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The effects of vegetated buffer zones on erosion and nutrients in surface runoff

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J. Uusi-Kämppä

1. Introduction: Erosion and nutrient surface runoff

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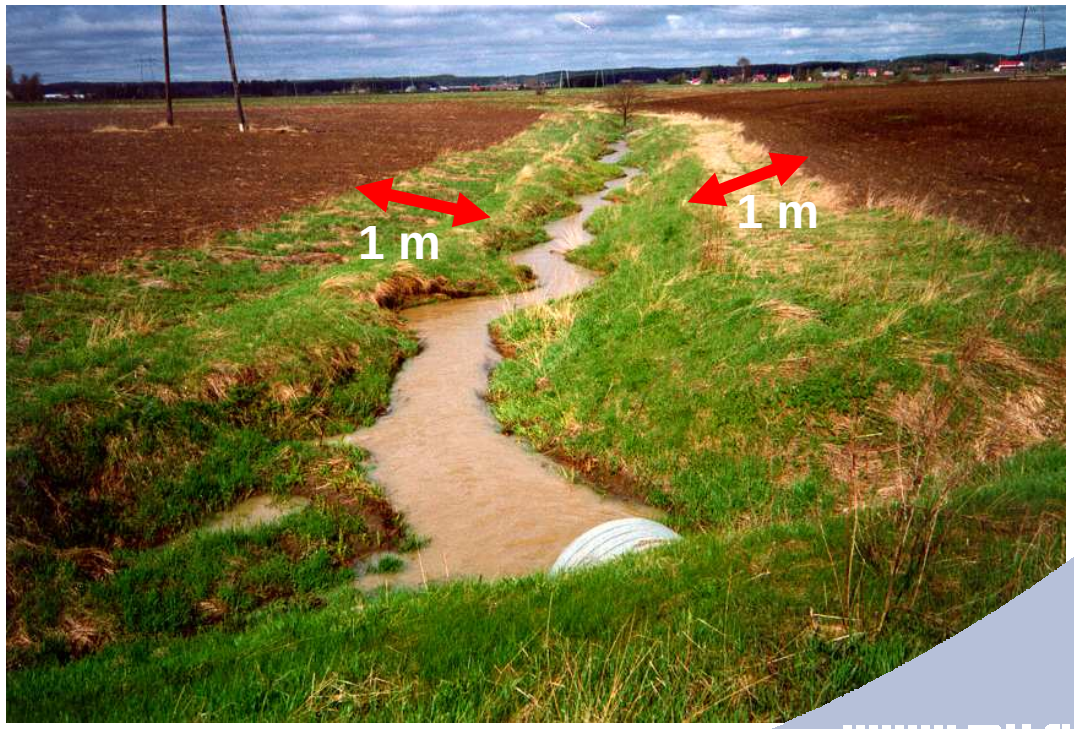
Headlands



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Buffer strips and buffer zones

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Retention prosesses on buffer zones

1. Deposition of soil particles
2. Adsorption of pollutants to soil surface, and infiltration of water into soil
3. Plant uptake of nutrients

