

Impact of agricultural technology on the yield and quality of grassland

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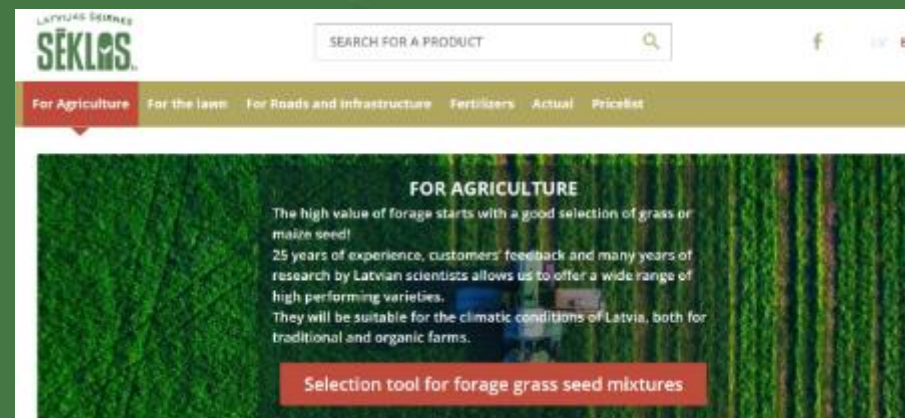
Latvijas Šķirnes Sēklas SIA

Established in 1993

LATVIJAS ŠĶIRNES
SĒKLAS.lv
AUGSIM KOPĀ

➤ Our main lines of business:

- grass seed production (growing, certification, trading)
- pre-treatment of seed material - drying, cleaning and packaging
- purchase and sale of grass and forage plant seeds
- studies and trials on the productivity of grass, maize etc.
- agronomist consultation, organization of seminars



We offer:

30 years of experience, customers' feedback and many years of research allows us to offer a wide range of seeds and mixtures suitable for different soils and uses in Baltic climatic condition

- High performing forage mixtures
 - For silage production, hay, grazing, requirements of eco-schemes
- Amenity grass seed mixtures
- Green manure and Catch crop mixtures
- Single species seeds



ZAĻAI ZEMEĻ S1 – a mixture for subsoiling



ZAĻAI ZEMEĻ S2 – a mixture with a high proportion of legumes



ZAĻAI ZEMEĻ S3 – mixture without brassica



ZAĻAI ZEMEĻ S4 – mixture for soil structure improvement



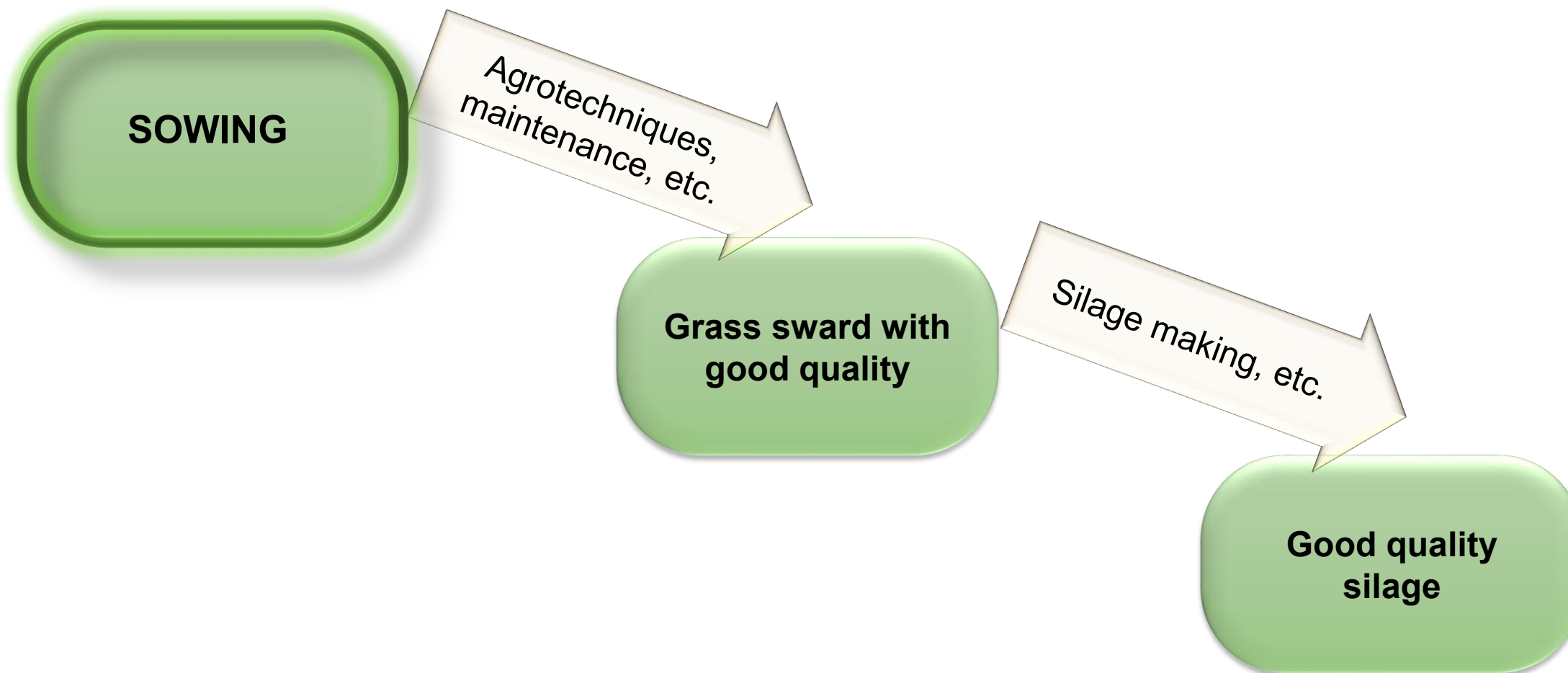
ZAĻAI ZEMEĻ S6 – mixture for soil structure improvement



ZAĻAI ZEMEĻ S7 – mixture for soil structure improvement and weed control



Good silage



Seeding rate



Grassland seeding

➤ Seeding rate

- Sward for cutting:
20 – 30 kg/ha
- For grazing and cutting:
30 – 35 kg/ha
- Using annual ryegrass as cover crop (12-15 kg/ha),
this amount we «+» to perennial mixture



Seeding rate for forage grassland

On average 1000 germinating seed on m²

Species	1000 seed weight, g	Necessary kg/ha, to get 1000 seeds/m ²
White clover / Valge ristik	0.6 – 0.8	6 – 8
Red clover / Punane ristik	1.4 – 2.1	14 – 21
Lucerne / Lutsern	1.5 – 2.4	15 – 24
Timothy / Pöldtimut	0.3 – 0.6	3 – 6
Meadow fescue / Harilik aruhein	1.8 – 2.8	18 – 28
Tall fescue / Roog-aruhein	1.8 – 2.8	18 – 28
Festulolium / Festulolium	2.7 – 3.7	27 – 37
Red fescue / Punane aruhein	0.7 – 1.2	7 – 12
Perennial ryegrass / Karjamaa raihein	1.7 – 2.8	17 – 28
Kentucky bluegrass / Aasnurmikas	0.2 – 0.4	2 – 4

