



A REVIEW (2013-2022) OF STRATEGIES FOR ADAPTING SILAGE PRODUCTION SYSTEMS TO CLIMATE CHANGE IN DRY CONTINENTAL REGIONS OF CENTRAL EUROPE

Szilvia Orosz¹, Dániel Szemethy², Dániel Antal³, Flóra Adél Hoffmann⁴, Krisztián Milán Balogh⁴

¹ Livestock Performance Testing Ltd., Gödöllő, Hungary; ² Neocons Co., Kiskunmajsa, Hungary; ³ University of Debrecen, Faculty of Agricultural and Food Sciences and Environmental Management, Debrecen, Hungary; ⁴ Hungarian University of Agriculture and Life Sciences, Institute of Physiology and Nutrition, Department of Feed Safety, Gödöllő, Hungary; Email: orosz.szilvia@atkft.hu

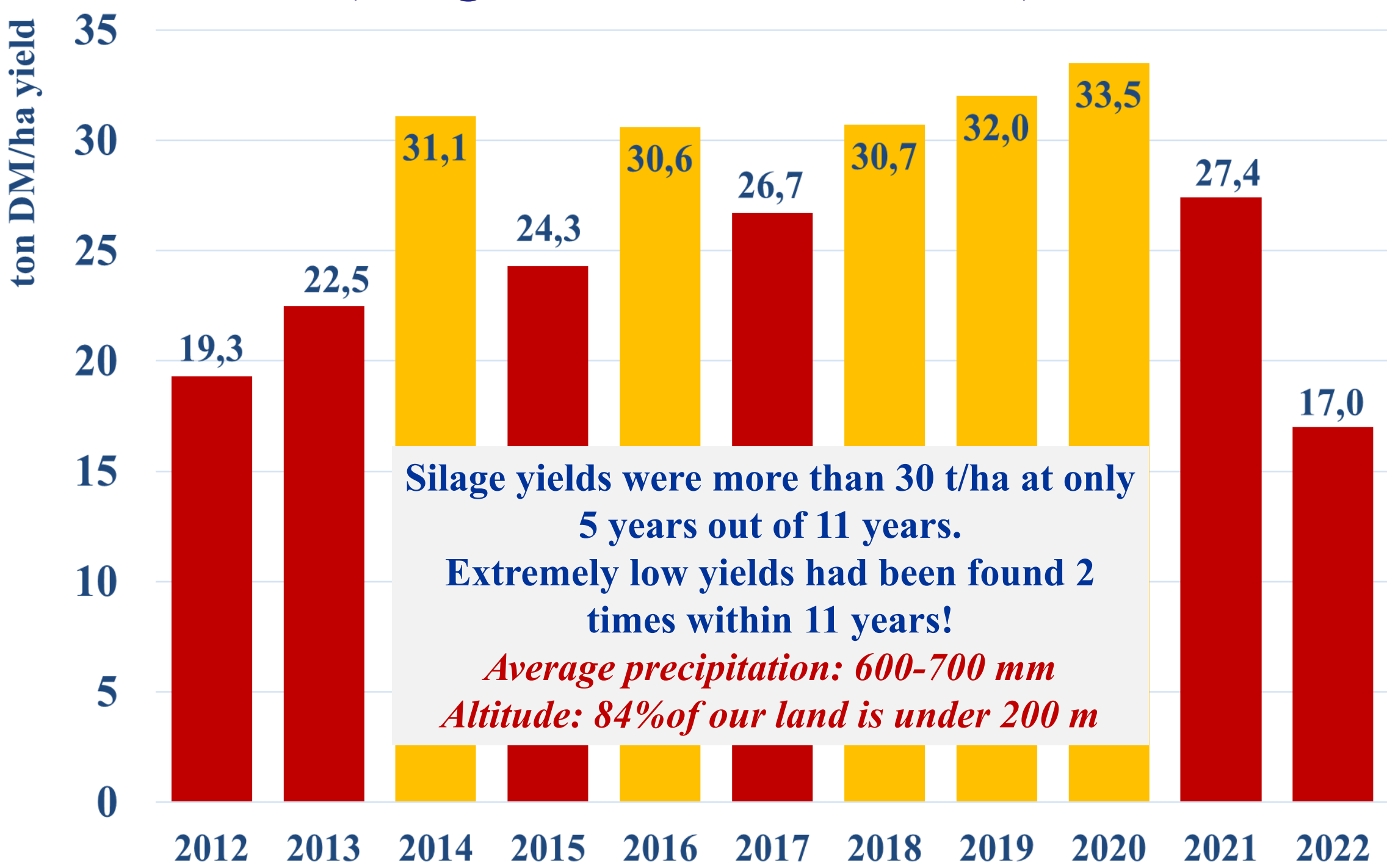


The authors show the 10 years database (nutritive values and digestibility) of whole-crop early-cut rye silages (*Secale cereale*) and intensively grown, annual, high sugar grass silages (*Lolium multiflorum*, Festulolium-type grass hybrids).



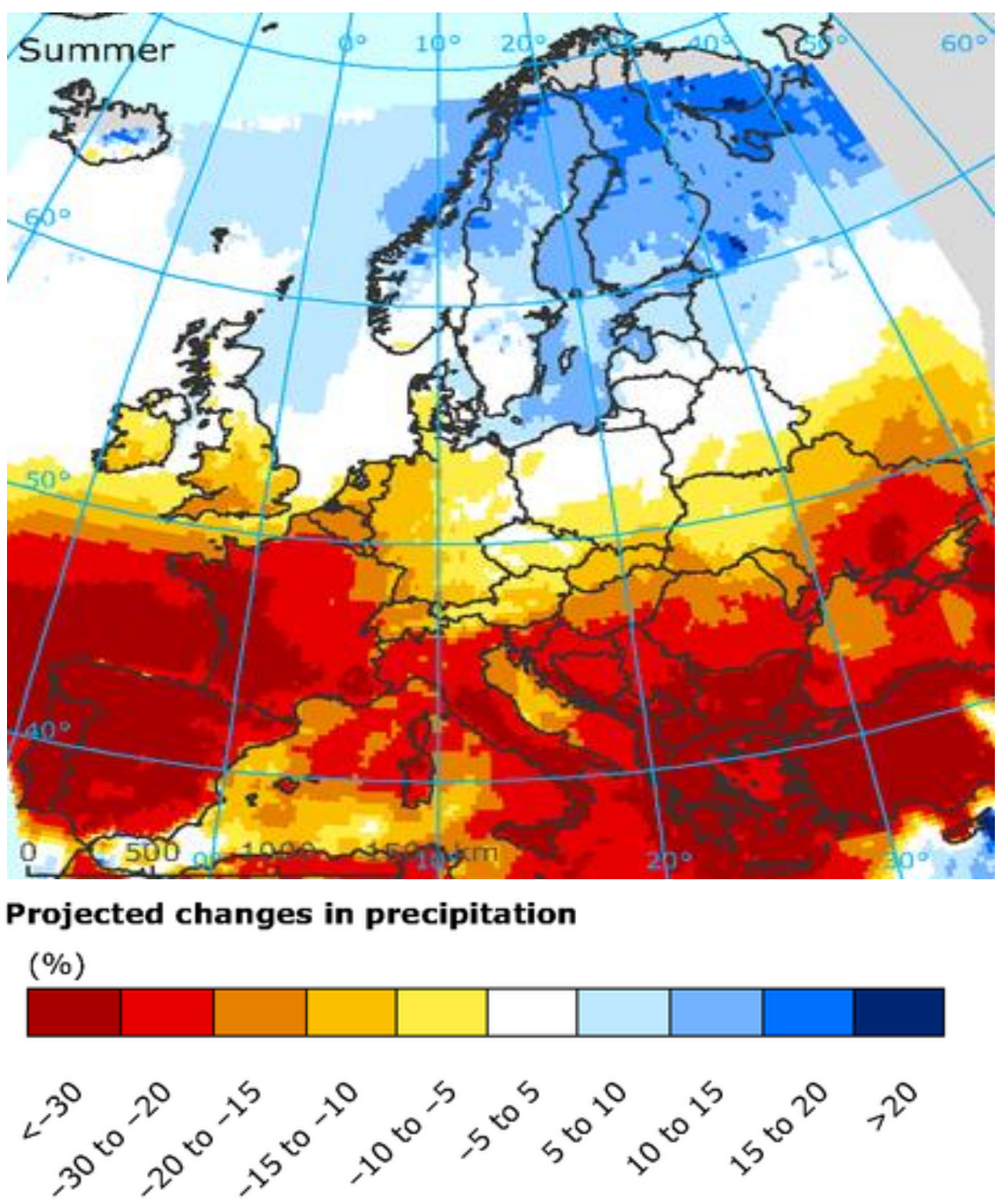
BACKGROUND-ALARM!