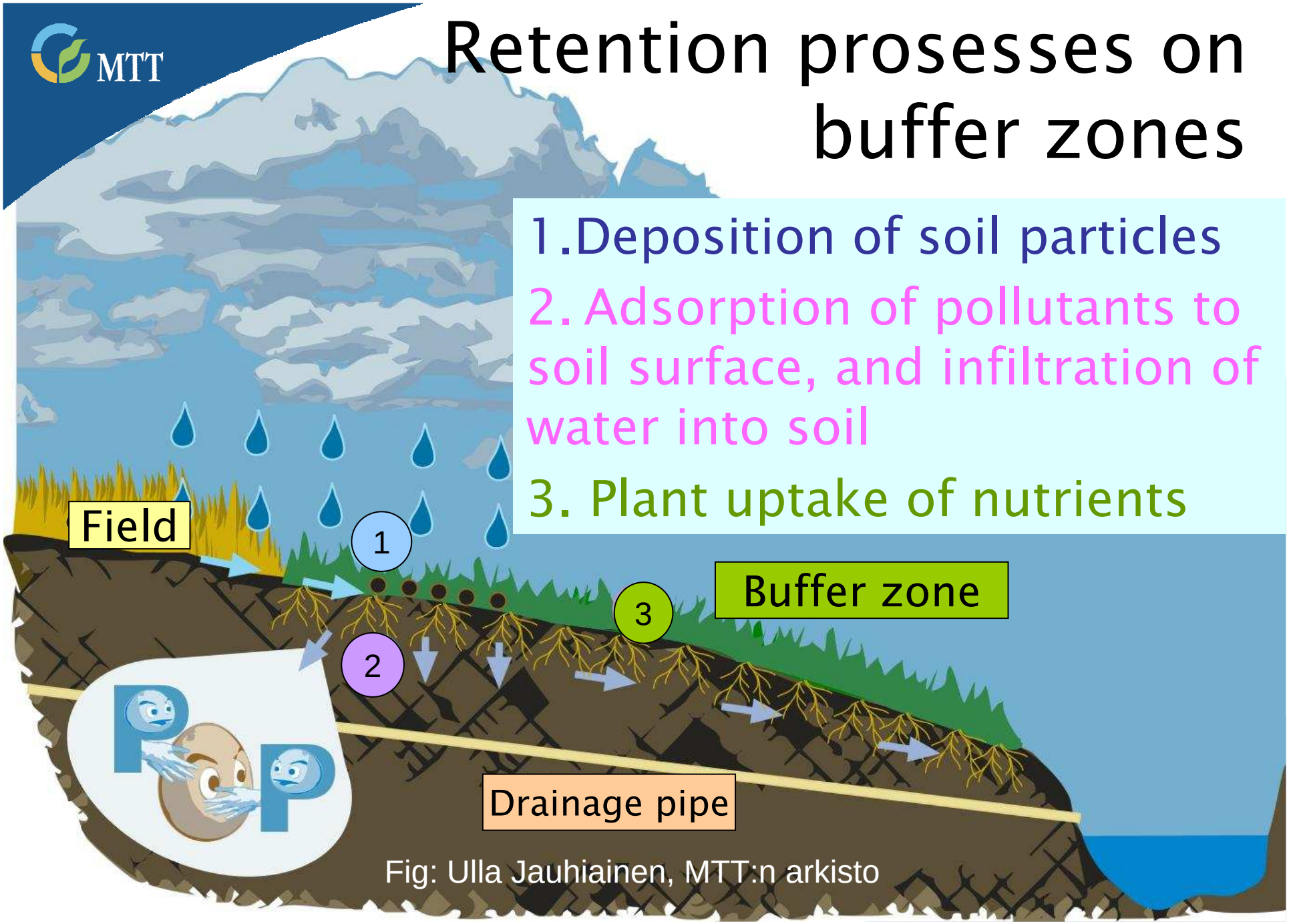

Fig: Ulla Jauhiainen, MTT:n arkisto

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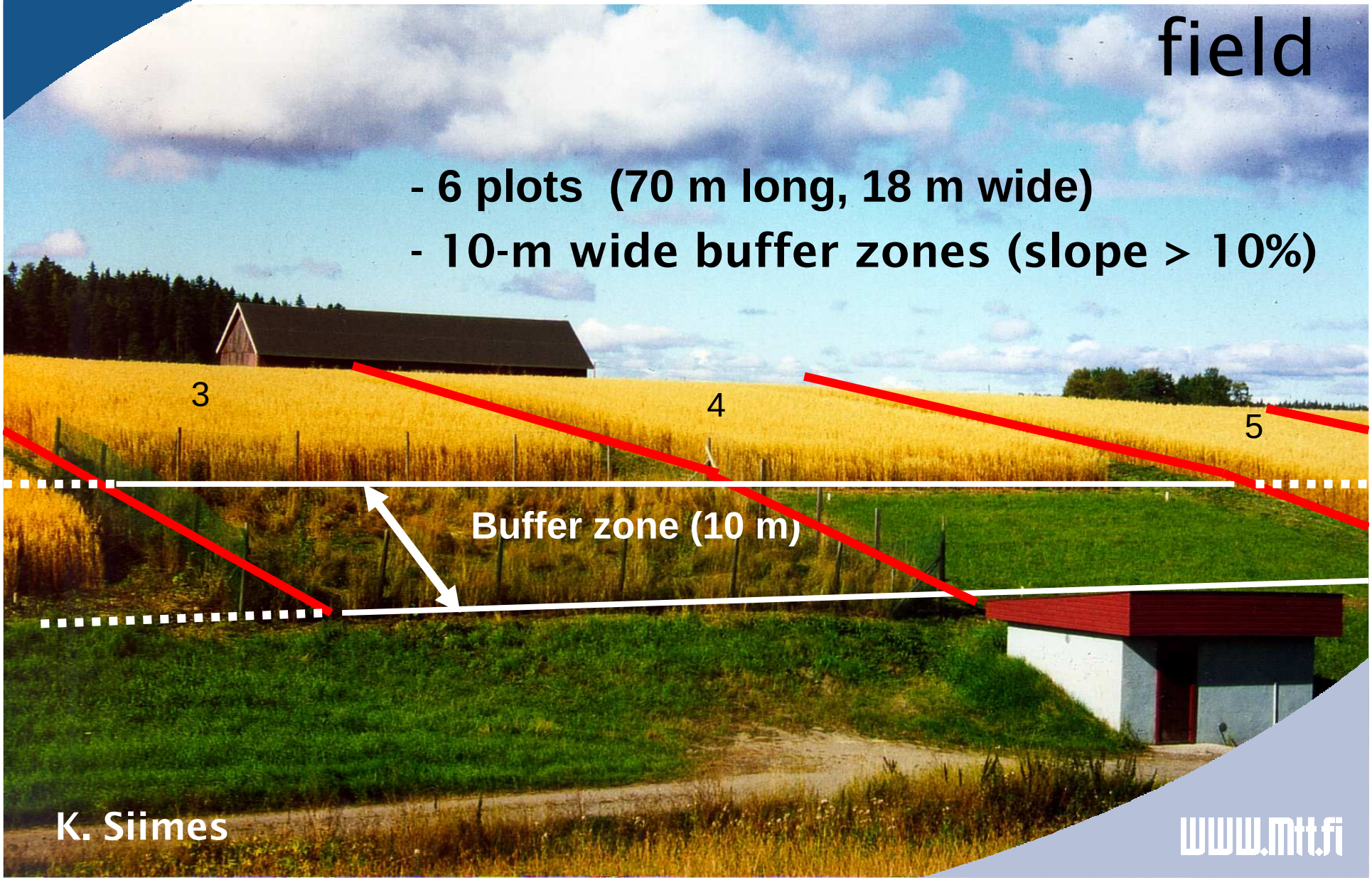
2. Lintupaju experimental field



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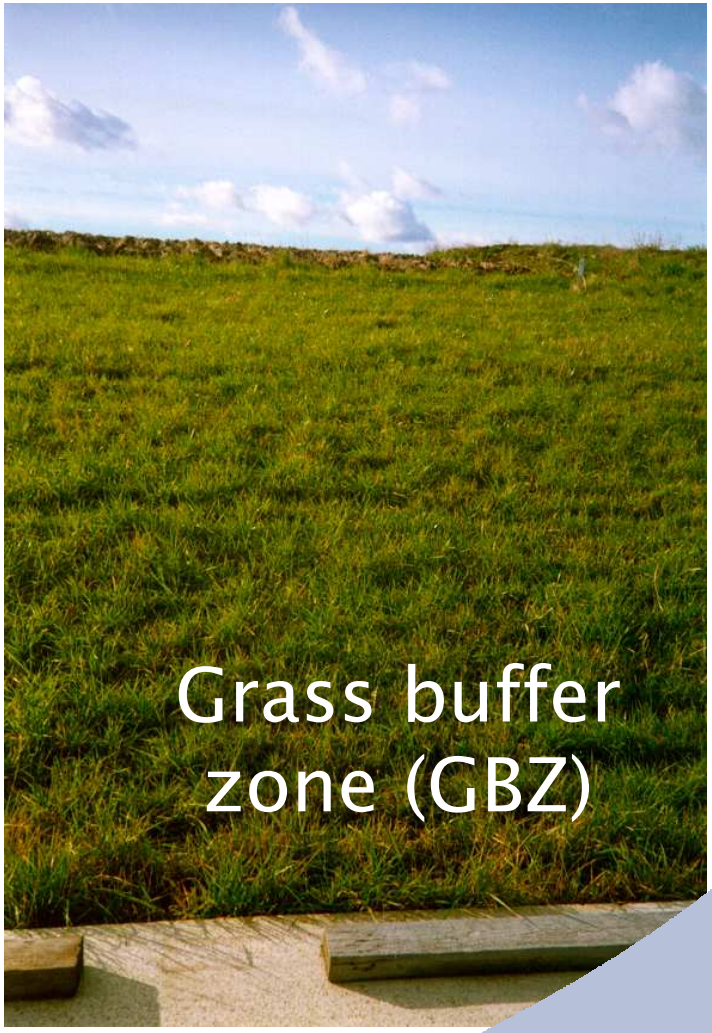
Treatments



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Buffer zone experiments on the Lintupaju field

