Combining ability of tropical and temperate inbred lines of popcorn

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ABSTRACT. In Brazil, using combining ability of popcorn genotypes to achieve superior hybrids has been unsuccessful because the local genotypes are all members of the same heterotic group. To overcome this constraint, 10 lines (P₁ to P₁₀) with different adaptations to tropical or temperate edaphoclimatic environments were used to obtain 45 F₁ hybrids in a complete diallel. These hybrids and three controls were evaluated in two environments in Rio de Janeiro State. Grain yield (GY), popping expansion (PE), plant height (PH), ear height (EH), and days to silking (FL) were evaluated in randomized complete blocks with three replications. Significant differences between genotypes (P ≤ 0.05) were detected for GY, PE and EH. General combining ability was significant for EH, PH, PE, and GY, and specific combining ability was significant only for PE and GY. The most promising inbred lines that improved GY were P₁ and P₃, unlike P₅, P₉ and P₁₀, which improved PE, and P₇, which improved both PE and GY. The additive effects were much more important for PE than for GY. The hybrid combinations
gave positive estimates of heterosis for GY but not for PE.

**Key words:** *Zea mays*; Edaphoclimatic adaptation; Gene effects; Diallel; Inheritance