BIOLIFE

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Digital Tools for Farm Machinery

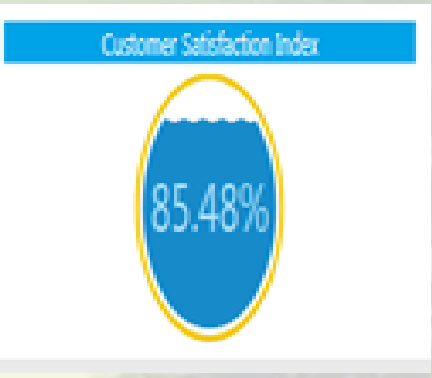
ACI Motors has been optimizing different technological tools for better customer service throughout the country. The newly launched unique Service Tracking App (STA) ensures its commitment to provide service within 6 hours to the farmers. Currently, 130 technicians of ACI Motors are providing on-time customer service using this app. The mobile app also measures customer satisfaction index effectively.

ACI Motors has also introduced a dashboard to monitor live service activities. The STA is connected to this dashboard and real-time data on the service activities can be accessed from anywhere in the country.

Moreover, farmers can directly call to the Call Center (16509) for service solution. Integrating the app with the call center, ACI Motors is ensuring timely service more efficiently. Besides, farmers can provide feedback on service and product performance using this mobile application. It is enabling ACI Motors to continuously improve its service quality. As a result, the overall Customer Satisfaction Index is increasing. ACI Motors is now more connected with the farmers 24x7, all over the country.

Dr. F H Ansarey
Managing Director & CEO
ACI Agribusiness

The Mobile Service Tracking Application Interfaces



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In cultivars developed as hybrids and propagated through seeds only can perform better only at hybrid generation and the seeds need to be produced every year as hybrid seeds. In crops, where seeds/grains are not the end product for use and the plants can be raised clonally, the efficient use of tissue culture technique can serve the best purpose not only for the first generation products but also to two more generations of true to type product.

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In May 2018, ACI Seed participated in DCCI Agro Tech Fair 2018 jointly organized by Dhaka Chamber of Commerce & Industry (DCCI) and USAID's Agricultural Value Chain (AVC) project at International Convention City, Bashundhara.

Scientists Boost Crop Production by 47%

Plants such as soybeans and wheat waste between 20 and 50 percent of their energy recycling toxic chemicals created when the enzyme Rubisco -- the most prevalent enzyme in the world -- grabs oxygen molecules instead of carbon dioxide molecules.

GM crop Research and Bangladesh Agriculture?

Bangladesh agriculture is in the transition of commercialization where a strongly built Contract Farming system is a necessary prerequisite. HYVs and Hybrid technology can help the development of transformation to a commercial environment. But it cannot support all the way to accept the Genetically Engineered crop varieties for production unless agro-product processing industries organize Contract Farming with ensured price of quality products. In an environment like this, introduction of still higher technology like the GM technology appears to be non-conforming to the needs and the conditions. However, we are in the club of 42 plus countries where GM crops are being used either for test or for cultivation. USA, China, India, Argentina, Brazil are the leaders in the production of GM crops.

As we are already in the system by releasing four varieties of BT Brinjal and with GM potato, BT cotton as well as golden rice in the pipeline; there is a need for understanding the whole process of product development to commercial release. It is of utmost importance that the process is understood and implemented due to the potential impact on non-GM crops, other types of plants and the food chain. Releasing varieties of crops like Brinjal, which is a fresh vegetable ready for consumption, and potato certainly needs specific attention to seed production and increase in the acreage under such crops. Possibly this is why also the government of Bangladesh has restricted provision of seed production and distribution by BARI and BADC only. But the transformed genes have become available in the fields of production wherever it took place through farmers and the farming community.

