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Nitrogen and Potassium Fertility Impacts on Aggregate Sheath Spot Disease and Yields of Rice

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Abstract: Aggregate sheath spot (AgSS), a disease caused by *Rhizoctonia oryzae-sativae*, is one of the major rice (*Oryza sativa* L.) diseases in California. A three year study was initiated in 1998 to evaluate the effect of nitrogen (N) and potassium (K) fertility on the severity of AgSS. A field with a history of AgSS was divided in two: in one the straw was incorporated and in the other the straw was removed. Rice was fertilized annually with five rates of N ranging from 0 to 200kg ha^{-1} (main plot) and six rates of K ranging from 0 to 125kg ha^{-1} (sub-plot). Soil K levels in both fields declined over time and by the third year, soil K was below the critical level of 60µg K g^{-1} soil in both fields. There was a grain yield response to K fertilizer in all 3 years in the field where straw was removed and in the third year when straw was incorporated. Where there was a significant response to K fertilization, yields increased by 560kg ha^{-1}. In all fields and years there was a significant yield response to N fertilizer. AgSS severity decreased with increasing N and K fertilizer rates and leaf N and K concentrations at panicle initiation. Furthermore, the leaf N concentration required for maximum rice yields was lower than the leaf N concentration which resulted in the lowest severity of AgSS.

Keywords: Nitrogen, Nutrient-disease interaction, Potassium, *Rhizoctonia oryzae-sativae*, Rice

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