Synthetic groundnut pre-breeding lines: a treasure to explore

The cultivated groundnut (*Arachis hypogaea* L.) is placed under the genus Arachis. A total of 81 Arachis species have been described and accepted internationally under the genus Arachis. *Arachis hypogaea* L. is the only cultivated species out of 81 described while, rest 80 species are wild and non-cultivated. However, five to six wild species are planted as fodder and pasture crop in European countries. Some of these wild species are cross compatible with cultivated groundnut and have been utilized in interspecific breeding program, resulting development of 585 pre-breeding lines, which harbor wide variability both at genetic and phenotypic levels. These pre-breeding lines are national treasure for many rare alleles, capable to make groundnut more climate-smart.

- ICAR-DGR has developed about 585 groundnut pre-breeding lines using about 45 accessions from 25 wild *Arachis* species over last 25 years.
- Pre breeding lines are grouped into two major sub-types i.e, Spanish (erect type with flowering on main stem) and Virginia (spreading type without flowering on main stem). Out of 585, 187 lines are Spanish and rest is Virginia type.
- Pre-breeding lines have been characterized for major foliar disease (Late leaf spot, rust and *Alternaria blight*), soil borne diseases (Stem rot and collar rot) and virus disease (Peanut bud necrosis and peanut stem necrosis) at hot spot locations and controlled conditions over the years.
- Pre-breeding lines have also been characterized for major abiotic stresses (salinity and drought) besides for a few agronomic traits like earliness, large kernel size, number of branching, Specific leaf area (SLA), SPAD chlorophyll meter reading (SCMR), waxy leaves, oil content and oleic acid content.
- Resistant/ tolerance gene(s) for late leaf spot, rust, stem rot, PBND, *Alternaria* leaf blight, salinity, drought related traits, have been successfully introgressed from wild species.
- More than 200 lines have been found resistant to late leaf spot and rust, 40 lines to PBND, 5 lines are to stem rot were identified
- More than 100 lines have been found with low SLA and high SCMR and 20 lines tolerant to salinity
- Sixteen novel pre-breeding lines have been registered and deposited with the NBPGR.
- Pre-breeding lines have already been shared with the ICRISAT and State Agricultural Universities.
- ICAR-DGR has developed about 585 groundnut pre-breeding lines using about 45 accessions from 25 wild Arachis species over last 25 years.
- CS 19 along with other two pre-breeding lines were identified as resistant to stem rot. Less than 30% plant mortality was recorded in CS 19 since last 10 years at several places in India. CS 19 is the only available donor available in India for stem rot resistance in groundnut and is being widely used as donor for breeding stem rot resistance groundnut in almost every places including ICRISAT. Request has also been received for CS 19 from outside the country.
- Besides pre-breeding lines resistant to late leaf spot, rust, stem rot, PBND, Alternaria leaf blight and tolerance of salinity drought related traits have been shared to SAUs and are under regular use in their breeding program.
- All pre-breeding lines are currently maintained at ICAR-DGR and are available upon request

Pre-breeding lines maintained in the field

Lines resistant to LLS, rust and PBND