

Popularization of Mechanical Rice Transplantation

Joint activities by ACI and Govt. Organization

Bangladesh is the 4th largest rice producing country in the world. Around 80% of total cultivated land utilized for rice is covered with transplanted rice. However, manual transplantation of rice is expensive because of labor shortage during harvesting season. Mechanical transplantation of rice has been considered the most promising option as it saves labor, ensures timely transplanting and attains optimum plant density that contributes to high productivity.

There are some challenges like: seedling rising, operation and maintenance, on time availabilities of seedling for popularization of mechanical Rice Transplanter. To overcome these challenges ACI Motors is planning with Government subsidy project

under Department of Agricultural Extension (DAE) to promote this technology. Government subsidy will support farmers to purchase Transplanter and ACI will provide support like: training on seedling rising, maintenance and operation. Thus, we are planning to popularize mechanical rice transplanter to the farmer's level.

According to Prof. Dr. Md. Monjurul Alam, Bangladesh Agricultural University, by using Rice Transplanter farmers can save transplantation cost up to 9,600 Tk/ha.

Dr. F H Ansarey
Managing Director & CEO
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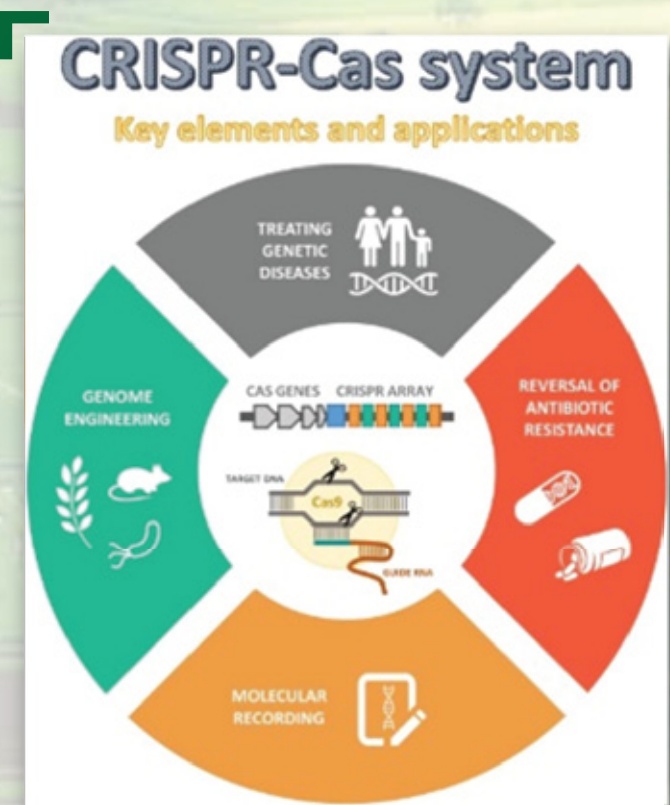
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Acceptability of CRISPR\Cas9 Technology: // // // // //

CRISPR/Cas9 has been dramatically changing the field of genome engineering. The clustered regularly interspaced short palindromic repeats (CRISPR) locus is found in the genomes of some bacteria and archaea which has been modified for genome engineering. It contains tandem repeats and spacers, in which the repeats comprise the same sequence and the spacers comprise different sequences derived from exotic DNA. The CRISPR locus functions with CRISPR-associated (Cas) proteins as an adaptive immune system against invading foreign DNA through inducing a DNA double-strand break (DSB) at the specific locus in association with Cas protein(s). DNA repair pathways, such as NHEJ (non-homologous end joining) or HDR (homology directed repair). Without donor template, NHEJ induces small indels, which can be used for gene knockout or frame-shifting. HDR is used to knocking or substitute the target sequence by using a donor template or ssODN (single stranded oligodeoxynucleotide). This mechanism is being used worldwide for editing genome of different organisms including human for molecular recording, genetic engineering, treating genetic disorders, reversibility of antibiotic resistance. Biosafety issues always arise with these types of gene modifications in organisms. The CRISPR\Cas9 system differs from other genetic modification methods that it uses cells own repair mechanism that leads to a knockout or knock-in of a targeted sequence. But the gene of insertion vehicles (e.g. lentivirus, T-DNA of Ti Plasmid) integrates into genome. Another big concern arises with CRISPR\Cas9 system, gene drive. The objective of gene drive is to rapidly spread a genetic modification within a population, e.g. spread a mutated mosquito that will not spread malaria, dengue etc. Gene drive research and its implementation can have major evolutionary and/or ecological impacts. Since risk depends on the alteration of species rather than on the drive itself, proposed gene drive experiments must be evaluated on a case-by-case basis. And where this technology is being used for gene therapy, e.g. modifying human somatic cells for therapeutic purposes has low biosafety issues

