

# Peanut Blog

An ounce of information



## Icrisat team maps heat tolerance genes in groundnut

**Hyderabad: International Crops Research Institute for the Semi-arid Tropics (Icrisat) scientists have identified the genetic and biochemical basis that enables certain groundnut varieties to survive high temperatures.**

The scientists studied both a heat-tolerant strain (ICGV 16553) and a heat-sensitive one (ICGV 16516) and found that tolerant plants accumulate more antioxidants, phenols, and sugars while activating over 1,600 genes that respond to heat stress.

These genes include those encoding heat shock proteins and enzymes involved in protecting chlorophyll and balancing energy within the plant. The study in groundnut, published on Aug 15, 2025, in 'Nature's Scientific Reports', focused on the flowering and pod development stages that are most vulnerable to high temperatures. Results revealed that the tolerant genotype witnessed a 74% rise in total antioxidant activity and a 33% increase in phenol content at the flowering stage under heat stress, while the sensitive strain showed declines. At the pod stage, tolerant plants exhibited more efficient sucrose metabolism and glucose translocation, leading to better starch accumulation in kernels compared to the sensitive type, which showed a drastic yield decline.

### **Genes that Guard Against Stress**

Through transcriptome sequencing, the team generated nearly 152 million reads, with over 98% aligning to the reference genome. Analysis revealed 1,631 differentially expressed genes (DEGs) at the flowering stage and 836 at the pod stage. These genes regulate photosynthetic efficiency, sucrose metabolism, transcriptional activity, and antioxidant defence. Due to these genes working in tandem, the tolerant groundnut maintains better physiological and metabolic balance under stress. The researchers suggest that future work should focus on the role of sugar transporters, enzyme activity, and regulation of sucrose metabolism to fully exploit the candidate genes identified.

**Source:** <https://timesofindia.indiatimes.com/city/hyderabad/icrisat-team-maps-heat-tolerance-genes-in-groundnut/articleshow/123350661.cms>