If our government decides to become GM friendly in the interest of having more biotic and abiotic stress tolerant crop varieties, then there should be a strong and technically high level planning committee of GM crop breeding where both public organizations and private company members will participate in deciding the (i) technique to be followed, (ii) the crops to be used for transformation and (iii) traits to be transformed. This is because in any GM crop breeding there is a need for central decision and decentralized competitive execution so as to reach the target product better and faster. One can see the list of the transformed products in ISAA documents and easily can see a large number of those are not available anymore. The dialogue that will require to be set is between scientists and academia across all fields of species identifying the needs of the traits, the methods of trait introduction, subsequent selection process and ultimate use of the materials in the production system covering the potential dangers of gene transfer through pollen grains to unknown species and the resultant effect thereof. The knowledge generated all over the world by this time is enormous and genes transferred and products transformed are many. We can see the events under GM technology having commercial importance. These are Abiotic stress tolerance, (i) altered growth and Yield, (ii) Disease Resistance, (iii) Herbicide tolerance, (iv) Insect resistance, (v) Modified product quality and (vi) pollination control system. Within each of these broad heads like the abiotic stress tolerance, a number of specific traits have been covered. According to ISAA around 42-3 specific GM traits have been studied using about nine technique of transformation Viz.; (1)Agrobacteriumtumefaciens mediated method; (2) Chemically mediated introduction into protoplast and regeneration; (3) Direct DNA Transfer System; (4) Electroporation; (5)Conventional Breeding-cross hybridization &selection involving transgenic donor(s)(6) Micro-particle Bombardment of plant cells or tissues; (7) Pollen Tube-Pathway; (8). Aerosol Beam Injection; and (9) Whiskers mediated plant transformation. Among all these most frequently used technique number 1 and 5.

Professor Lutfur Rahman
Advisor, ACI Agribusiness

Micro-propagation for Rapid Production of Gerbera Plantlets in Bangladesh

In cultivars developed as hybrids and propagated through seeds only can perform better only at hybrid generation and the seeds need to be produced every year as hybrid seeds. In crops, where seeds/grains are not the end product for use and the plants can be raised clonally, the efficient use of tissue culture technique can serve the best purpose not only for the first generation products but also to two more generations of true to type product. So, in the production system of ornamentals almost all over world plant tissues are a good source of next-generation plant product. This technique actually helps raising of true to types products (Plantlets) and also reaches flowering stage at proper time. Tissue culture is thus the way to bypass the limitations that might set-in if only seed setting provisions are kept. Thus, the Tissue culture for propagation of various ornamental plants for the large-scale production is a very powerful tool. Micro-propagation is extensively used for many plant species and cultivars. Experiments have been accomplished at the Advanced Seed Research and Biotech Centre (ASRBC) Lab, ACI Limited, Dhaka to evaluate the callus induction of Gerbera explants under different growth hormone and to develop a proper protocol for in vitro propagation of using tissue culture technique. The study for protocol establishment and performance of the plantlets have been conducted as MS students' thesis works of the Sher-e-Bangla Agricultural University at the Advanced Seed Research and Biotech Centre of the ACI Ltd. during the year 2015 under the supervision of Prof. AFM Jamaluddin of the Horticulture department of Sher-e-Bangla Agricultural University.

Gerbera jamesonii is a member of the family Asteraceae (daisy family). In the micro-propagation process, explants were taken and treated with various growth regulatory hormones. The hormones were given in various concentrations. The hormones mainly used in the lab for callus induction are BAP (6-Benzylaminopurine) and NAA (1-Naphthaleneacetic acid). The capitulum inside the flower bud was found to be the most suitable explant for plantlet production. Gerbera has a massive requirement in the flower industry due to its beauty and long container life which rated at fifth among the top ten cut flowers in the entire globe. It has high market value in the western countries, Malaysia, the Philippines, and India. By now it has also become a well-production and market position in Bangladesh. However, it needs more good quality plantlets for the farming groups already developed in different areas of the country. At present Godkhali of Jessore is the best location for its production by farmers who are already trained in its production, post-harvest processing, and marketing. A seedling supply system dependent on cross-border trade is not at all desirable, thus any company in Bangladesh can now take up this crop of immense potentials through Tissue culture technique to raise and provide high-quality plantlets of Gerbera on contract system of marketing.

The assistance of Aqief Afzal, RA, ASRBC, ACI Limited in preparing the article is highly acknowledged.