because the modifications will go off with the death of that person. In case of crop improvement programs this technology can be used to develop disease resistant varieties because this technology targets a particular gene sequence and cuts the targeted DNA into segments within the cytoplasm of the host cell before it takes part in protein synthesis. Whereas, the concern is about horizontal gene transfer, there is less information about post consequences, so, initially this technology can be used for the improvement of vegetatively propagated crops where flowering doesn't take place, e.g. potato. Therefore, this technology can be very effective for the betterment of animal health, crops, as well as human health. Building a strong public opinion and awareness would be crucial for using this technique in variable life forms. *(Assistance of Mahmood Hasan, ASRBC is acknowledged)*

Prof. Lutfur Rahman,
Advisor, Agribusinesses & Editor, Biolife



Events and Activities

ACI Seed Field Day at Rajshahi

ACI Seed organized a vegetable field day on Papiya Super at Joynagar, Rajshahi on 9 August 2017. The main aim was to introduce high yielding bitter gourd variety to the smallholder rural farmers of Joynagar village, and to build trust between the seed dealers and the farmers. Another aim was to improve their livelihood status. The village Joynagar under Poba Upazilla, Rajshahi is well known as a vegetable growing area. Different hybrid and HYV varieties of various crops are being cultivated there. Md. Bablu is a progressive farmer of Joynagar who accepts modern technology for sustainable development. This year Md. Bablu cultivated hybrid Papiya Super bitter gourd in his 5 decimal of land and earned net profit Tk. 15,000. He said, this year he also cultivated other varieties but he did not get much profit from them and the field conditions were not at acceptance level. But the Papiya Super showed more vigorous and higher yield potential over other market leading varieties and



he determined to cultivate Papiya Super in more land in the next season. Other farmers also got motivated to cultivate Papiya Super in their land. More than 20 farmers participated in the field day. Retailers, Sales Officer, SPO, and PDS Officer were also participated in the programme.

NEB Workshop held at Khamar Bari in Comilla

Nitrogen Efficiency for Bioavailability (NEB) is now applied to maximize its uptake and decrease environmental impact through reduced usage of urea fertilizer. It is a blend of natural ROOT EXUDATES, which helps to increase microbial activities in the soil. By the use of NEB, plants get more of the N for longer period of time, which helps to give significant growth advantages of plants.

ACI Fertilizer organized a workshop on NEB on Sunday, 27 May 2017 for the personnel of Department of Agricultural Extension (DAE) at Khamar Bari, Comilla. KBD Bashir Ahmed, Business Director of ACI Fertilizer was present there as the chief guest, Mr. Abdus Sabur Khan, ZSM of Comilla Zone, ACI Fertilizer was present as special guest while Dr. Md. Sahinul Islam, Additional Director of DAE presided over the program.

The key discussion was on the features, benefits,



application, and impacts on economy of using NEB at different crops especially on potato. A decision was made to conduct result demonstration under DAE in upcoming potato season and recommend the farmers to produce quality yield at optimum cultivation cost.

