

**CHANGES IN THE PHYSICAL PROPERTIES OF SOILS OF THE ROSTOV ZOO UNDER THE
IMPACT OF ANIMALS**

K. Sh. Kazeev¹, A. V. Zhadobin², A. A. Gobarova^{1, 2}, A. N. Fedorenko¹, S. I. Kolesnikov¹

¹*Southern Federal University*

194/1, Stachki prosp., Rostov-on-Don, 344006, Russia;

²*Rostov-on-Don Zoo*

3, Zoologicheskaya St., Rostov-on-Don, 344039, Russia

**E-mail: kamil_kazeev@mail.ru*

As a result of long-term studies, a significant impact of zoo animals on the physical properties of soil in 18 enclosures with various birds, ungulates, proboscis and carnivores has been revealed. Degradation of the soil and vegetation cover due to animal overcrowding within a limited area for decades was recorded in most of the enclosures. As a result, soil bulk density and penetration resistance increased, and its structure deteriorated. The degree of degradation of the zoo soil cover depended on the size of enclosures and the level of exposure to the animals. In enclosures with high animal load (zebras, deer, buffaloes), expressed as a ratio of animal weight to aviary area (0.3–5.5 kg m⁻²), more significant changes in the studied soil parameters were noted compared to enclosures with birds (0.02–0.08 kg m⁻²). The influence of animals hoof structure and animal activity on the soil physical properties within the enclosures was also noted. The direct impact of animals particularly affects the surface layer of the soil, where the penetration resistance can reach 7.3 MPa, which is more than 5 times higher than the values typical for the soil of the control area of the zoo park zone. Already at a depth of 20 cm, the differences in most of the cases do not exceed 20–30%, and in the middle part of the soil profiles (at a depth of 50 cm) the studied properties of the soils do not differ significantly.

Keywords: chernozems, soil degradation, animal enclosures, mechanical stability of soils, penetration resistance, bulk density.