Tissue Culture Protocol for High-quality True to Type Seedlings of Lisianthus

Lisianthus, Eustoma grandiflorum a member of the Gentianaceae family, is one of the important ornamental plants of the globe. The Bengali name coined by Prof. AFM Jamaluddin of SAU is “Nandini” This ornamental flower is widely being used as a cut and pot flower. Lisianthus is also a high value cut flower. It has recently been introduced in Bangladesh, which has the advantage of striking bloom with great appeal. The conventional method of raising the seedlings is through seed which in Bangladesh conditions considered to be difficult and has lower possibility of having variants within the population. Thus, micro-propagation technique has been developed using the Tissue Culture technique which is now being used at different levels. Various regulatory hormones were used is different concentrations on leaf explants, which were found to be most suitable. The hormones used for callus initiation was NAA (1-Naphthaleneacetic acid) with B5 medium, for shoot regeneration different concentrations of BAP (6-Benzylaminopurine) and GA3 (Gibberellic acid) and in the end for root formation different concentrations of IBA (Indole-3-butyric acid) and IAA (Indole-3-acetic acid) was used. While many new flower crops struggle to gain consumers awareness and acceptance, this has not been the case with Lisianthus. Within the past 10 years, these flowering plants have been the fastest growing segment of new flower category worldwide. In Bangladesh, it is still in the process of adoption as a promising and important ornamental plant and become suitable for commercial cultivation.

The study was an MS thesis work for the establishment of Tissue culture protocol of Lisianthus plants, of one of the students of Prof. AFM Jamaluddin of the Horticulture Department of Sher-e-Bangla Agricultural University with full technical support of the ASRBC scientists of ACI Ltd. This was done in 2016.

The Assistance in preparing this note by Aqief Afzal, RA, ASRBC, ACI Limited is highly acknowledged.

ACI Seed at DCCI Agro Tech Fair & SHIFT-MDDRM Mela 2018

In May 2018, ACI Seed participated in DCCI Agro Tech Fair 2018 jointly organized by Dhaka Chamber of Commerce & Industry (DCCI) and USAID's Agricultural Value Chain (AVC) project at International Convention City, Bashundhara. The fair was held on 3-4 May 2018 to support agricultural exports, agro foods process machinery, agro finished foods, and related stakeholders from Bangladesh. In the exhibition, ACI Seed demonstrated its innovative products, technologies, and services available for the agricultural sector, especially for farmers.

ACI Seed stall at DCCI Agro Tech Fair 2018

"SHIFT-MDDRM Digital Banijjo Mela 2018" hosted by Dnet, are a series of community fairs held in Sherpur and Jamalpur districts during May 2018. The aim was to promote and create awareness on Digital Financial Services, Digital Solutions, FMCG opportunities and issues of Consumer Rights as per the objectives of the Shaping Inclusive Finance Transformations: Merchants Development Driving Rural Markets (SHIFT-MDDRM) program.


ACI Seed stall at Sherpur Sadar SHIFT-MDDRM Digital Banijjo Mela 2018

SHIFT-MDDRM is an initiative of The United Nations Capital Development Fund (UNCDF), Dnet, Federation of Bangladesh Chambers of Commerce and Industry (FBCCI) and Bangladesh Dokan Malik Samity (BDMS) supported by the European Union. The aim is to enhance growth and competitiveness of retail merchants in rural Bangladesh through vertical integration with FMCG value chains and horizontal integration with financial service value chains, especially through the introduction and use of digital business technologies.


School going children visited ACI Seed stall at Melandah SHIFT-MDDRM Digital Banijjo Mela 2018

Women agripreneurs visited ACI Seed stall at Nalitabari SHIFT-MDDRM Digital Banijjo Mela 2018

SHIFT-MDDRM targeted to reach 10,000 rural micro-merchants (Mudi Dokan) and women entrepreneurs in its working areas. ACI Seed participated in three SHIFT-MDDRM Community Fairs at Sherpur Sadar (8-9 May 2018), Nalitabari (10-11 May 2018) & Melandah (14-15 May 2018).

