A Brief Analysis of the Soil Cover of the Upper Alpine Belt of the Northern Part of the Central and Eastern Caucasus

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ABSTRACT

The soils of the study area occupy the highlands of the northern macro slope of the Greater Caucasus from the upper rivers Kuma and Malka to the right bank of the Samur river basin. Characteristic elements are systems of volcanic and chest ridges and interquest depressions. In the southern part, the quest ridges are separated from the axial part of the Greater Caucasus by an extensive North Jurassic depression with elevations of 2000-2300 m above sea level. The conditional border between the Central and Eastern Caucasus runs along the volcanic massif Kazbek (Efremov et al., 2001). The highest absolute heights (over 5000 m above sea level) are observed in the Central Caucasus, which is composed of ancient crystalline rocks - granites, gneisses, crystalline schists. In this territory, modern glaciation and mountain-ice relief forms are most developed, glacial circuses, caravan lakes, moraine piles, steep ledges are often found. Elbrus and Kazbek have volcanic flows and are surrounded by lava plateaus (Gvozdetsky, 1963).

The highest point of the Eastern Caucasus is the peak of Tebulos-Mta (4494 m), glaciation is less developed here than in the Central Caucasus (Efremov et al., 2007). This part is composed mainly of sandstones and shales of the Jurassic period, all relief forms are significantly smoothed by the processes of erosion and weathering, landslides and taluses are highly developed. Most of the massifs of Dagestan are composed of Jurassic and partially Cretaceous deposits, and its northern part is limestone, with plateau-like peaks, gentle northern and steep southern slopes, deep canyons and gorges (Gvozdetsky, 1963). The highest point of the Eastern Caucasus is the peak of Tebulos-Mta (4494 m), glaciation is less developed here than in the Central Caucasus (Efremov et al., 2007). This part is composed mainly of sandstones and shales of the Jurassic period, all relief forms are significantly smoothed by the processes of erosion and weathering, landslides and taluses are highly developed. Most of the massifs of Dagestan are composed of Jurassic and partially Cretaceous deposits, and its northern part is limestone, with plateau-like peaks, gentle northern and steep southern slopes, deep canyons and gorges (Gvozdetsky, 1963).In the mountains, the distribution of soil types is subject to the general law of vertical zonality, as well as to topography as a factor in soil formation. The exposure of the slope determines the basic properties of soils and vegetation, and therefore has a primary influence on the formation of zonal features; factors due to altitudinal zonality only slightly modify them. The different orientation of the slopes determines the exposure differentiation of soils (Molchanov, 1989).

In the system of soil zoning, the studied territory belongs to the Zone of mixed zonality, which is characterized by various factors in soil formation: in the lower part of the mountains, humidification plays a role, and in the upper part, thermal factors. The height interval of this zone is from 2300 to 3100 m above sea level, the humidification coefficient is 2-3. A feature of mountain meadow soils is the fact that in the spring-summer period the soils warm up, and in the winter they do not freeze or freeze shallow under heavy snow cover. Therefore, in fact, in these soils biochemical processes occur throughout the year. Peculiarities

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of soil formation on skeletal weathering crusts in high mountains are good drainage of the soil thickness, accompanied by a high surface runoff, which contributes to the removal of readily soluble soil formation products beyond the soil profile (Valkov et al., 2004).

According to T.F. Urushadze (1989), the soil cover of the subnival belt, is represented by two varieties of soils: mountain meadow primitive with a profile characterized by the following composition: AC – CD – D under the complex of subnival microgroups, and mountain meadow soils, where the profile is compiled A1Ad – A1 –AB – CD under fragments of an alpine carpet. Mountain meadow primitive soils have a slightly acid reaction (pH 5.5-6.8), which tends to decrease with depth. The humus content is very small: in the upper horizon, 0.4–08%. According to the mechanical composition, the soils under consideration are loamy or light loamy. On the above-indicated relief forms and in depressions, mountain meadow soils of considerable thickness are formed under fragments of alpine carpets.

It should be noted that the distribution of plant groups and their development are affected not only by air temperature and precipitation, but also by the microclimate of the soil environment, however, this problem remains unexplored. It is very characteristic that in the subnival strip there is no typical soil cover (Zakharov, 1931; Zonn, 1940). Here there are processes of intense physical and glacial-nival weathering, accumulation of eluvial-deluvial deposits, on which mountain meadow soils begin to develop.

Thus, it is very characteristic that in the subnival strip a typical soil cover is absent (Zakharov, 1931; Zonn, 1940). Here there are processes of intense physical and glacial-nival weathering, accumulation of eluvial-deluvial deposits, on which mountain meadow soils begin to develop.

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