1. Spring cereal (Autumn plowing) 1991–2002

3. Direct sowing 2006–

2. Pasture 2003–2005

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3. Results

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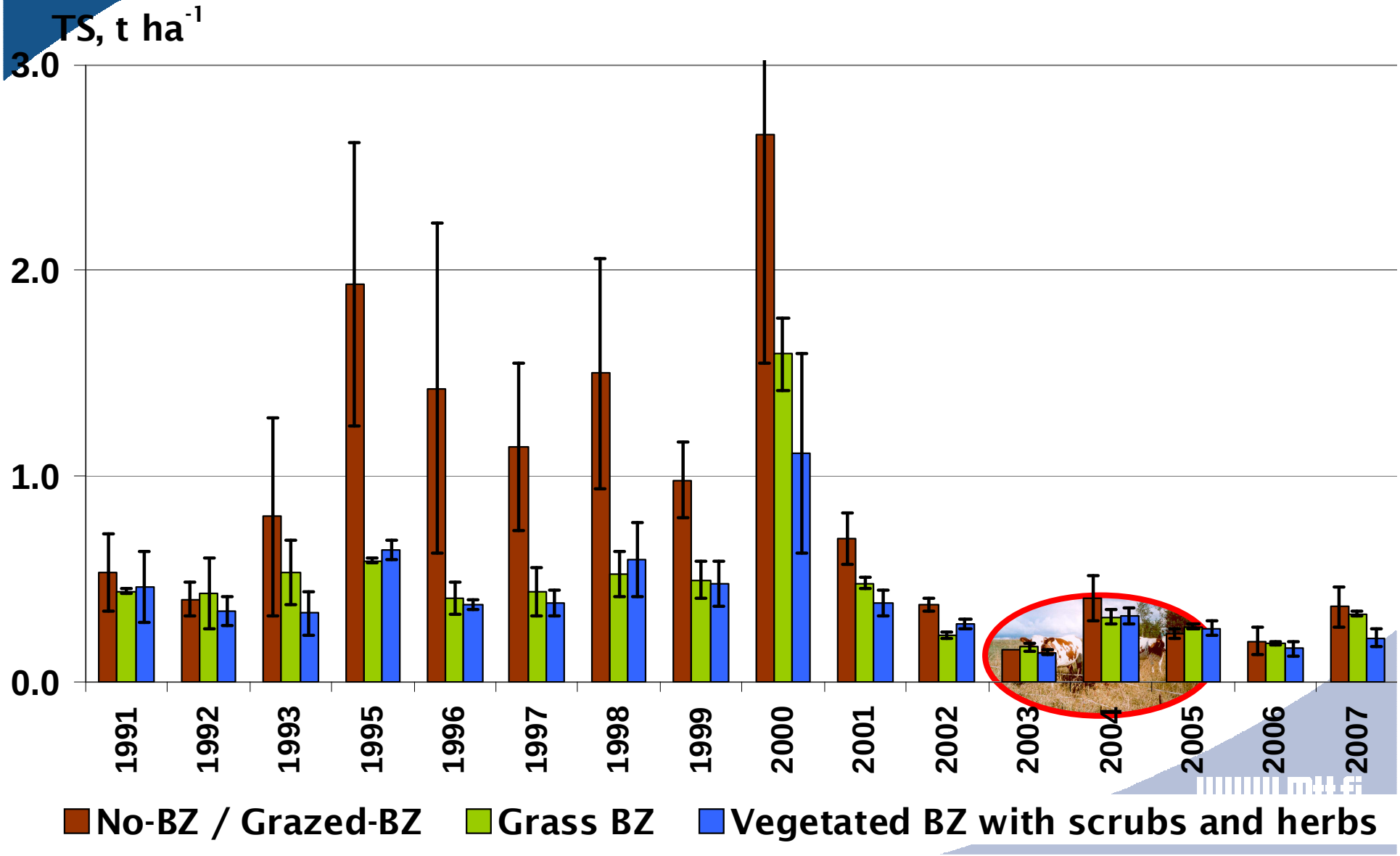
Total solids in surface runoff



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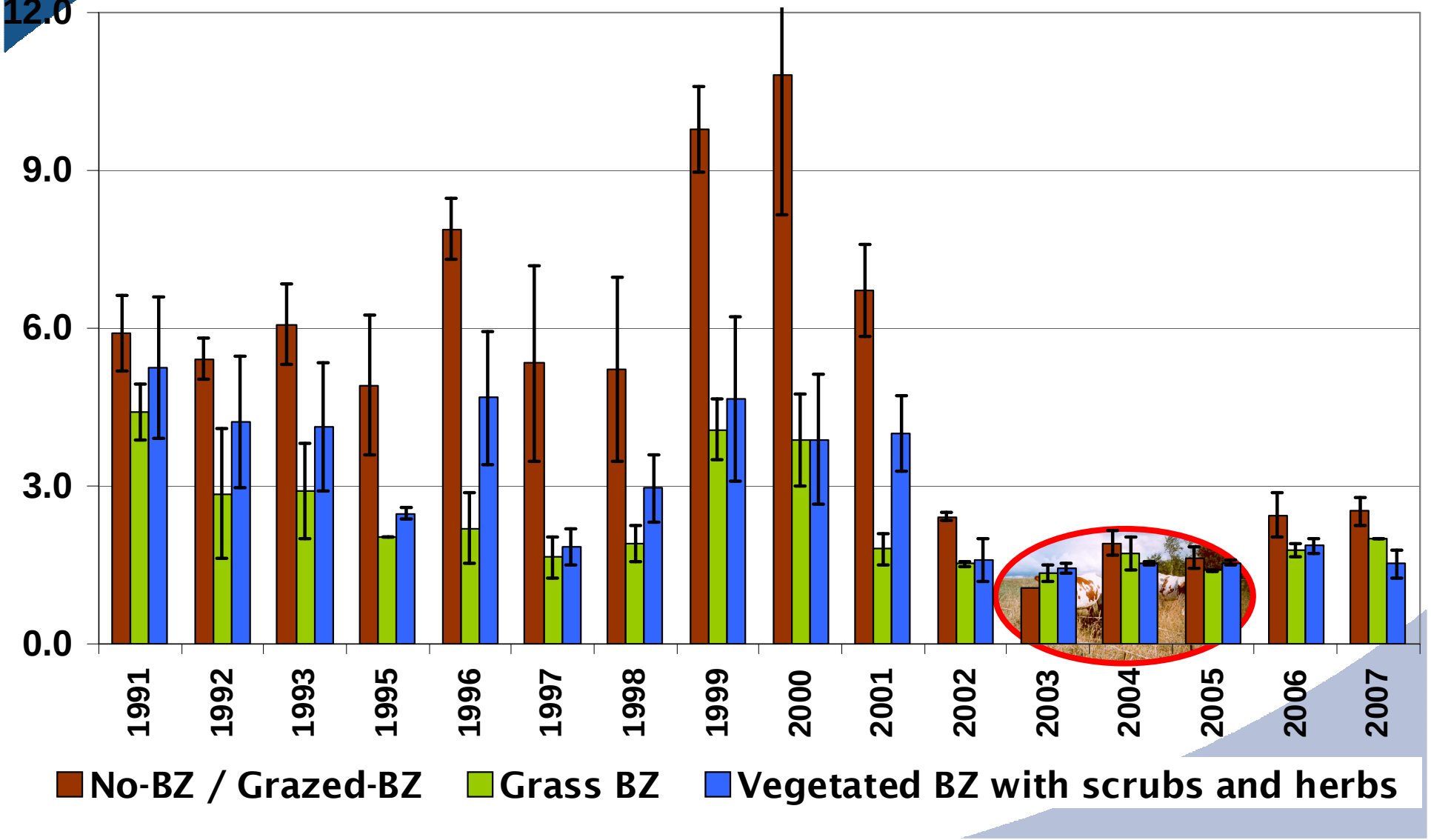
Total nitrogen in surface runoff



