Effect of Cropping Sequence on Agricultural Crops: Implications for Productivity and Utilization of Natural Resources

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Abstract

Offensive land uses system with continuous growing of similar crops on the same land largely affect soil physical condition, crop development and had big concerns on long term adverse effects of environmental pollution. The choice of sequence highly based on agricultural system, finance and environmental condition. Conventional monoculture agricultural systems can reduce the soil organic matter contents and structures. The accumulation of crop residues with frequent inclusion of pulse crops in a rotation is vital to improve the biochemical and physical properties of the soil via increasing the labile of organic matter. Surface residue of crops is one of the most effective erosion control measures and increase soil moisture content. Different crops have dissimilar growth and development periods thus, one crop may provide protection from erosive forces during a period of the year and the other may not. Besides, crop rotation combines with different management practices are essential to improve the

LSD (0.05)	Wheat	0.1	1.2	-	0.37	1.4
	Canola	0.35	0.9	-	0.32	1.1

Table 1: Yields of wheat and canola affected by the rotation with cereals, oil seeds, legume pulse and pasture. Note: N^+=with fertilizer, N^- =Without fertilizer. Source: McCallum et al., 2000.

Research conducted by Getachew et al., [29] indicated that cropping sequence is afects nitrogen need, productivity and quality of malting barley in the highland part of Ethiopia, and the feld experiments evaluated using factorial combinations of four preceding crops (faba bean, feld pea, rapeseed and barley) with four nitrogen fertilizer rates (0, 18, 36 and 54 kg N ha^{-1}) on Nitisols. As a result, the highest grain yield kernel plumpness, protein content and sieve test were obtained for malting barley grown afer faba bean followed by rapeseed and feld pea. On the other hand, in Australia, soil is high P fxation and low levels of plant available soil P only 10-20% of the applied P is utilized by crops in the year of application and subsequent usage of the residual P rarely exceeds 50% [30]. Te potential benefit of P availability is the incorporation of P-mobilizing species into the cropping system [31]. Several legume crops like chickpea can mobilize soil and fertilizer P through the exudation of organic acid anions such as citrate and maltase and other compounds from their roots [32]. Tis method enables some of these species to acquire P from soil sources that are not readily available to non-secreting crops that are grown in intercrop or rotation with them. A av ' h an e

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According to Merrill et al., [50] surface residue coverage measured at the time of spring wheat seeding indicated that crop sequences composed of spring wheat; millet and sorghum had the highest surface residue coverage whereas sequences composed of two alternative species such as chickpea, lentil, dry pea, sun fower and corn had lower surface residue coverage. For the period of drought, inadequate crop growth and consequent low residue e presence will negatively synergize with soil erodibility factors to increase wind erosion risks [60].

of cropping sequence on disease, insect and weed control

Efect on disease control: Crop sequence/rotation in combination with other management practices can be one of the most e fective and inexpensive methods to manage a number of plant diseases [62]. Cropping sequence is an important management practice that may lower the risk for leaf spot diseases of spring wheat. Field research was conducted ear Mandan, in the USA to determine the impact of crop sequences on leaf spot diseases of spring wheat following 10 crops. T e

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