

Sándor ARANY

(1899–1984)

Chemical engineer, the Doctor of Agricultural Sciences, expert of the salt-affected soils, Kossuth prize and Governmental awarded professor. „Doctor Honoris Causa” on the Debrecen University of Agriculture Many of methods and quality indexes were worked out by him, for example such as the method for examine the plasticity of soils: upper limit of plasticity according to Arany, K_A .



Prof. Dr. Sándor Arany was born on 4th March 1899 in Mezőtúr (Hungary). He graduated from the University of Technical Sciences (Budapest) as chemical engineer in 1923 and began his work at the Agricultural Chemical Research Laboratory of Debrecen as food industry engineer. The Research Division of the Ministry of Agriculture entrusted him with the study of the Hortobágy soils. For the successful completion of the work, he joined the Department of 'Sigmond at the University of Technical Sciences (Budapest), where he obtained his doctor's degree in 1926. He continued his studies on the features of sodic soils in the USA at the Agricultural Research Station of the Berkeley University, as a guest researcher of W. P. Kelley.

He spent a year at the University of Bonn with H. Kappen in 1927, where he familiarized himself with the development of soil acidity and the methods of acidic soil amelioration. He published his results with E. 'Sigmond, S. Herke and W. P. Kelly. Returning to Debrecen, in 1932 he was appointed Head of the Chemistry Department of the Debrecen Academy of Economics. As a result of his hard work, the soil science and agricultural chemistry education of the institution was raised to a higher level. He taught soil science also at the István Tisza University in Debrecen as a honorary lecturer and from 1941 as a titular associate professor.

Following Hungary's Liberation in 1945 he organized the Soil Laboratory of the Soil Amelioration Company of the Trans-Tisza Region. When the National Institute for Agricultural Quality Testing was established, he became Head of the Soil Science Department in Debrecen. At this time he received the Doctor of Agricultural Sciences degree (DSc).

The above-mentioned steps in his scientific career all determined his further work and the basic areas of professional interest. His achievements in the study of salinisation/sodification processes, the reclamation and agricultural utilization of salt-affected soils made him well-known and brought world-wide recognition for Hungarian soil science.

The Ministry of Agriculture charged the Institute of Geology with the collection and survey of salt-affected soils in the Great Hungarian Plain and with the analyses of the collected soil samples. In the sampling procedure emphasis was laid on the principles that were applied by E. 'Sigmond during the map construction of sodic samples by the Duna-Tisza channel and by S. Arany in the Hortobágy region.

On the basis of the detailed soil sampling in Hortobágy he proved in 1926 that harmful salts can be eluviated by irrigation and drainage; and poorer quality parts of soil can be upgraded by applying an appropriate quantity of lime. In his monography on salt-affected soils of the Hortobágy he establishes that „the quality and agricultural use of salt-affected soils are determined by the quality and quantity of harmful salts, the depth of their occurrence beneath the soil surface, and by their movement downward or out of the soil as a consequence transportation due to the eluvating effect of precipitation.”



Hortobágy



Spreading of beat potash (Hortobágy)

He concluded from his research results that those sodic parts of the Hortobágy where the upper layers show a lack of lime owing to eluvation could be upgraded by materials containing carbonic lime (ground carbonate lime, beet potash, and liming land).

Professor Arany investigated the chemical processes of soil reclamation made by beet potash minutely. In his studies on the lime and Mg content of salt-affected soils he rendered it probable that in some cases alkaliation is accompanied by the increase in Mg. According to his opinion the Ca/Mg ratio moves toward Ca in upgraded sodic soils and strongly acidic soils need not be improved neither by limestone rich in Mg nor by magnesia.

Many of his findings were in advance of his time and have not lost their topicality. Several methods and the quality index – which are still used at present in the examination and characterization of salt-affected soils – are connected to his name, such as the method for examining the plasticity of soils (upper limit of plasticity according to Arany, K_A), Na% and Mg ratio for describing the soluble salts of soils, sedimentation procedure for deterring the ameliorant requirement, sodicity rate.

With the introduction of irrigation his focus was directed on studying processes in irrigated soils and their practical consequences. He took part in the soil scientific research prior to the establishment of the Tiszalök irrigation system, and elaborated a method for the chemical improvement of irrigation water with high sodium content. In addition to his research and teaching activities, he played a decisive role in international scientific circles. From 1926 he acted as secretary of the Subcommittee on Salt-affected Soils of the International Soil Science Society He was one of the organizers of the meeting of the Subcommittee on Salt-Affected Soils held in Budapest in 1929 and he also delivered a lecture. He participated in the 6th Congress of the International Soil Science Society in Paris in 1956. In the 1950's he was member of the Scientific Council of the Ministry of Agriculture, and president of the Soil Reclamation Thematic Group. For his achievements Prof. Arany was awarded the „Kossuth Prize” in 1958 and a Governmental Award in 1962, and he received the Treitz Medal. He was conferred the title „Doctor Honoris Causa” by the Debrecen University of Agriculture.



Plant extinction, soil surface cracking on salt-affected spot (vicinity of Szeged)

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