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Soybean genetic gain in Argentina between 1985 and 2014

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Between 1985 and 2014 Argentine soybean area evolved from 2.9 to 19.3 M ha (+0.55 M ha.yr⁻¹); meanwhile, yield increased 24.4 kg ha⁻¹.yr⁻¹ ($r^2=0.677$) reaching 2774 kg.ha⁻¹. Previously, for maturity groups (MGs) 3-8, 1982-2000 released cultivars, we estimated an average genetic gain (gg) of 14.3 kg.ha⁻¹yr⁻¹ (0.50 %.yr⁻¹) from experiments at several locations. The objective of this study was to update that estimation. To add to the original yield data we planted during 2015 and 2016, 52 rainfed field trials in 19 locations (latitudes -26.5°/-36.0°). Each trial included cultivars from the same MG and, in most locations, two or three adapted MGs were sown in contiguous trials. Cultivars were the widest planted ones released in Argentina during 1982-2013. To accommodate the dataset imbalance within each sub-region, grain yield data were analyzed as mixed models with separate residual terms for the different trials. The BLUPs of the genotypic effects were computed from REML analysis. Using all data points, OLS regressions were computed to estimate average gg over time for each MG separately. Minimum gg rate was found within MG 5 (7.2 kg.ha⁻¹yr⁻¹, $P=0.2198$) while the highest for MG 6 (22.7 kg.ha⁻¹.yr⁻¹, $P=0.0011$). Intermediate values were found for the other GMs (~16.0 kg.ha⁻¹.yr⁻¹). For a unique-national gg estimation, each MG gg rate was weighted by their relative growing area in Argentina (R.Rossi, Pers.Comm.). The sum of these weighted rates represented the national average gg rate: 14.7 kg.ha⁻¹yr⁻¹ (0.39 %.yr⁻¹). The ratio between this figure and national yield progress, ie the breeding contribution to 1985-2014 argentine soybean yields, resulted 60.2%, greater than historic reports.