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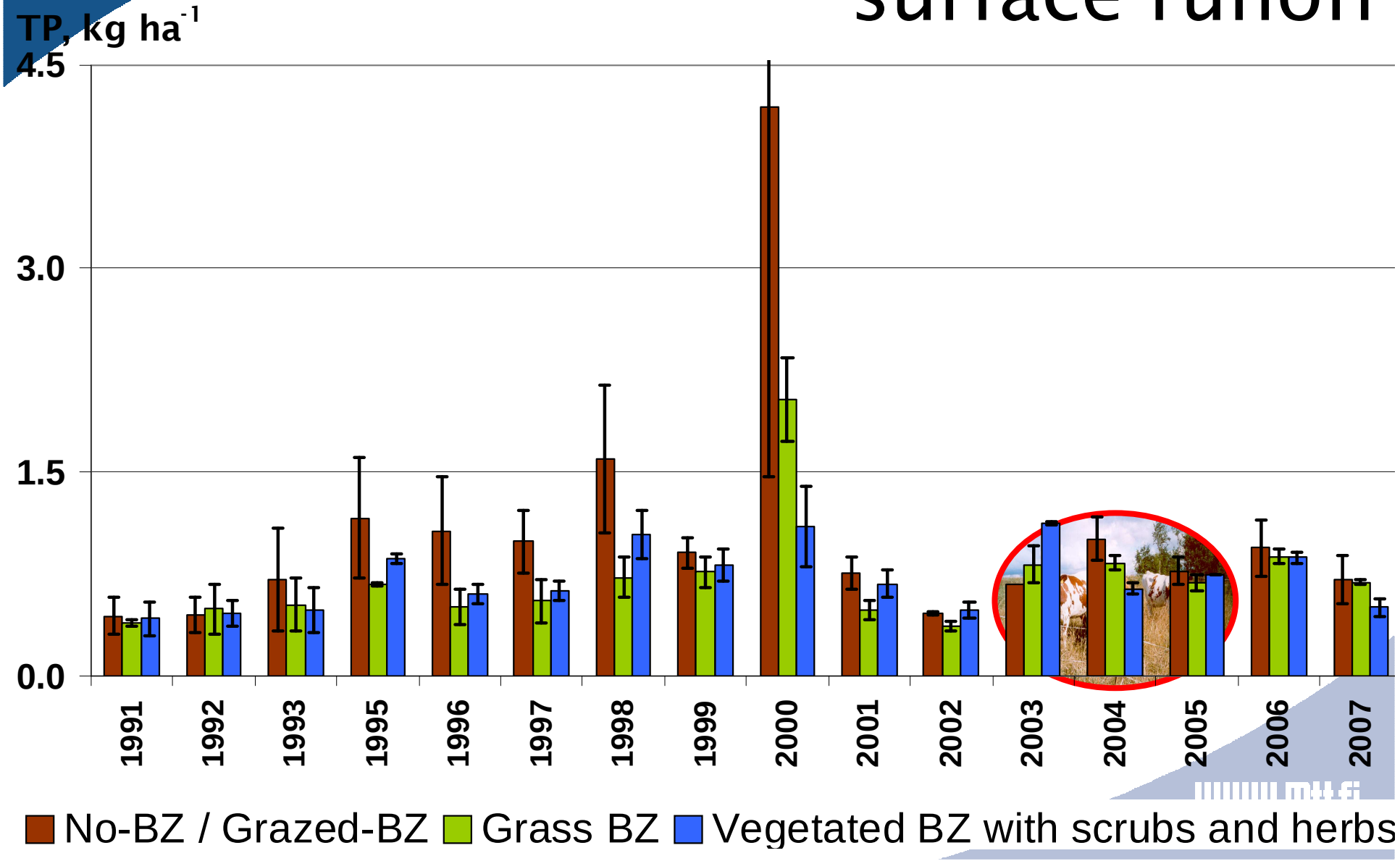
Total phosphorus in surface runoff



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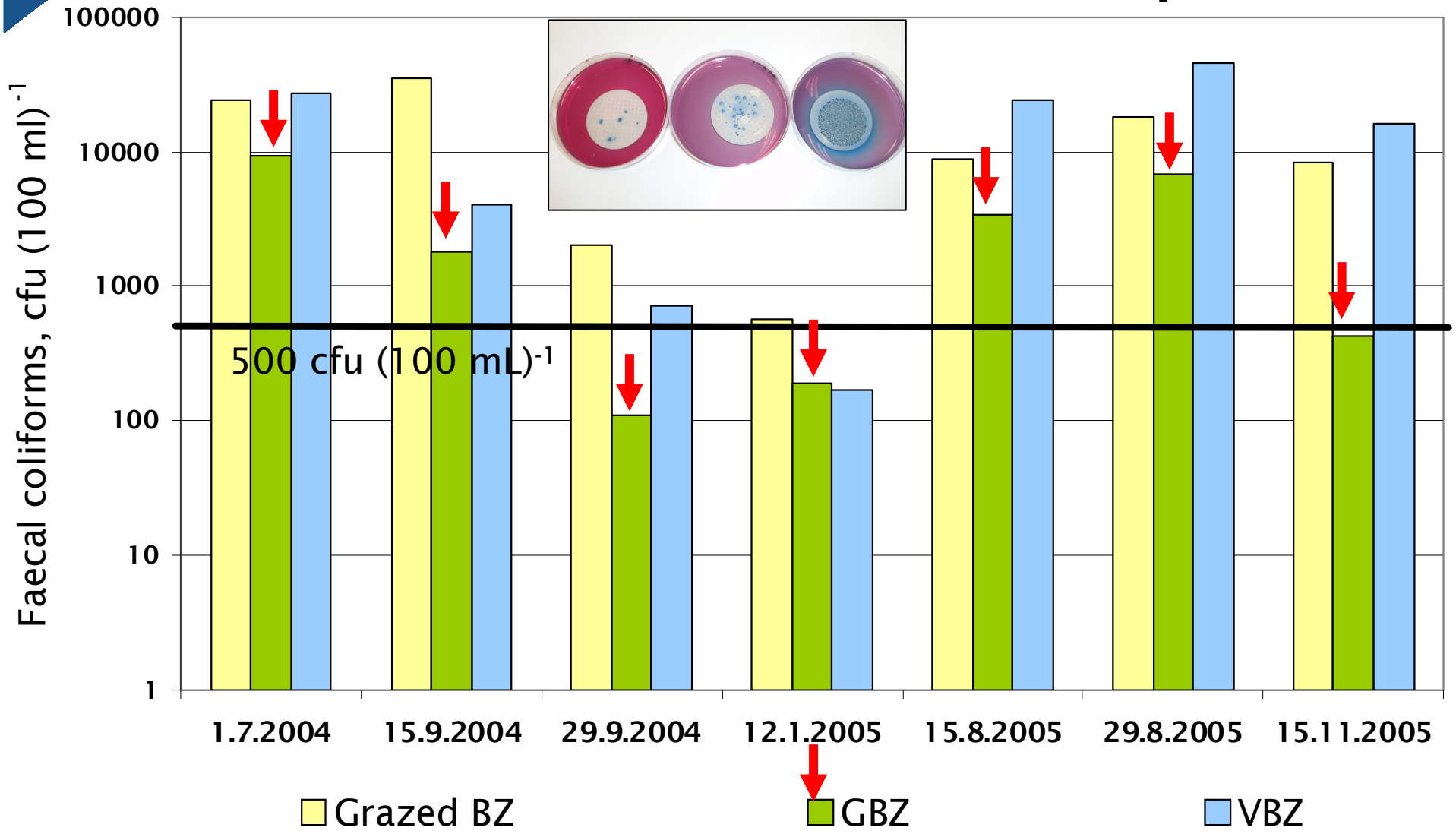
Faecal coliforms in surface runoff from the pasture