Events and Activities

Training on Bioferti by Acadian Seaplants Ltd, Canada

Bioferti is 100% natural product, which is produced from the world's best marine plant "Ascophyllum nodosum". It is produced in Atlantic Ocean. Bioferti's composition of beneficial bioactive compounds supports the plant to upgrade the nutrient and grow properly.

ACI Fertilizer arranged a training program for Area Manager and Regional Manager on bioferti to understand the features and beneficiaries positioning and communication on 5 August 2017 at hall room of ACI Centre.

Mr. Soumendhu Gosh, Business Development Manager of Acadian Seaplants Limited, Canada, the principal of bioferti took the training session. The participants showed their field experience regarding bioferti and gathered valuable knowledge.

Mr. Soumendhu also visited the field to understand the market. He went to Tangail and



discussed with stockiest, retailers and farmers as well as received tremendous feedback. He was delighted to see activities of field force in the market.

Organic Fertilizer Sales Booking Program at Rangpur



On the 22 August 2017, ACI Fertilizer organized a sales booking program for Organic Fertilizer at BRAC Learning Centre in Rangpur. Kbd Bashir Ahmed, Business Director of ACI Fertilizer attended the event as the Chief Guest while Kbd Md. Mustafizur Rahman, Sales Manager participated as a Special Guest. Mr. Asadur Rahman, Assistant Product Manager offered an attractive booking program

for Organic Fertilizer to the Stockiest. Mr. Rezaul Islam, Zonal Sales Manager with his team organized the program successfully and got a tremendous feedback from the customers with more than 1000 MT Organic Fertilizer from the customers. In the event, the customers actively participated and gave different suggestions to increase the market coverage with proper positioning and branding.

Events and Activities

YAMAHA Mega Service Camp

ACI Motors, the sole distributor of YAMAHA Motorcycles in Bangladesh arranged a 5-day long Mega Service Camp in August 2017. The service camp was held from 21 August to 25 August at International Convention City Bashundhara – ICCB, Dhaka. At this mega service camp, customers got Free Service Check Up for their YAMAHA Motorcycles. Moreover, Free YDT Check Up and Free Fuel Injector Cleaning

services were offered. While the service personnel handled Major Complaints, customers also received useful tips for bike maintenance. Customers also enjoyed 10% Discount on Spare Parts, Engine Oil and Helmets throughout the event. Different customer engagement events, rallies, and raffle draws took place during the service camp.



Climate Change Is Transforming the World's Food Supply

Climate change is poised to affect the world's food supply in three key ways, experts say. "There will be impacts on the quantity, quality and location of the food we produce," said Dr. Sam Myers, a medical doctor and senior research scientist studying environmental health at the Harvard T.H. Chan School of Public Health. According to him Researchers studying climate change are looking at how the biological and physical changes happening on Earth due to climate change will transform food production. For example, studies have shown that the combination of increased levels of carbon dioxide in the atmosphere, rising temperatures and changes to precipitation may result in significantly lower yields for staple crops such as corn and wheat, particularly in tropical



areas, where food production is normally high.
(Source: Agriculture - 2017 News and Scientific Articles on Live Science. www.livescience.com/topics/agriculture)

Big Agriculture creating new generation of antibiotic-resistant superbugs

A group of Canadian and French scientists have uncovered more evidence that prolific use of antibiotics in animal agriculture is contributing to the development of drug-resistant "superbugs," in a study published in Journal of Environmental Quality and funded by Agriculture and Agri-Food Canada.

Feeding antibiotics to healthy animals is a common practice in industrial agriculture, because it is believed to reduce rates of illness and to result in larger animals and therefore, higher profits. But there is risk for evolution of antibiotic-resistant bacteria. These bacteria might evolve directly in the animals' bodies, becoming superbugs if they somehow spread to humans (as in E. coli contamination from cattle feces). In addition, large quantities of unmetabolized antibiotics are secreted in farm animals' manure, which is then used as fertilizer



all across North America - creating the potential for the evolution of drug resistance in the wider environment.

