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Genetic Diversity and Combining Ability of *Lotus corniculatus* L. in central Alabama

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Two studies were conducted on fine sandy loam at latitudes 32°31' in central Alabama to evaluate the genetic diversity and combining ability of birdsfoot trefoil cultivars from North and South America. In the spaced plant test, extensive variability within and among 13 cultivars of various origins existed for all agronomic traits studied. Brazilian germplasm was more erect, earlier maturing and had higher seed yields than North American cultivars.

Five clones (two Brazilian and three North American types) were chosen for a complete diallel cross. Unemasculated hand crosses were made and reciprocals bulked. Fertility determinations showed some cross incompatibility between a Brazilian clone and a North American clone. This was the first indication of these clones being from diverse origins. The Brazilian cultivars and crosses had greater spring vigor but less regrowth potential than the North American cultivars and crosses were more erect and bloomed earlier. Inter- and intrasource crosses exhibited wide divergence in flowering, growth habit, and forage yield. The Brazilian x North American crosses gave some indication of heterosis in forage production and showed greater potential for selection purposes in central Alabama than intrasource crosses. General combining ability variances were greater than specific combining ability variances for all traits indicating a prediminance of additive gene action. This indicates that a hybrid breeding program would have no advantage over breeding a synthetic cultivar. Vigor, flowering, growth habit, and forage yield seem to be under quantitative control.