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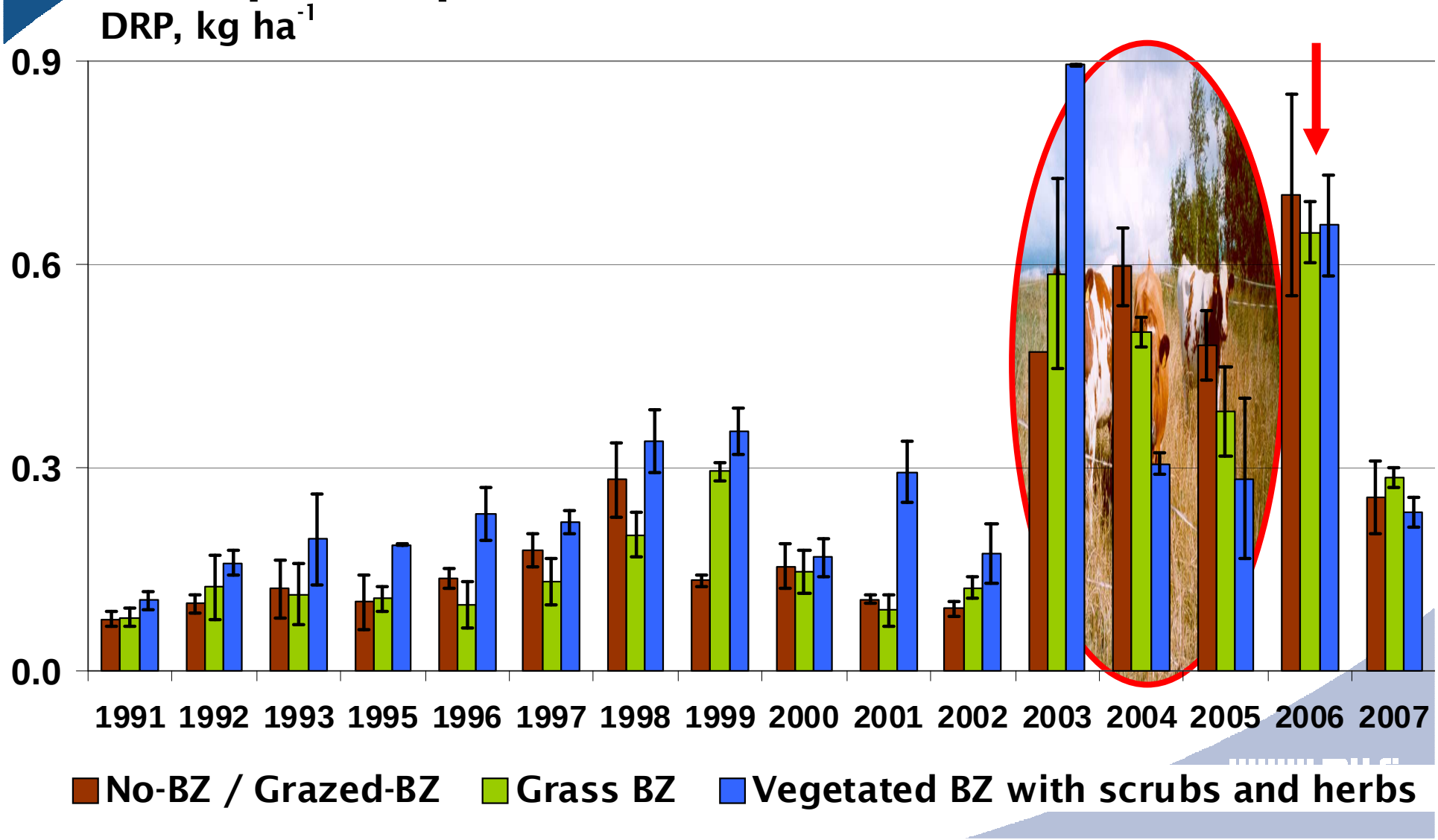
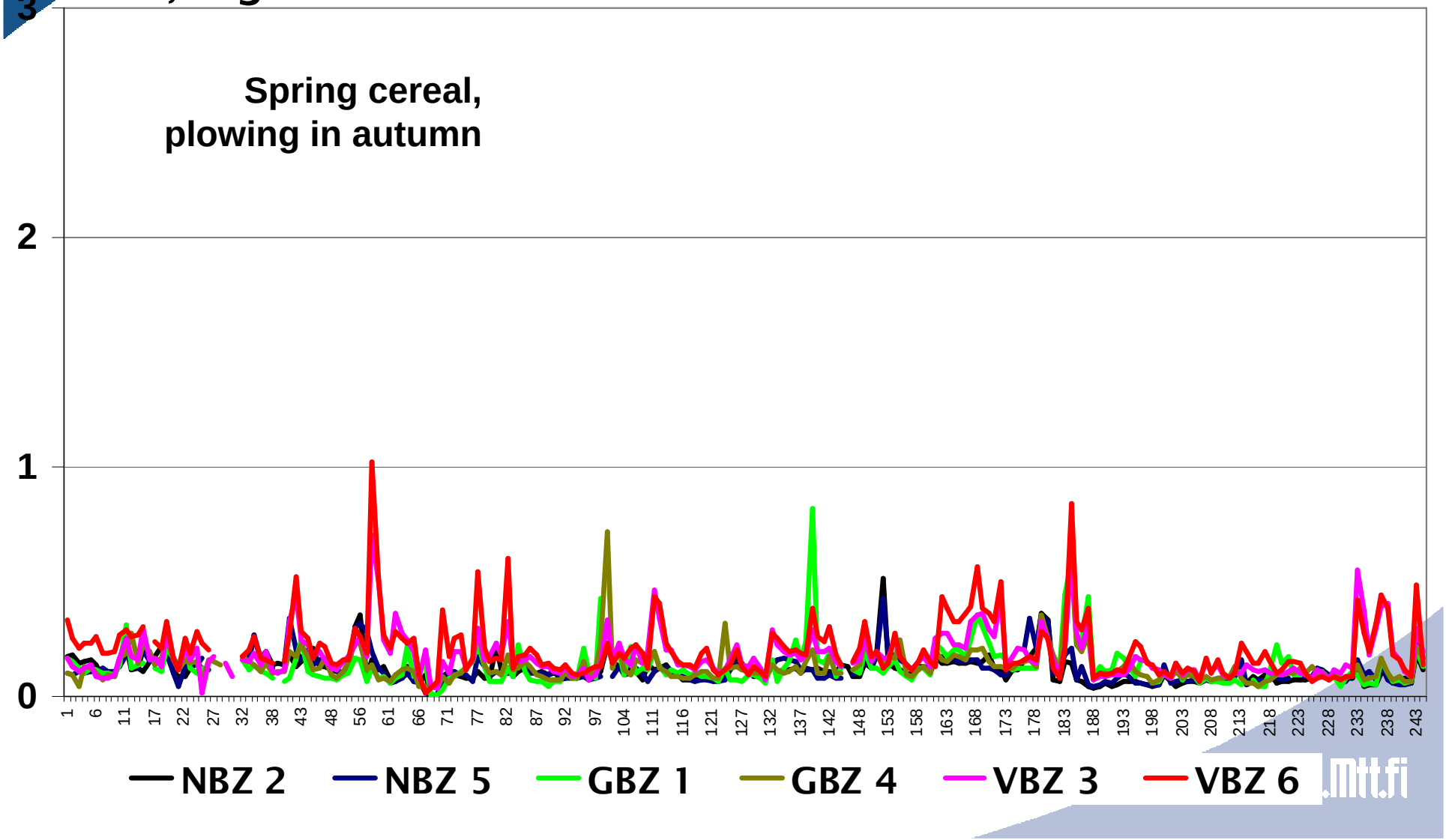
Dissolved reactive phosphorus in surface runoff



DRP concentrations in surface runoff (1991–2001)



