

Potassium to magnesium ratios affect expression of *Spongospora subterranea* in compacted clay soils

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Spongospora subterranea (Ss) causes galls on potato roots and powdery scab on tubers. Although, this pathogen can survive in the soil for >10 years, knowledge is lacking on how soil physical and chemical factors affect diseases caused by Ss. Potassium (K) and magnesium (Mg) in soils have an antagonistic relationship, and K to Mg ratio should be 0.3 for best plant nutrient uptake, while an imbalance from this inhibits root growth. This study evaluated influences of different responses to K/Mg ratios on development of Ss in three Ss-susceptible potato cultivars ('Red Lady', 'Asterix,' 'Rosara'). The cultivars were established in a field experiment in irrigated soil naturally infested with Ss. The soil was a red clay with subsoil compaction. Experimental treatments included K/Mg ratios of 0.1, 0.3, 0.4 or 0.6, combined with either nil fungicide (-F) or application of fungicide (+F; 3 L ha⁻¹ of Shirlan® 500 SC), with four replicates in the experimental design. At each of three host plant phenological stages (emergence, tuber initiation, flowering), five plants were harvested from each treatment and each replicate. The roots were washed and examined for presence of root galls. Compared with 0.3 K/Mg ratio, treatments of 0.4 and 0.6 K/Mg without Shirlan increased the presence of root galls by, respectively, 54% and 51%, while 0.6 K/Mg ratio plus Shirlan with fumigation increased the presence of root galls by 40%. These results show that Mg deficient and high K soils can favour expression of Ss on potato crops, but disease expression can be reduced with Shirlan applications. Soils with optimum K/Mg balance decrease Ss diseases. Use of pesticide management of Ss diseases will also be discussed.

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