Seeding rate



Higher seeding rate

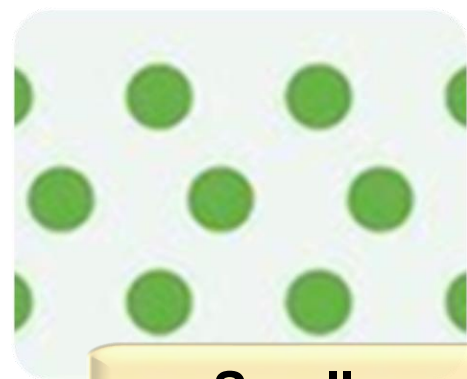


Higher yield

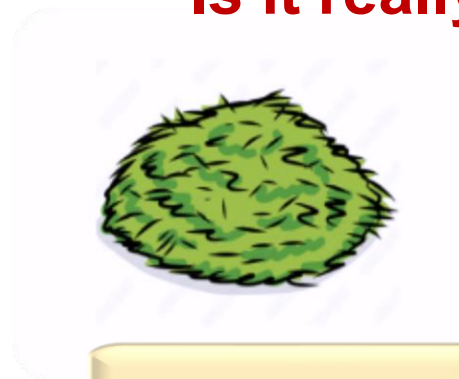


Better quality

Is it really so?



Smaller seeding rate



Lower yield



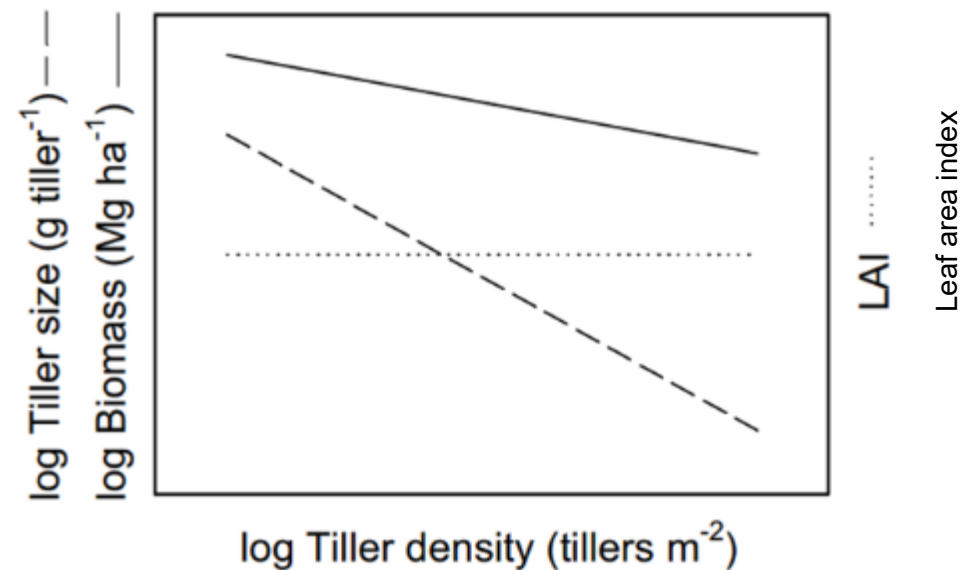
Lower quality



Use of growing space in grassland phytocenosis

- Sward density – tiller size (weight) relationship
size–density compensation (SDC)

Higher sward density (more tiller) $\Rightarrow$ finer (lighter) tillers



Assuero S., Tognetti J. (2010) adasted from Yoda et al. (1963)



Trial scheme

kg/ha								
30	Luc50/30	Luc30/30	Luc70/30		Na30/30	NutriF/30	Na70/30	Na50/30
45	Luc50/45	Luc30/45	Luc70/45		Na30/45	NutriF/45	Na70/45	Na50/45
60	Luc50/60	Luc30/60	Luc70/60		Na30/60	NutriF/60	Na70/60	Na50/60
celiņš								
30	Luc30/30	Luc70/30	Luc50/30		NutriF/30	Na30/30	Na50/30	Na70/30
45	Luc30/45	Luc70/45	Luc50/45		NutriF/45	Na30/45	Na50/45	Na70/45
60	Luc30/60	Luc70/60	Luc50/60		NutriF/60	Na30/60	Na50/60	Na70/60
celiņš								
30	Luc70/30	Luc50/30	Luc30/30		Na70/30	Na50/30	Na30/30	NutriF/30
45	Luc70/45	Luc50/45	Luc30/45		Na70/45	Na50/45	Na30/45	NutriF/45
60	Luc70/60	Luc50/60	Luc30/60		Na70/60	Na50/60	Na30/60	NutriF/60

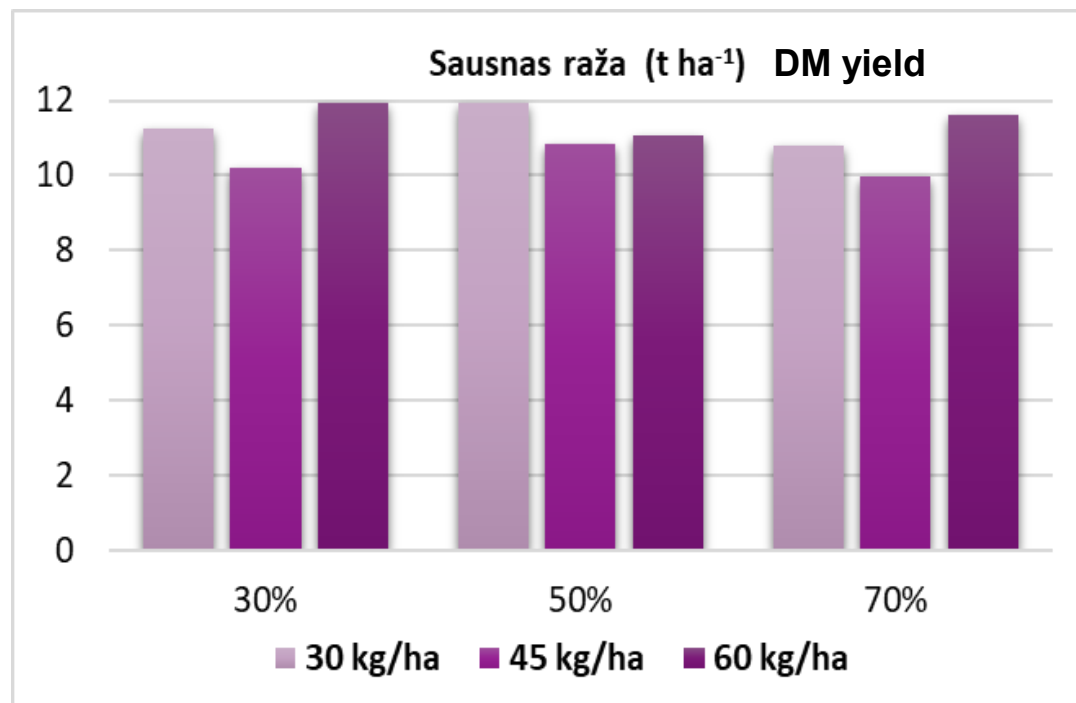
Sowing time: May 2023,
without a cover crop
Plot size: 8 m²