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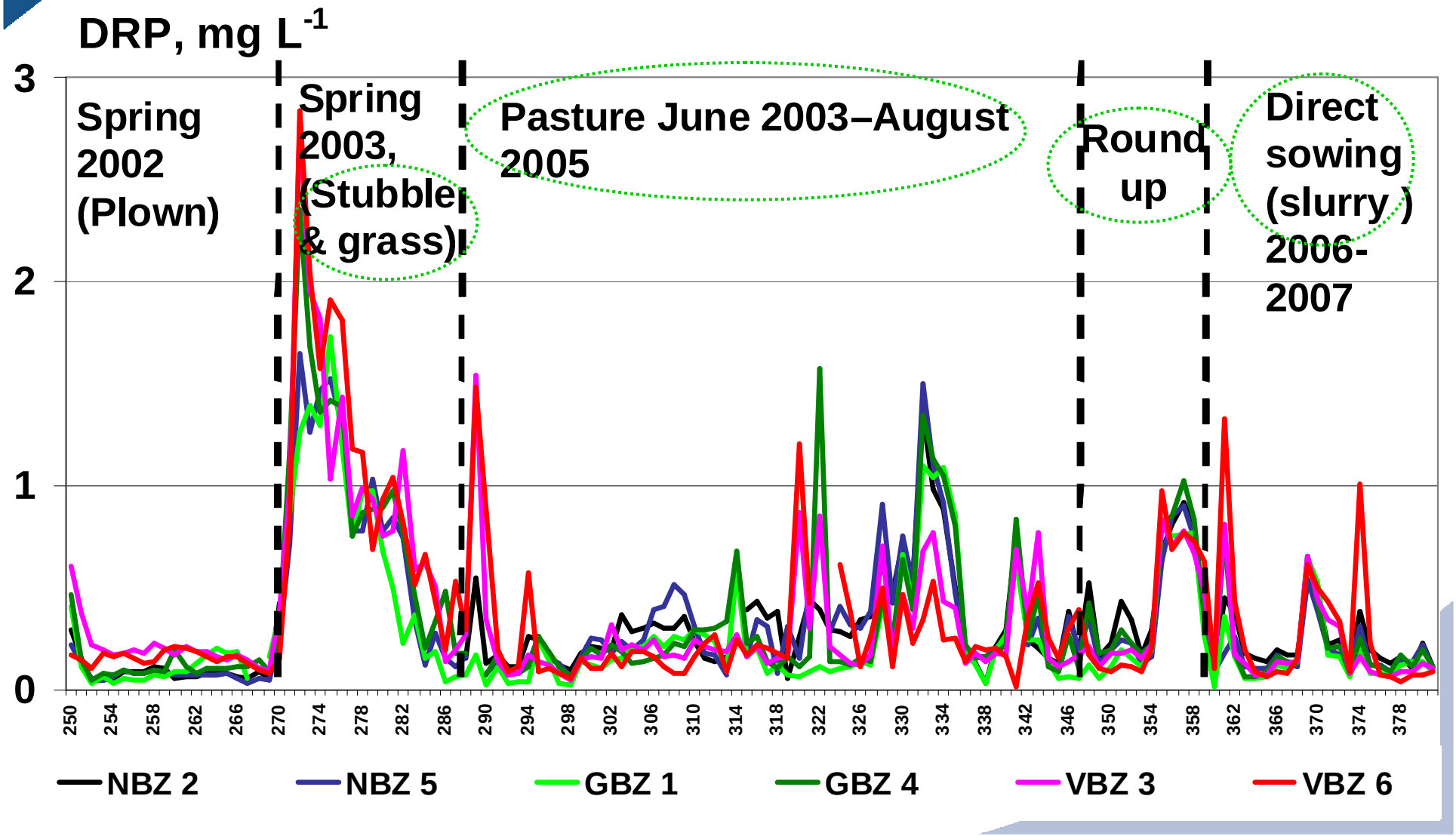
DRP concentrations in surface runoff (2002–2007)



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Buffer zones in different seasons

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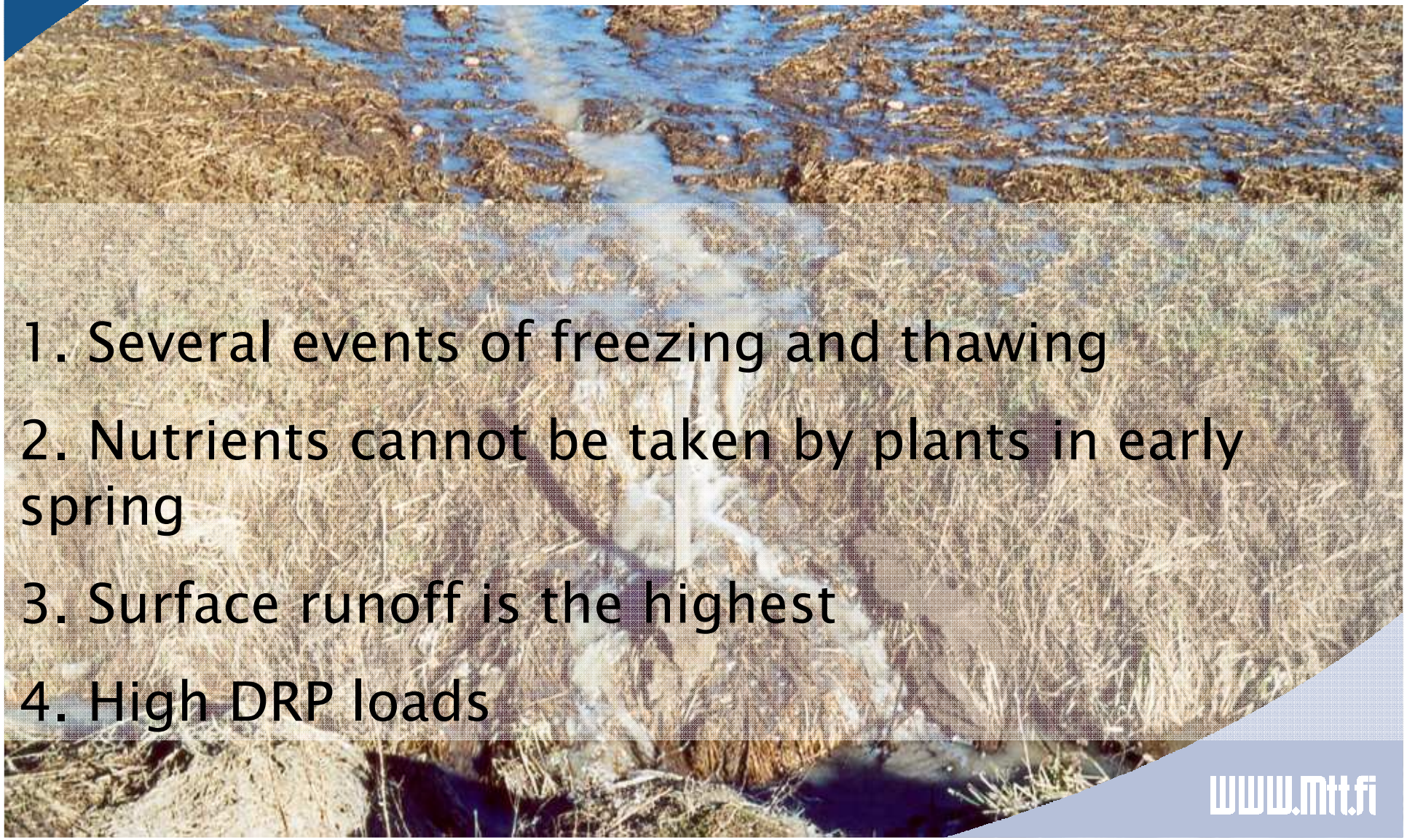
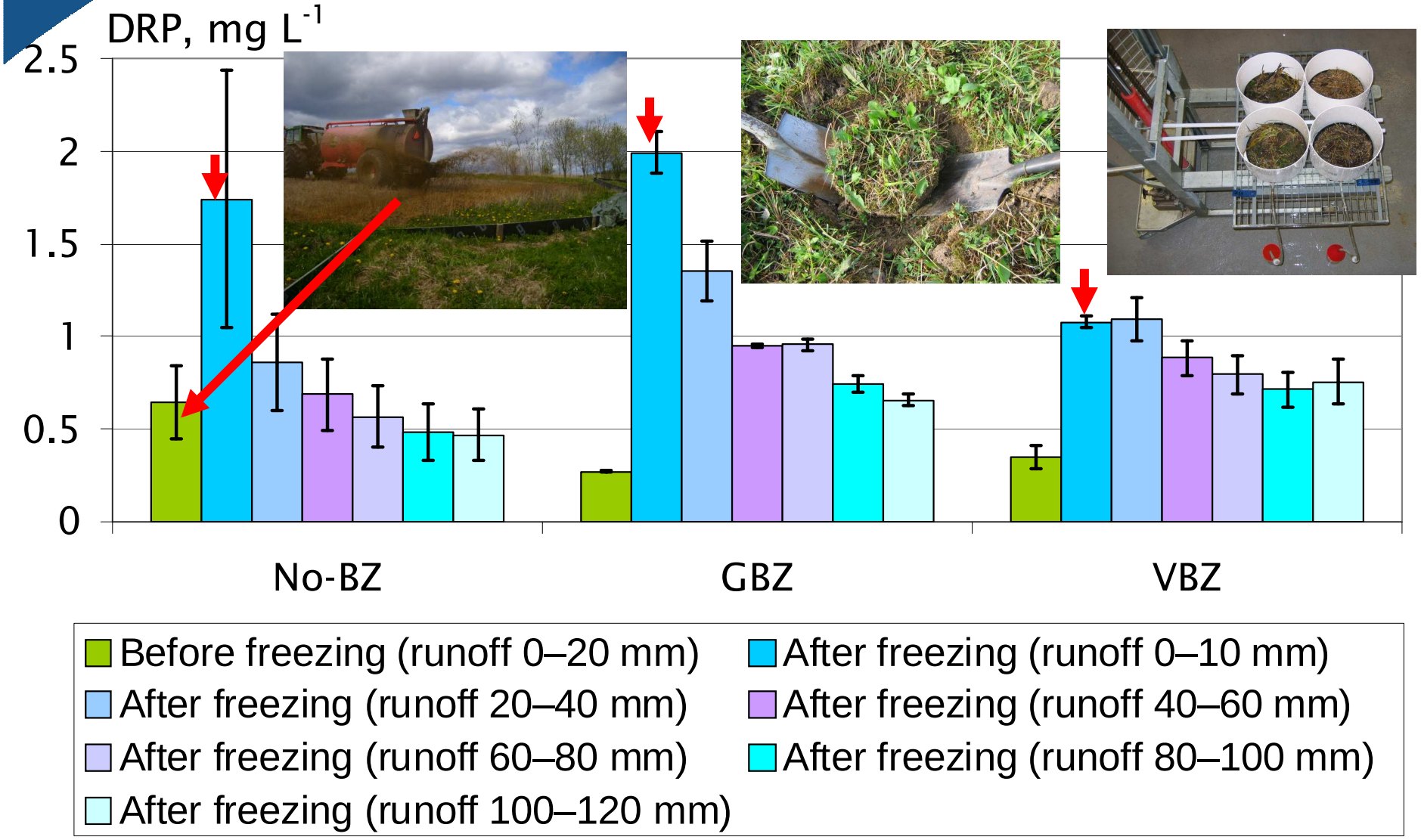
Surface runoff in spring

