

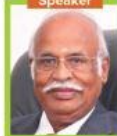





**Webinar on
Research priorities for Indian seed sector**


23rd January 2021, Saturday 3:00 pm to 5:00 pm FREE zoom

| | | |
|--|--|---|
|  Speaker Dr Tilak Raj Sharma <small>Deputy Director General Crop Science, ICAR</small> |  Moderator Mr Ram Kaundinya <small>FSII - Director General</small> |  Speaker Dr Ramasami <small>Rasi Seeds - Founder</small> |
|--|--|---|

**Listen from the best minds
to tackle emerging challenges in seed research**

| | | |
|---|--|--|
|  Speaker Shri Uday Singh <small>Namdhari Seeds - Chairman</small> |  Speaker Dr Surinder Kumar Tikoo <small>Tierra Seed Science - Co-Founder</small> |  Speaker Dr Paresh Verma <small>Bioseed - Research Director</small> |
|---|--|--|

Register through below link

Brought to you by  In collaboration with 

GUBBA
 SEED COLD STORAGE
 Contact : Raj kumar : +91-8978999626 | rajkumar@gubbagroup.com
 Ishika : +91-7337052626 | ishika@gubbagroup.com
 Gubba Seed Cold Storage | Gubba Seed Cold Storage
 www.gubbagroup.com

Agri Innovation Post
Agri-Biotech News & Views

Edition 26
January 2021

Federation of Seed Industry of India (FSII) and Alliance for Agri Innovation (AAI) wishes you a very Happy New Year 2021.

FSII jointly with Gubba Seed Cold Storage is organising this year's first webinar on 'Research Priorities for Indian Seed Sector' to be held on **23rd January 2021 from 3pm-5pm IST**.

We are delighted to share that Dr Tilak Raj Sharma, Deputy Director General, Indian Council of Agricultural Research has kindly agreed to join the panel discussion. The Webinar will also see stalwarts from the agri industry discussing the priorities and way forward for the Indian seed sector. Joining the discussion will be Dr M Ramasami, Chairman, Rasi Seeds and Chairman, FSII; Shri Uday Singh, Chairman, Namdhari Seeds; Dr Surinder Kumar Tikoo, Co-Founder, Tierra Seed Science and Dr Paresh Verma, Executive Director & Chief Executive, Bioseed South East Asia, and Research Director BRI. The session will be moderated by Mr Ram Kaundinya, Director General, FSII.

We would request your presence in this webinar to make the discussion enriching and successful. You may register from the following link to be part of the webinar- [Registration Link](#)

In this newsletter, we have also captured interesting developments and research work from around the world in the agri industry. Hope you find it a good read.



Shivendra Bajaj
Executive Director
Federation of Seed Industry of India-Alliance for Agri innovation

AgBiotech News

[Wheat variety modified to increase production](#)

(The Western Producer)

At the University of York in the United Kingdom, researchers have developed a new, modified wheat variety that increases grain production by up to 12 percent. Scientists at the university have increased the levels of a protein called expansin, which determines the growth of plants. "Expansins are conserved in all land plants and play a key role in growth," said professor Simon McQueen-Mason, chair in materials biology at the university's Centre for Novel Agricultural Products. "Growth of plant cells is constrained by the strong cell wall that surrounds them. Expansins loosen the structure of the wall, allowing cells to expand. They are accelerators of growth. They are present in the growing grain, but we just added a bit more, allowing the grain to get bigger. This should work in any plant or crop."

[Diversity In Food Intake Curbs Malnutrition](#)

(Outlook Poshan)

Representational Image

The food systems have evolved since Norman Borlaug won the Nobel peace prize in 1970. The Nobel going to World Food Programme underlines the importance and continual efforts required for feeding the world. Today, the world has moved away from food for sustenance to food for health and wellness. Rising awareness regarding micronutrient deficiencies and their adverse effects on health has consumers paying attention to their vitamin and mineral uptake. However, a large part of our population does not have access nor partakes the recommended nutrients in their diet. Globally, around 2 billion people suffer from hidden hunger, in absence of nutritious food. In 2020 FAO celebrated World Food day with the theme "Grow, Nourish, Sustain, Together". The observation has never been any more relevant as the hike in food system vulnerabilities due to the Covid pandemic.

