

Biographical sketch

Alvin Lloyd (Mox) Moxon (1909–2007)

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Alvin Lloyd (Mox) Moxon was born July 25, 1909, in Flandreau, SD, and died May 21, 2007, in Wooster, OH, at the age of 97. He was the first of six sons born to Ada and George H. Moxon. His father ran a stock farm, growing corn, primarily for silage, along with oats and alfalfa, all of which were used as feed. Mox completed grade school in 1924, and shortly thereafter his family moved to a farm near Brookings, SD, and established the Moxon Dairy. He did not attend high school, but rather attended the School of Agriculture at South Dakota State College, graduating in the spring of 1929. Many of the courses were taught by professors from the college, and Mox became very interested in chemistry from one of these teachers. When he entered South Dakota State College in the fall of 1929, he informed the

dean of agriculture that he would like to graduate in agriculture with a major in chemistry. Although they did not offer such a degree, the dean took the request under advisement, and in January of 1930, called Mox into his office and told him they were starting a new department to be called Experiment Station Chemistry. They had hired a new faculty member to head this department, K. W. Franke, who would need help in the lab and wondered if Mox would like the job.

At this time, K. W. Franke, along with colleagues at several USDA labs, undertook a cooperative field study on “alkali disease.” This condition was so named by the early settlers who believed that the alkali (high salt) content of the water in semiarid areas caused the disease. However, the disease occurred when animals were fed grain and plants from specific areas of western South Dakota. In general, it is a chronic condition characterized by emaciation, loss of hair and hoofs, and sometimes death of livestock. In poultry, the disease impairs egg hatchability and causes deformation of embryos. In 1931, government labs reported the presence of selenium in several soil samples from South Dakota, and they were able to reproduce symptoms of the disease by adding selenium to the grain. Subsequent studies in the lab at South Dakota, at various bureaus of the USDA in Washington, and at the University of Wyoming established a definite relationship between plants containing selenium and alkali disease. After graduation in June 1934 with a BS degree in agricultural chemistry, Mox was offered the position of chemist-analyst and subsequently made substantial contributions to the alkali disease project. K. W. Franke died of undulant fever in 1936, and Mox was appointed acting department head of Experiment Station Chemistry.

After Mox took over as department head, one of his first assignments in the spring of 1937 was to write a bulletin summarizing all of the work done at South Dakota on alkali disease. The resulting publication, South Dakota Agricultural Experiment Station Bulletin 311 (May 1937), *Alkali Disease or Selenium Poisoning*, is a historical benchmark in the field. Mox was awarded his MS degree in chemistry and toxicology in June 1937. The main focus of his work at this point was analysis of soils and geological formations for selenium to determine just where the selenium was located in the

state. This resulted in a second important publication, South Dakota Agricultural Experiment Station Technical Bulletin 2 (May 1939), *Selenium In Rocks, Soils and Plants*, by Moxon, Olson, and Searight. This work resulted in a review article in *Physiological Reviews* by Moxon and Rhian in 1943 (vol. 23, pp. 305–337).

Mox and Nannette Harker were married June 11, 1938. That fall he began classwork towards his PhD in agricultural biochemistry at the University of Wisconsin. His research, planned in conjunction with his major professor, C. A. Elvehjem, was carried out in his lab at South Dakota. The work included studies showing that linseed oil meals or low levels of arsenic would both prevent selenium poisoning. After completion of his PhD in June 1941, he was named head of the Agricultural Experiment Station Chemistry Department. Shortly thereafter, a son, James, was born. He was subsequently promoted to the rank of professor of chemistry at South Dakota State College in 1946.

In the period from 1937 through 1951, Mox continued research studies on the toxic role of selenium, its availability, metabolism, and geological and geographical distribution. He also carried out research studies on nitrate poisoning, vitamin A nutrition, and mineral metabolism.

In 1951, Mox accepted the position of professor and associate chairman of the Animal Science Department of the Ohio Agricultural Experiment Station in Wooster, Ohio. He was also appointed as professor of both animal science and agricultural biochemistry at Ohio State University. Besides his administrative duties, he was responsible for guiding the research program of the department as well as his own work in the area of evaluating forage quality.

Mox became involved in international animal agriculture in 1960, spending six months at the Agricultural College of Ludhiana in Punjab, India. In 1964, he accepted the position of Assistant Chief of Party and Professor of Animal Nutrition at the College of Agriculture in Piracicaba, Brazil (University of São Paulo). He returned to the department in 1966, but only briefly, going back to Brazil in 1967 for four more years as chief of party.

Upon his return in 1971, several faculty approached Mox for help with the selenium analysis of feedstuffs, blood, and body tissues. In his early studies with chicks he had noted that trace amounts of selenium improved animal growth; however, this had gone unnoticed for

years. Now it was being recognized that selenium was essential in very low amounts and that certain areas of the United States were deficient in selenium. This work clearly demonstrated that exogenous selenium is required in many areas, and led to the establishment of the requirements in various animal species and eventually to approval by FDA to add selenium to livestock rations. Without question, A. L. Moxon was a true pioneer in understanding the toxicity and essentiality of selenium in feedstuffs.

Although Mox retired in 1979, he was not quite ready to quit. In 1982 he returned to Brazil and helped set up a program to evaluate the selenium status of 80 dairy herds in São Paulo state.

Beginning with his first appointment as chemist-analyst in 1934, Mox authored or co-authored 195 scientific publications, two reviews, and four book chapters. At least 75 of the scientific publications are on selenium, and 53 deal with the composition of food and animal feeds. His work has been published in 40 peer-reviewed scientific journals, with the greatest number (30) being in the *Journal of Animal Science*. In his career, Mox conducted experiments with dogs, turkeys, chickens, rats, beef cattle, dairy cattle, hogs, deer, water buffalo, and sheep. Mox served as major adviser for three MS and four PhD students. Honors for Mox included his election as a Fellow of the American Association for the Advancement of Science in 1937; Service Award, College of Agriculture, University of São Paulo, Piracicaba, Brazil, 1966; Fellow of the American Society of Animal Science in 1975; Service Award, College of Veterinary Medicine, University of São Paulo, Pirassununga, Brazil, 1982; Fellow of the American Institute of Nutrition, 1985; and American Society of Animal Science Award in International Animal Agriculture, 1991. He also was active in many professional societies, which included the American Association for the Advancement of Science, the American Chemical Society, the American Institute of Nutrition, the American Society of Animal Science, the American Society of Biological Chemists, Gamma Sigma Delta, the New York Academy of Sciences, and Sigma Xi. Mox also made a large contribution to the education and development of numerous individuals, many of whom have had highly successful careers in agricultural biochemistry and animal nutrition.

He was preceded in death by his wife Nan and five brothers. Surviving are his son, two grandchildren, and three great grandchildren.