Izsējas norma kg ha ⁻¹	Lucerne (<i>Medicago sativa</i>), %		
	70%	50%	30%
30	+ Red clover 5% Punane ristik + White clover 5% Valge ristik + Grasses 20%; 40% vai 60% Körrelised		
45			
60			

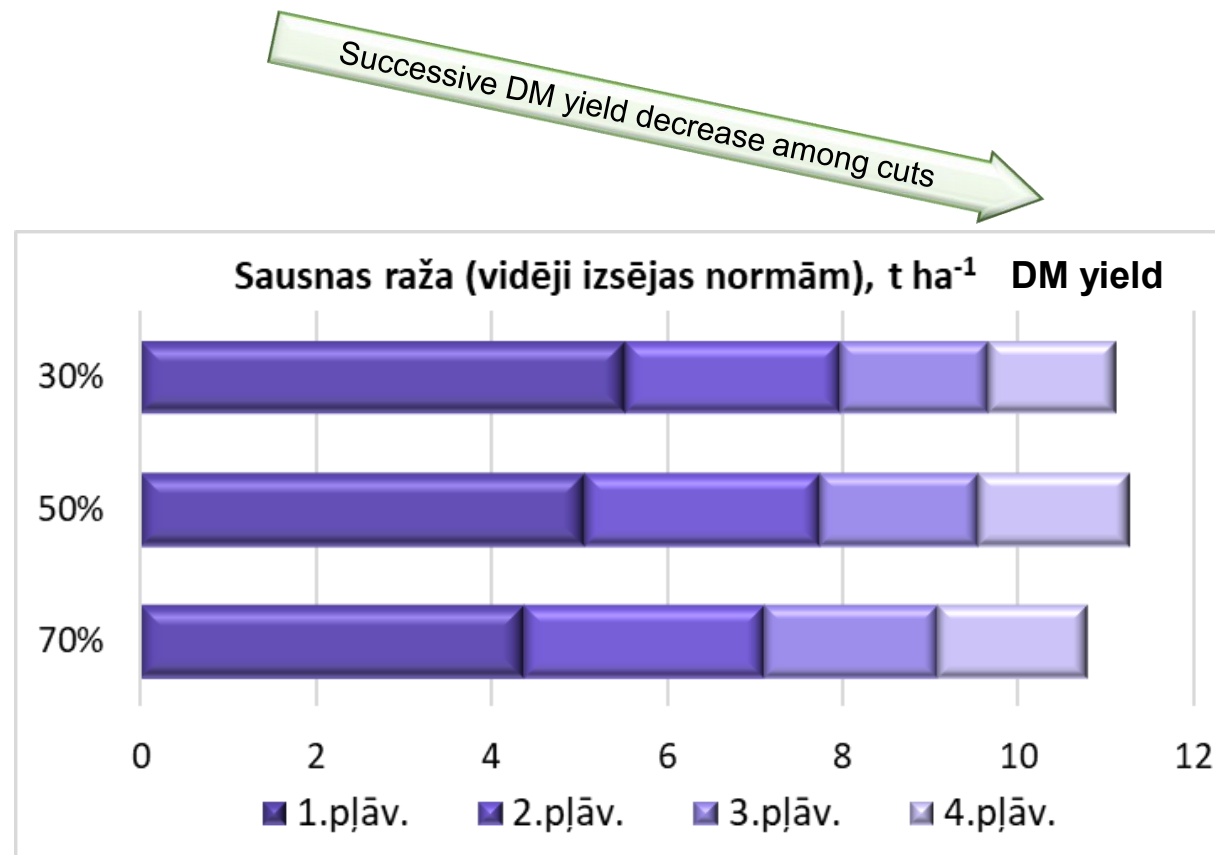
Grasses: Timothy; Meadow fescue; Festulolium; Perennial ryegrass
Körrelised: Pöldtimut; Harilik aruhein; Festulolium; Karjamaa raihein

The results of first year of sward use (2024)