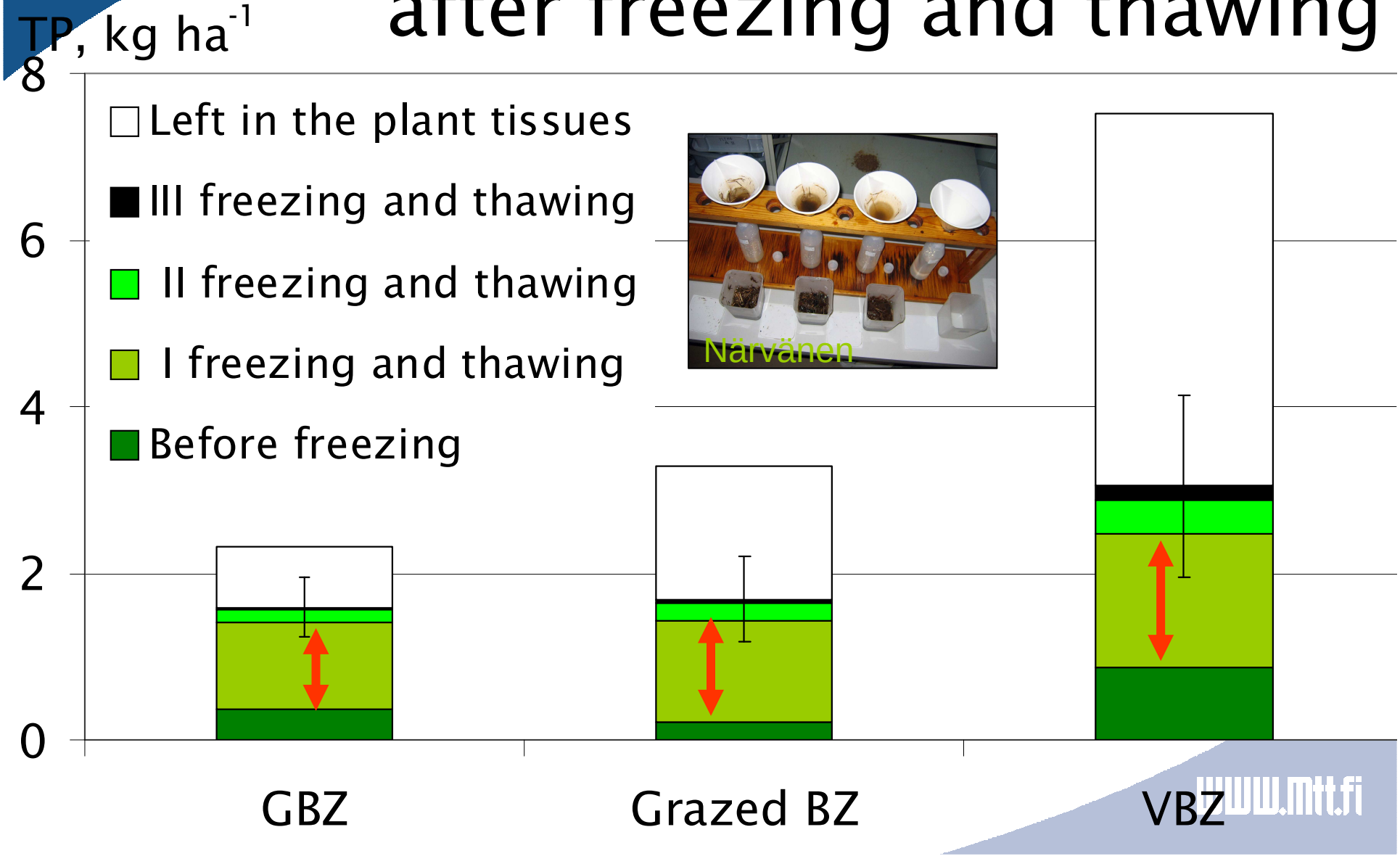


1. Several events of freezing and thawing
2. Nutrients cannot be taken by plants in early spring
3. Surface runoff is the highest
4. High DRP loads

