

## Effect of mineral fertiliser levels on the yield quality of perennial ryegrass

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**Keywords:** *Lolium perenne*, fertilisation, yield quality

**Introduction** Perennial ryegrass is a short-lived bunch-grass with shallow root system. The plant is nutritious and palatable and stands up to hard grazing. It will not do well under poor conditions, where fertility or rainfall is low. Perennial ryegrass is a major component in different seed mixtures that are used for grassland management and forage production. This plant is the predominant component in nearly all pasture mixtures, with perennial ryegrass and white or red clover forming the basis for permanent pasture for dairy production and cattle. This grass species plays an important role in grassland productivity and forage quality. Ryegrass requires high fertility levels for good production. The significance of ryegrass to agriculture is reflected by the huge investments in research. The aim of work is to determine the balanced rate of mineral fertilisers in ryegrass seed field.

**Materials and methods** Field experiments (2000 – 2002) were carried out on sod podzolic sandy loam soil (Luvic Phaeozem, WRB 1998), pHKCl-6.5, plant available, P-48 and K-169 mg/kg (Egner-Riehm), soil organic carbon-21 g/kg (Tyurins' method). Perennial ryegrass 12 kg/ha was planted using a Nordsten seed drill in May 1999, 2000 and 2001 after field preparation. The following mineral fertilisers rates were used: N – 0, 30, 60, 90, 120 kg/ha, P applied at 0, 13, 26, 39 and 52 kg/ha, K at 0, 33, 66, 100 and 133 kg/ha. The biomass, DM content and plant material chemical composition were determined by standard method. Mean were separated by LSD and were declared different at the  $p < 0.05$  level.

**Results** Perennial ryegrass tetraploid cv. 'Spidola' was developed at the Skriveri Research Center of the Latvia University of Agriculture. Perennial ryegrass on the first cut produced the highest DM yield (5.5 – 5.8 t/ha) using increased mineral fertiliser rates. The ranges of data obtained are presented in Table 1.

**Table 1** Dry matter yield and chemical composition of perennial ryegrass 'Spidola' (first cut, mean 2000–2002)

Fertiliser rate, kg/ha			DM yield, t/ha	Content in DM, g/kg				
N	P	K		CF	CP	Ash	Fats	Digestibility
0	0	0	2.1	266.7	77.4	43.8	22.5	596
0	26	66	2.4	273.6	80.3	44.7	22.6	586
30	13	33	3.3	263.2	83.3	45.3	24.4	608
30	39	100	3.8	272.8	83.8	47.4	26.8	594
60	26	66	4.4	264.4	82.1	46.3	26.5	625
60	26	133	4.6	272.8	91.3	50.5	27.0	602
90	39	33	4.7	274.9	95.9	53.1	30.9	607
90	39	100	5.5	272.8	95.9	53.1	28.5	608
120	26	66	5.8	289.2	107.1	56.4	33.4	588
120	52	133	5.4	272.2	118.1	60.9	36.2	594
LSD <sub>0.05</sub>			0.5	17.3	9.4	3.7	4.5	34

At the end of heading stage, perennial ryegrass 'Spidola' gave comparatively high crude fibre content (267 to 289 g/kg DM) at all investigated mineral fertiliser rates that significantly affected the chemical composition and digestibility of forage. Crude protein content in perennial ryegrass at this developmental stage is 80 – 118 g/kg DM and mineral content is 43.8 – 60.9 g/kg DM. Optimal values for ruminants nutrition for K (20 g/kg DM), Ca (3-7 g/kg DM) and P (2 g/ha DM) are realized through forage obtained. Mg concentration exceeding 2.0 g/kg DM, is given as a critical value for hypomagnesaemia in farm animals. In our investigations P, K and Ca changed within the range of these parameters, but Mg content accounted only for 1.4 – 1.7 g/kg DM.

**Conclusion** Application of balanced quantities of N, P and K fertilizers provides comparatively high DM yield of perennial ryegrass with good herbage quality.

### References

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