Yield of mixture with lucerne



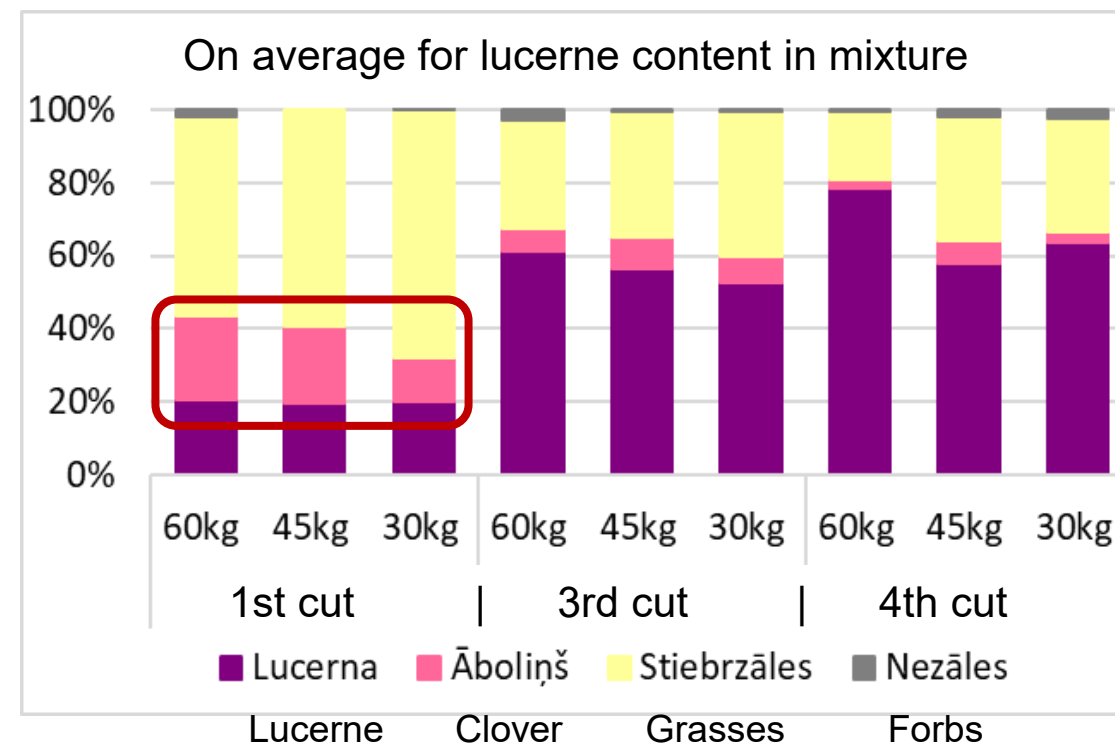
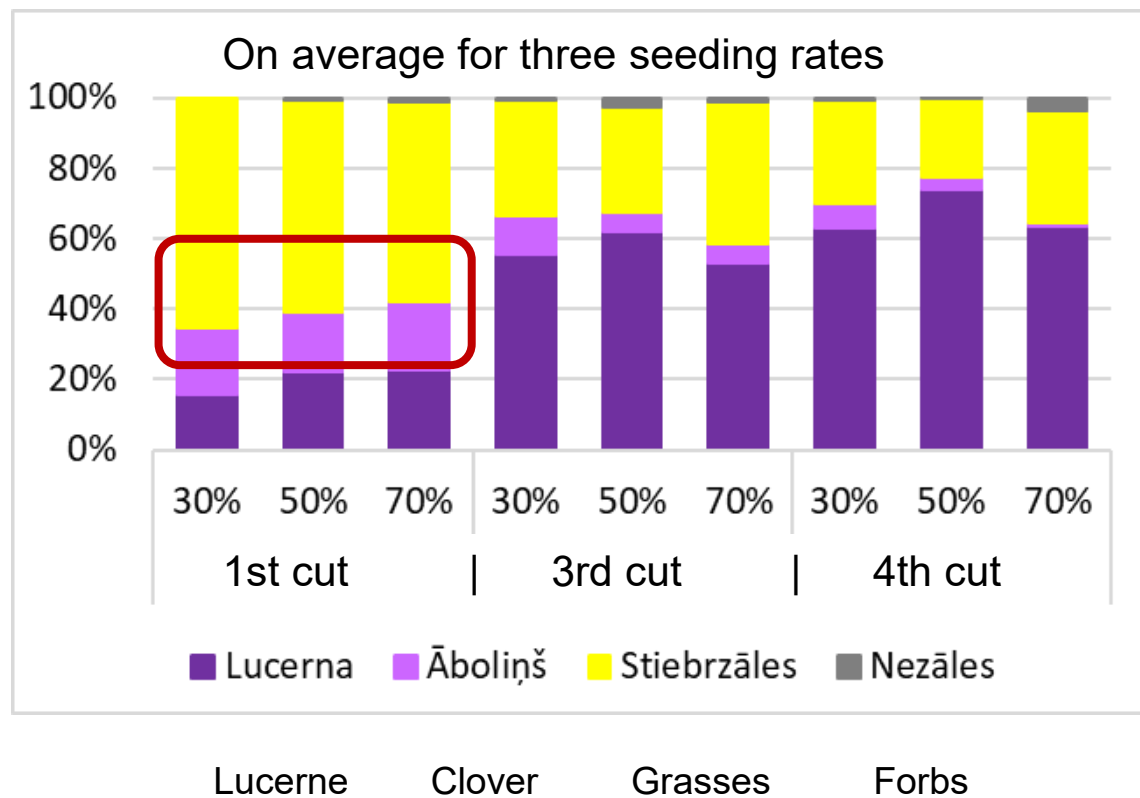
Increased seeding rate and lucerne rate in mixture haven't determined a positive effect on DM yield



Annual DM yield distribution among the cuts

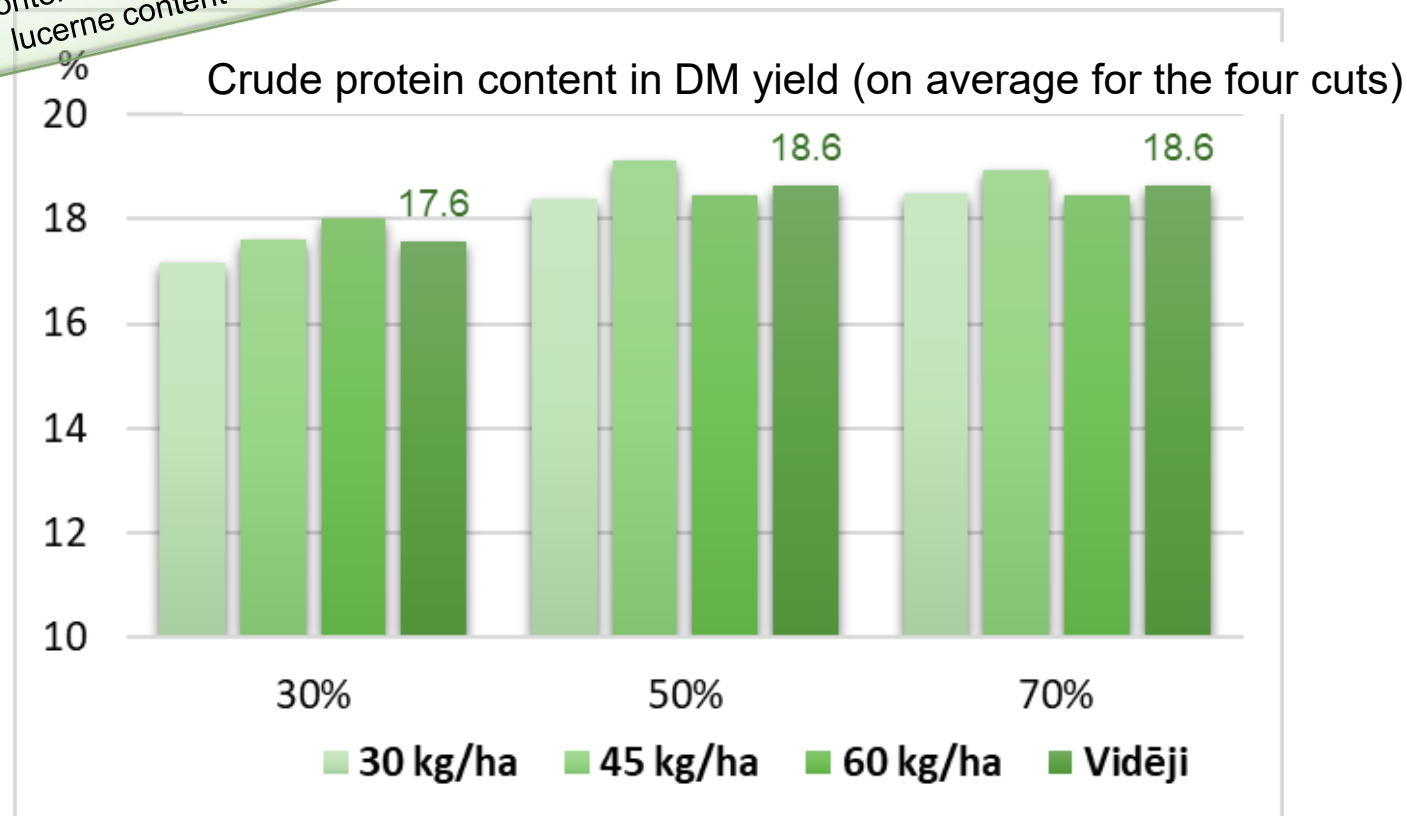
Successive DM yield decrease among cuts

Botanical composition of the swards during the vegetation season



Crude protein content (%)

