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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 (P_1 to P_{10}) with different adaptations to tropical or temperate edaphoclimatic environments were used to obtain 45 F_1 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 ($P \leq 0.05$) 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 P_3 and P_4, unlike P_8, P_9 and P_{10}, which improved PE, and P_2, 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

