IPM 2.0
Towards future-proof crop protection in Europe

Can minimal soil tillage be included in the integrated control of winter wheat diseases?

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THE HYPOTHESIS OF INVESTIGATIONS:

influence of minimum soil tillage could be controversial.

Minimum soil tillage	
improve soil properties; save resources !	better possibilities of surviving of harmfull organisms, included diseases ?

The aim of investigations is to evaluate the development of winter wheat diseases depending on soil tillage methods and crop rotation.

The main tasks:

- Assessment of winter wheat leaves diseases under different conditions;
- Determination incidence of stem base diseases under different conditions.

METHODS AND MATERIALS

Long-term field experimental were established at the Central part of Latvia in the autumn of 2008.

Trial place - Study and Research Farm „Peterlauki” of the Latvia University of Agriculture, (latitude: N 56°54′; longitude: E 23°72′).

Total plot area 6 ha, area for each treatment – 0.25 ha.

TWO-FACTOR TRIALS WERE ESTABLISHED:

A – soil tillage:

1) conventional ploughing – plough tillage with mouldboard plough (0.22 – 0.23 m);
2) minimum tillage – shallow tillage with disc harrow (0.10 – 0.12 m);

B – crop rotation:

1) wheat after wheat;
2) wheat after other crop.

Incidence and **severity** of leaf diseases was determined during vegetation period, incidence of crown rot – shortly before harvesting.

Total impact of diseases were evaluated by calculation of **AUDPC** – area under disease progress curve.

$$AUDPC = \sum_{n-1} [\frac{X_1 + X_2}{2} * (t_1 - t_2)]$$

Causal agents of crown rot were identified by isolation in pure cultures and followed molecular analyses.

RESULTS

Severity of mildew (caused by *Blumeria graminis*) was lower than 1%

Rusts (*Puccinia triticina* and *Puccinia striiformis*) were observed sporadically

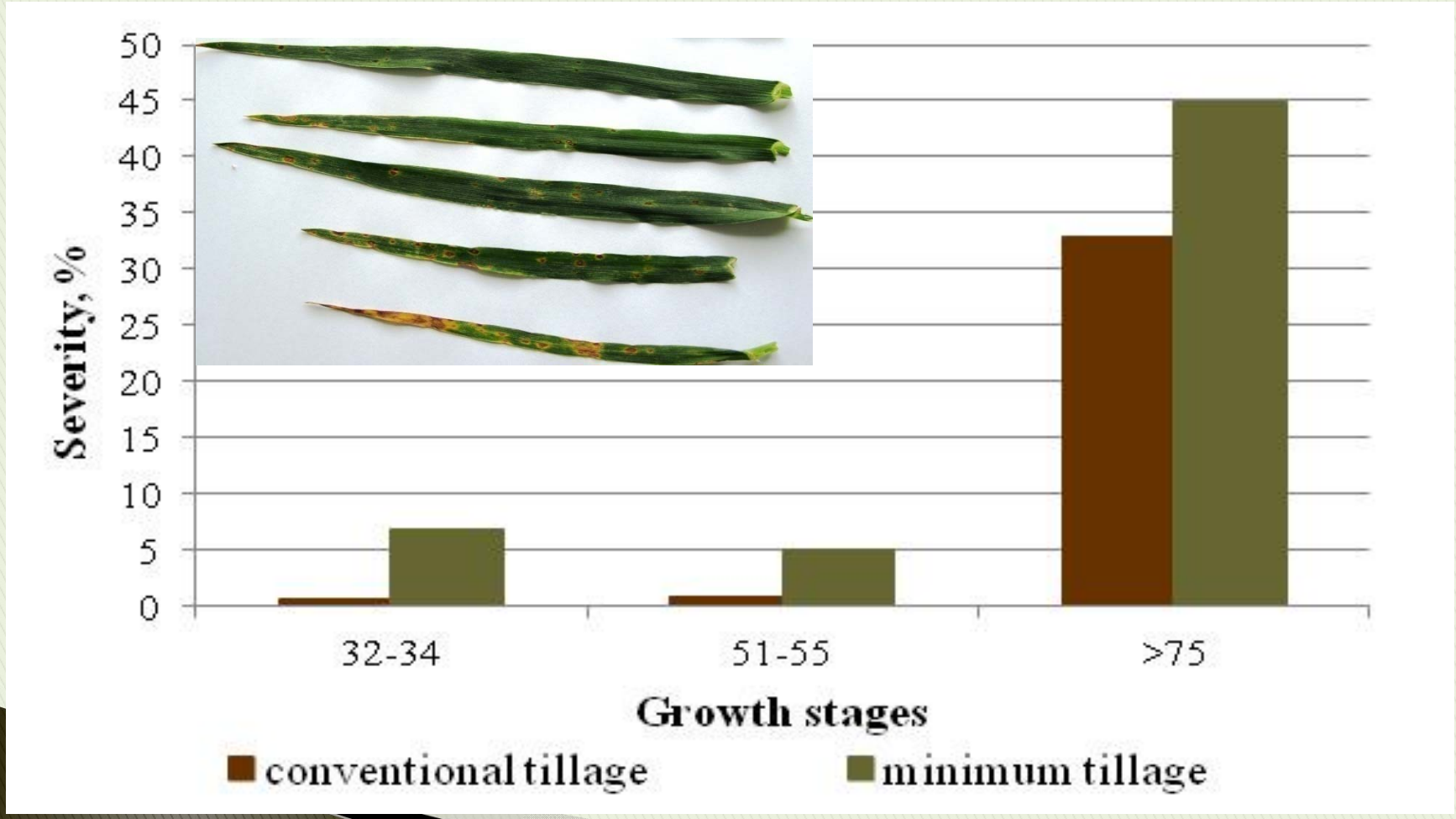
The most important winter wheat diseases

