

INFLUENCE OF AGROPERLIT ADDITIVES ON SOIL MOISTURE DYNAMIC

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Idea of research

- Many authors note that the yield of agricultural crops is greatly influenced by meteorological conditions. In Lithuanian soils, crop yields vary greatly due to meteorological factors, the yield is determined by the air temperature and atmospheric precipitation for all decades.
- Potato (*Solanum tuberosum* L.) is a traditional, one of the main food products in Lithuania. They are grown by most farmers and consumed more than 96 kg per capita per year. Potato is a shallow rooted crop and extremely sensitive to water stress. The deficit of water play big influence for commercial potato production. Both soil water and temperature have been shown to be in potato plant growth and tuber production.



- In order to avoid droughts, farmers have several options - to install irrigation systems or to use mineral additives in the fields, which help to increase soil moisture and thus reduce the need for irrigation.



Most researchers say that the highest potato yield can be grown when the soil moisture is 80% of the field moisture capacity (FMC). When the soil is too dry (15–20% FMC) or too moist (up to 90–100% (FMC)), the potato yield is low. In order to avoid droughts, farmers have several options - to install irrigation systems or to use different additives in the fields, which help to increase soil moisture and thus reduce the need for irrigation. Mineral additives potentially influence infiltration rates, density, soil structure, compaction, soil texture, aggregate stability, crust hardness, and evaporation rates.



The Aim of research

- The aim of the study was to determine the dynamics of soil moisture in May-August, when different amounts - 0.5 cm, 1 cm and 2 cm of biological additives are added to the soil. Soil moisture were measured with TDR 150.



Research methodology



Scheme of mineral additives ratio in the soil in the experimental field (explanation: 2-1 mean -2 cm of agroperlite 1 repeat, all ratio has 3 repeats)

2-3	1-3	0,5-3	Control	2-3	1-3	0,5-3
Agroperlite			Control	Agrovermiculite		
2-2	1-2	0,5-2		2-2	1-2	0,5-2
2-1	1-1	0,5-1	Control	2-1	1-1	0,5-1



