ICAR
भाकृअनुप

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Our New Director: Dr. Radhakrishnan T.

Dr. Radhakrishnan T. took over as Director of ICAR-DGR on 25th September, 2014. He holds PhD degree in Experimental Biology (Tissue culture) with wide research experience in the area of groundnut crop improvement. Dr Radhakrishnan belongs to the 1986 batch of ARS and joined this institute in the same year as Scientist. Later on he got promoted to Senior Scientist and Principal Scientist during 1998 and 2006, respectively. His specialization is in plant tissue culture, genetic transformation and marker assisted selection of groundnut crop. He has been instrumental in development of protocols for efficient regeneration, genetic transformation, and inter-specific hybrid rescue through meristem culture in groundnut. He has also developed and characterized the elite groundnut transgenic events having tolerance to salinity, water deficit stress, resistance to foliar fungal diseases, and viral diseases like PSND and PBND.

In the area of development of genomic resources for the groundnut crop, his group has identified and generated first SSR based groundnut linkage map, and the QTLs for rust and leaf spot resistance were transferred to 3 susceptible cultivars using MABC approach. His group has also identified nine non-toxic isolates of *Aspergillus flavus* having many defective aflatoxin producing genes which can be used as potential biocontrol agents. In the aspects of dissecting the molecular mechanism of biotic stress response in groundnut, his group has validated SSR markers linked to the rust and late leaf spot diseases resistance in diverse groundnut genotypes. With his vast knowledge on groundnut, the institute will march ahead and achieve new heights under the dynamic leadership of Dr. Radhakrishnan.

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TECHNOLOGY TRANSFER

Technologies to produce cellulase from groundnut shell and proteases from de-oiled groundnut cake commercialized

(21 November 2014, Junagadh)

Two separate MoUs on process/knowhow for production of enzymes cellulase from groundnut shell and proteases from de-oiled groundnut cake by microbial fermentation developed by scientists, K.K. Pal, Rinku Dey and J.B. Misra, at ICAR-Directorate of Groundnut Research, Junagadh were signed between ICAR-DGR and M/s Paccar Biotech Limited, Ahmedabad. The MoUs were handed over by Dr. T. Radhakrishnan, Director, ICAR-DGR to Shri Dilip Mansukhlal Bhatiya, Director, Paccar Biotech Limited, Ahmedabad in a function held at ICAR-DGR, Junagadh on 21st November, 2014 which was also attended by entrepreneurs and scientists of the directorate. The technologies have been commercialized on non-exclusive basis on payment of one time license fees by the firm.

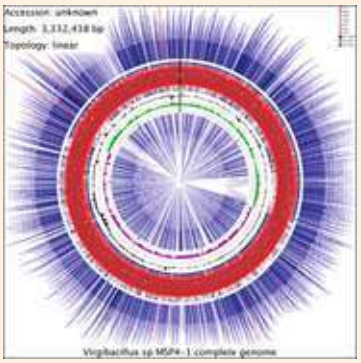
The process knowhow developed at ICAR-DGR for production of enzymes cellulase and proteases from groundnut shell and de-oiled groundnut cake, respectively, has commercial values owing to the fact that the substrates used are available

in plenty at nominal cost in Gujarat and the enzymes can be produced with high yield employing solid state fermentation. These two enzymes, having wide application in different industries like textile, detergent, poultry and animal feed, paper and pulp, leather, pharmaceuticals, etc., occupy globally around 40% of market share of all the commercial enzymes and India meets most of its need through import. Other entrepreneurs present on the occasion also showed keen interest in the technologies developed at ICAR-DGR for future transfer of these technologies through MoUs.

Technology transfer between ICAR-DGR and Paccar Biotech Limited, Ahmedabad

First complete genome sequencing of the genus *Virgibacillus*: *Virgibacillus* sp. MSP4-1, an obligate halophile

The microbiologists of this directorate, Dr. K.K. Pal and Dr. R. Dey, have successfully sequenced and annotated the first complete genome of the genus *Virgibacillus*: *Virgibacillus* sp. MSP4-1, an obligate halophile. This organism can tolerate up to 23.5% (minimum and optimum being 8% and 10%, respectively) NaCl in the growth medium. The bacterium was isolated from a salt crystallizer pond of the Rann of Kutch, Gujarat under NAIP funded projects on diversity of extreme organisms and isolation of relevant genes and alleles. The annotation of the complete genome of 3,332,438 bp of *Virgibacillus* sp. MSP4-1 (Figure 1) revealed the presence of 420 subsystems and genes for 3,459 coding sequences (CDSs), 90 RNA and 910 hypothetical proteins. Besides, there are 26 genes related to osmotic stress (osmoregulation, ectoine biosynthesis and choline and betaine uptake) and 37 genes for oxidative stress tolerance (protection from ROS, oxidative stress and glutathione).



The obligate halophilism of this organism is being studied from evolutionary, comparative and functional genomics point of view at ICAR-DGR. Exploring the genome of this obligate halophile will pave the way for a comprehensive understanding of the mechanisms of halophilism i.e. the genes, the biochemical pathways, and the metabolites involved in imparting osmotolerance. Further studies on identification of genes and alleles for enzymes, which remain biologically active in this organism are in progress.

White grub menace reported in *kharif* groundnut of Saurashtra

White grub species belonging to genera *Holotrichia*, *Apogonia*, *Schizonycha*, *Adoretus*, *Anomala* and *Phyllognathus* were reported infesting groundnut of Saurashtra region of Gujarat. During the *kharif* season of 2014, white grub was reported in different talukas of Saurashtra *viz.,* Porbandar, Ranavav, Jetpur, Kutiyana, Maliya, Keshod, Visavadar, Mendarada and Dhari. The extent of damage ranged from 20-80 per cent and the worst hit fields were observed in Porbander and Ranavav. The three main species of white grub *viz., Holotrichia consanguinea, H. serrata* and *Apogonia rauca* were recorded causing damage to groundnut from these areas. White grub is polyphagous in nature and prefers sandy-loam and light-red soils. Damage typically appears as stunted, wilted, discolored, or dead plants and/or as gaps in rows where plants fail to emerge. Damaged plants can be easily pulled out which gives a patchy appearance to fields. The research findings so far have indicated that control measures are more effective on adult beetles than the grubs which have a peculiar behaviour and are difficult to control. The pest can be managed effectively through an integrated approach that involves sound knowledge about the behaviour of different species and, their nature and extent of damage. The following integrated pest management practices were recommended on a community approach. Follow deep summer ploughing during months of April and May. Establish petromax light traps (1/ha) and synthetic pheromone dispensers (2-3/tree) on the host trees from 7 PM to 11 PM continuously for three consecutive evenings after adult emergence. Beat the shrubs/trees to dislodge the congregated adults and destroy them. Apply well decomposed FYM. Early sowing may be an option if irrigation facility is available. In endemic area, seeds may be treated with chlorpyriphos 20 EC or quinolphos 25 EC @ 25 mL/kg. Pre-sowing soil application of phorate 10 G @ 25 kg/ha or quinalphos 5 G @ 30 kg/ha is recommended in highly pest prone areas.

Larva of white grub on uprooted groundnut plant

White grub damage in groundnut field

(Inputs: M.V. Nataraja and Poonam Jasrotia)