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Role of wild species in improvement of cultivated ground nut (*Arachis hypogaea* L.)

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ABSTRACT

The genus *Arachis* is native to South America and consists of 22 described and possibly more than 40 undeceived species. Collections are maintained in Brazil, USA and India. Many of the species accessions have been screened for useful characters. Immunity or high levels of resistance, exists in the genus to rust, leaf spots, viruses and some insect pests. To utilize these species in breeding programs to improve the cultivated groundnut has necessitated much basic study on the cytogenetic relationships of the species and the cultivated groundnut. ICRISAT is currently using diploid species of section *Arachis*, which are cross compatible with the tetraploid cultivated groundnut, to transfer useful genes through interspecific hybridization by various soutes. Currently stable, Tetraploid, Interspeciefic hybrids with resistance to rust and the late leaf spots are showing high yield potentia1. Species in other sections of the genus that will not normally cross with the cultivated groundnut are being exploited through hormone treatments and embryo-rescue techniques.

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Groundnut (*Arachis hypogaea* L.), an annual legume species, is grown as a cash crop and an important oilseed throughout the tropical and warm temperate regions of the world with great potential for both food and industrial purposes as an edible oil crop. It is a native of South America, which occupies 45% of the total oil seed area and contributes 55% of production. Although India ranks first in the world in term of both ground nut area and production, but its productivity is low and ranks 10th in the world peanut productivity. A total 67% of the world's total is grown in the semi-arid tropics (SAT) by small-scale farmers of limited means. Average yields in the sat are low around 800 kg ha^{-1} and do not compare well with the average yield of 2900 kg ha^{-1} from developed countries. This crop is predominantly under rainfed condition. Its seeds contain 45-56% oil and 22-30% protein on a dry seed basis. In addition, calcium, magnesium, potassium and vitamins (E, K, B groups) constraints in groundnut production in the sat include pests and diseases, unreliable rainfall patterns and limited agronomic inputs. Many of the sat constraints also apply to the developed world but these farmers are able to overcome them by utilization modeling farming practices and high level inputs over the last decade, there has been much interest in trying to use genetic means to overcome constraints, particularly those caused by insects and diseases.

In some cases the cultivated groundnut has been found to be resistant to biotic constraints and so can be directly utilized by conventional breeding procedures. One example to resistance to groundnut rosette virus found in cultivated land races occurring in the northern Ivory Coast area of West Africa. Commercially acceptable rosette resistant cultivars have now been released in Senegal, Nigeria and Malawi by crossing the resistant germplasm with high yielding but susceptible cultivars. In other cases only moderate levels of resistance have been located in the *Arachis hypogaea* gene pool to such diseases late leaf spot caused by *Phaeisoriopsis personata* V. Arx. Some time despite intensive searches resistance cannot be found in the cultivated groundnut to some pests and diseases and this has prompted researchers to screen the available wild species as alternative sources of useful genes.

The genus Arachis:

The genus *Arachis* (2n-20; 4n=40) is native to South America. There are presently 22 described species including *A. hypogaea* and possible 40 or more undescribed species. Species are either annual or perennial, 3-4 foliolate and diploid or tetraploid. Further explorations are still needed to presently delimit the exact distribution limits of individual species. The species are divided into seven sections based on their morphological characteristics and cross compatibility species within section will generally hybridize, but hybrids between species of different section are difficult to obtain and are sterile. The germplasm is a potential source of genes for resistance wild *Arachis* to pests and disease, shel1ing