[FDA releases new crop biotechnology curriculum for high schools](#)

(Alliance for Science)

The US Food and Drug Administration (FDA) released its new supplementary curriculum, Science and Our Food Supply: Exploring Food Agriculture and Biotechnology – Teacher's Guide for High School Classrooms, with the goal of getting accurate information about agricultural biotechnology in front of teens. It's part of a biotech outreach program mandated and funded by Congress. A parallel consumer-focused education initiative "Feed Your Mind" launched earlier this year. "Feed Your Mind" aims to help consumers better understand genetically engineered foods, commonly called GMOs or genetically modified organisms. Additional consumer education materials will be released soon.

[China should strengthen genome editing and GM seeds to break Western monopoly, ensure food safety: experts](#)

(Global Times)

China should beef up research and development of cutting-edge seed breeding biotechnology in the next five years, such as genome editing, breeding by design and genetically modified variants, to protect the nation's agricultural progress and grain security, said leading agricultural specialists. Grain security was identified as one of the priorities of China's government at a just-concluded tone-setting economic work conference. New technologies, which could breed crops of higher yields in a short-time through safe, precise and efficient modification, is the key to break the Western-led monopoly and even a step ahead of them in the global seed market, the specialists said, while noting that China could gain an edge via early commercialization.

[Long Live the Bio-Revolution](#)

(Project Syndicate)

In November, the United Nations World Food Program and the International Organization for Migration warned of the "unprecedented" threat to food security brought about by COVID-19. The pandemic's collateral damage could turn out to be even worse than the disease itself. Most leading international institutions with an interest in food security have now called for action to prevent future outbreaks of infectious disease, and to make food systems more resistant to shocks. Biological innovation must factor into our thinking as we strive to meet the dual challenge of feeding a growing population and managing natural resources sustainably.

[Helping to breed better beans](#)

(The Nation)

Bean production is a multi-million naira industry. It employs thousands of people. Given the importance of beans farming, researchers are working to develop improved beans varieties. Following more than two decades of research, field trials, and risk assessment by multiple organisations, the Nigerian Biosafety Management Agency (NBMA) approved the commercial release of the resulting genetically modified cowpea to farmers in Nigeria. NBMA's approval allowed the Institute for Agricultural Research (IAR) to commercially release Pod Borer-Resistant Cowpea (PBR Cowpea)-event AAT709A, genetically improved to resist Maruca Vitrata. The permit is valid until the end of 2022. The release provides a relief to millions of farmers who depend on cowpea for food and income, as well as the consumers of cowpea. The International Institute for Tropical Agriculture (IITA) Principal Scientist in Plant Biotechnology, Leena Tripathi, expressed delight, stating: "This is indeed good news for IITA and Nigeria at large, as the first GM food crop will be available for commercialisation."

[Defra seeks support for Gene Editing of crops and livestock](#)

(The Scottish Farmer)

Permission for gene editing in agriculture is back on the political agenda, following the launch of a Defra consultation on a potential change in UK law to allow the technology into the food chain. Under current European law, Gene Editing is lumped together with Genetic Modification, and as such is excluded from use in producing novel crop plants and livestock. Defra is touting the GE consultation as an early consequence of its post-Brexit independence from EU law, potentially giving UK farmers a tech edge over their continental counterparts.

[Sowing the Seeds of Agricultural Biotechnology](#)

(GEN News)

The agbiotech sector is poised for tremendous growth as a result of multiple drivers. Probably first and foremost, we need to increase the sustainable production of food and feed to meet population growth and increased demand for protein. We also have global warming resulting in increased disease and pest pressure and the increasingly variable and unpredictable weather patterns impacting food production. Consumers are also educating themselves on the science, sustainability, and safety of agbiotech advancements like genome engineering in crops. In the developed world, consumers are particularly interested in making healthier and more sustainable purchases. As a result, they are becoming more informed about the potential benefits of agbiotech and what these advancements have to offer to themselves and the global community.

