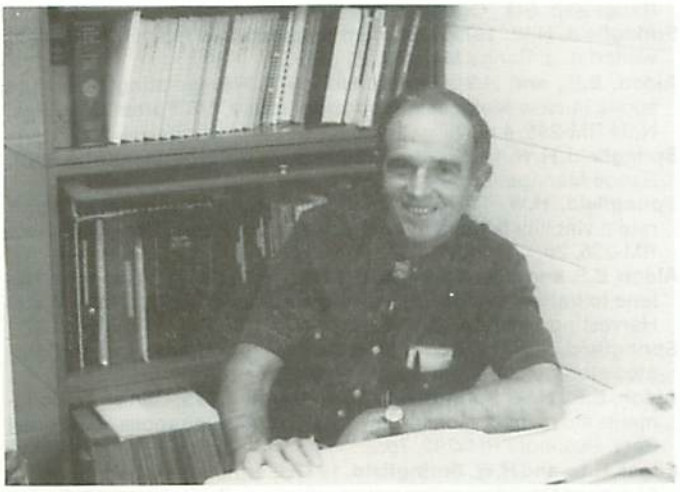
Reprinted from *Rangelands*
Vol. 9, No. 4, August, 1987

687

H. Wayne Springfield—Southwestern Range Ecologist

Jerry R. Cox, Thomas N. Johnsen Jr., and Howard L. Morton

H. Wayne Springfield, a U.S. Forest Service rangeland researcher, retired with 30 years of service in 1977. During a 30-year career in range research he published 79 scientific and popular articles. Typical examples of his significant contributions are determining how to plant, establish and manage crested wheatgrass, germination requirements for shrubs, and methods for establishing forage species on mine spoils. He is not well known within the Society for Range Management, but much of our current research is based on his work.



After completing a B.S. in biology at the University of New Mexico, H. Wayne Springfield intended to begin medical school in the fall of 1942; however, World War II interrupted his plans. After the war Springfield was stationed at Biarritz, France, where he attended the American University and enrolled in an introductory course in range management taught by John Fenley, a range ecologist from Nevada and brother-in-law of Ken Parker, a pioneer in semidesert grassland research.

Stimulated by Fenley, Springfield enrolled at Colorado State University, completing undergraduate course work in 1946. He then enrolled at the University of Arizona and received a Master of Science in botany and range ecology in 1949. While continuing to work as a scientist for the Forest Service, he enrolled at Texas A&M in 1950 and completed requirements for a Ph.D. in range management at Texas A&M in 1959.

Springfield began his research career with the Forest Service in New Mexico during 1947. His first assignment was to plant introduced and native grasses at high elevation pine forest-range sites, and determine which grasses would emerge and persist. He found that crested wheatgrass was easy to establish, was widely adapted, and that herbage production was influenced by winter and spring precipitation. Additional studies showed that crested wheatgrass should be planted between June and November. Springfield then determined the practical effect of row spacing on competition, vigor, and production of crested wheatgrass. He found that 10 lbs/acre of crested wheatgrass seed planted in 8-inch rows produced a viable stand if 1 plant per 12 inches of row space survived.

Springfield seeded crested wheatgrass and native grasses in combination, and began grazing studies to determine proper use based on weight gains of cattle and sheep. These studies illustrated the need to consider plant palatability when designing a seed mix for rangeland planting. A general conclusion was that livestock distribution might be improved by seeding highly preferred grasses on areas which receive light use, and by seeding less preferred species on heavily used areas, such as those near water. Daily cattle and sheep gains were greatest on lightly used crested wheatgrass pastures when grazing occurred in late spring and summer.

Springfield found that crested wheatgrass herbage production was more dependent on winter and spring precipitation rather than livestock use, if herbage removal did not exceed 70%. Herbage removal was determined by ocular estimate, actual weight, and the grazed plant method to determine which method was most reliable and easiest to use in the field. The grazed plant method was selected as a dependable and quick technique.

In 1963, Springfield initiated a 10-year study to identify problems associated with field germination of shrubs. Research efforts were concentrated on fourwing saltbush and winter fat because of their wide range of adaptability, relatively high nutritive quality, and value to both wildlife and livestock. Results showed that seed viability and germination of both species were dependent on collection year, time of collection among years, seed size, soil type, moisture stress, temperature, cold storage, and planting depth.

Direct transplant studies were used to complement germination studies. Springfield transplanted hundreds of plants of more than 30 species of shrubs at 10 field locations to determine site-adaptability characteristics. Springfield states: "Just planting seed and keeping records of what happened was not a true test of adaptability." By using transplants Springfield bypassed failures associated with climate and soils that often are responsible for a plant being classified as "non-adapted."

Springfield conducted revegetation trials on mine spoils and found that seeding success depended on precipitation and evaporation rates. Paraffin and polyethylene catchments increased soil moisture in the root zone by 20 percent even if less than 0.3 inch of precipitation was recorded. Additions of organic materials (sawdust, manure, straw and

Authors are range scientist, research agronomist, and supervisory plant physiologist, respectively, U.S. Department of Agriculture, Agricultural Research Service, Aridland Watershed Management Research Unit, 2000 East Allen Road, Tucson, Arizona 85719.

bark), nitrogen fertilizers, and top soil had little or no effect on the emergence and early growth of shrubs and grasses. However, growth following emergence was improved with all additions.