The yield of corn, as whole crop plant in Hungary (harvested during August-September of 2012-2022). (Hungarian National Database)

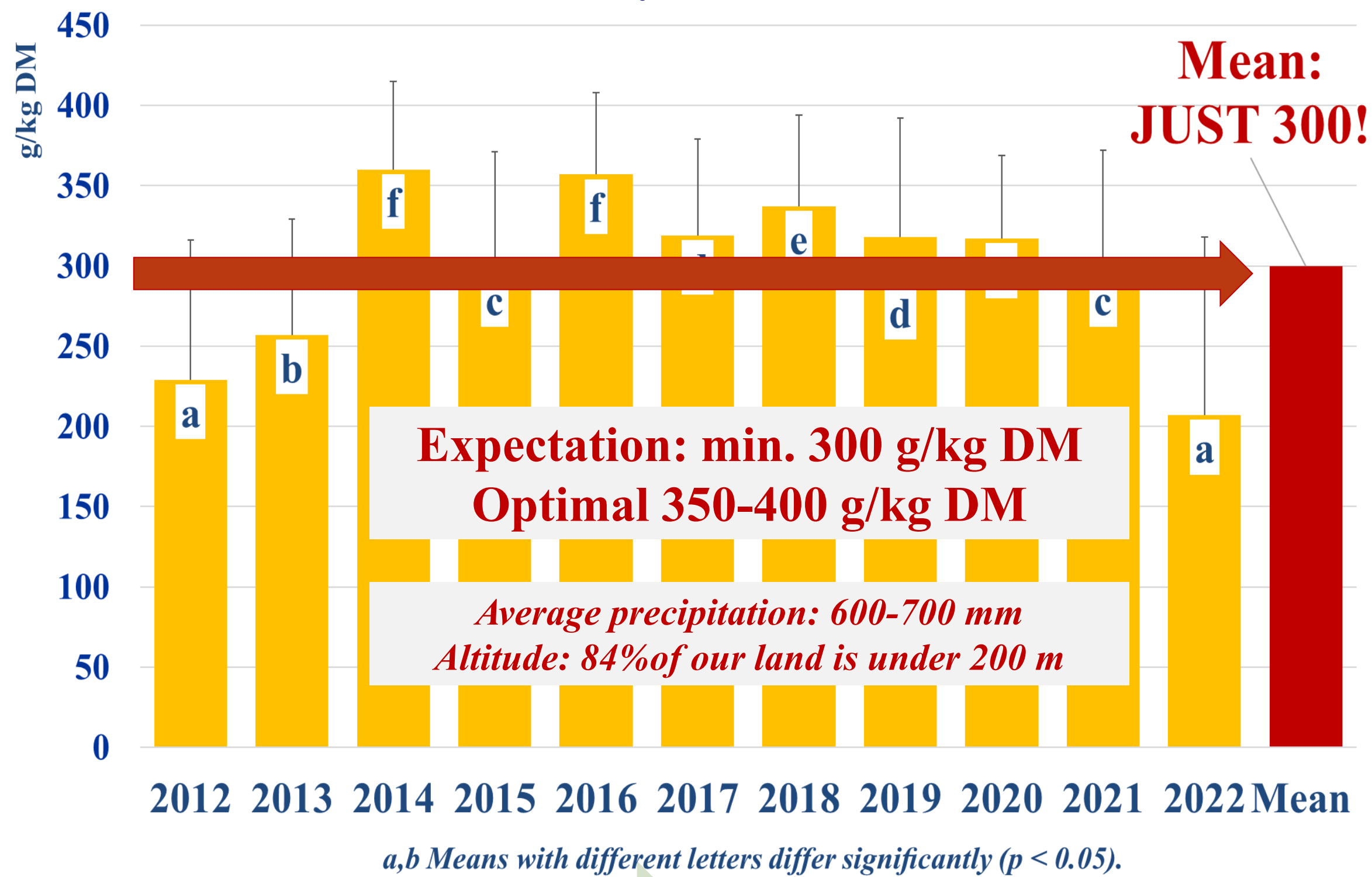


Climate change in Europe

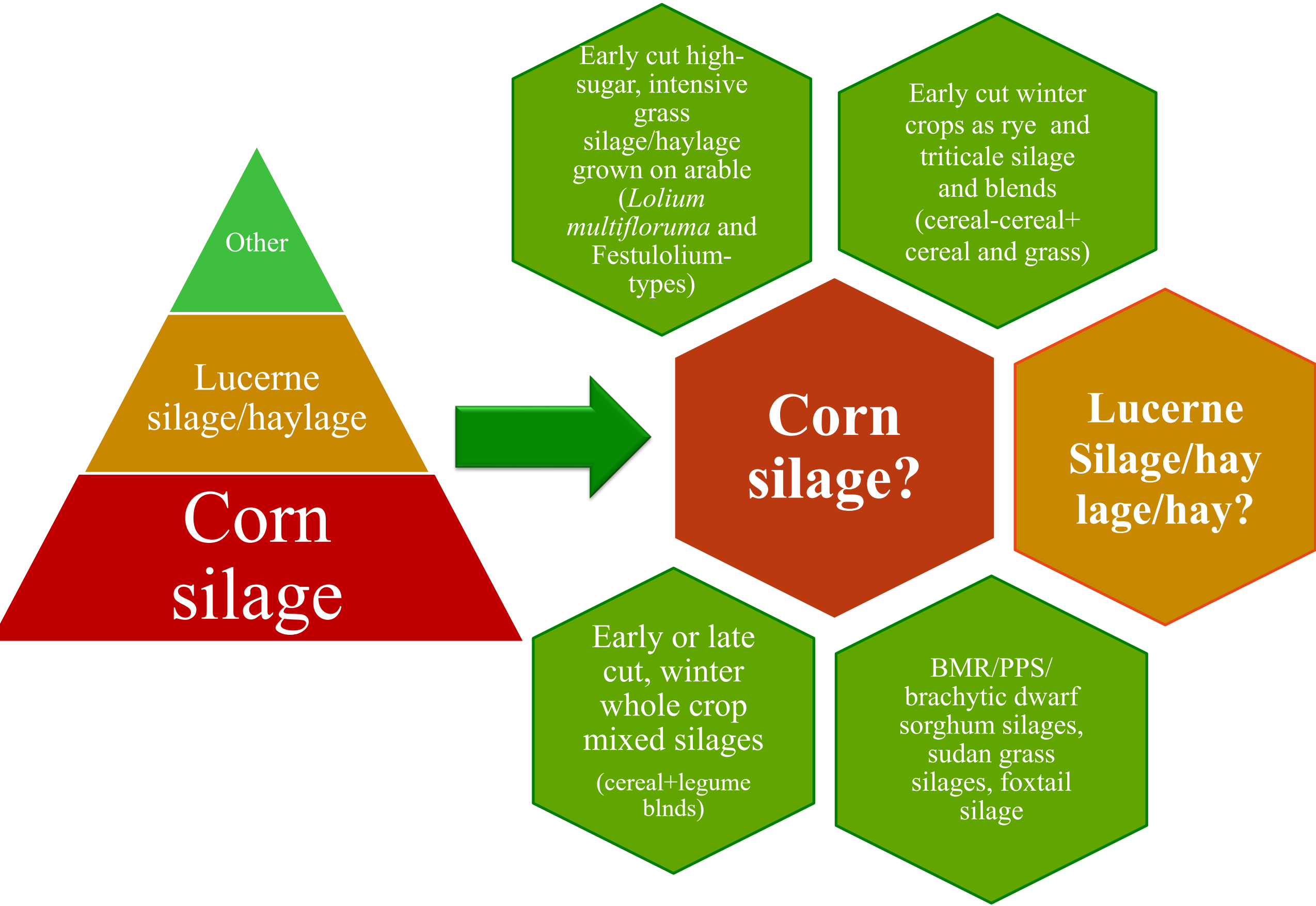
Summer precipitation expectations for 2071-2100