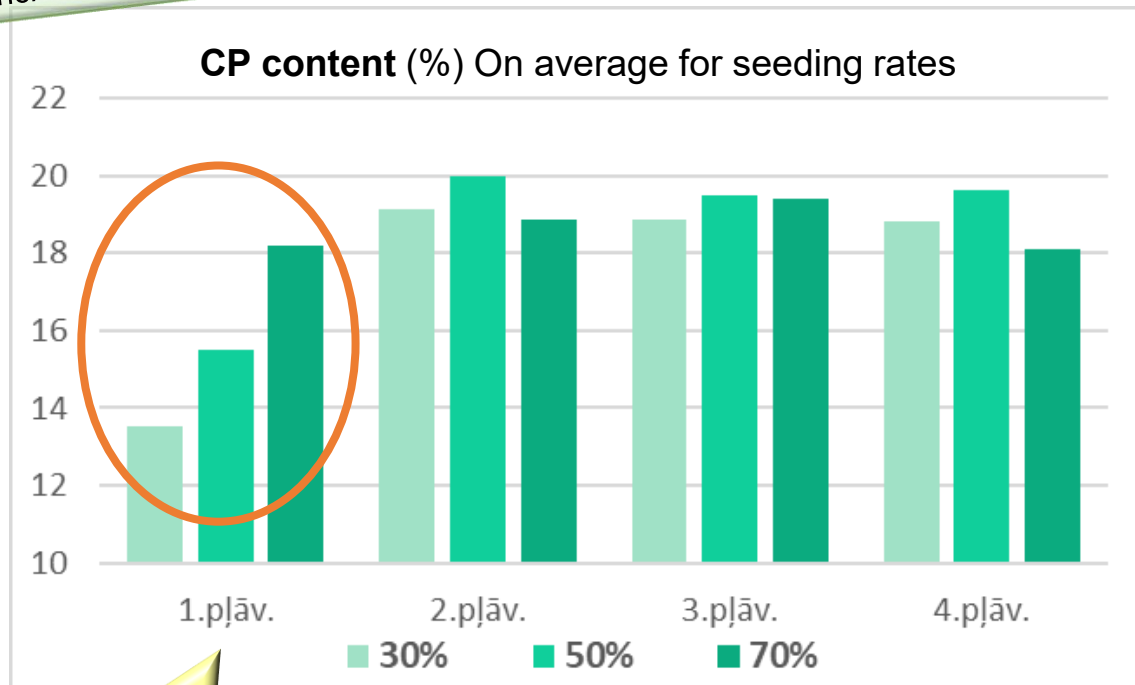
Lower CP content for mixtures with 30% lucerne content



Higher seeding rate did not result in increase of CP content

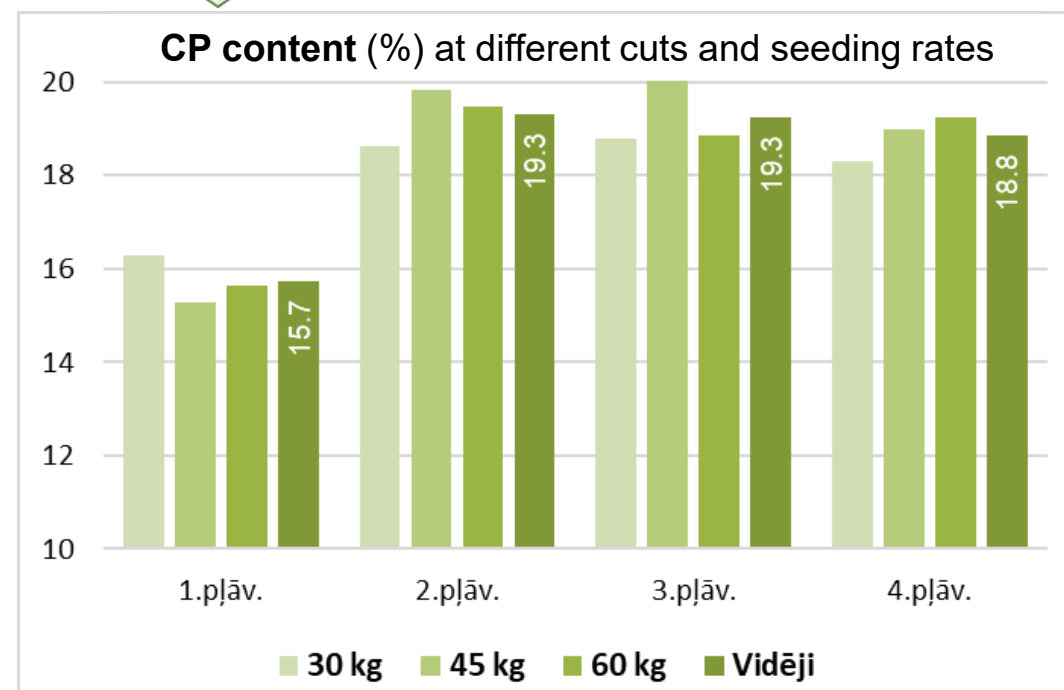
Crude protein content (%) depending on the cut

Increased proportion of lucerne contribute to successive increase of CP content in the first cut grass



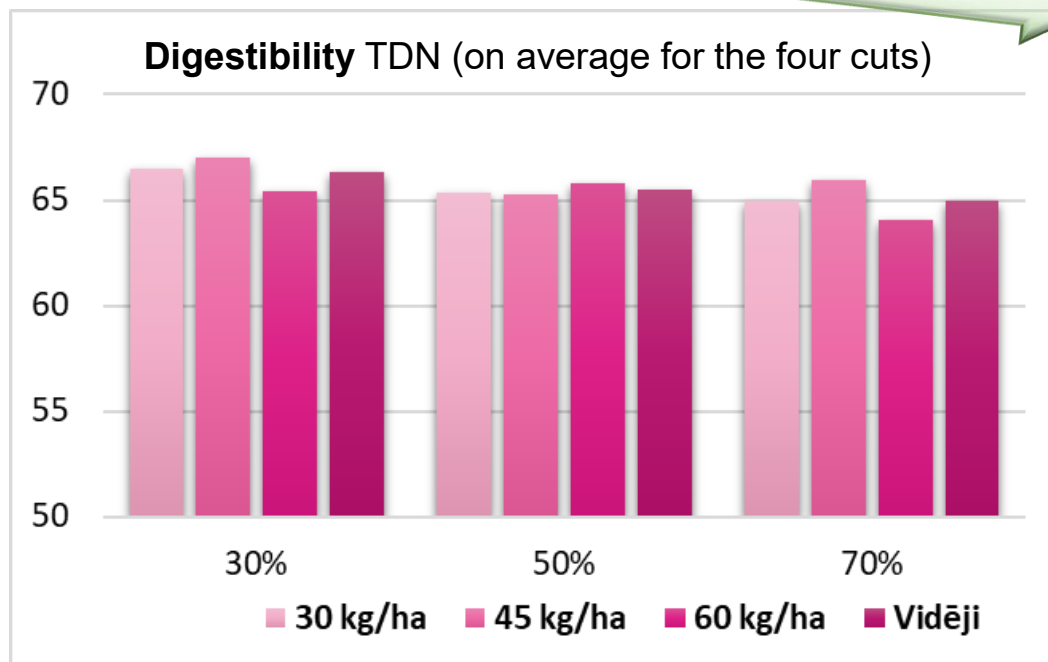
Let's remember about the distribution of DM yield among cuts !