H. Wayne Springfield currently lives in Sun City, Arizona. In a personal interview he summarized his experience in the following manner: "We were the individuals who conducted research as traveling bands of gypsies, spent nights in the field, and cooked over open camp fires. Results of our studies, even when completely valid, were not always accepted by statisticians." Throughout his career, and often with a limited budget, Springfield was both scientist and technician. His research was conducted in the field, in vacant lots within the city of Albuquerque, and, when needed, at home in a garage. Regardless of the circumstances, Springfield was a dynamic researcher and we hereby recognize his outstanding contributions to Range Science and Management.

Selected References

Springfield, H.W., and H.G. Reynolds. 1951. Grazing preferences of cattle for certain reseeded grasses. J. Range Manage. 4:83-87.

Reynolds, H.G., and H.W. Springfield. 1953. Reseeding southwestern rangelands with crested wheatgrass. USDA Farmer's Bull. 2056, 20 p.

Lavin, F., and H.W. Springfield. 1955. Seeding in the southwestern pine zone for forage improvement and soil protection. Agr. Hdbk. No. 89, 52 p.

Springfield, H.W. 1956. Relation in time of planting to establishment of wheatgrasses in northern New Mexico. US Forest Serv. Rocky Mt. Forest and Range Exp. Sta. Res. Note 24, 9 p.

Springfield, H.W. 1961. The grazed-plant method for judging the utilization of crested wheatgrass. J. Forest. 59:666-670.

Gray, J.R., and H.W. Springfield. 1962. Economics of lambing on crested wheatgrass in North-Central New Mexico. N.M. Agr. Exp. Sta. Bull. 461, 31 p.

Springfield, H.W. 1963. Cattle gains and plant responses from spring grazing on crested wheatgrass in Northern New Mexico. USDA Prod. Res. Rep. 74, 46 p.

Springfield, H.W. 1965. Rate and spacing in seeding crested wheatgrass in New Mexico. US Forest Serv. Res. Note RM-42, 8p.

Springfield, H.W. 1966. Germination of fourwing saltbush seeds at different levels of moisture stress. Agron. J. 58:149-150.

Springfield, H.W. 1966. Effects of 3 years' grazing at different intensities on crested wheatgrass lambing range in northern New Mexico. US Forest Serv. Res. Note RM-65, 7 p.

Springfield, N.W., and E.H. Reid. 1967. Crested wheatgrass for spring grazing in Northern New Mexico. J. Range Mange. 20:406-408.

Springfield, H.W., and D.G. Bell. 1967. Depth to seed fourwing saltbush. J. Ranage Manage. 20:180-182.

Springfield, H.W. 1968. Cold storage not required for fourwing saltbush seeds. J. Range Manage. 21:335-336.

Springfield, H.W. 1968. Cold storage helps winterfat seeds retain viability. J. Range Manage. 21:401-402.

Springfield, H.W. 1968. Germination of winter seeds under different moisture stresses and temperatures. J. Range Manage. 21:314-316.

Springfield, H.W. 1968. Age and year of collection affect germination of winterfat seeds. US Forest Serv. Res. Note RM-112, 2 p.

Springfield, H.W. 1969. Temperatures for germination of fourwing saltbush. J. Range Manage. 22:49-50.

Springfield, H.W. 1970. Germination and establishment of fourwing saltbush in the southwest. US Forest Serv. Res. Rep. RM-55, 48 p.

Springfield, H.W. 1971. Winterfat seedlings emerge best from shallow seeding, moderately dry soil. J. Range Manage. 24:395-397.

Springfield, H.W. 1971. Selection and limitations of mulching materials for stabilizing critical areas. 128-162p. *In:* Critical Area Stabilization Workshop Proc. N.M. Interagency Range Comm. Rep. 7A, 197p. USDA, Agr. Res. Serv. Las Cruces, New Mexico.

Springfield, H.W. 1972. Using mulches to establish woody chenopods. 382-391p. *In:* Wildland shrubs—Their biology and utilization. US Forest Serv. Gen. Tech. Rep. INT-1,494p. Intermt. Forest Range exp. Sta., Ogden, Utah.

Springfield, H.W. 1972. Optimum temperatures for germination of winterfat. J. Range Manage. 25:69-70.

Aldon, E.F., and H.W. Springfield. 1973. Revegetating coal mine spoils in New Mexico: A laboratory study. US Forest Serv. Res. Note RM-245, 4 p.

Springfield, H.W. 1973. Larger seeds of winterfat germinate better. J. Range Manage. 25:69-70.

Springfield, H.W. 1973. Cliffrose and mountain-mahogany seeds retain viability 6 years in cold storage. US Forest Serv. Res. Note RM-236, 2p.

Aldon, E.F. and H.W. Springfield. 1974. Using paraffin and polyethylene to harvest water for growing shrubs. 251-257p. Proc. Water Harvesting Symp. ARS W-22.

Springfield, H.W. 1974. Winterfat seeds viable after 8 years refrigerated storage. J. Range Manage. 27-28p.

Aldon, E.F., H.W. Springfield and G. Garcia. 1975. Can soil amendments aid revegetation of New Mexico coal mine spoils? US Forest Serv. Res. note RM-292, 7p.

Edgar, R.L., and H.W. Springfield. 1977. Germination characteristics of broadscale: a possible saline-alkaline site stabilizer. J. Range Manage. 30:296-298.