Tan spot, caused by ***Pyrenophora tritici-repentis***

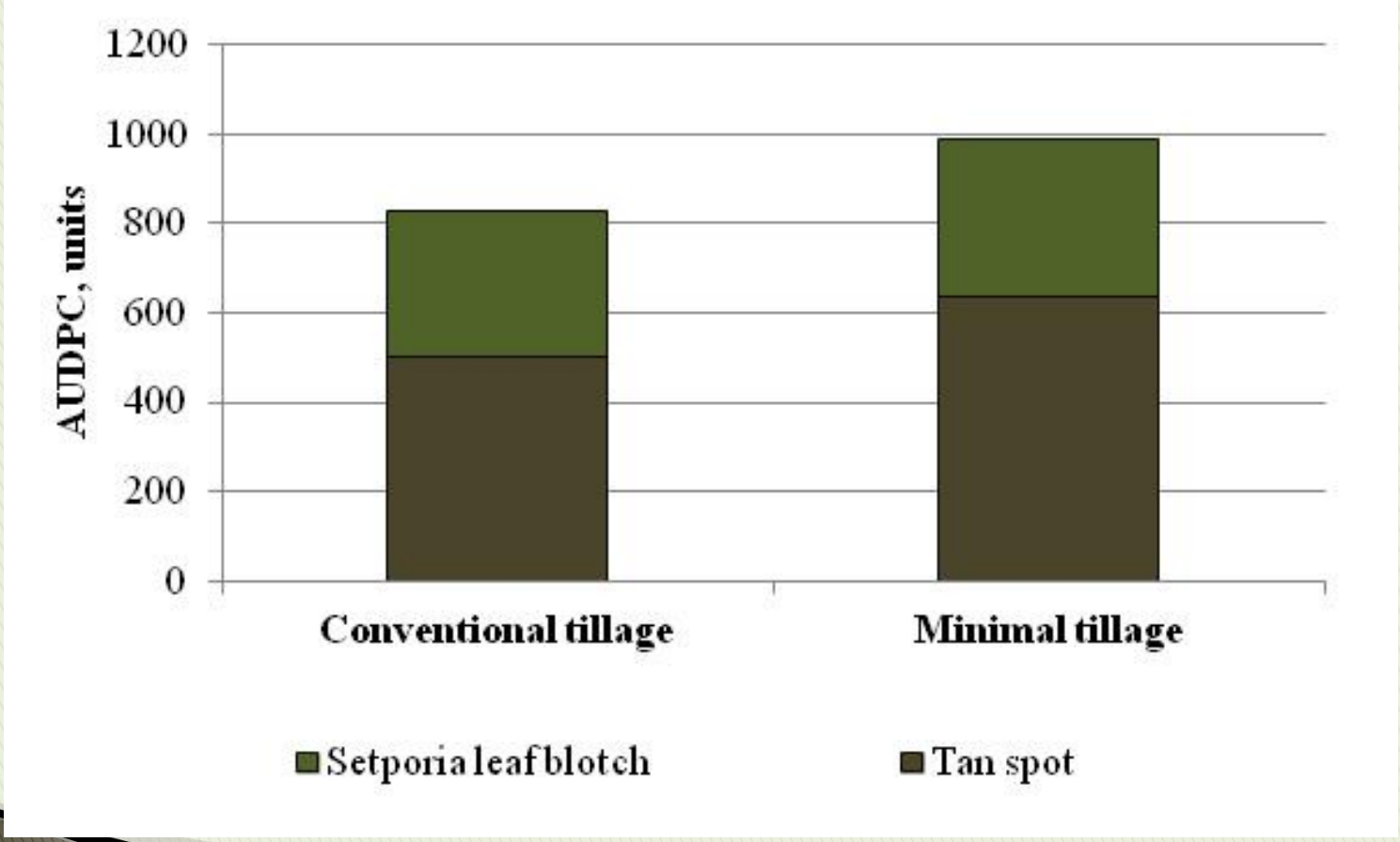
Septoria blotch, caused by ***Septoria tritici***