[This Pune-based start-up helps farmers make crops more resilient to changing weather](#)

(Krishi Jagran)

Among the weather complexities that have troubled Indian farmers in recent times are the growing instances of untimely or heavy rainfall and fluctuating temperatures. Not only does such bad weather harm standing crops, but it also seriously hampers seasonal yield, impacting their total farm revenue.

City-based Bioprime Agrisolutions has built eco-friendly bio-molecules capable of making crops more resistant to the atmosphere to help farmers deal with the effects of climate change. Natural biomolecules, available in liquid form, are delivered to plants and are a targeted intervention aimed at preventing any kind of crop failure during plant development. Under the Biotechnology Industry Research Assistance Council (BIRAC) LEAP funds; the company was awarded Rs 1 crore. The organization has received a grant from the Atal New India Challenge under the Atal Innovation Mission for the climate-resilient agriculture group.

[Environment department scientist calls for biotechnology debate](#)

(The Guardian)

Gideon Henderson, chief scientist at the Department for Environment, Food and Rural Affairs, believes the time is ripe for a new public debate on biotechnology. "The last time we had an extensive public discussion was in the 1990s," he notes. Then, public outrage at the idea of 'Frankenfoods' centred on fears of what might result from newly available techniques that allowed the introduction of genes from one species into a completely different species. Lurid stories of tomatoes altered with fish genes grabbed the headlines. In the intervening decades, science has moved on. Gene editing tools that act as "genetic scissors" now allow a degree of precision unthought of in the 1990s, whereby individual

genes can be targeted and sections of their DNA manipulated, effectively cutting and pasting as one would with an electronic document. This brings within reach the kind of genetic selection within a species that was previously achieved only through decades of selective breeding.

[Farmers Grow GMOs for these Environmental Reasons](#)

(The Farmer's Daughter)

We grow corn and soybeans. We've used genetically modified crops that benefit our farm since they were introduced 20 years ago. Specifically, we've adopted crops that are herbicide-resistant and produce the Bt protein. The herbicide-resistant crops allow us to use herbicide to kill weeds without hurting the crops. The Bt trait protects our corn by making it toxic to certain bugs, including all those pesky worms that can quickly and effectively destroy an entire field. Unfortunately, biotechnology has taken quite a beating in public perception. We've seen activists' smear campaigns disseminating misinformation. The most ridiculous claim is that farmers don't want to plant these crops; they're forced to grow them. But we've adopted this technology voluntarily. And one reason is the environmental benefits for our farm.

[Goodbye to potato late blight](#)

(Dhaka Tribune)

With 10 million tons of yearly output, Bangladesh ranks 7th among top potato growing nations in the world. The country has now an exportable surplus of over two million tons of potatoes after meeting annual domestic requirements. But each year thousands of farmers who grow the tuber crop in over one million acres of land in the country spend up to a fourth of their investments on fungicide sprays to fight late blight, a deadly fungal attack that damages 20 percent of the potato yield in Bangladesh. Good news is that Bangladesh finally allowed its scientists to import two blight resistant (RB) potato lines, developed at the Michigan State University (MSU), and go for a field trial. Once approved for commercial release, the RB potato will be the farmers' answer to tackle late blight disease, thereby saving them about Tk. 100 crore which is spent on fungicides.

[Europe's blanket opposition to gene editing, pesticides means higher food prices for world's poorest people](#)

(GLP)

Stanford University estimated that if we would still use the farming technology of 1960, we would need additional farm land of Russia's size, the world's largest country, to earn the same yields as current technology. This is a huge success but also leaves us to the task of improving the situation of the remaining children and adults facing hunger as a daily challenge. Unfortunately, the current political narrative in one of the world's wealthiest regions seems to ignore the challenges ahead of us and wants us to turn to less efficient farming. The European Union's Farm to Fork (F2F) strategy sets out to create a more sustainable food system by the end of this decade. However, looking at the currently proposed ideas, it is worrisome that this new policy framework will achieve the opposite of sustainable farming and lead not just Europe but the entire world in a potential food crisis with massive geopolitical ramifications.

