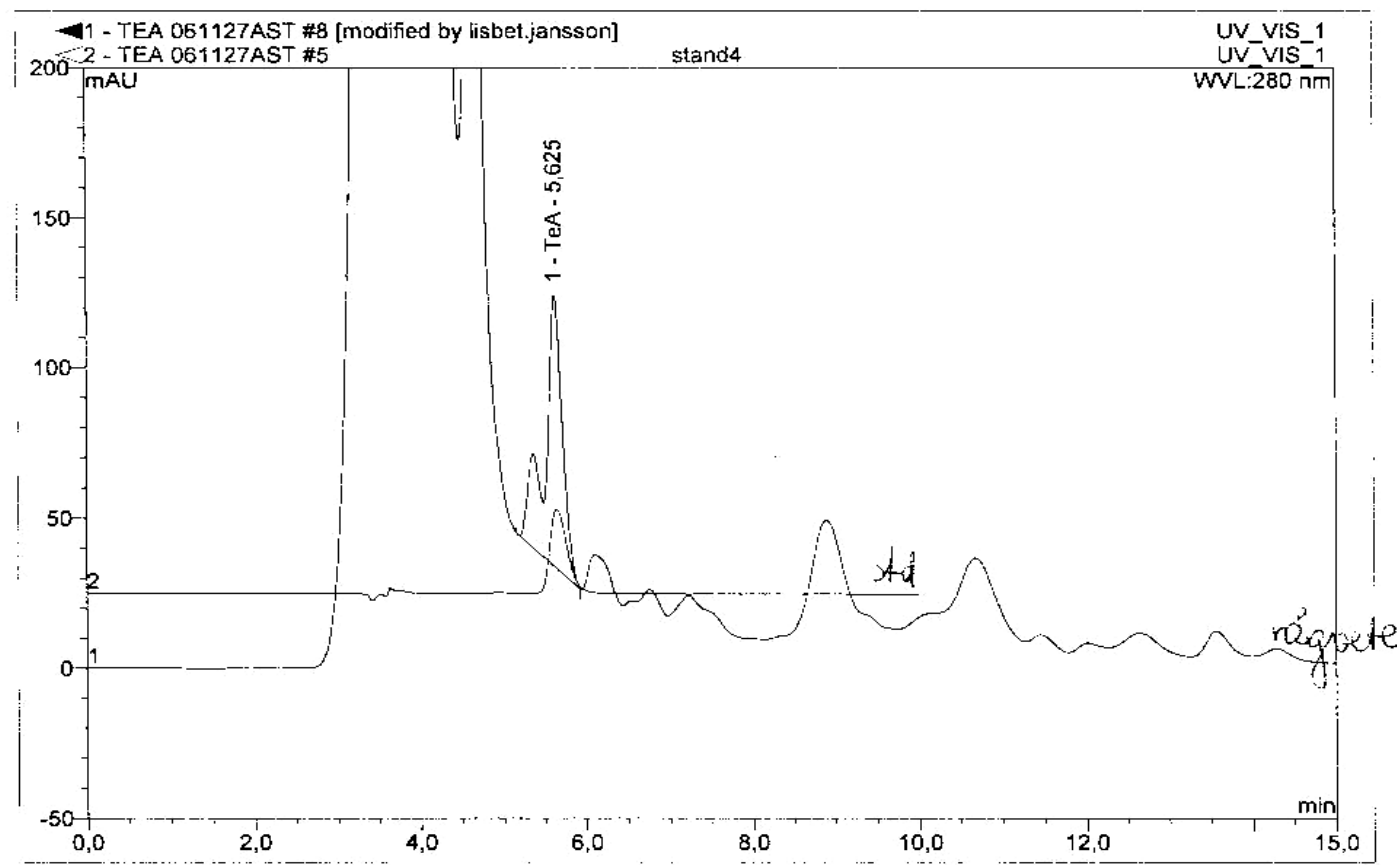
Analytical method for alternaria mycotoxins (Solfrizzo et al. 2004)

