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COMPOSITION AND MOVEMENT OF WATER IN SOIL

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Abstract:
The types of this soil, physical properties of the soil, soil layers and thickness, soil composition, water in the soil and its composition and movement are given.

Keywords: Soil, soil composition, layer, water, sand, compaction, osmotic pressure.
The composition and movement of water in the soil is closely related to the type and composition of the soil. The physical properties of different types of soils show dramatic differences. Sand with a thickness of 1 mm can be found in scattered areas of the soil. But although this layer makes up a very small part of the soil surface, it is important in the conduction channels between the layers. In another layer, a clay pencil with a thickness of 2 mm is observed. Although this layer occupies a significantly larger surface area, it plays a lesser role in the organic communication channels between the layers. The granularity created by mixing the soil with organic matter such as humus (substance resulting from the decomposition of organic matter) with a layer of clay slightly improves the processes of water circulation and air aeration in the soil. When the soil is irrigated by heavy rain or strong water flow, the accumulated water moves down between the layers under the influence of gravity, and a certain part is held between the layers due to the air between these channels. Water in the soil can be attached to the surfaces between its layers or accumulate in interlayer spaces. In sandy soils, the interlayer spaces are relatively large, through which water can flow, and the water contained in the soil can only be

stored in a viscous state on the surfaces of the layers. Clay soils have few channels, so water does not form free streams and occurs in a slightly compacted state. Water-retaining soils are sources of moisture storage. These springs retain the necessary moisture when the soil is wet with water and allow excess water to drain freely. Clay soils or soils rich in humus retain a large amount of moisture. After several days of saturation, these layers hold up to 40% of water. Sandy layers hold only 3% water after several days of saturation. In the following sections, we will look at how water is absorbed by plants through the roots, soil water movement, and how reverse soil water pressure changes the soil water regime. Like plant water potential, soil water potential is based on two main elements, osmotic and hydrostatic pressures. The osmotic pressure of water in the soil (section 3) is almost very low, depending on the amount of dissolved substances in it, it can be up to 0.02 MPa. Depending on the amount of salts in the soil, the pressure in the soil is 0.2 MPa or less. The next factor of soil water regime is hydrostatic pressure. In wet soils, the Rn indicator is close to zero. As a result of soil drying, Rn may drop to the level of the indicator. The question arises, how does the reverse pressure of water in the soil appear? We discussed the phenomenon of capillarity in Section 3. Water has a high surface viscosity, which tends to keep the air-water interface to a minimum. As a result of soil drying, water is first separated from large parts of the soil. Under the influence of adhesive forces, water is retained in small parts of the soil, and water-air interfaces appear over a large part of the soil surface. As a result of the decrease in the amount of water in the soil, water moves towards the hollow parts of the soil. The air-water surface is formed as a result of the interconnection of air-water parts. The back pressure effect of water between these surface layers increases. This can be calculated using the following formula. The Rn indicator of water in the soil is directly related to the water surface in the air layer, and can be very small or the opposite indicator in dry soils. For example, if the water retention surface (g) is 1 mm, its back pressure effect is Rn=- 0.15 MPa. as a result, it can vary from -1MPa to -2 MPa. Water flows through soil layers. Water moves through soil layers under the influence of gradient pressure, creating flow directions. In addition, the diffusion of water vapor is also the movement of water. As a result of plants absorbing water from the soil, dehydration occurs in the parts of the soil near the plant roots.

This dehydration lowers the Rn value of the soil around the root and creates a pressure gradient between adjacent, high-Rn soil areas. Due to the filled water, there

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is an organic connection between the soil cavities, and through these channels, under the influence of gradient pressure, water moves towards the root surfaces in the form of a stream. The speed of movement of water in the soil depends on two factors: the pressure gradient indicator and the hydraulic conductivity of the soil. The moisture permeability of the soil is considered as an indicator of its volume and depends on the movement of water through the soil, which changes depending on the composition of the soil and water. Sandy soils have high hydraulic conductivity because their fine particles can form large voids, while clay soils have significantly lower hydraulic conductivity because of the small amount of voids between particles. When the amount of water in the soil changes, its hydraulic conductivity immediately decreases. The reduction of this indicator is caused primarily by the exchange of water and air between the layers. As a result of the exchange of places between air layers and previously accumulated water, the movement of water is limited by networks of channels. As the exchange of soil permeability channels with air increases, water begins to move through smaller channels and hydraulic conductivity decreases. Water potential may decrease in very dry soils.

This led to permanent drought. At this time, due to the lack of water potential, plants stop developing. This means that the plant water potential (¥u>) is less than or equal to the plant osmotic potential (¥8). Since it is a plant cell, continuous processes of water exchange are not considered a characteristic of soil.

This process directly depends on the types of plants and other factors. Absorption of water through the roots. Strong surface bonds between roots and soil play an important role in increasing the efficiency of water uptake by roots. In return for root and root shoot growth, this attachment provides a highly absorbent surface to increase water absorption capacity. Root buds are formed by the expansion of root epidermal cells. They significantly increase the root surface and ensure maximum absorption of water ions from the soil. When we observed the development of a buckwheat plant for 4 months, it was observed that the total surface of its root buds is 60% of the root surface. Water easily moves through the roots to the roots. Large parts of the root have an outer protective layer called exodermis and epidermis, these layers are hydrophobic (water impermeable) and almost impossible to absorb water from their walls.

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Conclusion:

As a result of soil damage, the strong bonds between the root surface and the soil are easily broken. Therefore, it is necessary to protect newly transplanted seedlings from water loss in the first days. With the emergence of root-soil contact in the new soil environment, resistance of plants to water loss stress increases. We will now consider the movement of water in the root and the factors that determine the rate of water absorption by the root. Water passes through many intermediate environments as it moves from soil through plants to the atmosphere.

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