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Influence of Relief on Vegetation Factors and Agrotechnical Differentiation Measures in Transylvania Plain

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Transylvanian Plain (TP), with an area of 395.616 hectares, has a special importance for Romanian agriculture being characterized as a region orographically represented by hilly areas hills whereas climatically appears as a plain. Physical-geographical conditions from TP (low level of forestation; climate specific to plains) have resulted in numerous land degradation phenomena: land erosion, landslide, draining of gradient springs and groundwater level. These conditions create a favourable framework for the development of anthropic morphogenetic processes, as well as those triggered by natural mechanisms, thus intensifying the pace and their territorial expansion. Rainfall, through annual distribution and spring-summer pluvial aggressiveness, require the implementation of preservation measures on arable land, particularly for spring cultures. Along with rainfall, more factors are involved: relief, by the high degree of fragmentation and through tilting slopes; vegetation, by the dominance of cultivated plants and by the advanced state of degradation of vegetal grasslands (especially on southern slopes); lithology, by the predominance of loose rocks (sand, marl, sandstone etc.).
In order to determine the influence of landscape morphology on the agro-technical characterization of land, 11 HOBO Micro Stations (H21-002) have been implemented from April to October in the locality Caianu, at various altitudes (311-441 m) at exposure coverage (N, NW, W, S, SE, E, NE). HOBO Smart Temp (S-TMB-M002) temperature sensors and Decagon EC-5 (S-SMC-M005) moisture sensors were connected to HOBO Micro Stations. Additionally, in 4 of the 11 sites, tipping bucket rain gauges (RG3-M) were deployed to measure precipitation. Each station stored electronic data regarding ground temperature at 3 depths (10, 20, 30 cm), humidity at a depth of 10 cm, air temperature (1 m) and precipitation. Data were downloaded from the Micro Stations via a laptop computer using HOBOware Pro Software Version 2.3.0 (On-set Computer Corp., Bourne, MA, USA).
The soil temperature is directly influenced by the positioning of the station on the slope: on the north side (N) at 10 cm was recorded the lowest temperature (15.45°C), followed by the western slope (W) (15.72°C) and then the highest on the Eastern (E) and north-eastern (NE) slopes (on eastern slopes of 17.66°C, on the north-eastern 17.59°C), followed by the southern (S) with 17.28°C. In case of soil humidity, there isn't a direct relationship between slope exhibition and humidity, important fluctuations being recorded even within the same slope, the humidity level being influenced by the land inclination. Thus, on the north-western slope (NW) the highest average humidity of 0.29 m3 has been recorded.
By analyzing the recorded data, one can assess a similar situation of the southern slopes with the south-eastern and eastern slopes- reduced precipitation to 43.8 mm, higher temperatures by 0.37°C in air and 1.9°C at 10 cm with 2.22°C to 20 cm with 2.43°C at 30 cm soil depth, as compared to the northern, north-western and western slopes. These differentiations of vegetation factors completed by those linked with slope require special agro-technical measures generated by TP relief. The slope exposition is particularly important to the correct assessment of land use, to crops included in the rotation and cultivation technology and especially the depth and the seeding period.

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