



Pastures feeding value response to humic fertilizers



Klimas E. and Balezentiene L.

Lithuanian University of Agriculture (LUA), Sudentų 11, LT-53361, Akademija, Kaunas distr., Lithuania ligita.balezentiene@lzuu.lt

Humus content determines soil fertility as well as affecting crop yield. Natural formation of humus is important, but this is a long and slow process. This process could be improved by applying different organic fertilizers. The humic fertilizer 'Turbo Grass' containing 9.7% of organic acids was applied at different rates to improve the feeding value of grass on dairy farms. The objective was to evaluate the impact of humic fertilizers (up to 32 l ha⁻¹) on grass chemical composition, yield, metabolisable energy (ME), net energy (NEL) and digestibility of intensively managed sown pastures in combination with different rates of mineral fertilization. Rates of humic and complex fertilizers had different effects on recorded parameters.

Keywords: fertilizing, grass, yield, feeding value

Introduction. Turbo Grass (TG) is an organic fertilizer which originated from American leonardites and is composed of 7.8% humic acids, 1.9% fulvic acids and 19.5% K. TG may increase grass feed value. Recommended TG rates are 20-25 l ha⁻¹ in spring and 5-10 l ha⁻¹ after each cut. TG improves interaction between soil fractions, aeration, water balance, and assimilation of N, P, K and microelements by transforming insoluble P forms into plant-available P. This humic fertilizer stimulates germination, promotes root system development, grass growth and stress-resistance during drought or frosts, and therefore helps reduce sward deterioration.

The objective of this investigation was to evaluate the impact of different Turbo Grass application rates on grass chemical composition under different background rates of mineral fertilization.

Materials and methods. Field trials were performed at O. Baltrušaitienė farm, Kauno distr. Lithuania in 2006-2007 on a sandy moraine, loam humic horizon of Calcarey Epihypogleyic Luvisol. The sward (10% red clover 'Liepsna', 10% timothy 'Gintaras', 10% blue grass 'Lanka', 15% white clover 'Atoliai', 15% lucerne 'Birute', 15% perennial raygrass 'Žvilgė', 25% meadow fescue 'Dotnuvos I') was sown (25 kg ha⁻¹) in 2005. The area of each treatment plots was 2 m x 5 m (net area 2 m x 3 m). Complex fertilizers at 300 kg ha⁻¹ were applied early in spring, and 150 and 100 kg ha⁻¹ NH₄NO₃ of supplementary fertilizers were applied after the 1st and 2nd cuts respectively. The experimental site was not grazed, but used only for fresh herbage production. Four mineral fertilizer treatments (N8P20K30, N8P20K30 + M (microelement), N8P13K24, N8P24K24) were combined with five TG rates including an unfertilized control (Control (0), 8, 16, 24 and 32 l ha⁻¹) which were applied as early as possible in spring (Fig. 1). The treatment N8P20K30 is commonly accepted as optimally balanced for grass, and this was therefore taken as the control. The 2-cut system was applied manually at the beginning of the flowering stage. Chemical content of the sward was determined at Kiel University. Botanical composition, dry matter, crude protein (CP) and crude fibre (CF) were determined according to the commonly used Wende forage analyses. Metabolisable energy (ME, MJ kg⁻¹) and net energy of lactation (NEL, MJ kg⁻¹) of grasses were calculated by the formula of Nauman and Bassler (1993).

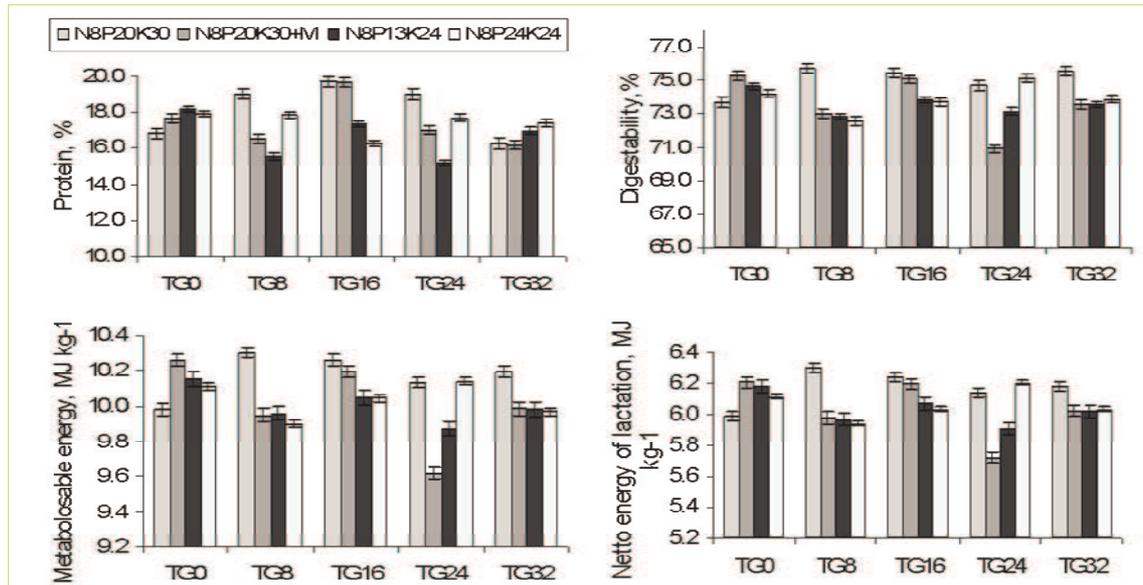


Figure 1. NPK +Turbo Grass impact on mean protein content, digestibility, metabolisable and net lactation energy (mean \pm SE, $P < 0.05$)

Conclusions. Fertilizer application using N8P20K30+M without humic fertilizer TG stimulated the highest digestibility, metabolisable energy and net lactation energy. Tests have proven different impacts of the TG humic fertilizer, and its rates of application, on the effectiveness of complex fertilizers in changing various feed value indices. The highest Turbo Grass effectiveness was evaluated only in combination with the NPK rate most suitable for grass (N8P20K30). TG rates of 8-16 l stimulated formation of the highest protein content, digestibility, ME and NEL. NPK with lower K rates decreased the efficiency of humic fertilizer and grass value. Low rates of Turbo Grass (8-16 l) in combination with N8P20K30 may substitute analogous microelement fertilizers and improve the main indices of feed value.

Acknowledgements

Research was carried in cooperation with Kiel University. We would like to express personal gratitude to prof. F. Taube for his help in performing the chemical analyses.