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Project Title: Greenhouse Studies of DON in Durum Wheat as Influenced by Infection Timing and F.G. Isolate.

PROJECT 1 ABSTRACT

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Controlled greenhouse inoculation studies of a very susceptible spring wheat cultivar, at Cornell University, indicated that FHB severity was highest when inoculated near flowering, but DON levels were highest with inoculations at watery ripe stages (Del Ponte, et al., 2003). ND greenhouse studies indicated that multiple inoculations on hard red spring wheat and durum wheat increased DON, but spring wheat and durum wheat reacted differently to times of inoculation (McMullen, et al., 2007). These 2007 results also indicated that DON derivatives were rare and only associated with very high DON levels. North Dakota greenhouse studies in 2008-2009 indicated that increased durations of moisture at late growth stage inoculations had larger impacts on durum infection than in hard red spring wheat. North Dakota studies also indicated that cultivar resistance interacted with post-flowering moisture duration. North Dakota has the largest production of durum in the US, and durum susceptibility to FHB is greater than in many hard red spring cultivars. More information is needed on durum infection timing and *Fusarium graminearum* isolate effects on infection.

Overall project goal: NDSU has gathered considerable data on infection timing effects on DON accumulation in spring wheat and wants to finish these studies on durum wheat, a grain class in which resistance to FHB is not as available as in newer spring wheat cultivars. Durum appears to have a longer duration of susceptibility, and differences in durum cultivars needs to be defined, as well as determine if there is an interaction among durum cultivars and *Fusarium graminearum* isolate genotype.
These studies will further the data base in durum wheat on what growth stage is most vulnerable to DON production under varying mist regimens, and how isolate source impacts DON production at various growth stages. This information will help: 1) disease forecasters determine if wheat prediction models are reliable for durum wheat and may help them further develop a DON prediction forecast; 2) fungicide and biological control researchers to look at various timings of application of products, possibly evaluating post-flowering product efficacy and provide justification to EPA for shortened pre-harvest intervals (PHI) for available products (current fungicides have a 30-40 day PHI) or find fungicide + management solutions; and 3) breeders seek and incorporate more DON resistance into their germplasm by extending post-flowering irrigation in their nurseries and determining need for multiple isolate sources.