In the new study, researchers found a new, previously unknown type of drug resistance that combined two already well known bacterial abilities. It is well established that bacteria readily evolve two major forms of drug-resistance: either they develop ways to purge drugs from their cells, or they metabolize the drugs to make

them less harmful. Now, researchers have found a species of bacteria that eats antibiotics for food. "I think it's kind of a game changer in terms of how we think about our environment and antibiotic resistance," Topp said.

(Source: Agriculture news, articles and information - Natural News. <http://www.naturalnews.com/agriculture>)

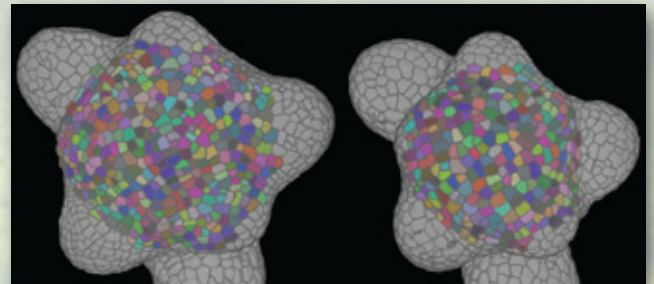
Green Revolution Genes Promise More Yield



A team of researchers at the John Innes Centre (JIC) led by Professor Robert Sablowski studied DELLA proteins which cause a range of growth responses in plants. Mutations in DELLA genes were selected by plant breeders during the green revolution to increase yield through reduced stem length.

The research details how selecting the mutation for shorter stems also resulted in a smaller inflorescence meristem, the growth zone where flowers form. Smaller growth zone results in fewer flowers and seeds, which is a key factor in crop yield potential. But the team showed how the effects could be separated.

Professor Sablowski said that separating the stem growth and meristem size effect could unlock further yield increases in widely-used



3D reconstructions of the inflorescence apex of Arabidopsis, comparing the wild type (right) with a DELLA mutant (left) – each apex is approximately a fifth of a millimeter across. To precisely measure how DELLA mutation affected the meristem, individual

varieties, and that their research means that plant breeders can now select new mutations that separate the desirable and undesirable traits conferred by DELLA proteins.

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

Drought-Tolerant Wheat on The Way

Look for a grinning, midsize lab-coat guy this winter, wearing dark glasses possibly, at the CFIA Variety Registration Office in Ottawa or Toronto. Julian Northey plans to be there, toting his paperwork, to register a new durum wheat for trials in western Canada. If it happens and if it holds up to scrutiny, the new durum wheat will be a breakthrough in drought-tolerant technology. Northey earned a doctorate in plant molecular genetics in 2009 from the University of Toronto. A year later, he launched Frontier Agri-Science (FAS), an agricultural biotechnology company specializing in non-GMO genetic technology.

FAS now has a team of seven scientists with serious credentials and a website listing partnerships with four Canadian universities as well as BASF, Biogemma, and ICRISAT, the international crops research institute for the semiarid tropics (frontieragri.science). The new durum is a product of the platform that specializes in water-use efficiency and stress tolerance. Other platforms are directed toward herbicide tolerance and biofuel production. The September 28 FAS durum harvest, with six lines



of foundation seed, was long awaited. "We've been working on this for four years, and we feel it has great promise in drought resistance. The science itself has been 10 years in development," Northey says.

(Source: Successful Farming, www.agriculture.com)

Planthoppers May Help Stop Crop Disease Spread

Researchers from the Chinese Academy of Sciences' Institute of Zoology have discovered how a severe rice virus reproduces inside the small brown planthopper, a major carrier of the virus. Rice stripe virus (RSV) causes major damage to rice crops each year. "Most plant viruses depend on insects to carry them between plants, and many can reproduce inside the cells of these carrier insects, or 'vectors', without actually harming them," says Feng Cui, Professor of Zoology. "RSV, one of the most notorious plant viruses, is carried by the small brown planthopper and, once inside the cells, manages to achieve a balance with the insect's immune system. Viral infections in animal hosts activate a pathway by which a type of enzyme, called c-Jun N-terminal kinase (JNK), is signalled to respond. But how exactly viruses regulate this pathway in vectors remains an open question.