Harvesting & Field Day for Hybrid Rice & Maize

GHarvesting program on ACI Hybrid Dhan-6 at Ramgonj, Laxmipur on 15 May 2018

ACI Field Crops Seed arranged a number of harvesting and field day programs over the country during the harvesting period of Rabi crops. In May 2018, 30 Field Days and 9 Harvesting Programs based on ACI Hybrid Rice "ACI-6" were conducted in Cumilla, Rangpur, Dinajpur, Rajshahi, Jhenaidah, Jashore, Magura, Kushtia, Mymensingh, and Netrokona reaching around 1500 farmers. All those programs were conducted by Principal Company "MAHYCO" in association with ACI Seed. Participating farmers and dealers became highly motivated and confident enough to promote ACI-6 through those effective result demonstration programs. And it was predicted that about 300 MT of ACI-6 will be sold in the coming season with about 42% sales projection over last year. Lead farmers, prominent dealers, local leaders, UAO, SAAO, RSM, ASM, PM, Representative from Principal Company and Journalists of Local Newspapers i.e. Akash Khabar, Somoyer Samikaran, Paschimanchol etc. attended the programs. Mr. Ashraf Hasan, Product Executive-Field Crops Seed coordinated all the events.

Field day on Hybrid Maize Shahi at Hossenpur, Kishoregoanj on 21 May 2018

On the other hand, 16 Harvesting & Field Days on ACI Hybrid Maize i.e. Don, PAC 139, Shahi & Profit have been conducted in Cumilla, Manikganj, Dinajpur, Bogra & Chuadanga districts during the harvesting period of Maize (April-May 2018). Approximately 1000 farmers attendant these field days. The varieties from ACI performed better across the country. About 377 MT of Hybrid Maize is predicted to be sold in next season with approx. 47% sales projection over last year. Mr. Sudhir Chandra Nath, Head of Business-ACI Seed; Mr. Golam Mostafa, Portfolio Manager-Maize & Potato; Regional Manager of respective region, lead farmers, dealers, local leaders and journalists of local newspapers attended the programs.

Crop cutting program on Hybrid Maize Shahi at Chuadanga on 16 April 2018

ACI's NEB brings Better Yield for Maize

ACI Fertilizer arranged a field day for result demonstration of NEB on Maize crop in Thakurgaon Sadar on 23 May 2018. Former Director General of Department of Agricultural Extension (DAE), M. Enamul Haque was present in the program as the chief guest. Additional Director of Rangpur, Kbd. Shah Alam and Additional Director of Dinajpur, Kbd. Wazed Miah were also present as special guests on the occasion. Kbd. Bashir Ahmed, Business Director of ACI Fertilizer was present there as a guest of honor. Kbd. Aftab Hossain, Deputy Director Thakurgaon, Abul Kashem Azad, Deputy Director Nilphamari, Samsul Haque, Deputy Director Panchagarh, Dr. Mahbubur Rahman, Deputy Director Horticulture Dinajpur Kbd. Prodip Kumar Guho, Asst. Product Manager Md. Asadur Rahman and Regional Sales Manager Rejaul Islam, Area Manager & Territory Officers were also present there.

The honorable guests discussed the importance of NEB and its usage in crops. NEB is a blend of natural root exudates, which helps to increase microbial activities in the soil. It reduces the loss of nitrogen by saving the usage of Urea. So, application of NEB in crops surely helps to minimize the cost of Urea. Moreover, the field day demonstrated that the yield of treated plot was 11.96 MT/Hectare and control plot was 11.89 MT/Hectare. Around 200 Model farmers and local stakeholders participated in the program. They portrayed a positive vibe and showed interest to use NEB in Maize cultivation.

Field Day on Ratno NPKS Fertilizer

ACI Fertilizer's Manikgonj area sales team organized a field day for Ratno Fertilizer focusing on Boro Rice at Karotia, Tangail on 23 May 2018. Union Parishad Chairman, Additional Deputy Director, UAO, SAAO of DAE, Stockiest, Retailers, 100 Model Farmers, Asst. Marketing Manager, Sales Manager, Area Manager, Marketing Officer and the media representative of ATN Bangla were present in the program. Ratno Fertilizer is a balanced combination of 4 nutrients – Nitrogen, Phosphate, Potassium, and Sulphur which helps the farmers to use four nutrients in the field at the right dose at the right time. The yield of demo plot was 30 Mond/Bigha and control plot 23 Mond/Bigha. Observing the difference in field performance, the guests of the event focused on the effectiveness of Ratno balanced fertilizer and the prospect of its further use.

