Research Application Summaries
Symposium
Cropping Systems in the Great Plains

The following six papers were presented at the Symposium on Cropping Systems in the Great Plains held during the 1994 ASA-CSSA-SSSA annual meetings in Seattle. The program was organized by Division S-6 and cosponsored by Divisions A-4, A-8, C-3, and S-4.

EXECUTIVE SUMMARY

The Great Plains of North America are recognized around the world for their wheat production and their fertile Mollisol soils, which dominate landscapes from Canada to Texas. These same Great Plains also are known for their winter and spring blizzards, seasonal temperature extremes, and the “Dirty Thirties.” Early settlers, who migrated from the eastern USA and northern Europe, started farming in the Plains with techniques suited to their home climates, all of which were much wetter than the climate of their new home on the Plains. Economic instability was a trademark of the region. Climate related disasters, grasshoppers, grain flooded markets, etc., caused wide swings in the economic stability of farming, which resulted in many people abandoning their homesteads. Federal intervention occurred between 1905 and 1910 in the form of new experiment stations and scientists, who were charged with developing farming methods for the Plains. Their major contribution was development of the summer fallowing system to store water for subsequent crops. Both spring and winter wheat fit well into the summer fallow system, and wheat-fallow became the norm. Production and income levels were stabilized, farming became profitable, and agricultural communities had fewer boom and bust cycles.

Weed free fallow is requisite to maximizing the benefits of a fallow period. This meant that farmers needed to till frequently as weeds germinated during the summer portion of the fallow period. Hence large acreages of bare soil were created across the Plains. Erosion by wind and water increased. Pioneer researchers like J.C. Russel and E.L. Duley recognized the possibilities of leaving residue cover on the land to slow erosion, and started developing tillage implements, like sweeps, that would leave the land with more cover even after tillage. Thus stubble mulching was created. The advent of herbicides allowed even further reductions in tillage and more residue cover. However, many of the disadvantages of extended fallow periods still remain. Fallow periods of 14 and 21 mo for winter and spring wheat systems, respectively, where no carbon is added, still result in soil organic matter losses. Furthermore, these wheat systems are a monoculture and grassy weed problems continue to increase.

Scientific results published from 1968 to the present have shown increased likelihood of more continuous cropping if no-till techniques are used. No-till enhances precipitation capture and soil water retention, even in areas once considered too dry for anything but fallow-crop systems. During a discussion of dryland cropping systems, a group of crop and soil scientists from Colorado, Kansas, Nebraska, and Wyoming concluded that a symposium addressing dryland cropping systems issues would provide a useful forum and synthesis opportunity for cropping system issues pertinent to the Great Plains. The following papers resulted from that symposium, and each addresses a facet of how more intensively cropped systems fit into Great Plains agriculture. The consensus of the symposium was that more intensive cropping systems are not only feasible, but adoption is essential for the long-term sustainability of agriculture in the Great Plains.

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