CP content at the first cut were significantly lower



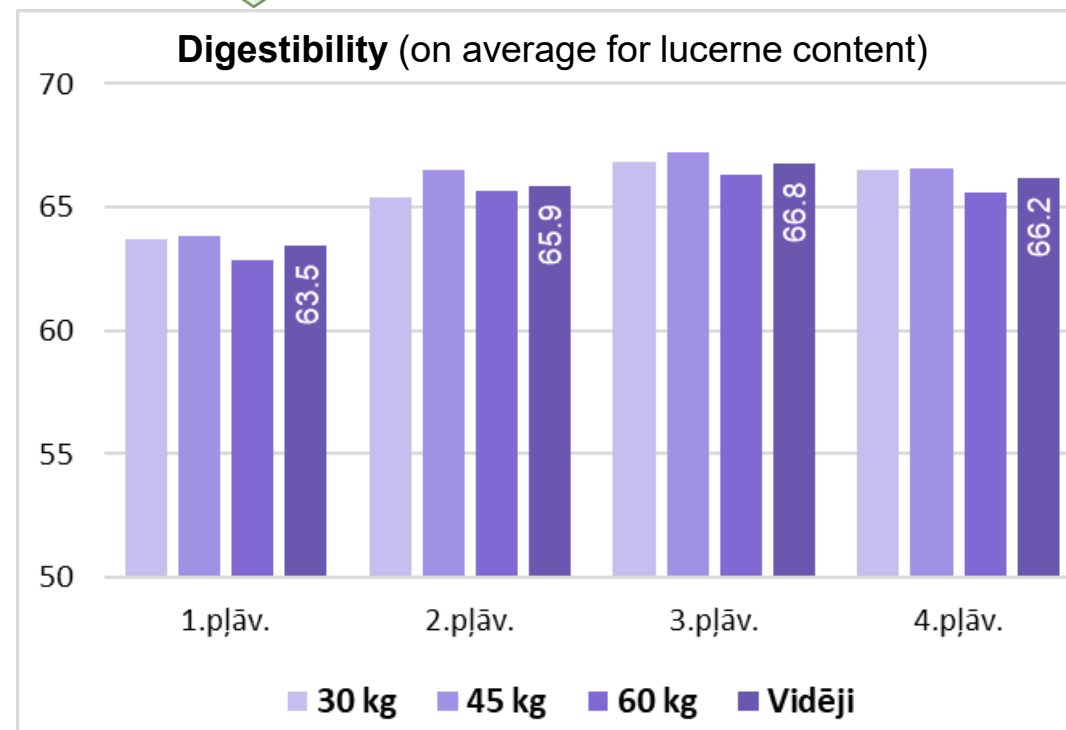
Digestible dry matter (TDN/DDM)

