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Contribution of exotic germplasm to the success of tropical soybean in Brazil

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In Brazil, the genetic improvement of soybean is quite recent when compared to other species of economic importance, but its contribution to Brazilian agriculture is very significant. Although the number of cultivars available in Brazil is large, estimates of the genetic variability of the crop have highlighted that the Brazilian germplasm comes from a restricted genetic base. The first study carried out in the 1980s showed that of 26 introductions from the southern United States, only four represented about 50% of the Brazilian gene pool; or, otherwise, nine were responsible for more than 80% of the sampled genotype set. More recent studies showed that in the period from 1971 to 2009, there was an increase in the number of ancestors over time, but the fourth ancestors were the same in all periods and their contribution was more concentrated, going from 46.60% to 57.59%, indicating the narrowing of the genetic basis. The new ancestors incorporated in this period were only to introduce some qualitative characteristics, such as long juvenile period, resistance to diseases, pests and nematodes. The fact that these traits are controlled by few genes does not significantly alter the genetic base, although they promote significant improvement in the agronomic performance of soybean cultivars. In recent years, due to the appearance of Asian soybean rust, establishment of a second crop and soybean resistance to herbicides, a new gene pool of undetermined growth type materials, early maturation cycle and high yield potential were introduced in the Brazilian soybean, represented by cultivar strains originated from Argentinian programs and Asian cultivars, but also primitive accessions that predate scientific plant breeding. This allowed the incorporation of rare and/or exclusive alleles, not found or available in Brazilian germplasm and cultivar collections, improving complex, quantitatively inherited traits. This resulted in a cycle reduction, in average around 20 days, with an increase in yield of tropical Brazilian commercial cultivars.