Cross Compatibility Studies in *Arachis* Wild Species to Identify New Species.

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It is useful to know the relationships of the various species of *Arachis* for developing introgression pathways to utilize useful traits in the wild species to improve cultivars. Describing new species of *Arachis* and studying the relationship of these species can be accomplished in different ways. For many years studies of morphological characters and later, associated cross compatibility studies were the only ways to define new species and determine relationships of species. Modern technology has brought about molecular studies that can be beneficial in determining which wild species of *Arachis* are closely related and which are not. When crossing and morphology studies are combined with molecular data a clearer understanding of species relationships often is the result. The studies reported here do not include molecular studies, only crossing and morphology. Molecular studies will be topic of a future publication.

The accession VSGr-6340 (PI 476105) was collected near Caceres, Brazil in 1981, and it contains some valuable traits for developing introgression pathways. In the Monograph, 6340 was included within the species, *A. matiensis*, even though the plant morphology of the two groups is quite different. Pertinent crossing data were not available at the time the Monograph was printed. Access to the site where we collected 6340 has been taken away so we cannot re-visit that location to confirm the peanut still grows there. At a later date we collected the same material from a nearby location several times (e.g., VKSV 8910 = GRIF 7663). The 6340 was found east of the Rio Paraguay. Most *A. matiensis* populations are west of Rio Paraguay. Early crossing studies with the original accession resulted in pegs and fruits when crossed with *A. hypogaea*, but the fruits were empty. This is a typical result when we attempt to cross a section *Procumbentes* species with the cultigen. Crossing 6340 with several members of three sections, including section *Arachis*, gave the following results for pollen stains of hybrids: Species of section *Arachis*, *A. hypogaea* var. Florunner 0.20%; section *Caulorrhizae*, *A. pintoi*, 12787, 17.2%; section *Procumbentes*, *A. appressipila*, 9990 42.8%, 9993 20.2%, 10002 18.5%, *A. rigonii* 10034 72.5 & 83.8%, *A. subcoriacea*, 30037 85.6-96.8%. In summary we can say that 6340 approaches *A. subcoriacea* and *A. rigonii* in crossability and pollen count; by plant morphology 6340 is very different from other members of the *Procumbentes*. 