Digestibility slightly decrease, in mixture with higher content of lucerne

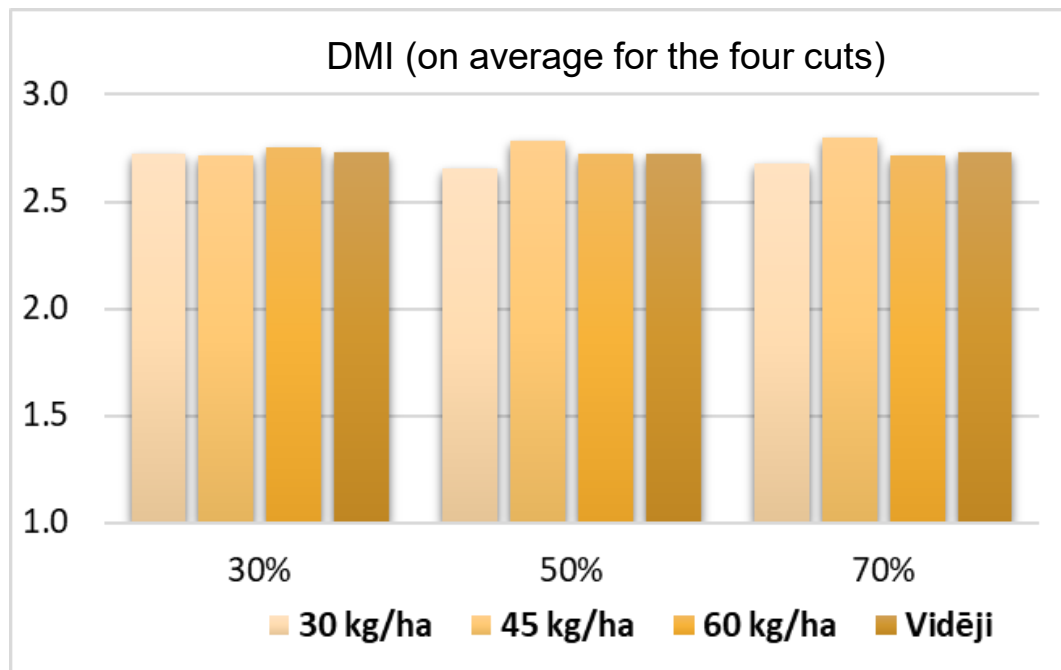


Higher seeding rate do not result in better digestibility

Digestibility at the first cut were significantly lower

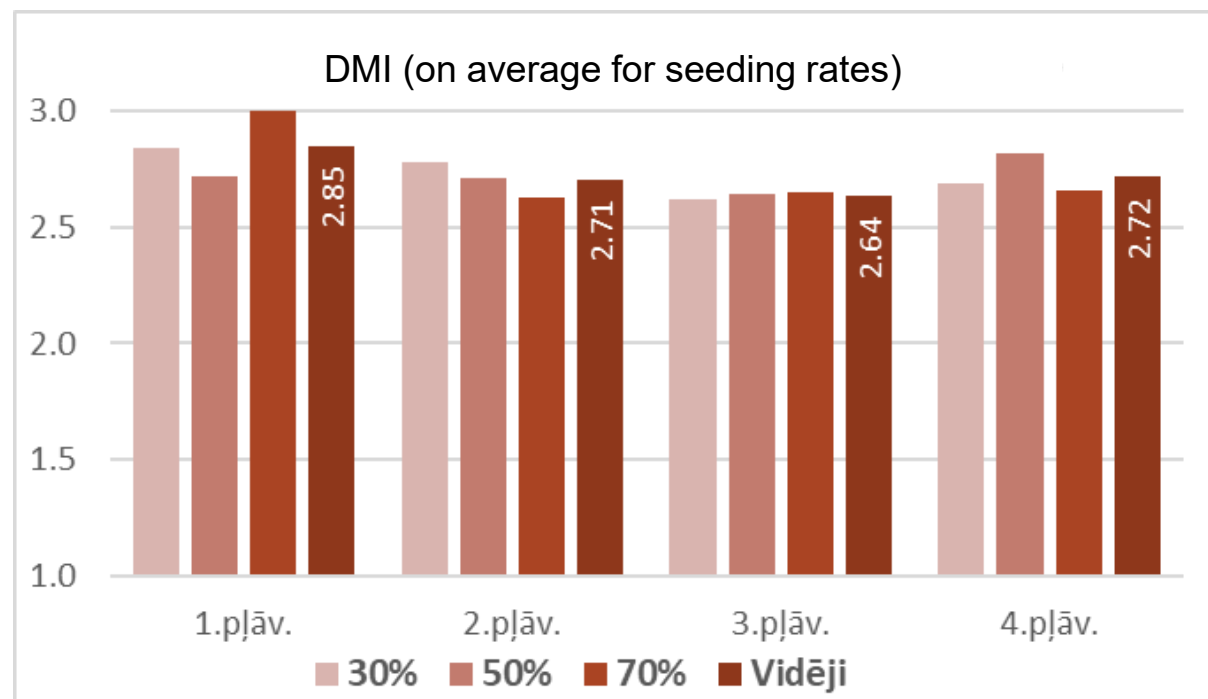


Dry matter intake (DMI)



Increased seeding rate and lucerne rate in mixture have not determined a positive effect on DM intake

DMI at the first cut were slightly higher

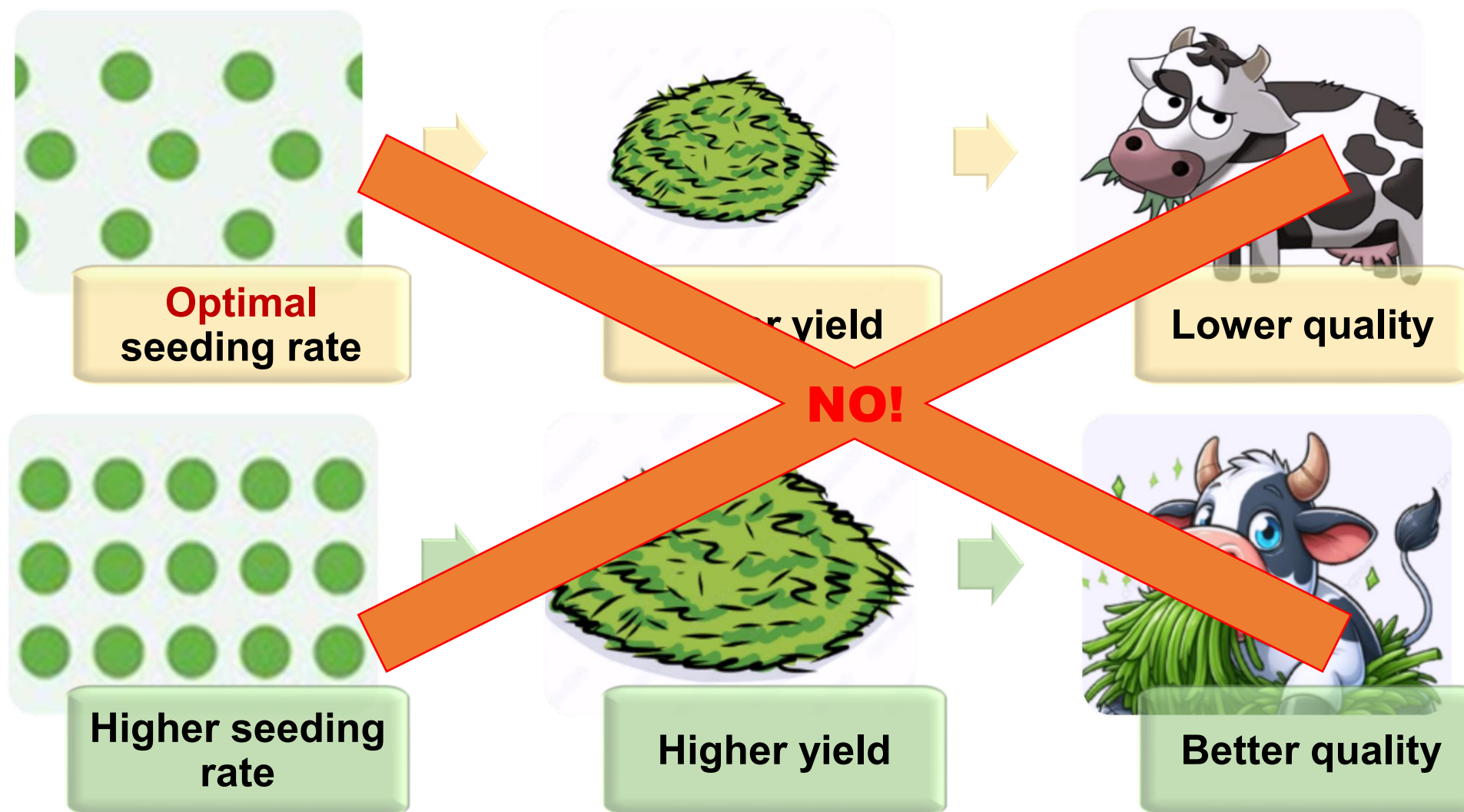


Conclusion

- Dry matter yield at the first year of sward use
 - Seeding rate and lucerne proportion in mixture did not influence DM yield
- Quality
 - Mixtures with 30% lucerne content had lower CP content
 - The effect of seeding rate and lucerne content on several DM yield quality parameters are not certain, or it is minimal
 - (Fiber, ash; ADF; NDF; NEM; NEG; TDN/DDM; DMI; Ca, P, K, Mg content)
- Cut
 - Cutting factor had greater impact on DM yield and quality as seeding rate or lucerne content in mixture
- In this trial, we compare increased seeding rates with optimal!
Trial results do not provide any reason to reduce the seeding rate!



