GENETIC GAIN IN YIELD AND CHANGES ASSOCIATED WITH PHYSIOLOGICAL TRAITS IN BRAZILIAN WHEAT DURING THE 20TH CENTURY

MARCHESE J.A., BECHE E., BENIN G., DA SILVA C.L., MUNARO L.B.

Agronomy Department, Technological Federal University of Parana, Pato Branco, PR CEP 85501-970 (Brazil)

genetic gain, grain yield, photosynthetic traits, above-ground biomass

The objective of this study was to characterize physiologically wheat cultivars released in different decades and identify selection criteria for the continued genetic progress in Brazil. Ten cultivars released from 1940 up to 2009 were tested. The following traits were evaluated: grain yield (GY), thousand-kernel weight (TKW), grain number per m$^{-2}$ (GN), plant height (PH), harvest index (HI), above-ground biomass (BIO), relative Chlorophyll content and leaf gas exchanges. The increase in grain yield was 29 kg ha$^{-1}$ yr$^{-1}$ a genetic gain of 0.92%, annually. Grain yield improvement was largely associated with HI ($0.94^{**}$), number of grains m$^{-2}$ ($0.93^{**}$), BIO ($0.88^{**}$) and reduced PH ($-0.93^{**}$). The post-anthesis Chlorophyll content, stomatal conductance and pre/post-anthesis photosynthetic rate were positively correlated with GY. Genetic gains of Brazilian wheat are mainly related to the increases of HI, GN, and BIO. These improvements were achieved by reducing PH and raising gas exchanges and chlorophyll content.