



Effect of three preceeding crops on yields and qualitative characters of winter wheat in organic farming system in the years 2006-2007



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Personal Introduction

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Problem Introduction

- Popularity of organic food and farming has been increasing during the last years.
- Wheat (*Triticum aestivum* L.) as one of the most important crops offer a wide range of substances relevant for human nutrition (Langenkämper, G.; Zörb, C.; Seifert, M.; Mäder, P.; Fretzdorff, B. and Betsche, T. (2006).
- In organic farming winter wheat is typically grown after good pre-crops, as it pays well for this in terms of yield and quality.
- Wheat is valuable crop in organic farming, and much effort has been put into optimising yields and quality of organically grown wheat.
- A good pre-crop is typically one that leaves much available N in the soil that ideally is not released in higher amounts before winter to avoid nitrate leaching. (Pedersen, L.; Thorup-Kristensen, K. and Loges, R., 2006).
- It is not clear, whether foods from organic and conventional agriculture are equal with respect to nutritional quality.

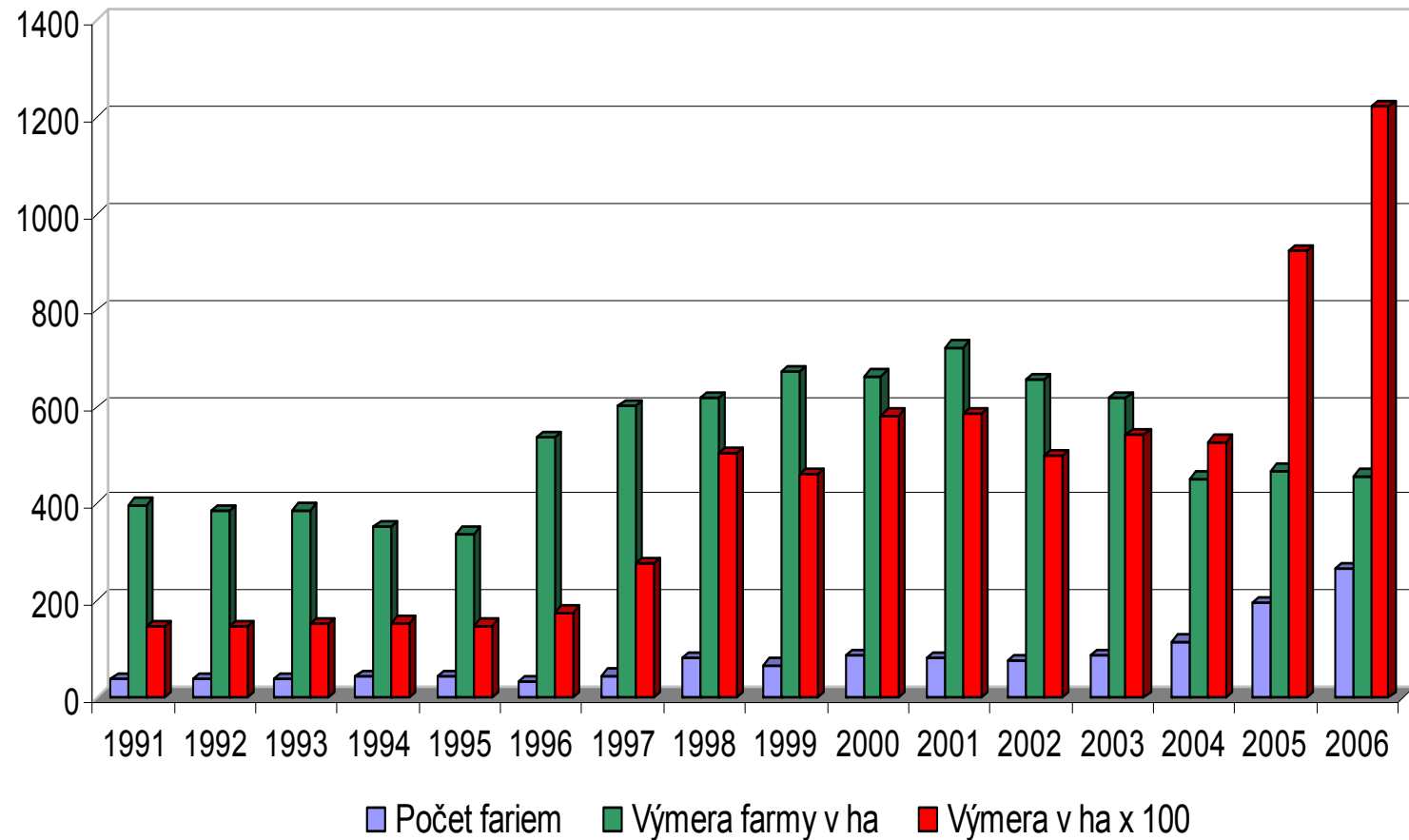
Aim of paper / research



to evaluate the effect of three preceeding crops on grain yields and selected qualitative parameters of winter wheat in the years 2006 – 2007

Organic Farming Development

Vývoj ekologického poľnohospodárstva v rokoch
1991 - 2006



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Source ÚKSUP, 2008

Material and methods

Long term stationary field experiment

establishment in 1990

Lokality: Borovce near Piešťany town (western part of the Slovak Republic)

Soils: loamy luvi-haplic chernozem

Climate: territory has continental character of climate with a mean annual precipitation of 593 mm per year (358 mm during the vegetation period) and with an annual temperature average of 9.2°C (15.5°C during the vegetation period).