Seeding rate influence on yield and quality



Grass seed mixtures used for silage

- Seed mixtures with a high proportion of legumes >50% to meet ecosystem requirements
- Mixtures for cutting and aftermath grazing
- For cutting
- For cutting and grazing



Zaļai zemei N1

For silage production and grazing

❖ suitable for different types of soils

- ✓ The first mowing can be used for green fodder or silage, while the second growth can be used for silage making or grazing
- ✓ High-yielding, produces protein-rich fodder
- ✓ Contributes to enhanced soil fertility and structure



Content :

- red clover / Punane ristik 50 %
- white clover / Valge ristik 5 %
- timothy / Põldtimut 10 %
- meadow fescue / Harilik aruhein 10 %
- festulolium / Festulolium 10 %
- perennial ryegrass / Karjamaa raihein 15 %

Seeding rate: 25 kg/ha



Zaļai zemei N3

For silage production

❖ For medium-heavy soils (**pH > 6**)

- ✓ High-yielding
- ✓ Produces protein-rich fodder
- ✓ Contributes to enhanced soil fertility and structure

Content:

- | | |
|-----------------------------------|------|
| • red clover / Punane ristik | 5 % |
| • alfalfa / Lutsern | 60 % |
| • timothy / Pöldtimut | 10 % |
| • meadow fescue / Harilik aruhein | 10 % |
| • festulolium / Festulolium | 15 % |

Seeding rate: 30 kg/ha



P/2

For silage and hay production

❖ suitable for different types of soils

- ✓ Excellent harvest results in trials in Latvia!
- ✓ For 3 – 4 harvest years
- ✓ High-yielding, produces protein-rich fodder



Content:

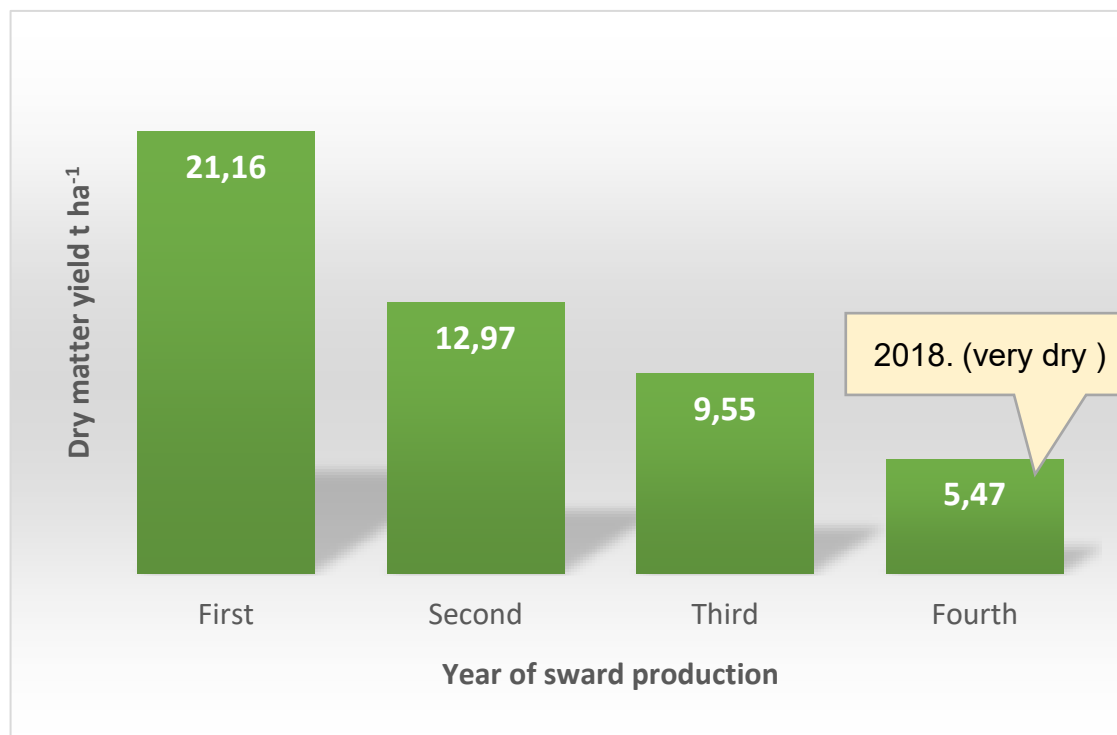
- | | |
|-----------------------------------|------|
| • red clover / Punane ristik | 27 % |
| • timothy / Pöldtimut | 27 % |
| • meadow fescue / Harilik aruhein | 23 % |
| • festulolium / Festulolium | 23 % |

Seeding rate: 25 – 30 kg/ha



P/2 for mowing

Mixture P/2 dry matter yield in four years of sward production
(on average in three trial places), t ha⁻¹



Results from ZM project no. 10.9.1.-11/18/887-e
"Scientific rationale for the development of
technologies for the production of grass fodder, and
the multi-purpose use» trials



G/1

For grazing and mowing (silage or hay production)

❖ suitable for different types of soils

- ✓ perennial
- ✓ can be used for more than 5 years
- ✓ high-yield and high-quality fodder
- ✓ suitable for dairy and beef pasture
- ✓ forms a dense leafy sward

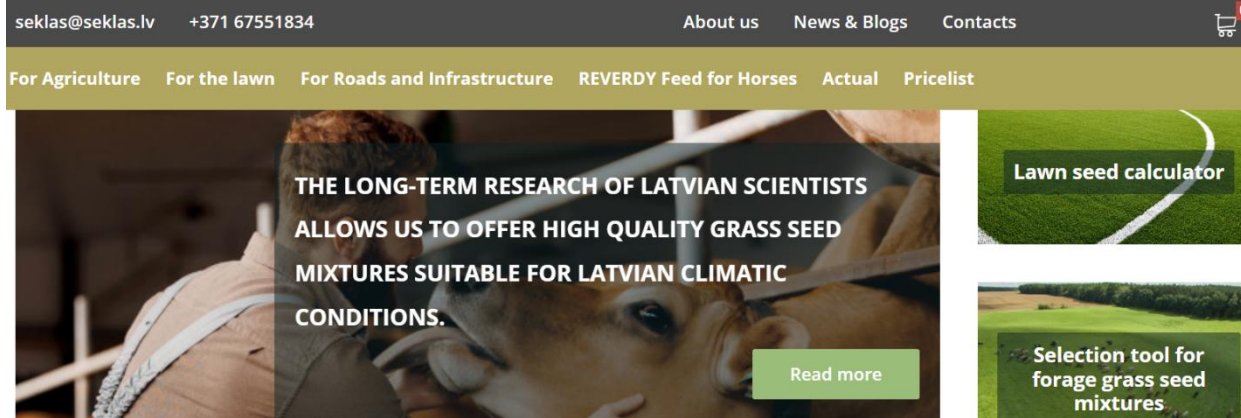
Content:

• red clover / Punane ristik	13 %
• white clover / Valge ristik	10 %
• meadow fescue / Harilik aruhein	17 %
• timothy / Pöldtimut	20 %
• perennial ryegrass / Karjamaa raihein	20 %
• red fescue / Punane aruhein	13 %
• kentucky bluegrass / Aasnurmikas	7 %

Seeding rate: 35 – 40 kg/ha



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Thank you!