The starch content of corn silage in Hungary (dry continental region of Central Europe, altitude: under 200 m; rain: 60-700 mm/year; 2012-2022, NIR, n= 4898)



®EVOLUTION OF FORAGE BANK IN HUNGARY BETWEEN 2007-2025



FORAGE CLIMATE STRATEGY tools

1. Early cut system of whole crop cereals and intensive grasses grown on arable (flagleaf stage, in boot) – FOR DAIRY
2. Winter whole crop silages (early cut rye-, early cut triticale, Italian ryegrass, Festulolium) – FOR DAIRY
3. Cereal-cereal, cereal-grass and cereal-legume mixed silages cut in in boot – FOR DAIRY
4. Cereal-cereal, cereal-grass and cereal-legume mixed silages cut in early dough stage– FOR HEIFERS and BEEF
5. Double cropping (RYE- CORN, TRITICALE- SORGHUM, GRASS-SORGHUM, higher biomass/ha; forage bank safety, soil cover: from September till April
6. Annual drought-tolerant crops (modern BMR/PPS/brachytic dwarf sorghum hybrids, BMR sudan grass, sorghum mixes, legume-sorghum mixes) – FOR DAIRY
7. Increased area for hay production (due to potentially low summer yields)- FOR SHEEP, BEEF
8. Non-protected grasslands – management development to mitigate summer yield losses – FOR SHEEP, BEEF
9. Cereal hay production on arable and grazing arable fields – FOR SHEEP, BEEF

Type of forage	Dry matter	Crude protein	Crude fat	Crude fiber	Ash	Total sugar	Nitrate	Soluble protein	aNDFom	ADL	NDFd ₃₀	NDFd ₄₈	dNDF ₄₈	OMd ₄₈
	g	g	g	g	g	g	g	g	g	g	%NDF	%NDF	g	%
Early cut whole-crop rye silage	291	137	35	291	106	39	3.5	111	544	26	53	66	353	71.6
Early cut grass silage (annual)	340	143	34	271	116	59	4.3	95	499	25	54	65	322	73.0

Nutrient content of early cut whole-crop rye silage (n= 1379) and early cut intensive grass silage (n=910) within the period of 2013-2022 based on 1000 g dry matter (NIR database, LPT Ltd.). Explanation of abbreviations, SD, BIAS, R² can be find in the abstract.

CONCLUSIONS

We can conclude that there are still challenges in cultivation and harvesting technology of early-cut rye silage and intensive grass silages. However, even the non-optimal quality is an improvement over the corn silage- and alfalfa silage-based diet from fiber digestibility and digestible fiber content point of view in the high milking dairy cow diet.