Area: classified as maize – barley growing region

Design: split plot arrangement, two replications

Crop rotations:

BIOLOGICAL: a1) alfalfa - alfalfa – **winter wheat** – sugar beet – spring barley – maize for grain,

CEREALS: a2) maize for grain – spring barley – **winter wheat** - spring barley – pea - **winter wheat**.

Farm yard manure at the rate of 40 t/ha was applied after spring barley. The harvested area of one plot represented 75 m² (3x25 m).

All agro technical operations were realized in accordance with the Law NR SR No. 421/2004 about organic farming.

Model variety Bardotka with the quality standard E, the sowing rate was 500 viable kernels per square meter at a row distance of 125 mm.

Experimental plots were harvested at full maturity.

Qualitative characteristics:

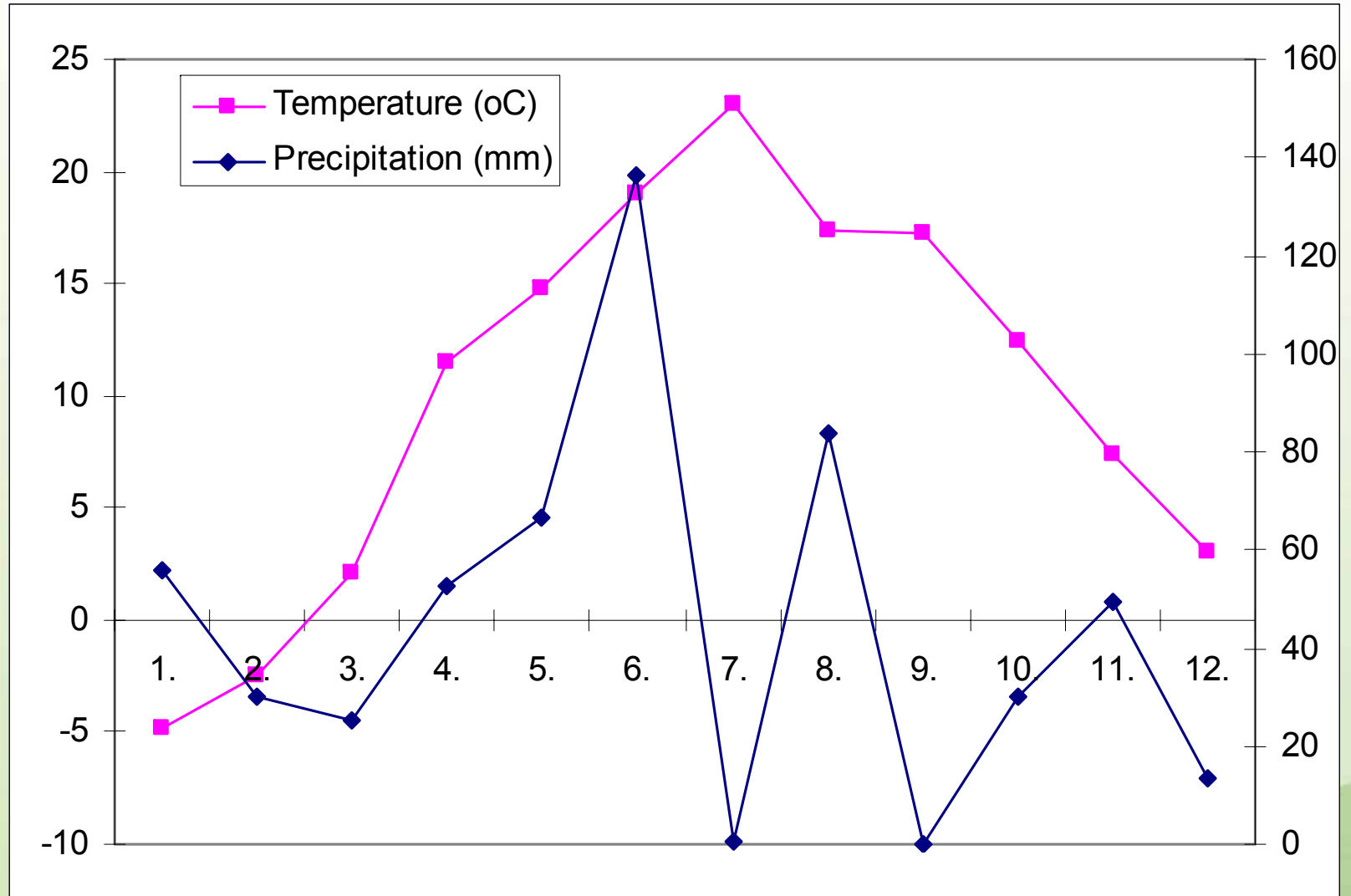
Crude protein content by the Dumas method (% N x 5.7) in according to the Slovak Technical Standard STN 46 1011.

Selected indicators of baking quality included: test weight of grain according to the Slovak Technical Standard STN 46 1011-5, sedimentation index according to Zeleny (STN – ISO 5529), fall number according to the STN – ISO 3093, wet gluten content according to the STN 461011-9.

Obtained results were evaluated by variance analysis, differences testing by Tukey test.