[Three decades of biotechnology innovations](#)

(Agri News)

The seed to promote regional expansion of biotechnology-related research and businesses for the "Gateway City" and bi-state area was first planted 25 years ago and has since turned into a bumper crop that has reached the farm. The St. Louis BioBelt Plant and Life Science Strategy promoted economic and scientific development in the greater metropolitan area and beyond through the research and development business opportunities in the sciences.

[Will Rising Temperatures Make Rice Too Toxic?](#)

(EOS)

Rice is particularly vulnerable to arsenic uptake because unlike most crops, it grows in flooded conditions with anoxic soil. Microbes that thrive in these anoxic environments release arsenic into the soil's pore water through normal metabolic reactions. Once liberated from soil particles, this pore water arsenic can be taken up by the rice plant's roots. Previous studies have focused mainly on heat stress and its impact on how rice plants grow, possibly making them more likely to concentrate

arsenic. What the new research indicates, however, is that “bioavailability may be more important,” researcher Yasmine Farhat said. Farhat’s team grew rice plants in four greenhouses set to daytime temperatures of 25.4°C, 27.9°C, 30.5°C, and 32.9°C. Results showed a strong link between rice grain arsenic concentrations and temperature and confirmed that in hotter conditions, soil pore water contained more arsenic.

Research

[Nature Biotechnology publishes research on wheat resistant to rust fungal diseases](#)

(The Fence Post)

Nature Biotechnology has published research — partially funded by The 2Blades Foundation — on the development of a new wheat variety that shows exceptional resistance to wheat stem rust. Stem rust is among the world’s most devastating plant diseases, with records of stem rust pandemics dating back over 2000 years. The stem rust pathogen *Puccinia graminis* is capable of completely destroying a crop of wheat in a matter of weeks. The most effective and environmentally benign way to control wheat rust is through the use of genetic resistance. The recurring threat to the wheat crop had been managed successfully in the 1960s through Norman Borlaug’s breeding of the wheat varieties introduced in the Green Revolution. But rust pathogen races have now evolved to overcome that resistance and once again the disease threatens harvests.

[Gene Edit Could Get Oil from Plant Leaves](#)

(Futurity)

Vegetable oils are traditionally extracted from fruits or seeds, and the extraction process often leads to the rest of the plant going to waste in the process. The technique could allow producers to harvest oil from large, leafy plants that also have other uses. Sorghum, for example—a global source of grain prized for its drought-resistant qualities—could serve a dual role as a source of vegetable oil, creating a more efficient and valuable crop. Now, Jay Thelen, a professor of biochemistry at the University of Missouri, has found a way to boost the production of triacylglycerol—the main component of vegetable oil—in plant leaves, a technique that could allow producers to harvest oil from large, leafy plants that also have other uses. Thelen and Yajin Ye, a postdoctoral fellow in Thelen’s lab, used the gene editing tool CRISPR to “knock out” a family of genes they found to be responsible for regulating fatty acid production in the leaves of *Arabidopsis*, a plant regularly used by researchers to study plant biochemistry.

[How green is my fertiliser?](#)

(Forbes)

On an average, a farmer in India has to use about 100 kg of various conventional fertilisers to grow 1 acre of paddy. While some part of the fertiliser is absorbed by the plants, the rest leach through the soil into the ground water, thus going to waste and causing pollution. If the farmer uses a nano-fertiliser, she will need only a few grams for 1 acre; the crop will have a higher yield because it absorbs almost all the nutrients from the fertiliser, there will be no wastage, and, therefore, no soil or water pollution. Working towards researching and manufacturing these nano-fertilisers for a variety of crops is the TERI Deakin Nano-Biotechnology Centre in Gurugram. It has field-tested some of these fertilisers, and found improvements in the crop yields of tomatoes, paddy and soybean, and is conducting further field trials in many states across India.