***Zymoseptoria tritici*?**

Development of tan spot (caused by *Pyrenophora tritici-repentis*) depending on soil tillage



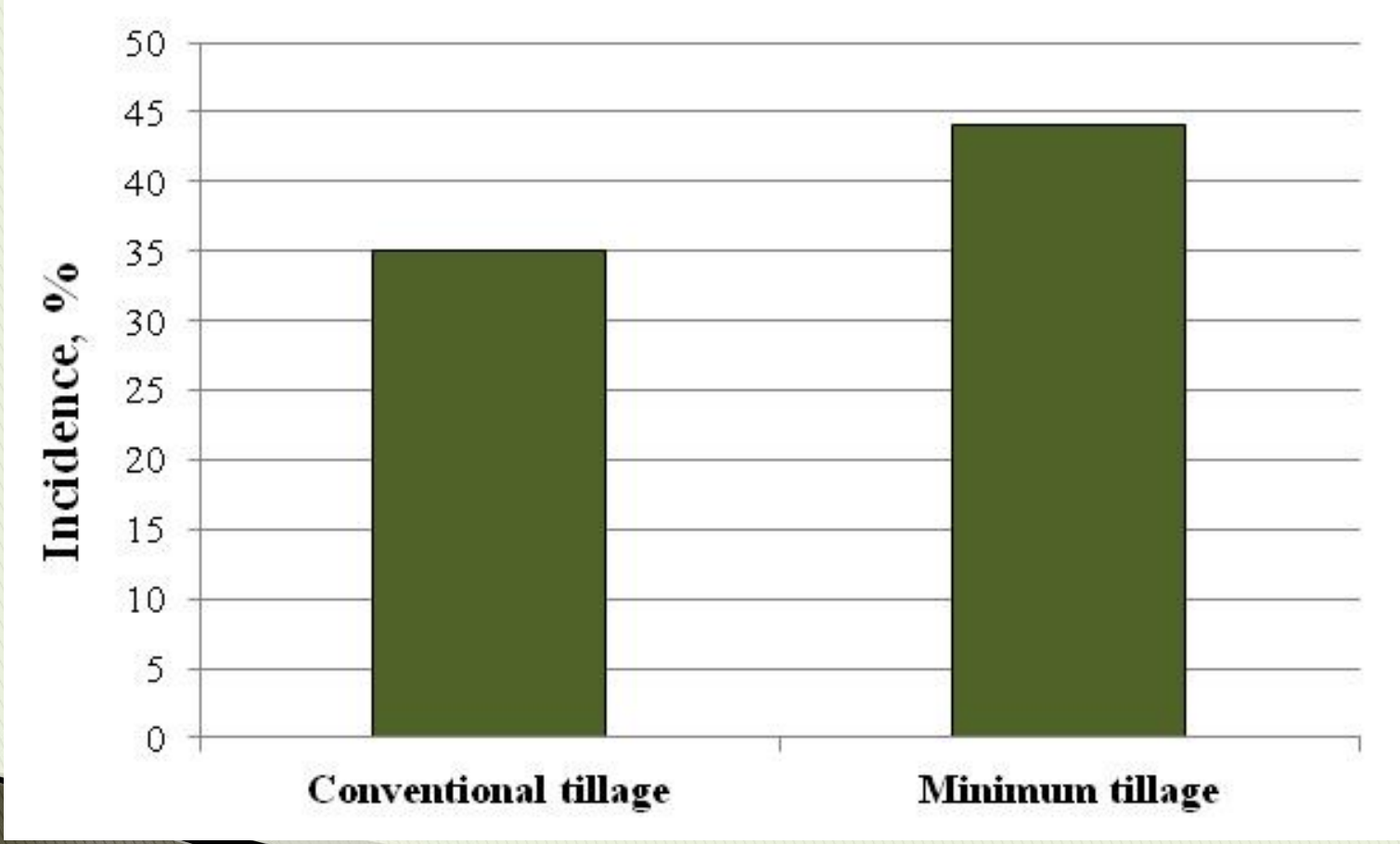
Development of the diseases depending on soil tillage (average data)