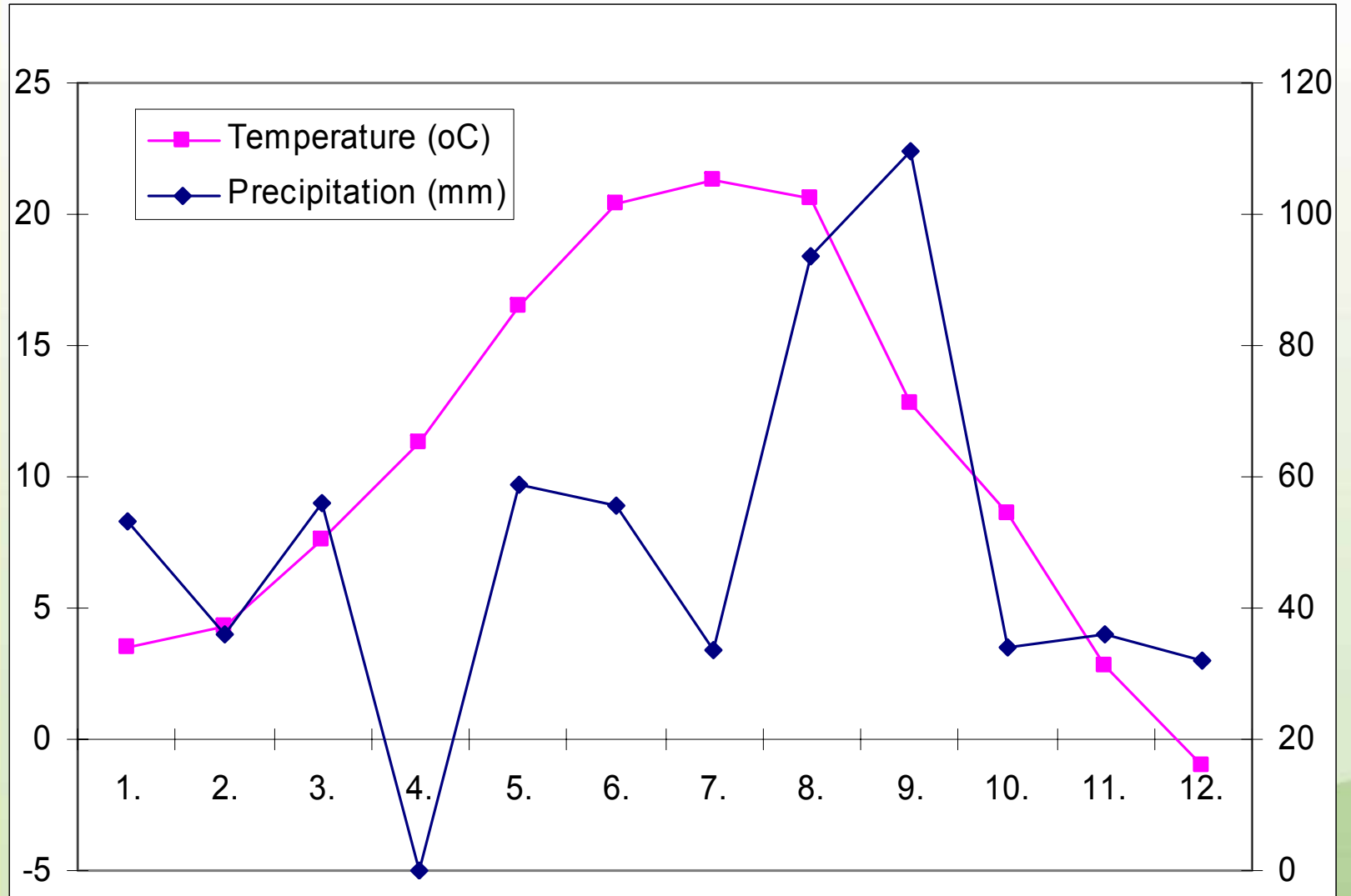
Results

Climatic conditions, locality Borovce, year 2006



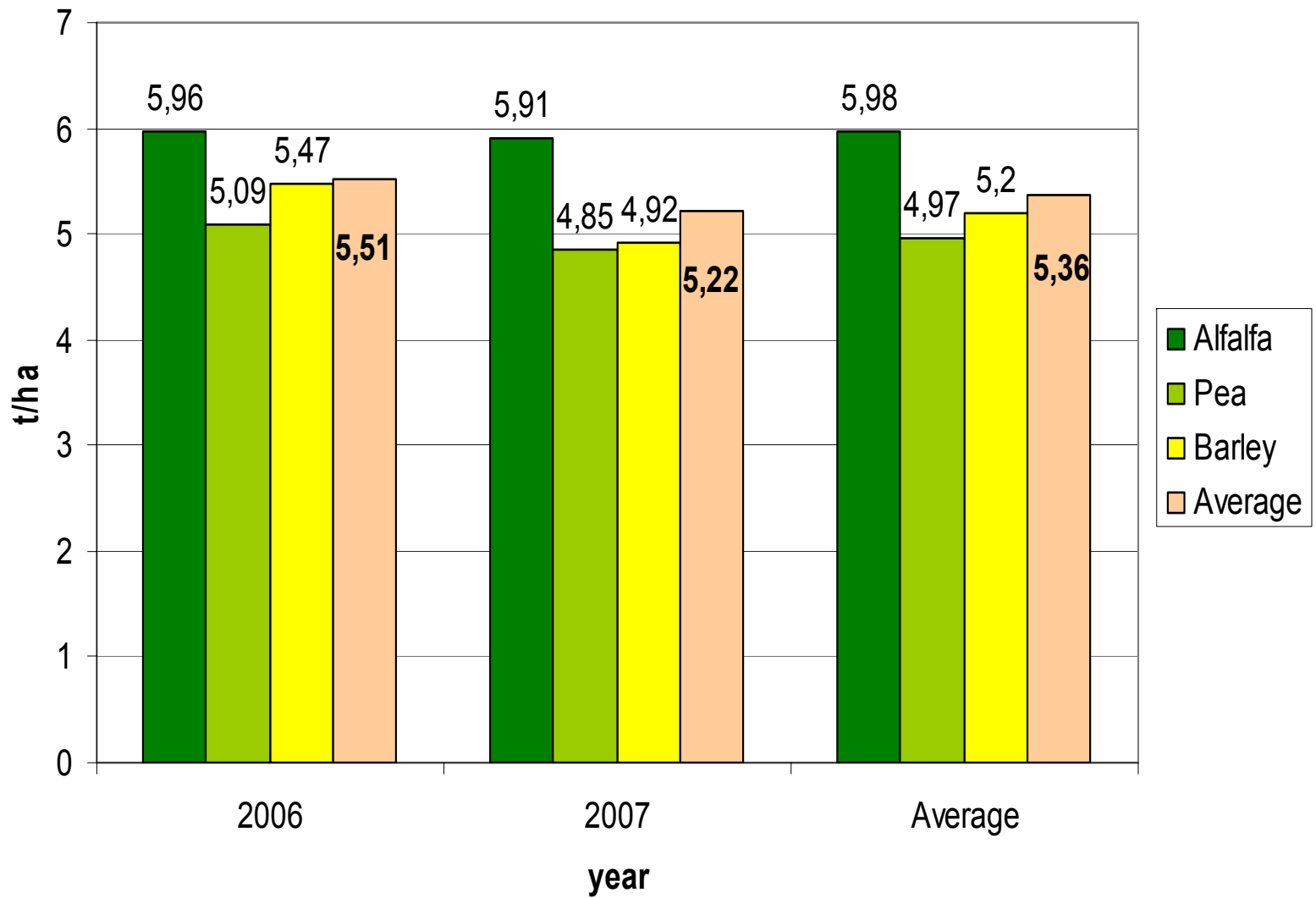
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Climatic conditions, locality Borovce, year 2007

