



WELL DIGESTIBLE FORAGES FOR FEEDING DURING HEAT STRESS (DATASET 2013-2022)

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The goal of this study is to describe the fiber characteristics of the early cut whole-crop rye silages and intensively grown, annual, high sugar grass silages (*Lolium multiflorum* and *Festulolium*-type hybrids) compared to the traditional silages of dry and hot lands of Central Europe (corn silage and alfalfa silage).

BACKGROUND- ALARM!

- The higher number of **heat stress days due to climate change in dry continental low lands** (below 500m altitude) of Central Europe (Tóthi et al., 2024) decreases DMI and increases the animal health risk.
- Correlation between **the forage's NDF digestibility and dairy cow milk production**: the expectable effect is 0.18 kg d-1 more dry matter intake (DMI) and 0.25 kg d-1 more 4% fat-corrected milk for every 1% increase of NDF digestibility (Oba and Allen, 1999).
- Well digestible forages flow through the rumen more quickly (fast pool), increasing dry matter intake, while reducing relative heat increment in the rumen.**
- Well digestible forage may lead to a higher economic return also, due to less grain consumption and **higher income-over-feed-cost** (Chase, 2012).



Fiber fractions, fiber digestibility and undigestible fiber of early cut whole-crop rye silage and early cut intensive grass silage 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.

Type of forage	aNDFom	ADL	NDFd ₃₀	NDFd ₄₈	dNDF ₄₈	uNDF ₂₄₀	uNDF ₂₄₀
	g	g	%NDF	%NDF	g	%NDF	g
Early cut whole-crop rye silage (n= 1379)	544	26	53	66	353	20.6	112
Early cut grass silage (grown on arable, n=910)	499	25	54	65	322	23.0	115
Corn silage (harvested in 2022, n=517)	472	17	45	58	275	23.5	111
Corn silage (harvested in 2023, n=415)	398	14	48	61	242	25.1	100
Corn silage (harvested in 2024, n=502)	422	15	48	61	256	25.4	107
Alfalfa silage/haylage (n=3043, 2013-2022, MIDDLE QUALITY)	425	62	32	40	166	51.1	217!

CONCLUSIONS

- We can conclude that early-harvested rye silages and intensive grass silages
- have optimal **digestible fiber ratio (dNDF₄₈ 65, 66%NDF, respectively),**
 - contain **more digestible fiber (NDFd₄₈ 353 g kg-1 DM, 323g kg-1 DM, respectively)** than corn silage and alfalfa silage, and
 - have similar or **less indigestible fiber ratio and content (uNDF₂₄₀ 112 g kg-1 DM 115 g kg-1, respectively)** compared to corn silage and alfalfa silage.

Based on these results we can project that early cut rye silage (harvested in boot stage or earlier) and intensive grass silages (*Lolium multiflorum*, *Festulolium*-type grass hybrids) **may reduce the drop in DM-intake during the summer** preventing many diseases and production losses in hot area.

We suggest to introduce **a new concept - the heat stress forage or heat stress silage based on fiber digestion characteristics** described by parameters of **dNDF₄₈, NDFd₄₈ and uNDF₂₄₀** on dry continental low land of Europe.

The concept of heat stress silage helps to understand the positive effects on animal health and improved cow performance on farms when the proportion of corn silage in **,summer' TMR** is reduced from 30%DM to 15%DM, the proportion of alfalfa silage is reduced to 0-5%DM (compared to 10-15%DM overall), while the ratio of **early-cut rye silage and intensive grass silage is increased from 5-10%DM to 15-20%DM overall in the diet.**