Discussion Program on Organic Fertilizer

ACI Fertilizer participated in a discussion program at Chandina, Cumilla with Alternative Development Initiatives (ADI), a Non-Government Organization, as part of its engagement with the community in May 2018. Zonal Sales Manager, Cumilla and Marketing Officer, Cumilla territory joined in the meeting for local planning and coordination. Model farmers, Agriculture Officer, Cumilla, Livestock Officer, Cumilla and retailers of fertilizer & pesticides were also present in the discussion session. The meeting focused on Organic Fertilizer and its prospect in agriculture as well as in the food security. The farmers shared their thoughts and views in applying organic fertilizer to their fields for high yield. Agriculture Officer and ZSM, ACI also added some points and expressed their views in organic cultivation.

YAMAHA FZS Double Disc & R15 V3 launched

On 14 May 2018, ACI Motors launched two new models of motorcycle: YAMAHA FZS Double Disc and YAMAHA R15 V3. With the launching event, ACI Motors unveiled these new models officially in Bangladesh for the country's motorbike lovers. Dr. F H Ansarey, Managing Director & CEO, ACI Motors graced the occasion with his presence. Mr. Subrata Ranjan Das, Executive Director, ACI Motors; Mr. Himanshu Sharma, Senior Manager, Yamaha Motor India and other high officials of ACI Motors were also present in the event.

ACI Motors is the only distributor of Yamaha motorcycle and spare parts in Bangladesh. Currently, there are more than 40 dealer points and two 3S Flagship Centre across the country.

ACI Motors: Sharing Ramadan's Spirit with 10,000 Smiles

ACI Motors is sharing the spirit of Ramadan in numerous locations while arranging and having Iftar with local communities. In May 2018, it arranged a series of Mechanics Meet and on spot Iftar gatherings at many of its dealer points and rural areas all over the country. ACI Motors is expecting to reach at least 10,000 people mostly farmers, mechanics, drivers, and operators of farm machinery at the root level and have Iftar together in this Ramadan.

Scientists Boost Crop Production by 47%

Plants such as soybeans and wheat waste between 20 and 50 percent of their energy recycling toxic chemicals created when the enzyme Rubisco -- the most prevalent enzyme in the world -- grabs oxygen molecules instead of carbon dioxide molecules. Increasing production of a common, naturally occurring protein in plant leaves could boost the yields of major food crops by almost 50 percent, according to a new study led by scientists at the University of Essex published today in Plant Biotechnology Journal.

This work is part of the international research project Realizing Increased Photosynthetic Efficiency (RIPE) that is supported by Bill & Melinda Gates Foundation, the Foundation for Food and Agriculture Research, and U.K. Department for International Development. In this study, the team engineered a model crop to overexpress a native protein that is involved in the recycling process called photorespiration. Over two years of field trials, they found that increasing the H-protein in the plants' leaves increases production 27 to 47 percent. However, increasing this protein throughout the plant stunts growth and metabolism, resulting in four-week-old plants that are half the size of their unaltered counterparts.

"Plant scientists have traditionally used promoters that express proteins at high levels throughout the plant, and there are many examples where this has worked really well," said the lead author Patricia Lopez-Calcagno, a senior research officer at Essex. "But for the H-protein, we showed that more is not always better demonstrating that when we translate this method to other crop plants, we will need to tune the changes in protein to the right levels in the right tissues."

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)

Golden Rice Gets Approval from US FDA

On May 24, 2018, the United States Food and Drug Administration (US FDA) released a statement on GR2E Golden Rice, a rice genetically engineered to produce provitamin A carotenoids. The US FDA statement concurs with the assessment of the International Rice Research Institute (IRRI) regarding the safety and nutrition of Golden Rice. The US FDA approval is the third positive food safety evaluation of Golden Rice, after the approvals granted by Food Standards Australia New Zealand (FSANZ) and Health Canada in February and March 2018, respectively.