[Trade-offs between sperm viability and immune protein expression in honey bee queens \(*Apis mellifera*\)](#)

(Nature)

Queens of many social hymenoptera keep sperm alive within their specialized storage organ, the spermatheca, for years, defying the typical trade-off between lifespan and reproduction. However, whether honey bee (*Apis mellifera*) queens experience a trade-off between reproduction and immunity is unknown, and the biochemical processes underlying sperm viability are poorly understood. Here, we survey quality metrics and viral loads of honey bee queens from nine genetic sources. Queens rated as ‘failed’ by beekeepers had lower sperm viability, fewer sperm, and higher levels of sacbrood virus and black queen cell virus. Quantitative proteomics on N = 123 spermathecal fluid samples shows, after accounting for sperm count, health status, and apary effects, five

spermathecal fluid proteins significantly correlating with sperm viability: odorant binding protein (OBP)¹⁴, lysozyme, serpin 88Ea, artichoke, and heat-shock protein (HSP)¹⁰. The significant negative correlation of lysozyme—a conserved immune effector—with sperm viability is consistent with a reproduction vs. immunity trade-off in honey bee queens.

[Genomic basis of geographical adaptation to soil nitrogen in rice](#)

(Nature)

Using a panel of diverse rice germplasm collected from different ecogeographical regions, we performed a genome-wide association study on the tillering response to nitrogen—the trait that is most closely correlated with nitrogen-use efficiency in rice—and identified OsTCP19 as a modulator of this tillering response through its transcriptional response to nitrogen and its targeting to the tiller-promoting gene DWARF AND LOW-TILLERING (DLT)^{3,4}. A 29-bp insertion and/or deletion in the OsTCP19 promoter confers a differential transcriptional response and variation in the tillering response to nitrogen among rice varieties. The allele of OsTCP19 associated with a high tillering response to nitrogen is prevalent in wild rice populations, but has largely been lost in modern cultivars: this loss correlates with increased local soil nitrogen content, which suggests that it might have contributed to geographical adaptation in rice. Introgression of the allele associated with a high tillering response into modern rice cultivars boosts grain yield and nitrogen-use efficiency under low or moderate levels of nitrogen, which demonstrates substantial potential for rice breeding and the amelioration of negative environment effects by reducing the application of nitrogen to crops.

[IISER scientists identify the gene that greens plants](#)

(The Hindu)

Researchers at the Indian Institute of Science Education and Research (IISER) have identified a gene that facilitates in the greening of plants by playing a crucial role in regulating the levels of protochlorophyllide — an intermediate in the biosynthesis of the green pigment chlorophyll. Dr. Sourav Datta, Associate Professor, Department of Biological Sciences, IISER Bhopal, and a PhD research student Nikhil Job have identified the gene 'BBX11' and their study was recently published in the prestigious British journal New Phytologist. Using genetic, molecular and biochemical techniques, the duo found a mechanism where two proteins oppositely regulate the 'BBX11' gene to maintain optimum levels of 'BBX11'. Dr. Datta said that the amount of protochlorophyllide synthesised needed to be proportional to the number of enzymes available to convert them to chlorophyll.

[Transgenic Chickpeas Exhibit Drought Tolerance, Increased Seed Yield Under Extremely Dry Condition](#)

(ISAAA)

Researchers from India developed a line of transgenic chickpea found to be more tolerable to drought with increased seed yield trait. In the long run, the transgenic chickpea can contribute to the decrease of annual chickpea yield and production loss that is commonly attributed to drought. The researchers developed transgenic chickpea lines that harbor the transcription factor Dehydration Responsive Element-Binding (DREB) protein 1A from Arabidopsis thaliana (AtDREB1a gene), with the objective of enhancing drought tolerance in the crop. DREBs are known to be important plant factors that regulate stress-induced gene expression and play a role in stress tolerance against abiotic factors. The GM chickpeas were found to exhibit higher relative water content, longer chlorophyll retention capacity, and higher osmotic adjustment under extreme drought condition levels as compared to the non-transgenic controls. The chickpeas were also found to have yielded more seeds with a progressive increase in water stress.