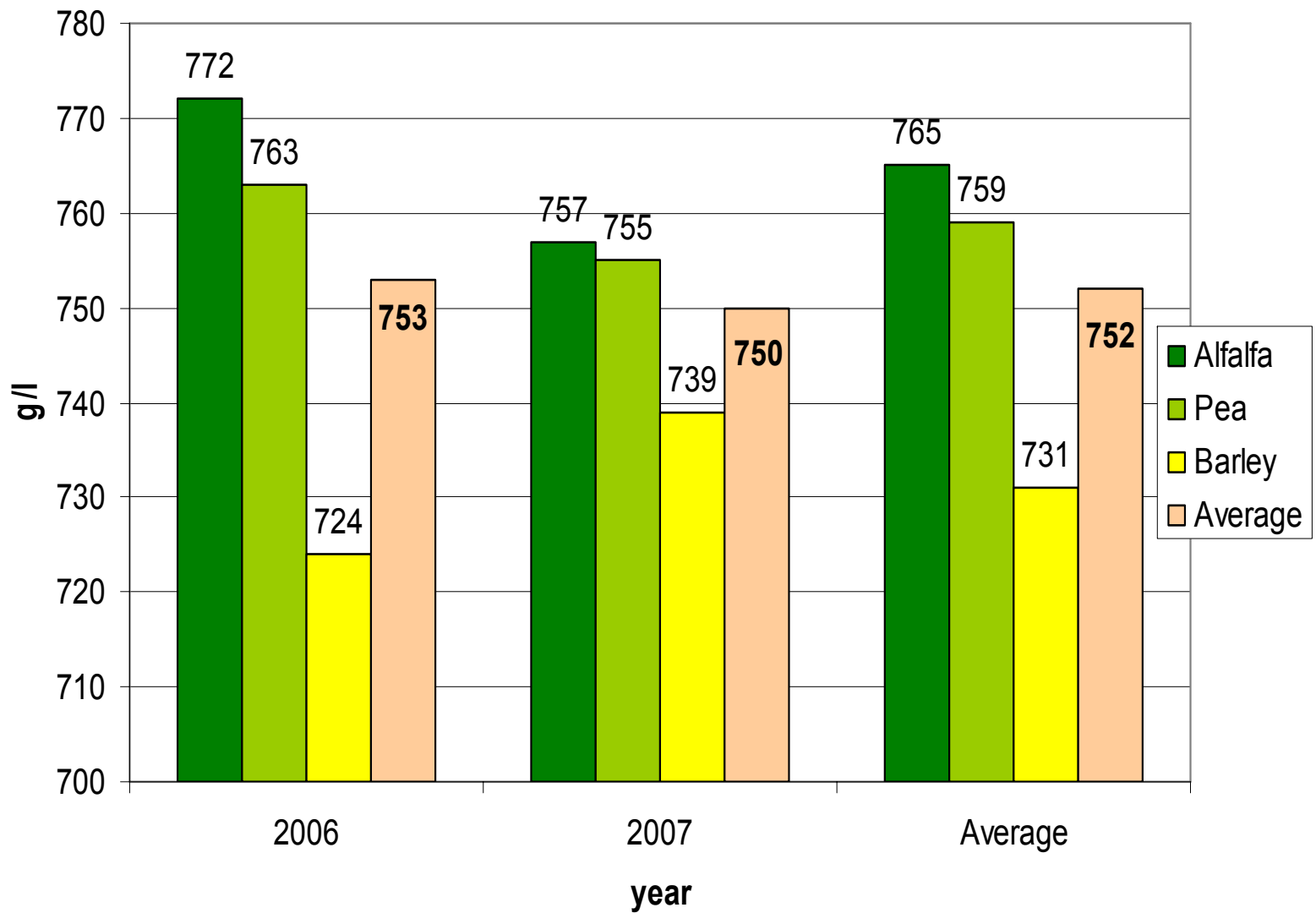


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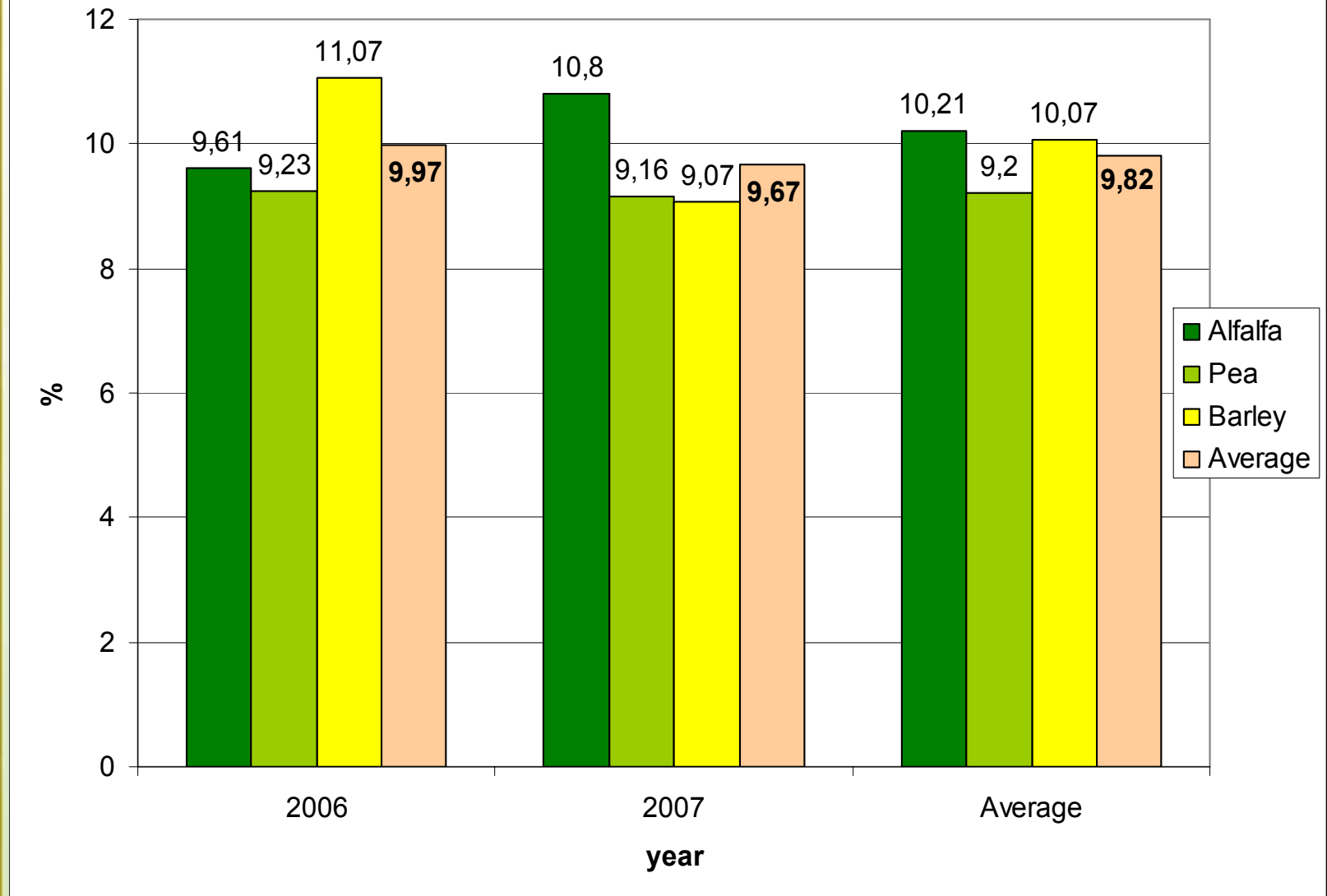
Grain yield (t/ha)



Test weight of grain (g/l)