Research methodology

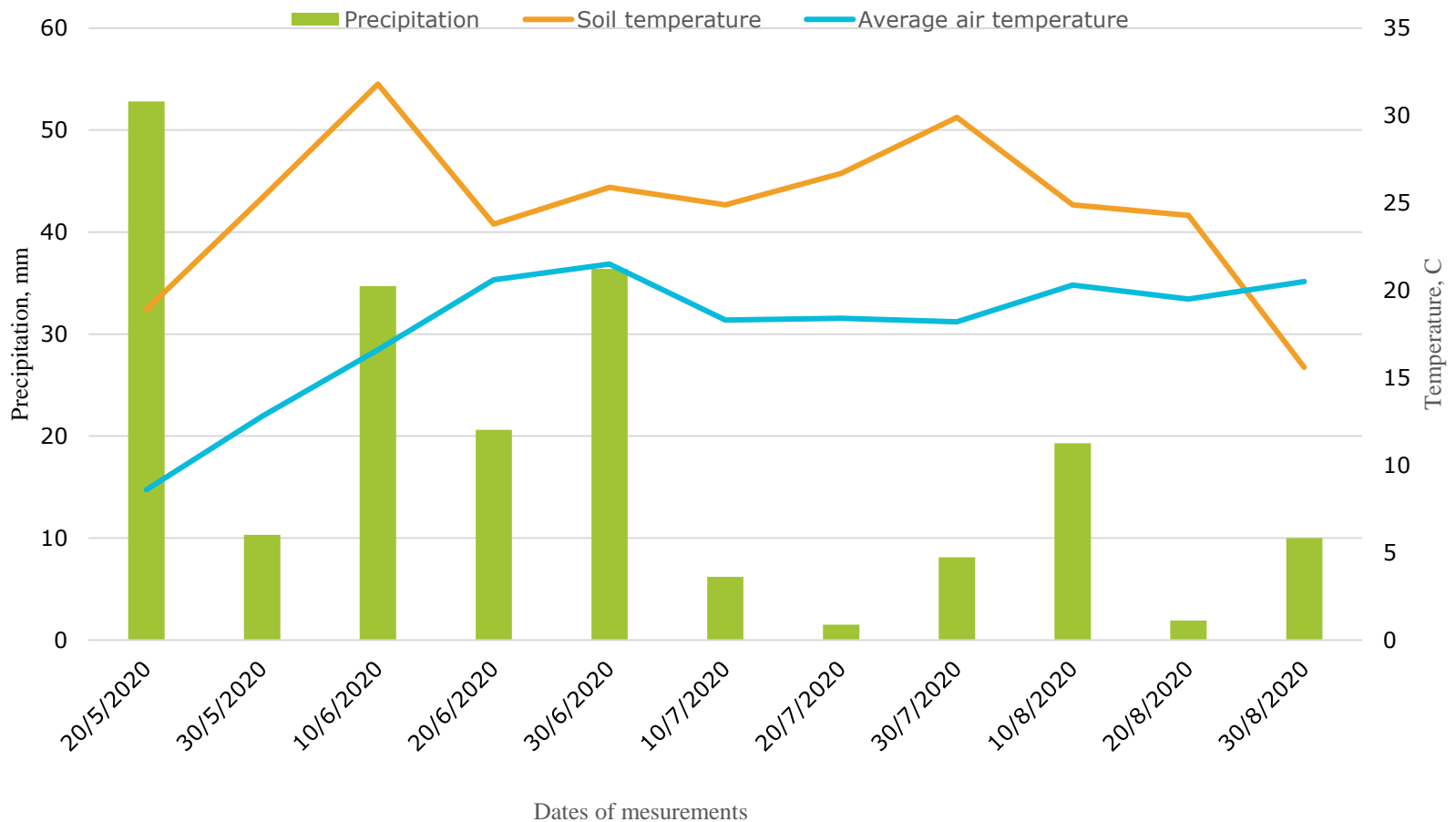
- Soil moisture measurements were performed every 10 days at a depth of 0–20 cm, and soil temperature was also recorded with 3 measurements in each test field. Metrological data of the analyzed period were used from the nearest meteorological station at Alytus.



Results

- In 2020, the amount of precipitation changed during the research. During the whole period observed in 2020, precipitation was 234 mm and in 2nd of May the highest precipitation was recorded - 52.8 mm.
- In this short observed period amount of soil moisture was in the optimal conditions for potato germination. At period 1st and 3rd decades of August felt 34.7 mm and - 21.7 mm of precipitation. Another 6 decades was fixed less than 10 mm of precipitation per decade. During this observed period, 77% of all decades were drier than perennials (DNs).

