Evaluation of inoculation methods to assay wheat for resistance to Fusarium crown rot

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Crown rot is a major biotic constraint on rainfed wheat production systems throughout the world and in the Pacific Northwest (PNW) of the U.S. Caused by a complex of *Fusarium* species, of which *F. pseudograminearum* and *F. culmorum* are the most important, crown rot reduces wheat yields by an average of 9% in the PNW. Many groups have attempted to develop a genetic map and identify QTLs for crown rot resistance. However, adequate *Fusarium* screening systems must be established to appropriately phenotype the population for accurate QTL identification. The objective of this research was to find the inoculation method with the greatest consistency and least variation. Methods of inoculation were to 1.) grow *Fusarium* on millet seed which was placed near the germinated seedling; 2.) soak germinated seedlings in a liquid conidial suspension (10^6 conidia per ml), reported as the 'Nicol method'; 3.) place a 10 µl droplet of a liquid conidial suspension (10^6 conidia per ml) in water or methylcellulose on the stem base (10 days post-germination), reported as the 'Mitter method'; or 4.) place an agar-based suspension of conidia (10^6 conidia per ml) in short 4- cm drinking straws at the base of the stem (10 days post-germination). The millet seed placement and the conidial-agar straw inoculation methods resulted in the most consistent virulence, differentiation between resistant ('2-49') and susceptible ('Seri') varieties, and the least amount of variation.