"Each regulatory application that Golden Rice completes with national regulatory agencies takes us one step closer to bringing Golden Rice to the people who need it the most," says IRRI Director General Matthew Morell. He added that the rigorous safety standards observed by the US FDA and other agencies provide a model for decision-making in all countries wishing to reap the benefits of Golden Rice.

Photo Credit: IRRI

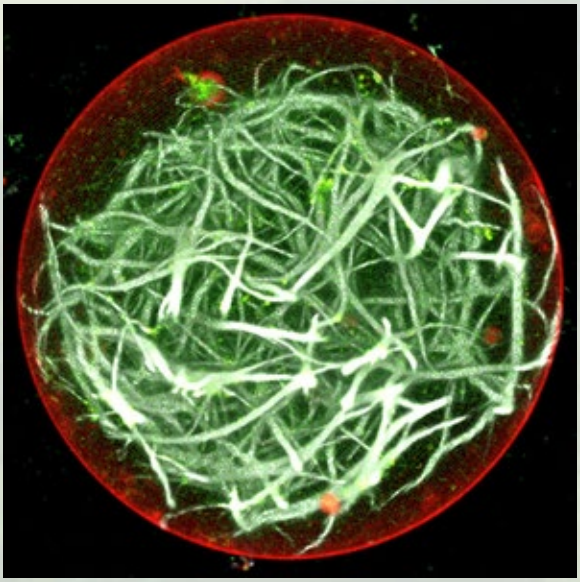
(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)

Researchers Engineer Cell-Like Structure for Photosynthesis

An international team of researchers from Harvard University in the United States and Sogang University in Seoul, Korea has engineered a cell-like structure that harnesses photosynthesis to perform metabolic reactions, including energy harvesting, carbon fixation, and cytoskeleton formation.

The researchers engineered a photosynthetic organelle from the unique components from plants and animals to build the synthetic system. Keel Yong Lee, a postdoctoral fellow at the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) said that their idea is simple. They chose two protein photoconverters, one from plants, the other from bacteria, which can generate a gradient across the cellular membrane to trigger reactions. The photoconverters are sensitive to red and green wavelengths of light. The proteins were embedded in a simple lipid membrane, along with enzymes that generate adenosine triphosphate (ATP), the essential energy of cells. When the membrane is illuminated with red light, a photosynthetic chemical reaction occurs, producing ATP. When the membrane is illuminated with green light, the production stops. The ability to turn energy production on and off allows the researchers to control many reactions within the cell.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)



A membrane (red outer boundary) encapsulates actin fibers (white lines), the protein building blocks of the cytoskeleton and tissues. The actin was polymerized by coupling ATP synthesis with artificial organelles (green dots) inside the membrane.

Photo Credit: Disease Biophysics Group/Harvard University

Crop Rotation Decreases Greenhouse Gas Emissions

Many farmers grow corn and soybean in rotation to avoid the continuous corn yield penalty, but now there's another reason to rotate. Scientists at the University of Illinois have provided further evidence that rotating crops increases yield and lowers greenhouse gas emissions compared to continuous corn or soybean.

"I think farmers in today's world are looking for reasons to avoid growing in a monoculture. They're looking to diversify and rotate their systems. If they're doing that partially out of a concern for the environment, well, it lowers greenhouse gasses. And it could potentially result in a substantial yield increase," says Gevan Behnke, research specialist and doctoral candidate in Maria Villamil's research group in the Department of Crop Sciences at U of I.

There are other studies out there looking at the link between crop rotation and greenhouse gas emissions, but Behnke's study is unique in a couple of ways. First and most significantly, he sampled greenhouse gas emissions from fields that had been maintained as continuous corn, continuous soybean, rotated corn-soybean, or rotated corn-soybean-wheat, under tillage and no-till management, for 20 years.

"These long-term plots are very stable systems. Sometimes you don't see the impacts of rotation or tillage for years after those practices are imposed. That's one of the highlights of this study," Behnke says. Comparing the corn phase of a corn-soybean rotation to continuous corn showed an average yield benefit of more than 20 percent and a cumulative reduction in nitrous oxide emissions of approximately 35 percent.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)

Photo Credit: Gevan Behnke, University of Illinois

University of Illinois researchers confirmed, through long-term observation, that corn-soy rotation increases yield and decreases greenhouse gas emissions relative to continuous planting of either crop.

