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Production of fertile and foliar disease resistant hybrids and backcross progeny between *Arachis hypogaea* and *Synthetic amphidiploids*

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ABSTRACT : Peanut (*Arachis hypogaea* L.) is widely used as a food and cash crop around the world. It is considered to be an allotetraploid (2n = 4x = 40) originated from a single hybridization event between two wild diploids. The utilization of wild germplasm in breeding programs has received little attention due to the reproductive barriers between wild and cultivated species and to the technical difficulties encountered in making large number of crosses. Polyploidy creates severe genetic bottlenecks, contributing to the genetic vulnerability of leading crops. Cultivated peanut is thought to be of monophyletic origin, harboring relatively little genetic diversity. There are only a few reports of successful crosses between cultivated peanut (*Arachis hypogaea* L., section. *Arachis*) and wild species from sections other than section *Arachis*. Many of the wild *Arachis* species harbour important traits necessary for the improvement of peanut. LLS, caused by *Cercosporidium personatum*, is an important fungal disease in Asia and the Americas as well as Africa. To introduce LLS resistance from diploid wild species into tetraploid cultivated *Arachis hypogaea*, a synthetic amphidiploids ISATR 278-18 (*A.duranesis* ICG 8138 x *A.batizocoi* ICG 13160) and ISATGR- 5B (*A.magna* ICG 8966 x *A.batizocoi* ICG 8209) was used as donor parent to generate a backcross population and screened for resistance to LLS. Hybrids in different generations were scored for rust and LLS resistance and found that they were resistant for all components of disease resistance as compared to female parent. Thus crosses with species outside the section *Arachis* may not only confer disease resistance but will also broaden the genetic base of cultivated peanut.

Key Words : Groundnut, Wild species, *Synthetic amphidiploids*, Interspecific hybridization

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Cultivated groundnut, also known as peanut (*Arachis hypogaea* L.), is grown on nearly 24 million hectares between latitudes 408 N and 408 S. Although originating in South America, the vast majority of groundnut is produced in Asia and Africa: Asia 68 per cent (23 Mt), Africa 24 per cent (8 Mt). The remaining 8 per cent (3.5 Mt) comes from North America, the Caribbean, Europe and Oceania. Approximately 94 per cent of groundnut is produced in the developing world, mostly under rainfed conditions. The major groundnut producing countries are China, India, Indonesia, Myanmar and Vietnam in Asia. Groundnut is the principal source of human dietary protein, oil/fat and vitamins such as thiamine, riboflavin and niacin in parts of Asia and Africa (Savage and Keenan, 1994). Groundnut paste is an important source of calories for small children, particularly those being weaned. These children cannot obtain the calories they require from high-bulk cereal grains and depend on groundnut for energy as well as vitamins. Groundnut cake is used as livestock feed and help to maintain livestock productivity. The crop also contributes up to 60 kg/ha nitrogen to the soil, benefiting crops subsequently planted in the same field (Sprent, 1994). Late leaf spots (LLS), caused by *Cercosporidium personatum*, and are an important foliar disease of groundnut in Africa, Asia and the Americas. An estimated global loss in yield of 600 million US$ due to LLS has been reported (Dwivedi *et al.*, 2003). Hence, yield losses due to the disease can be a major impediment to groundnut production. Managing the disease through the application of fungicides is not a viable option for resource poor farmers. Besides, the application of fungicides may pollute the environment, including ground water, thus causing greater risk and damage than the loss of the crop due to the disease. Molecular analysis has shown that the crop