To address this question, Cui and her team explored the effect of RSV on the JNK signalling pathway in the small brown planthopper. Studying interactions between proteins, and using an analytical method to determine the compounds that are important for the JNK signalling pathway, they found that the virus



A small brown planthopper -- a member of a species known for being a major carrier of rice stripe virus -- feeding on a rice plant.

Photo Credit: : Junjie Zhu

activates the pathway in various ways -- especially through the interaction of a planthopper protein called G protein pathway suppressor 2 (GPS2), and a viral protein called capsid protein. "The interaction between these two proteins promotes RSV reproduction inside the planthopper, ultimately leading to disease outbreak when the insect carries the virus among rice crops," says first author and postdoctoral researcher Wei Wang.

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

How Humans Domesticated Wild Wheat



A sophisticated sequencing study reveals genetic changes that emerged in wheat as it became domesticated by agricultural societies in the Fertile Crescent, roughly 10,000 years ago. The findings provide scientists with a better understanding of traits in modern wheat -- the variety used to make bread and pasta -- and could inform efforts to improve the yield and quality of this key food source.

The domestication of wild wheat caused a shift in traits, which mostly relate to seed dormancy, spike morphology, and grain development. For example, while the spikes of wild wheat shatter at maturity, all domesticated wheat spikes remain intact, which enables easier harvest. Here, RazAvni and colleagues used 3-D genetic sequencing data and software to reconstruct the 14 chromosomes of wild tetraploid wheat, *Triticum turgidum*.

The team then compared genes responsible for shattering in domesticated wheat to the corresponding genes in wild wheat, in order to understand genetic changes underlying the evolutionary transition to a non-shattering state. They identified two clusters of genes in domesticated wheat that



have lost their function. When they engineered strains of wheat with one of these gene clusters restored, the wheat exhibited unique spikes where the upper part was brittle and the lower part was not brittle. These results suggest that the two gene clusters play a part in transforming the brittle qualities of wild wheat.

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



Believe it or not!



- Banana plants are not trees, they are a type of herb.
- Bananas contain around 75% water.
- Fibre taken from banana plants can be used to make clothes.
- The banana tree, or herb, bears only one bunch of bananas before dying. Luckily, it shoots a new "eye" (a baby plant) before dying, the entire process only taking about ten months.
- The word "Banana" has been derived from an Arabic word "Banan" that means finger in Arabic. And, of course, they have given it a thoughtful name as the fruit resembles a finger.



Nutrition Chart

Banana (100 grams)	
Calories	89
Sugar	12 g
Total Fat	0.3 g
Protein	1.1 g
Potassium	358mg
Sodium	1 mg
Dietary fiber	2.6g

Source: USDA

Agro Tips

- A banana is considered a natural mood booster. Depressed people are said to be low on Serotonin and bananas are a cheap source of Serotonin, amino acid, and Vitamin B6.
- Banana is also used as a skin rejuvenator and lets your skin remain youthful for a long time.
- The richness of nutrients and vitamins in banana make it a natural healer in various kinds of body ailments. It is one good digestive fruit.
- If a Pregnant lady munches on banana regularly, she can avert any kind of deficiency as well as side effects of medicines. They are rich in Folic Acid, Calcium, iron, Vitamin C, and antioxidants.
- Bananas are very rich in a mineral called potassium. It is an electrolyte that our body requires to keep electrical impulses flowing through the body. Without electrical impulses, our heart will not operate. So, eat bananas for a happy and healthy heart.

Sharing is caring!

It's awfully hard to extract juice from bananas, even though they're 80% water. Have you ever tried squeezing one? Their molecular structure is just not very squeezable. The currently available banana juice is blended banana, not squeezed banana. Which is, obviously, cheating. But for some reason, Indian atomic scientists are trying to find a way to extract juice from banana. Yeah, atomic scientists! (From the Bhabha Atomic Research Centre)



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