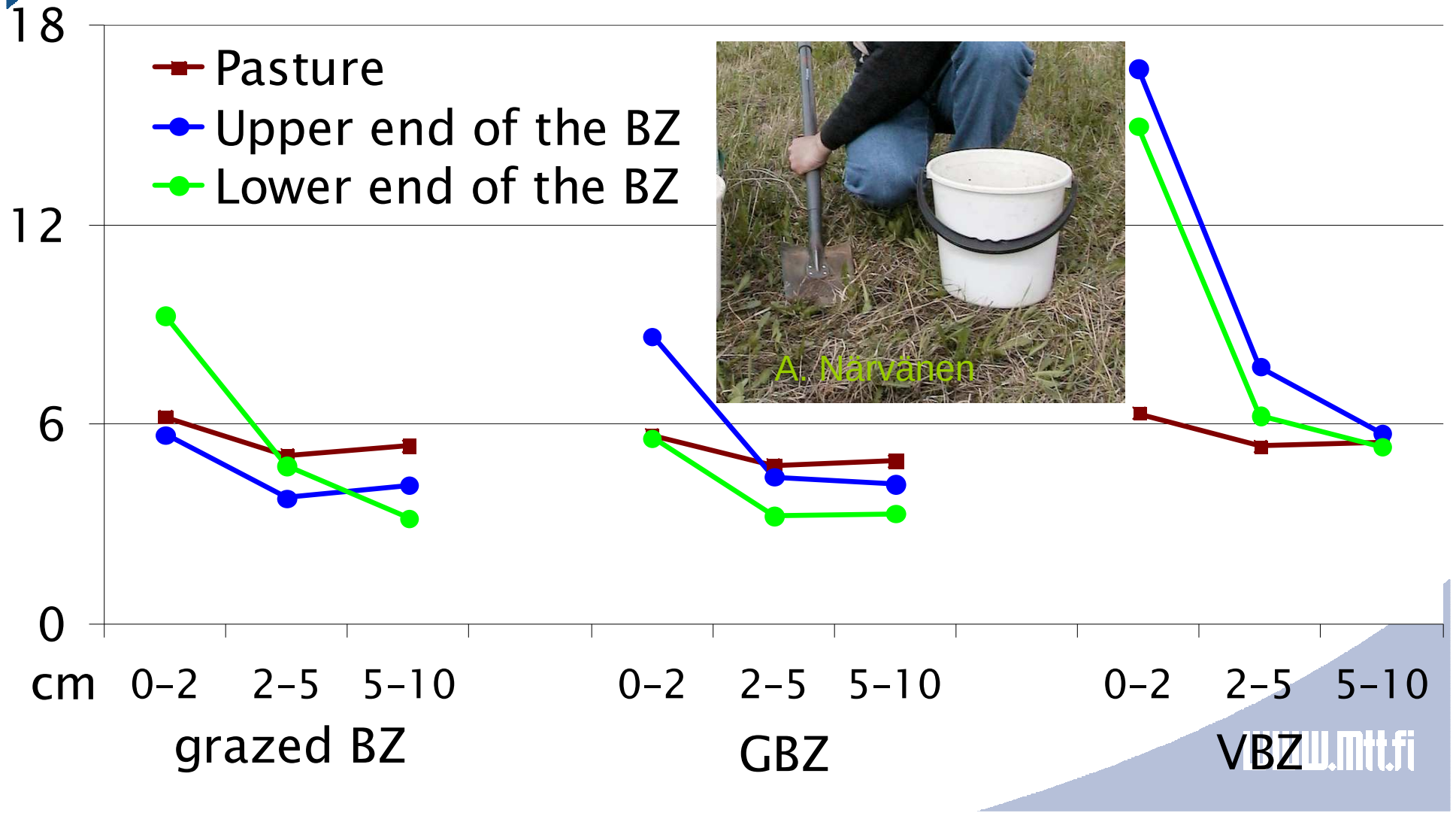
DRP in surface runoff from a clay soil under the rainfall simulation



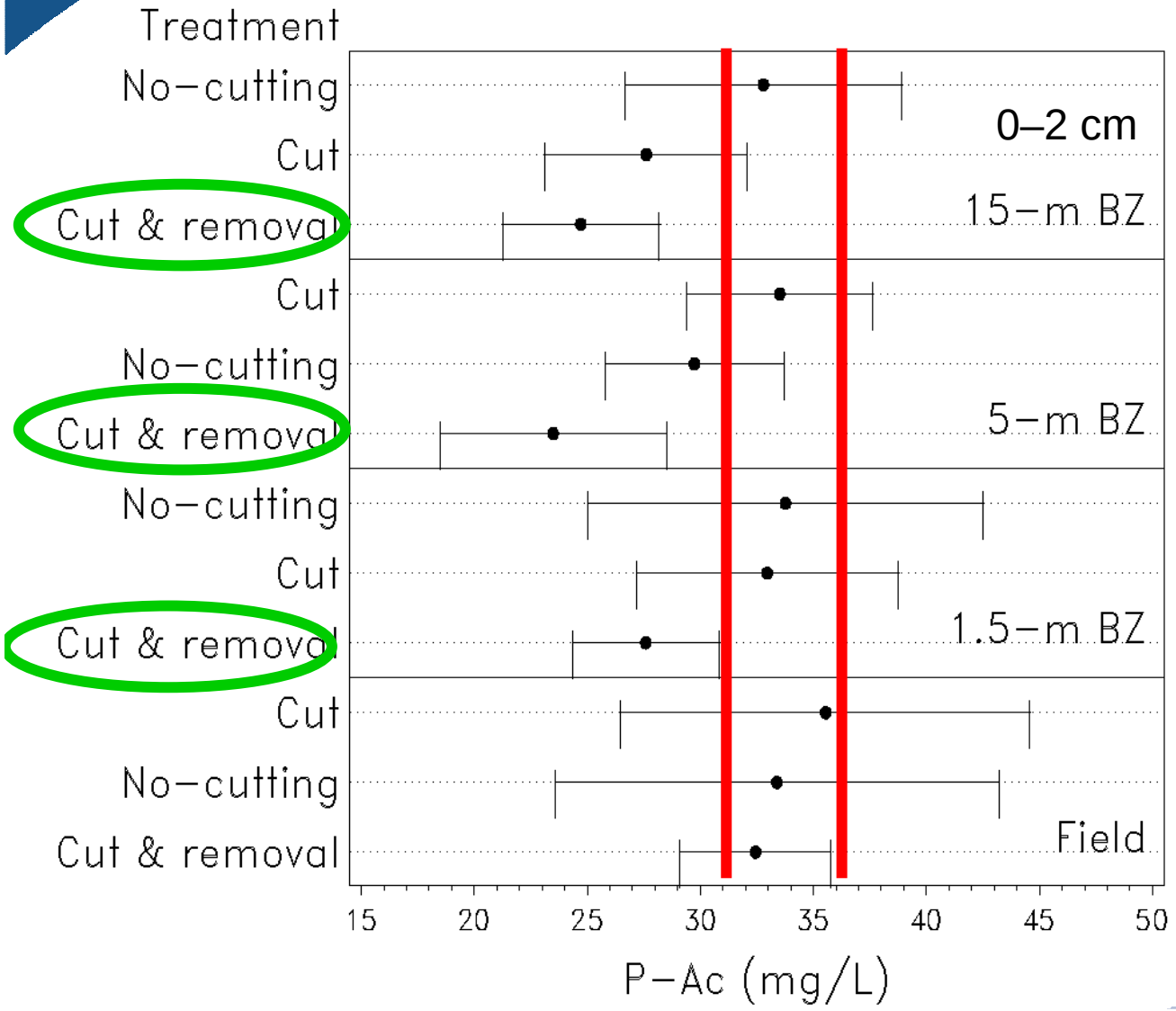
Potential TP losses from plants after freezing and thawing



Soil P extracted by ammonium acetate (pH 4.6)



Soil P in surface soil of BZs managed in different ways



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4. Conclusions

- Buffer zones are effective in decreasing losses of eroded soil particles, total P and total N in surface runoff from fields plown in autumn

-The retention of DRP is poor, losses of DRP may increase in surface runoff from BZs in winter and early spring

---> The grass should be cut and the swathe removed from the BZs

--> New innovations, with them DRP can be retained into BZs especially in winter and spring→ StoP

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Thank you for your attention!