Plant Peptide Plays a Role in Salt Stress Tolerance

Scientists at the RIKEN Center for Sustainable Resource Science reported their discovery of a hormone-like small protein that helps plants increase their tolerance to excessive salt. The report is published in the Proceedings of the National Academy of Sciences of the USA (PNAS).

They started the study by looking for small proteins linked to salinity tolerance through microarray analysis. Each of the genes that were expressed more under high salinity conditions was overexpressed in transgenic plants and then the transgenic plants were exposed to salinity stress test. Four of the transgenic plants showed better tolerance to salinity compared to the control plants. Then they focused their investigation on AT13, which induced the greatest tolerance to saline conditions.

Further tests showed that levels of the AT13 peptide naturally increased when plants were exposed to salt stress. Thus, the team searched the most important part of the peptide by making pieces of the AtPep3 peptide synthetically. They later found that treating plants with one section of the peptide (AT13-5) was as effective as boosting tolerance through transgenic overexpression of the gene.

"Peptides are natural compounds that are safer than genetically modified plants," said Kentaro Nakaminami, lead researcher of the study. "Additionally, potential supplements made from synthetic peptide fragments will be easy to apply to different species of plants," he added.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)

Photo: The salt tolerant Ice Plant, Mesembryanthemum crystallinum

Candidate Gene for Drought Tolerance Found in Wheat

The calcineurin B-like protein (CBL)-interacting protein kinase (CIPK) signaling pathway responds to various abiotic stresses in plants. The research team of Xiao-Yu Cui and Yong-Tao Du from the Chinese Academy of Agricultural Sciences studied the CIPK23 gene from wheat (Triticum aestivum).

The wheat CIPK23 was found to be induced by multiple abiotic stresses including drought, salt, and abscisic acid (ABA). The TaCIPK23-overexpression wheat and Arabidopsis lines showed higher survival rates under drought conditions as well as enhanced germination rates, developed root system, and reduced water loss rate. Analysis revealed that overexpression of TaCIPK23 made transgenic plants ABA sensitive, as evidenced by the delayed seed germination and the induction of stomatal closure. Consistent with the ABA-sensitive phenotype, the expression level of drought- and ABA-responsive genes were also increased under drought conditions in the transgenic plants. These results suggest that TaCIPK23 plays vital roles in ABA and drought stress responses in wheat.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)

Rice Becomes Less Nutritious as CO_2 Levels Rise

Increased carbon dioxide in the atmosphere will reduce the nutritional value of rice, according to an international research team that analyzed rice samples from field experiments started by a University of Tokyo professor. Specifically, iron, zinc, protein, and vitamins B1, B2, B5, and B9, were reduced in rice grown under higher carbon dioxide concentrations expected in the second half of this century (568 to 590 parts per million).

"Rice is not just a major source of calories, but also proteins and vitamins for many people in developing countries and for poorer communities within developed countries," said Professor Kazuhiko Kobayashi of the University of Tokyo, co-author of the recent study and expert in effects of air pollution on agriculture. The rice was grown at research sites in China and Japan using an open-field method where researchers build 17-meter-wide (56-foot-wide) plastic pipe octagons elevated about 30 centimeters (1 foot) above the tops of plants within standard rice fields. A network of sensors and monitors measure wind speed and direction to determine how much carbon dioxide is released out of the pipes to raise the local carbon dioxide concentration to the desired experimental level. The technique is known as Free-Air Carbon dioxide Enrichment (FACE).

"I first started using this technique in 1998, because we knew that plants raised in a plastic or glass house do not grow the same as plants in normal, open field conditions. This technique allows us to test the effects of higher carbon dioxide concentrations on plants growing in the same conditions that farmers really will grow them some decades later in this century," said Kobayashi. Researchers analyzed a total of 18 different varieties of rice for protein, iron, and zinc levels. Nine varieties of rice grown in China were used for the vitamin B1, B2, B5, and B9 analyses. Other common names for the vitamins are thiamine (B1), riboflavin (B2), pantothenic acid (B5), and folate (B9).