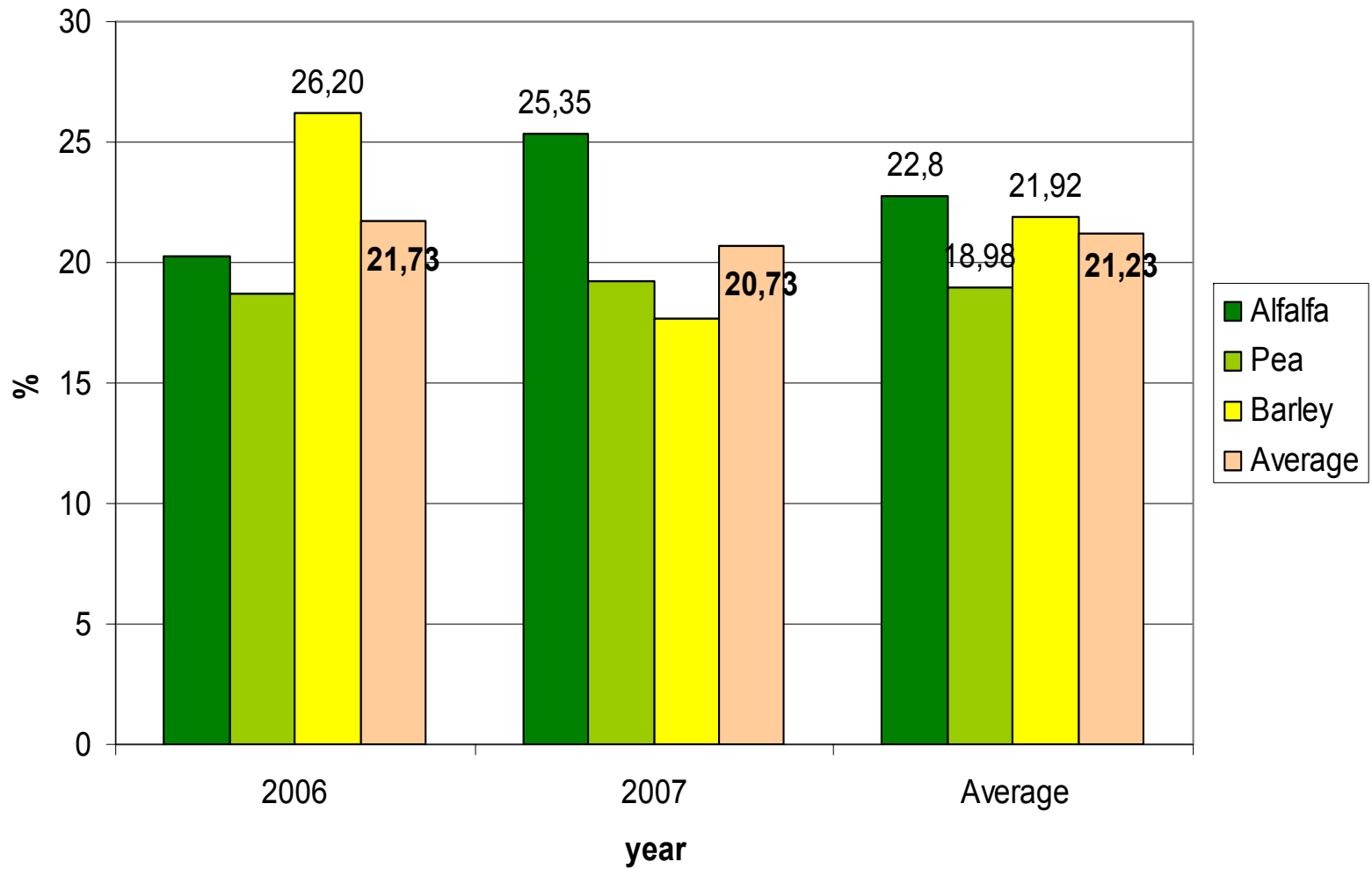


Crude protein content (%)

