



ISBN 978-85-66836-16-5

A CRITICAL-POINT YIELD LOSS META-ANALYTIC MODEL FOR FUSARIUM HEAD BLIGHT OF WHEAT IN BRAZIL¹ / Modelo metanáltico de ponto crítico para estimar danos pela giberela do trigo no Brasil. M. R. DUFFECK²; F. J. MACHADO²; E. M. DEL PONTE².
²Departamento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, 36570 000, Brazil.
E-mail: maira.duffeck@ufv.br

Fusarium head blight (FHB), caused mainly by *Fusarium graminearum*, is a devastating disease of wheat worldwide, including Brazil. In addition to the current concern with the mycotoxins in grains, wheat yield may be reduced under conditions of moderate to severe epidemics. Empirical relationships between disease and yield data or disease and mycotoxin contamination data from multiple experiments have been established, but research data are limited to temperate wheat-growing regions of the northern hemisphere. In Brazil, reports of wheat yield loss due to FHB are limited to individual studies. A systematic review of peer and non-peer reviewed publications reporting disease and yield from randomized fungicide testing trials was conducted from 2000 to 2016 in 20 locations in Brazil. After applying criteria for study inclusion - FHB index (percent infected spikelets) >7% and range between minimum and maximum index > 4% in each experiment - 29 out of 68 field trials found in 39 publications were selected. Exploratory analysis suggested a general linear decrease in yield with the increase of FHB index due to the varying efficacy of the fungicides. A multi-level mixed (random-coefficients) model was fitted to the yield (kg/ha) and FHB index (%) relationship data. One trial was further excluded based on influence analysis. The estimated population-average intercept (yield in the absence of the disease) and slope (decrease in yield per unit increase in index) were 3,409.85 kg ha⁻¹ (SE = 197.30) and - 40.85 kg ha⁻¹ %⁻¹ (SE = 6.16), respectively. In relative terms, for every percentage point increase in FHB index, yield was estimated to decrease by 1.19% (95% CI = 0.74 to 1.82). Losses as high as 20% and 40% due to FHB are expected when FHB index reaches 16.7% and 30.4%, respectively. The damage coefficients estimated here are similar to studies conducted in Europe and North America. The critical-point model can be useful for predicting or assessing the risk of yield loss and basing economic decisions in FHB management. Funding FAPEMIG.

Key words: *Triticum aestivum*, *Fusarium graminearum*, systematic review, meta-analysis