Six hundred million people primarily in Bangladesh, Cambodia, Indonesia, Lao People's Democratic Republic, Myanmar, Vietnam, and Madagascar consume at least 50 percent of their daily energy and/or protein directly from rice. This was also true in Japan during the 1960s, but current Japanese receive only about 20 percent of their daily food energy from rice.

(Source: Agriculture and Food News, ScienceDaily. www.sciencedaily.com)

Beef Peptides Block Bitter Tastes

From burgers to steaks, beef has a long history of being a delicious part of dinner. But what if that pleasant experience of eating beef could extend beyond the dinner plate? Now, one group reports in ACS' Journal of Agricultural and Food Chemistry that beef protein, when broken down into peptides, can block bitter taste receptors on the tongue. Such peptides could someday be used to make other foods and even medicines taste better.

Most people try to avoid bitter flavors because they find them to be unpleasant. But some healthful foods are bitter, as are some medications. So, the food and pharmaceutical industries have been looking at ways to reduce or eliminate bitter sensations, which are detected in humans by 25 receptors known as T2Rs. Only a few inhibitors of T2R activity have been identified so far. In recent years, bioactive peptides created from breaking down food proteins, through a process known as enzymatic hydrolysis, have gained attention for reducing bitterness and inflammation. Because beef proteins have been shown to generate desirable flavor-promoting peptides, Prashen Chelikani, Rotimi E. Aluko and colleagues wanted to see if these peptides could block bitter tastes.

The researchers hydrolyzed beef protein with six different enzymes: alcalase, chymotrypsin, trypsin, pepsin, flavourzyme and thermoase. Peptides produced from trypsin and pepsin digestion were the most effective in reducing the intensity of the bitterness of quinine in a test with an electronic tongue. These peptides were also the longest, which suggests that peptide size might play an important role. The group notes this could impact not only the food industry but the pharmaceutical industry as well.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. www.isaaa.org)

Believe it or not!

- Mango seeds are used to make soap due to its high stearic acid content.
- A mango tree can grow as tall as 100 feet.
- Mangoes are related to cashews and pistachios.
- 1 cup Mango can provide 100% of your daily vitamin C, 35% of your daily vitamin A and 12% of your daily fiber.
- In many Latin American countries, mango on a stick with the skin peeled back is sold by street vendors.

Calorie Chart

Mango (per 100 g)	
Energy	250 kJ
Carbohydrates	15 g
Fat	0.38 g
Protein	0.82 g
Calcium	11 mg
Iron	0.16 mg
Magnesium	10 mg
Manganese	0.063 mg
Phosphorus	14 mg
Potassium	168 mg
Sodium	1 mg
Zinc	0.09 mg

Source: USDA Nutrient Database

Agro Tips

Mango Orchard Intercropping

Intercropping is a multiple cropping practice involving growing two or more crops in the same crop field having different canopy coverage and uses different production technology. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources that would otherwise not be utilized by a one crop variety. Careful planning is required, taking into account the soil, climate, crops, and varieties. It is particularly important not to have crops competing with each other for physical space, nutrients, water, or sunlight.

Mango intercropping with various cereal crops, especially paddy has been gaining momentum in the region, including its vast Barind tract for a long time as the growers, in general, are getting interested towards the farming. In the wake of adverse impact of climate change, the farmers face trouble to depend on only paddy cultivation for the last couple of years. To get more income and to recoup the losses, they can cultivate paddy, onion, garlic, brinjal, mustard, turmeric and papaya with mango as intercropping. By dint of excellent output, the farmers can create new mango orchards in the new method.

Sharing is caring!

A navigable aqueduct, or water bridge, is a structure to carry navigable waterway canals over other rivers, valleys, railways or roads. Although there's none in our country, a number of such water bridges have been engineered around the world spanning from the late 1700's to the early 2000's. At 918 meters, Magdeburg Water Bridge in central Germany, located near Magdeburg is the longest navigable aqueduct in the world. It connects the Elbe-Havel Canal to the Mittellandkanal, crossing over the Elbe River. The construction work for the water bridge started in 1997, taking six years and costing €500 million. The water bridge now connects Berlin's inland harbour network with the ports along the Rhine River.