

Rūgščių dirvožemių derlumo gerinimas efektyvesniam maisto medžiagų prieinamumui ir augalininkystės produkcijos savikainos pokyčiui

- 1. Keywords:** plant nutrition, soil acidity, soil fertility, liming
- 2. Area:** Crop production, Organic Farming, Agro-environmental protection
- 3. Subarea:** Optimising plant nutrition conditions in acid soils by liming
- 4. Theme:** Improving the fertility of acid soils for more efficient nutrient availability and changes in the cost of crop production
- 5. Year:** 2021
- 6. Summary:** Soil acidity is one of the most important soil quality criteria. It is soil acidity that determines crop yields. The more acidic the soil, the lower the yield (yields can be 20-50% lower). This is a particularly acute problem for the majority of Lithuanian farmers, especially those in the western and eastern regions of Lithuania.
- 7. More detailed version of the summary:** Soil acidification is a naturally occurring and ongoing process in soil, driven by acid precipitation, agricultural practices, the application of physiologically acidic mineral fertilisers, intensive use of pesticides, and the leaching and removal of nutrients from soil along with crop yields. Farmers and agriculturalists are therefore looking for solutions to reduce soil acidification in order to farm economically, successfully and sustainably. One way is to lime it. This helps to regulate the macro- and micro-nutrient nutrition of plants. Liming improves physical and chemical properties of acidic soils, changes plant nutritional conditions, physiological and biochemical processes, photosynthetic intensity, carbohydrate and protein metabolism. The most favourable uptake of micro- and macro-nutrients occurs when soil solution pH is 6,0-6,5. When soil is relatively acidic (pH 5,5), phosphate, potassium, calcium and magnesium uptake is limited, trace elements are leached out of soil, and denitrification occurs. When farming on acidic soils, the choice of liming materials and their rates is based on soil acidity (pH), texture and the crops to be grown. Lime application is the most effective when soil is sufficiently moist and when liming is carried out in windless and dry weather. To make sure of this, the Lithuanian Agricultural Advisory Service implemented a 3-year project with 8 demonstration field trials on relatively acid soils. The farms were selected in different parts of Lithuania: 6 trials were set up in Western Lithuania (Tauragė, Telšiai, Klaipėda and Plungė districts) and 2 trials were set up on farms in the eastern part of Lithuania (Šalčininkai district), where acidic soils are the most common. The farms used different lime composition and form, as the soils selected for the trials were very heterogeneous and differed from each other in terms of soil group, texture and agrochemical properties. However, all the soils were relatively acidic. In order to use lime correctly, it is important to know its chemical composition and form. Chemical composition determines neutralising capacity and activity of fertiliser, while form determines the application and choice of technique. Dusty (floury) lime materials are the fastest acting, granular lime materials are slightly slower and crushed (broken) lime materials, which dissolve gradually, are the longest acting. The most important rule is to use a higher rate of lime fertiliser on heavy soils. With proper liming, on lighter soils it is worth spreading the required amount of lime over several applications, but in smaller quantities. It is recommended to choose a carbonate form of lime. In addition, liming should be carried out systematically, depending on the pH and texture of soil, using 1 to 3 t/ha as a one-off fertiliser, every 4 to 5 years after the main liming, or 200 to 500 kg/ha annually, and sowing crops that are not very sensitive to acidic soils. Liming is necessary for sandy loam soils with a pH of less than 5,2 and for loamy and clayey soils with a pH of less than 5,5. Based on the trial results, recommendations have been drawn up (attached) which will help farmers to maintain soil fertility, preserve the ecosystem that is typical of the area, reduce the cost of growing crops, improve the farm's economic performance, and also improve the competitiveness of the farm.
- 8. Effect:** Economical, Sustainable Farming
- 9. Argumentation:** The yields obtained during the project showed that lime improved plant nutrition with essential nutrients, absorption of nutrients delivered with fertilisers was better, the plants formed more and stronger productive stems, reduced rejection of kernels in the ear, formed more grains, and at the same time increased plant yield. Yields increased on average by 0.3 - 0.8 t/ha for different crops: winter rye, winter triticale, oats, spring wheat, rapeseed, etc.
- 10. Project description:** -
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12. URL: <https://www.manoukis.lt/naujienos/renginiai/konsultantai-iesko-optimaliu-kalkinimo-sprendimu>;
<https://www.agroakademija.lt/s/augalininkyste/nepraleiskime-palankiausio-dirvu-kalkinimo-laiko-13120/>

13. Images:

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14. YouTube: https://www.youtube.com/watch?v=N7Zqugoj_F8; <https://www.youtube.com/watch?v=AvFDPqCUup0>; <https://www.youtube.com/watch?v=a57j3k6OzhY>

15. Documents: -