Dynamic of observing meteorological conditions at Silavotas





2020-5-30 14:00



XIII Международная научно-практическая конференция
2020-6-30 10:43



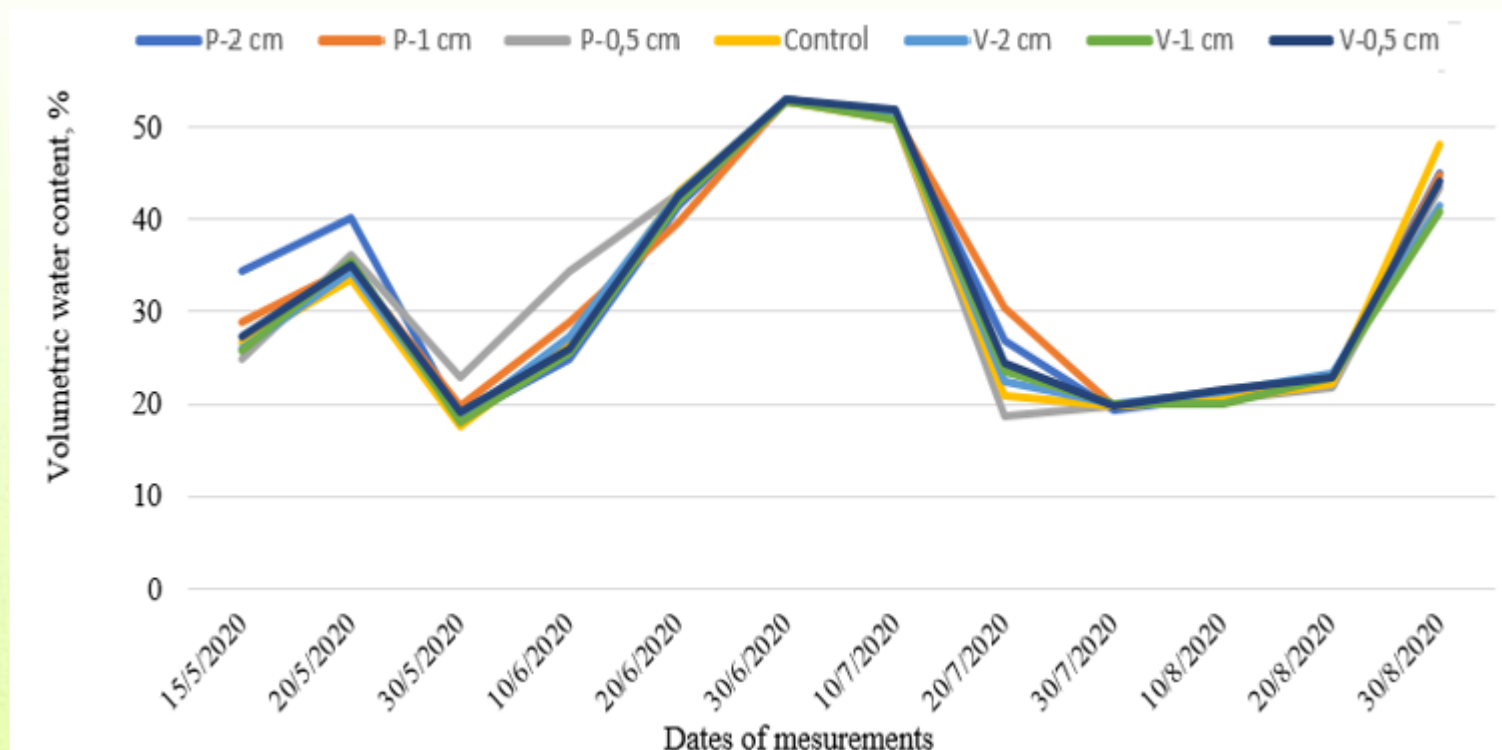
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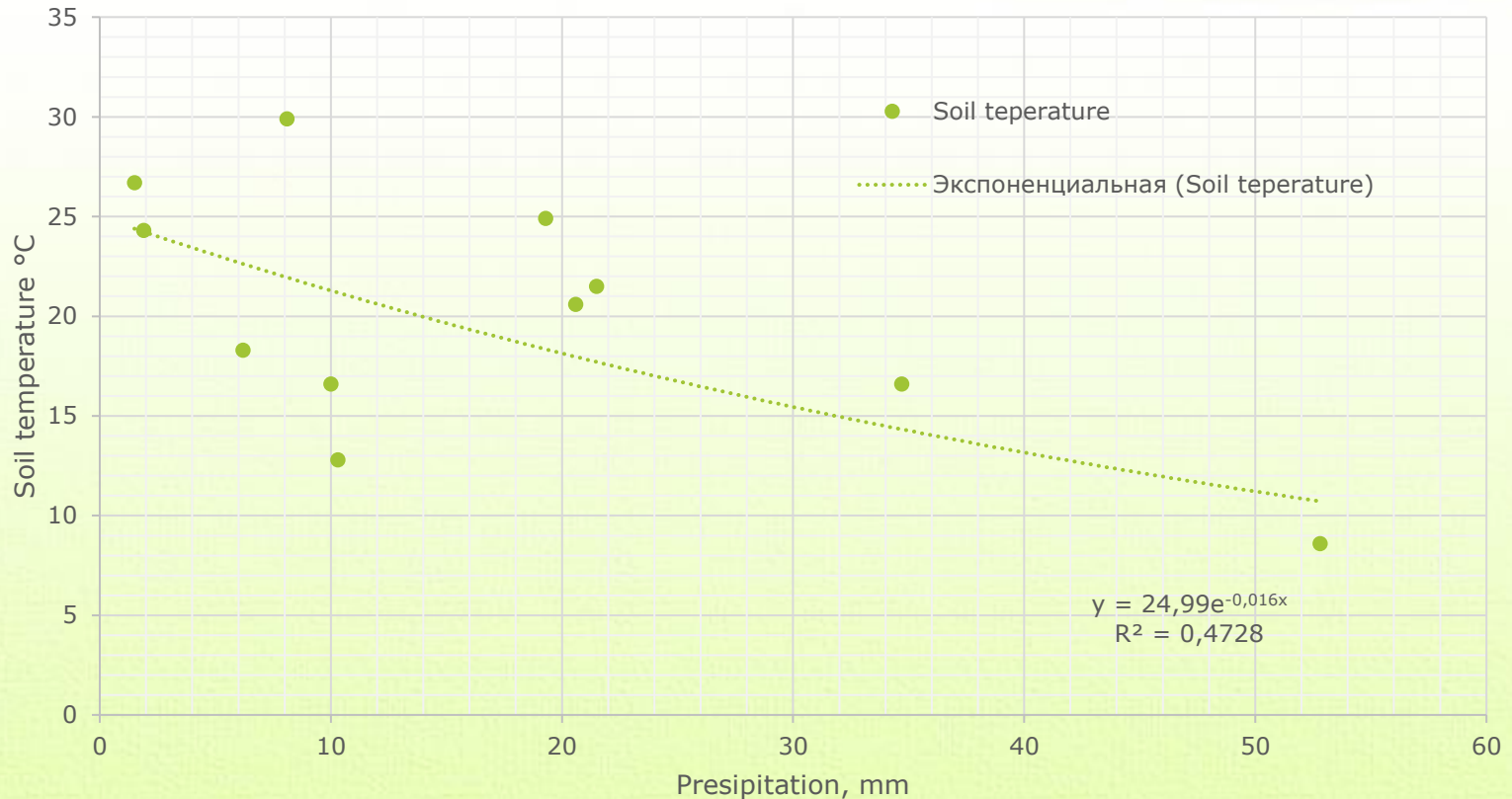
Soil moisture measurements

- Soil moisture measurements were performed at 10-day intervals. Soil moisture dynamics overlap in the same field of study even with different rates of biological additives. However, as might be expected, soil moisture dynamics are mostly influenced by precipitation and air temperature. In experimental fields during the dry period from second decade of July till second decade of August, up to 5% difference in soil moisture dynamics compared to the control fields is observed. The results show that differences between volumetric water content warier from 2.07 % till 3,66 % in experimental fields.

Volumetric soil moisture dynamics in experimental fields



Soil moisture measurements



Conclusions

- In 2020, the amount of precipitation changed during the research. During the whole period observed in 2020, in the study fields it was found that 351.5 mm of precipitation fell during the obser
- The study found that soil temperature correlates with exponential dependence on precipitation (fig. 2). The correlation coefficient $r = 0.69$, and when assessing the relationship between soil temperature and ambient temperature, a linear dependence and coefficient of determination $R = 0.5649$ were found, and the correlation between these two environmental phenomena is very strong at $r = 0.751$.

Thanks for your attention

