

DAAD

of forest park planting reconstruction

Holovnia Alevtvna

Oles Gonchar Dnipro National University

Ecological restoration is an important means of managing urban

natural areas with human and ecological values in mind. Urban park

restoration involves significant impacts on soil cover. Soil quality is

a major concern in urban park management, but little is known

about the impact of park reconstruction on soil properties. The

effect of urban park reconstruction on physical soil properties was

investigated. The study was conducted in the recreational area of

the Botanical Garden of the Dnipro National University.

In 2019, a 2.8 ha area of the park was reconstructed (Fig. 1). The

samples were taken within polygons, 2 of which were placed in the

reconstruction area and 2 of which were placed in a similar section

of the park where no reconstruction was performed.

At each measurement point, the soil mechanical resistance was performed

in only one replication. To measure the electrical conductivity of soil in situ the HI 76305, working in conjunction with the portable instrument HI

993310 were used. The soil aggregate fractions size distribution was

determined in accordance with the Soil Sampling and Methods of

Analysis recommendations. Soil moisture was measured under field conditions using a dielectric digital moisture meter MG-44

(vlagomer.com.ua). The core method was used for measurement of the

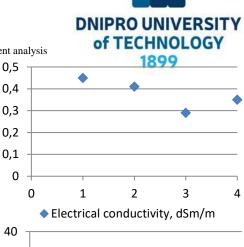
Soil properties measurement

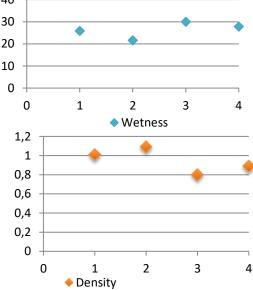
Deutscher Akademischer Austauschdienst German Academic Exchange Service

Descriptive statistics of the soil properties and the result of the principal component analysis

Properties. Polygons mean±st. Ecological structure of soil macrofauna in the assessment of the results 2 3 1 Δ error Soil penetration resistance at a depth of, cm in MPa 0-5 1.79 ± 0.04 1.44 ± 0.05 0.83 ± 0.01 0.99 ± 0.01 5-10 2.45±0.06 1.88 ± 0.07 1.05 ± 0.01 1.2 ± 0.02 10 - 152.77±0.09 2.06 ± 0.10 1.17 ± 0.02 1.21±0.03 15-20 2.73±0.09 1.97±0.09 1.33 ± 0.04 1.19 ± 0.03 20-25 2.43±0.09 1.74 ± 0.08 1.7 ± 0.06 1.27 ± 0.04 25-30 2.25±0.09 1.75 ± 0.06 2.23±0.08 1.46 ± 0.05 30-35 2.31±0.09 2.1 ± 0.07 2.74 ± 0.09 1.99 ± 0.08 35-40 2.83±0.09 2.78 ± 0.08 3.22±0.08 2.58±0.09 40-45 3.45 ± 0.09 3.57±0.08 3.56±0.08 3.28±0.09 45-50 4.04 ± 0.08 4.13±0.08 3.76±0.07 3.79 ± 0.07 50-55 4.33±0.06 4.53±0.06 4 ± 0.07 4.23±0.06 55-60 4.64±0.04 4.77±0.05 4.36±0.05 4.53±0.05 60-65 4.87 ± 0.04 4.91±0.05 4.62 ± 0.05 4.75±0.04 65-70 4.9 ± 0.03 4.99 ± 0.04 4.75±0.04 4.89±0.03 70-75 4.79±0.03 5.01±0.04 5.35±0.05 4.85±0.03 75-80 4.7 ± 0.03 4.88 ± 0.04 5.63±0.06 4.86±0.03 80-85 4.82±0.03 5.67±0.05 4.88 ± 0.03 4.57±0.03 The soil properties were measured at each test point of the 85-90 4.99 ± 0.02 4.53 ± 0.04 4.98 ± 0.02 4.15±0.03 polygons. The soil mechanical resistance was measured in the field using 90–95 4.78±0.02 3.95±0.03 4.64 ± 0.04 5.02 ± 0.02 the Eijkelkamp manual penetrometer, to a depth of 100 cm at 5 cm 95-100 4.23±0.03 3.95±0.03 4.79 ± 0.04 5.10 ± 0.03 intervals. The average error of the measurement results of the device is \pm 8%. Measurements were made with a cone with a cross section of 1 cm2.

Aggregate fraction, in %				
	1	2	3	4
>10 mm	0.06 ± 0.003	0.05±0.002	0.13±0.006	0.07 ± 0.003
7–10 mm	0.24 ± 0.009	0.21±0.01	0.47 ± 0.02	0.25±0.01
5–7 mm	0.31±0.01	0.46±0.02	0.67 ± 0.02	0.37 ± 0.02
3–5 mm	7.65±0.18	8.74±0.37	13.03±0.34	8.52±0.25
2–3 mm	17.84 ± 0.29	17.94±0.41	20.48±0.45	19.94±0.42
1–2 mm	24.08 ± 0.50	24.72±0.52	27.25±0.43	30.05±0.52
0.5–1 mm	16.64±0.34	18.53±0.53	19.19±0.50	20.05±0.43
0.25–0.5 mm	12.24±0.23	12.27±0.28	9.72±0.25	10.17±0.25
<0.25 mm	21.00±0.76	16.54±0.58	8.82±0.35	10.23±0.47





Conclusion

soil bulk density.

As a result of the technological processes that are carried out during the reconstruction process, soil compactness increases to a considerable depth and the aggregate structure of the soil is disturbed. The thinning of the stand and the destruction of the shrub undergrowth greatly alter the microclimatic regime in the city park and increase the risks of excessive evaporation of moisture from the soil surface. These changes can have negative consequences for the ecological services performed by the soil. Therefore, measures to remediate the physical properties of the soil should be an obligatory element of the reconstruction of urban parks.

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

