



DAAD

Deutscher Akademischer Austausch Dienst
German Academic Exchange Service



DNIPRO UNIVERSITY
of TECHNOLOGY
1899

Spatial organization of *Vallonia pulchella* (Muller 1774) in ecological niche in pedozems Nikopol Manganese Ore Basin

A.K. Umerova

Bohdan Khmelnytskyi Melitopol State Pedagogical University, Melitopol, Ukraine

Relevance. Environmental factors affect the distribution of species. The spatial distribution of land-snail species and individuals has been extensively investigated. The vital activity of mollusks is influenced by edaphic factors: circulating organic and mineral substances, humidity gradient. Habitat is characterized by the presence of resources and conditions in a certain area, which allows the species to survive and reproduce.

Aim. Describe the ecological niche of the micromollusk of *Vallonia pulchella* on the artificial soil-like structures such as technozoles (pedozems) from the point of view of the edaphic properties has been grounded.

Material and methods. The study was conducted in June 2019 at a research path within the Nikopol manganese ore basin (on pedozem). The experimental polygon consisted of 105 samples located within 7 transects (15 samples each). The distance between the rows in the polygon is 3 m. The average density of the investigation object is 1.18 specimens/m². Measurement of soil mechanical impedance was carried out in the field using a hand penetrometer Eijkelkamp, to a depth of 50 cm at intervals of 5 cm. The aggregate structure was evaluated by Savinov's dry sieving method.

Results . On the test site is a characteristic monotonic increase in soil penetration resistance with increasing soil depth. In the upper soil layer, soil penetration resistance varies on average in the range of 3.00–4.03 MPa, in the lower varies in the range of 6.19–6.9 MPa. In the test site the average values of soil penetration resistance was greater than the critical value for the growth of plant roots (5.0 MPa), starting with 0–5 cm of soil layers. In the according to penetrometer indicators: 5 MP indicates soil compaction, which counteracts root growth . Also, may be that this soil layer formed by the most appropriate conditions according to the criterion of penetration resistance for the growth of herbaceous plants. Exceeding the limit to the level of soil penetration resistance of plant roots (5 MPa) to was 5.42. The coefficient of variation of this value is significant and amounts to was 16.02%. The analysis aggregate structure indicates that the predominant fraction is 3–5 mm (21.13%) and 1–2 mm (25.77%), they determine the resistance of soils to erosion under the influence of water. Somewhat lower, given the relative proportion, fractions 2–3 mm the other fractions (<0.25 mm; 0.25–0.50 mm and 0.5–1.0 mm. 5–7 mm. 7–10 mm and > 10 mm) are at the level 5.32–7.83%. It was found, that molluscs *V. pulchella* are sensitive to the soil aggregate structure: the highest number – accounted for aggregate fractions of 1–2 mm, in less extend – 0.5–1.0 mm (due to exposure to sunlight and drying mollusc). Observed the stable numbers of *V. pulchella* with growth aggregate fractions (1–2; 2–3; 5-7 mm). On the zonal micromollusk distribution, may be influenced uneven distribution of minerals, root exudates and dendrite.

Conclusions. The result of the research that the sensitivity of the micromollusk to the factors of the environment change in the space. The *Vallonia pulchella* are sensitive to the structure of the soil aggregates: the largest number of them falls on the aggregate fractions of 1–2 mm and 3–5 mm, and the smallest is on 0.5–1.0 mm. Therefore, the number of the micromolluscs depends on the edaphic indicators. This allows studying fully the ecological niche, including not only the position of the species in the space, but also its functional role in the group, which will continue in our future research.

“EcoMining: Development of Integrated PhD Program
for Sustainable Mining & Environmental Activities”