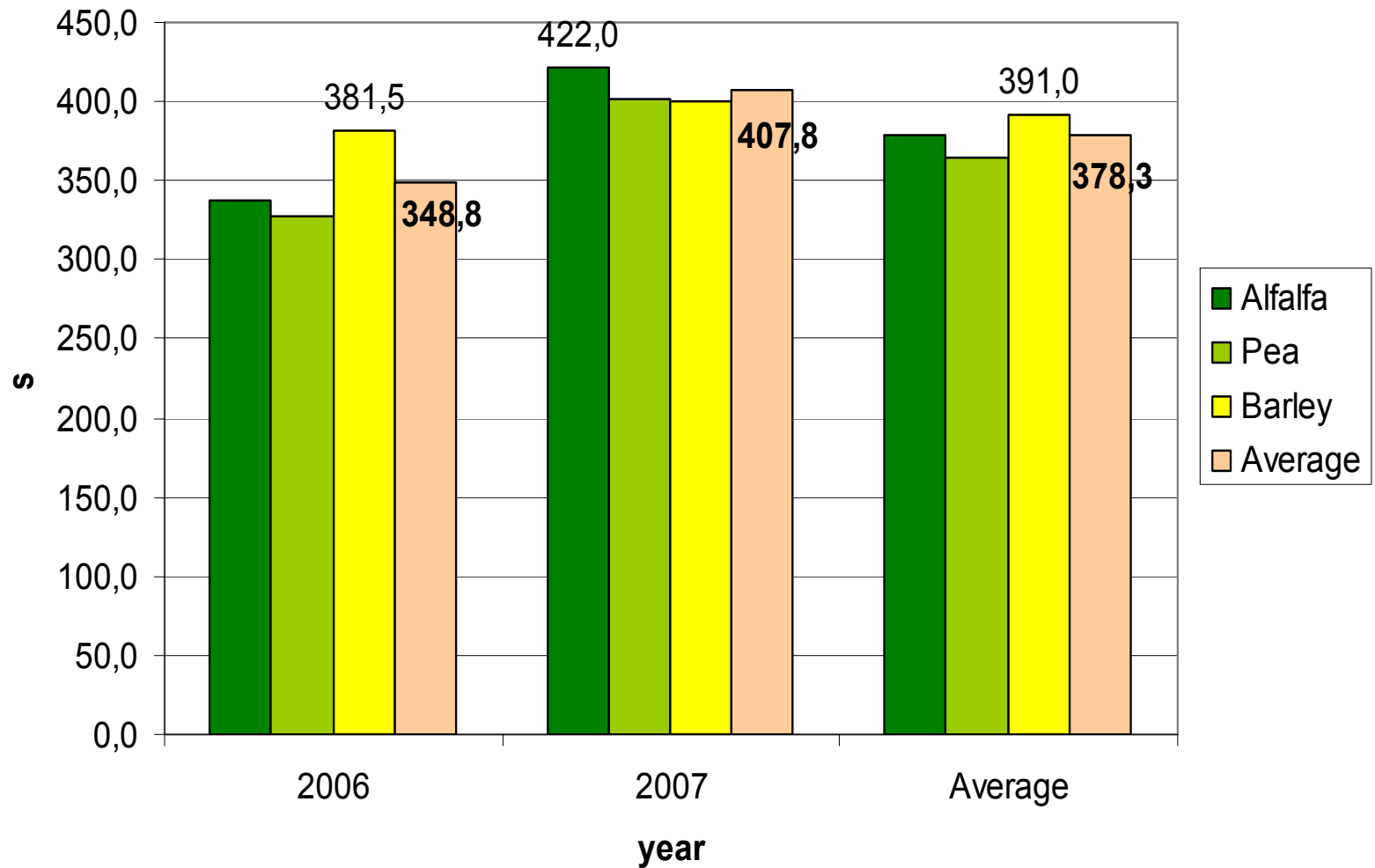


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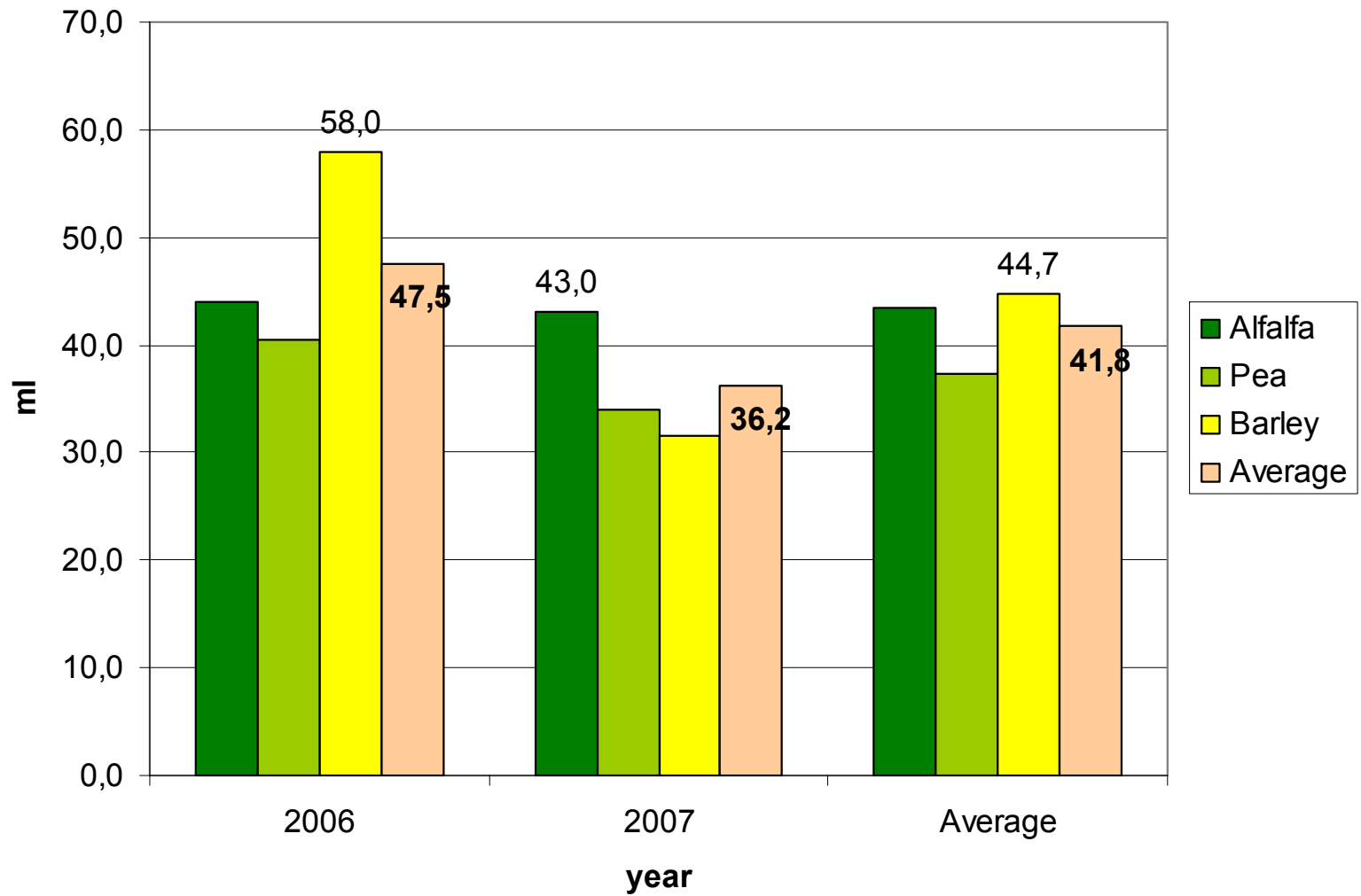
Wet gluten content (%)



