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(1 Page Limit)

Based on experience and research, the *general rule* is that major FHB epidemics and correspondingly high levels of DON accumulation are associated with warm temperatures, high relative humidity, and rainfall before, during, and even after anthesis. However, the specific factors associated with *costly exceptions* to the general rule -- such as "*high DON with low/no visual symptoms*" as stated in the MGMT Action Plan -- are still poorly understood. This proposal specifically addresses **Goal# 3** of the latest version of the MGMT Action Plan which is to "*Develop a full understanding of specific factors influencing infection and toxin accumulation that can be used to develop the next generation of scab and DON risk assessment measures.*" Under this goal, we will address two specific **Research Needs**: (1) "*Evaluate the role of post-flowering weather on DON accumulation*" and (2) "*Determine the potential contribution of late/secondary infections on DON accumulation, including the importance of post-flowering inoculum density and the associations among inoculum density, weather, FHB, and DON accumulation.*" A series of controlled-environment experiments are proposed herein to: **1)** determine and model the effects of temperature and relative humidity on DON accumulation in spikes with known levels of FHB index, and **2)** Evaluate and model relationships among post-anthesis infection, inoculum density, and DON accumulation, as influenced by temperature and relative humidity. For both objectives, replicated experiments will be conducted in temperature- and RH-controlled growth and mist chambers at the OARDC to evaluate the influence of temperature, moisture, inoculum density, and timing of infection on DON accumulation in both symptomatic and asymptomatic wheat grain. Groups of plants in three severity categories (Obj. 1) or inoculated at different post-anthesis growth stages with different spore concentrations (Obj. 2) will be exposed to one of 6 temperature-RH regimes (**cool-wet, cool-dry, warm-wet, warm-dry, hot-wet and hot-dry**). Models fitted to the data will help to identify, and quantify the effect of, late-season factors affecting the fate of DON, and will provide estimates of the risk of DON exceeding critical thresholds under the influence of post-anthesis environmental and biological factors.