

Effect of Mixed Systems on Crop Productivity

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Songul Senturklu^{1,2*}, Douglas Landblom², Larry Cihacek³, Eric Brevik⁴

(1) Department of Animal Science, Canakkale Onsekiz Mart University, Canakkale, Turkey, (2) Dickinson Research Extension Center, North Dakota State University, Dickinson, North Dakota, USA, (3) Soil Science Department, North Dakota State University, Fargo, North Dakota, USA, (4) Department of Natural Sciences, Dickinson State University, Dickinson, North Dakota, USA

The goals of this non-irrigated research has been to determine the effect of mixed systems integration on crop, soil, and beef cattle production in the northern Great Plains (NGP) region of the United States. Over a 5-year period, growing spring wheat (HRSW-C) continuously year after year was compared to a 5-year crop rotation that included spring wheat (HRSW-R), cover crop (dual crop consisting of winter triticale/hairy vetch seeded in the fall and harvested for hay followed by a 7-species cover crop that was seeded in June after hay harvest), forage corn, field pea/barley, and sunflower. Control 5-year HRSW yield was 2690 kg/ha compared to 2757 kg/ha for HRSW grown in rotation. Available soil nitrogen (N) is often the most important limitation for crop production. Expensive fertilizer inputs were reduced in this

study due to the mixed system's complementarity in which the rotation system that included beef cattle grazing sustained N availability and increased nutrient cycling, which had a positive effect on all crops grown in the rotation. Growing HRSW continuously requires less intensive management and in this research was 14.5% less profitable. Whereas, when crop management increased and complementing crops were grown in rotation to produce crops and provide feed for grazing livestock, soil nutrient cycling improved. Increased nutrient cycling increased crop rotation yields and yearling beef cattle steers that grazing annual forages in the rotation gain more body weight than similar steers grazing NGP native range. Results of this long-term research will be presented in a PICO format for participant discussion.