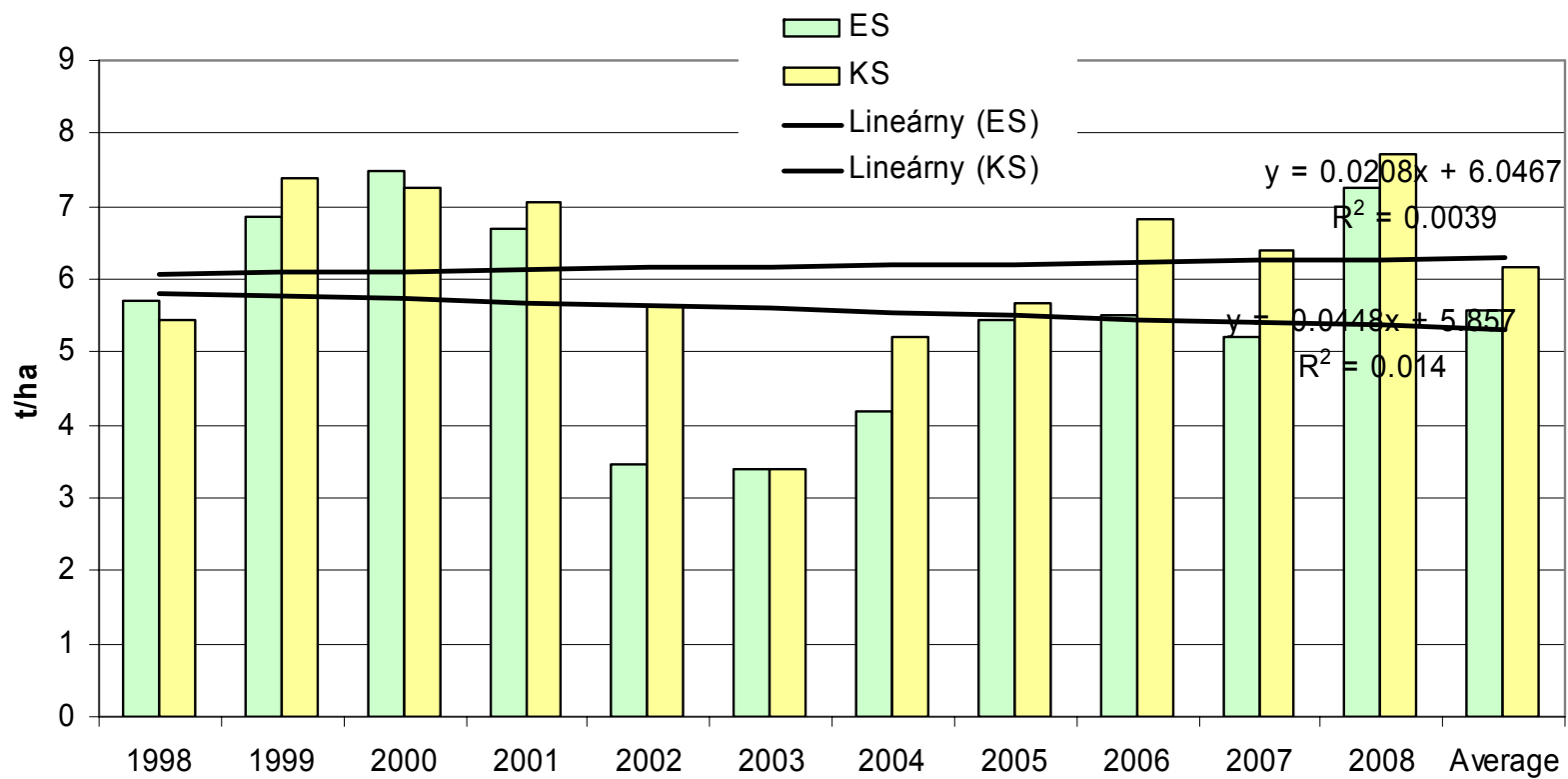
Falling number (s)



Sedimentation test (ml)



Winter wheat grain yields in organic (ES) and conventional (KS) farming system (1998-2007)



Conclusions

- Conditions of analysed years statistically modified qualitative parameters of winter wheat grain (fall number ** $P < 0.01$, sedimentation test ** $P < 0.01$).
- Interaction year x preceeding crops modified the selected qualitative parameters of winter wheat.
- Preceeding crops significantly influenced grain yields and test weight of grain in the years 2006 – 2007.
- The most suitable quantitative and qualitative parameters of winter wheat grain were obtained after alfalfa.
- Qualitative parameters of winter wheat were more favourable in the year 2006 than in the year 2007.

Thank you for your attention !



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