- **Extraction**: MeOH
- **Clean-up**: Solid-phase columns, AOH & AME, C-18 ; TeA, SI
- **Detection**: AOH & AME, UV (345 nm) and fluorescence (Ex 253nm, Em 415 nm)
TeA, UV (280 nm)



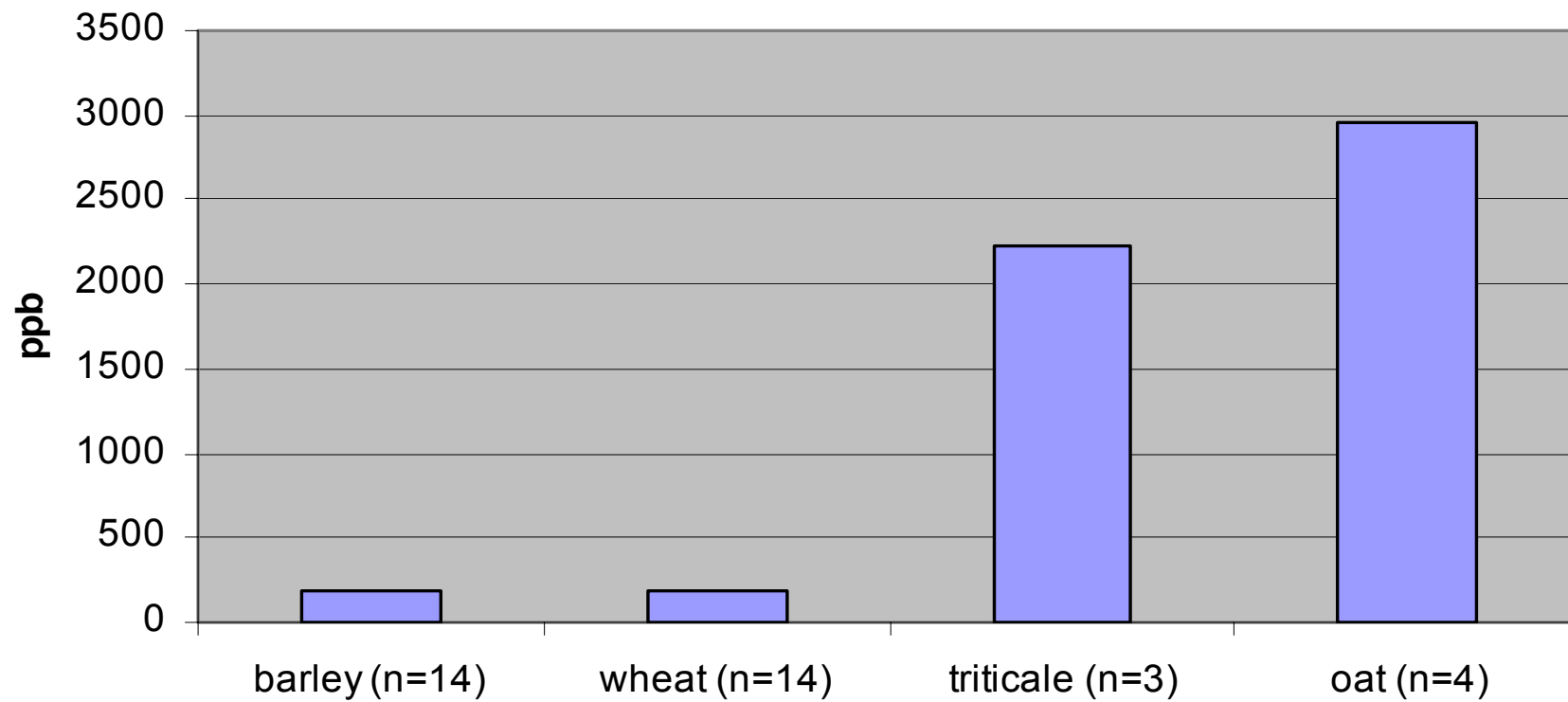


TeA in triticales



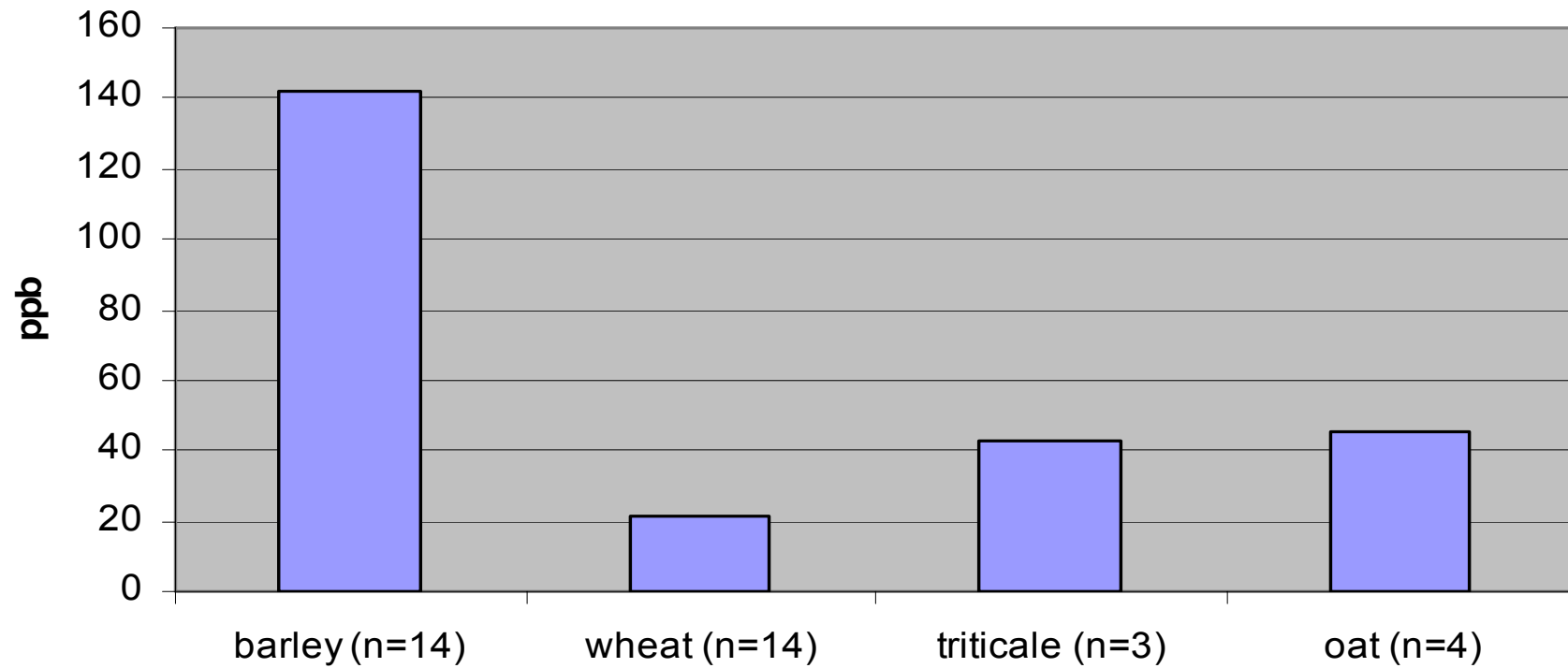


Tenuazonic acid levels (mean values) in different cereals



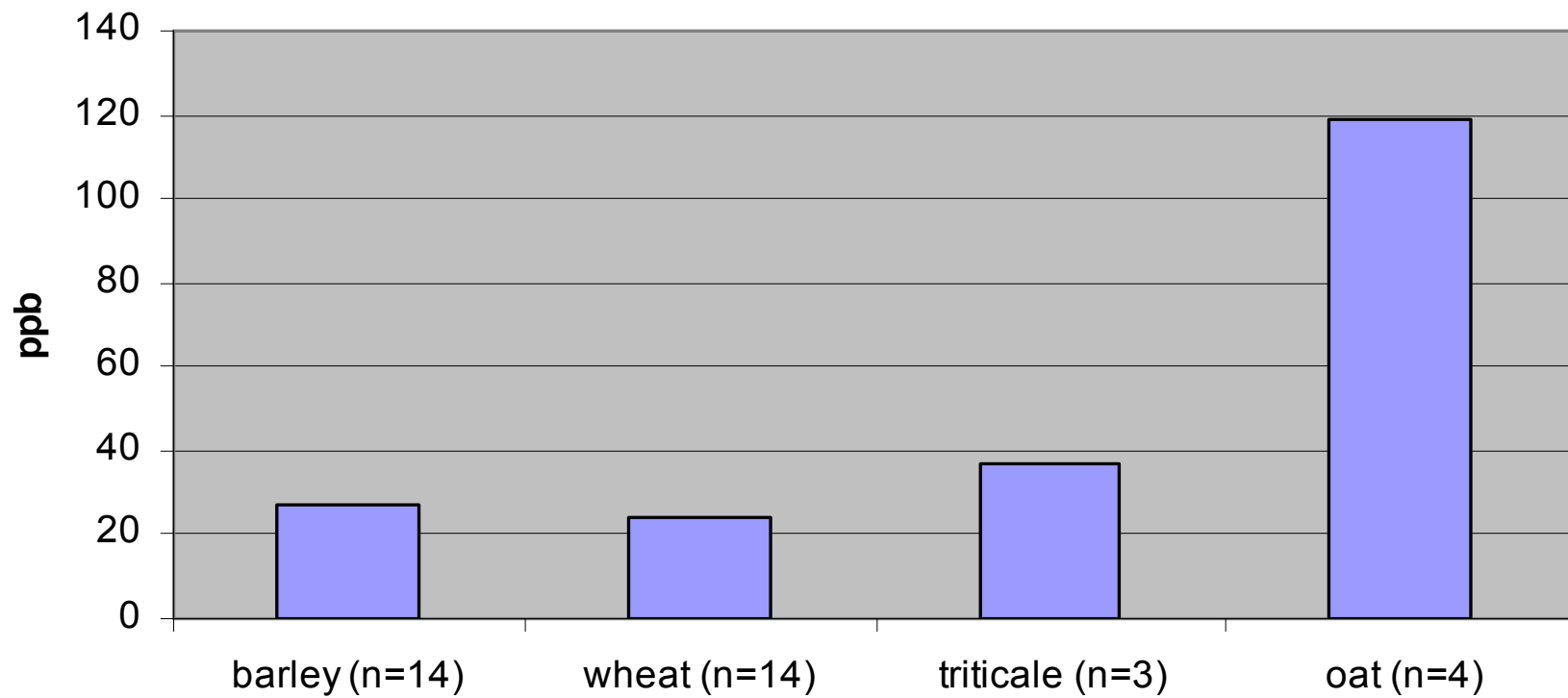


AOH levels (mean values) in different cereals





AME levels (mean values) in different cereals





LC-ESI-MS/MS

- Column: Phenomenex Luna 5 μ C 18 (150x2)
- Mobile phase: ammonium acetate and AcN
- ESI: negative mode, SRM
- Transitions: m/z 196 \rightarrow 139(TeA), m/z 257 \rightarrow 213 (AOH) and m/z 271 \rightarrow 256 (AME)
- MS conditions: CID 20 V , collision energy 22V, source temp 25⁰ C, capillary voltage 3kV, collision gas (Ar) 1.5 Torr





Occurrence of Alternaria mycotoxins

Germany (1988), 6-160 ug / kg in cereals (AOH/AME)

Poland (1993), 20-600 ug/ kg in wheat (AOH)

Australia (1997), < 1050 ug/ kg in weathered wheat (AOH)

China (2000), 335, 443, and 2400 ug/ kg in wheat of AOH, AME and TeA, respectively





Toxicology of *Alternaria* mycotoxins

- Only a few studies carried out
- Low acute toxicity of AOH/AME, TeA most acutely toxic
- Cytotoxic and genotoxic effects are reported for AOH and AME, recently





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