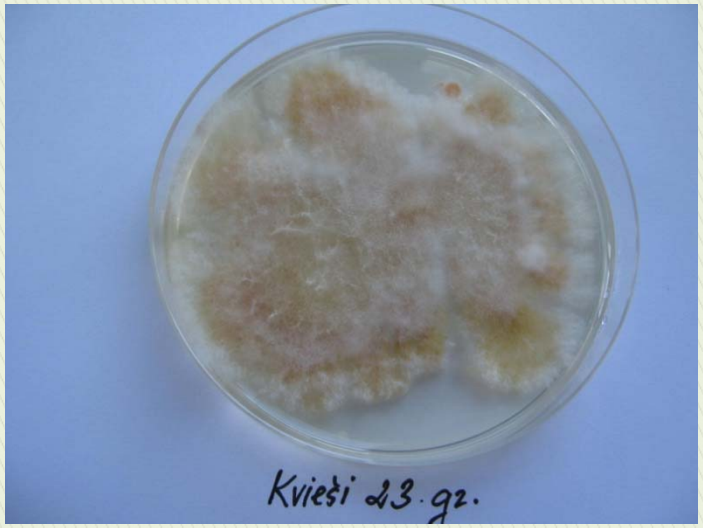
One of the most important problems – increasing risk of crown (stem base) and root rot.

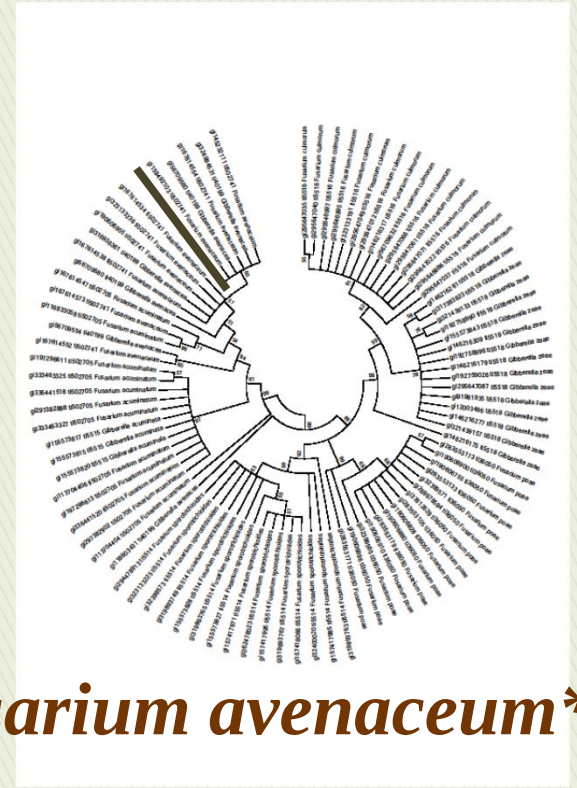
Crown and root rot could be cause by different pathogens: *Gaeumannomyces graminis*, *Oculimacula* spp., *Rhizoctonia* spp., *Bipolaris sorokiniana*, *Fusarium* spp. and other pathogens.

Development of wheat crown and root rot depending on soil tillage (average data)



One of the most important causal agent of crown and root rot – fungi from *Fusarium* genus.





*Fusarium avenaceum**

Fusarium **spp. molecular analyses was done by Dāvids Frīdmanis and Iveta Vaivode from Latvia Biomedical Research and Study Centre!**

CONCLUSION

Minimal soil tillage increases the risk of wheat leaf and root disease development.

Is this risk too high for including minimal soil tillage in the integrated wheat production?

Thank you for attention!

Acknowledgement

The research was supported by State research programme „Sustainable Use of Local Agricultural Resources for the Development of High Nutritive Value Food Products”, subproject No. 3.1 “Sustainable Use of Soil as the Main Resource for the Production of Safe and Qualitative Food and Feed from the Main Agricultural Crops” and the grant of the Ministry of Agriculture (ZM 070410/S 35) and ELFLA (020311/C – 31).