

Through PPP, subsequent cost of irrigation can be minimized: Kantai River-Dam as an example

With the help of PPP (Public Private Partnership), subsequent cost of irrigation in dry climate can be reduced and well managed. Jain Irrigation Systems Ltd. in India has shown it through Kantai Dam which is situated at the Girna River in Jalgaon, Maharashtra.

The Kantai Dam can be rated as one of the major water management projects in the state of Maharashtra having a capacity of 179.2 crore litres. Funding for this project was 8 crore. As per the government directives Jain Irrigation are entitled to use only 50% of water and 50% of water will be used by the society.

The dam ensures a sustainable and secure supply of water for agriculture as well as drinking water

during drought periods. This dam will also help to reduce the off seasonal water availability and further help to reduce sudden floods in the downstream area up to a certain extent. Backwaters will also support fisheries.

Bangladesh has many suitable spots and opportunities to use this method. Government can use Kantai river dam as a model and take initiative with private companies through PPP which will not only reduce the use of ground water in irrigation but also ensure significant reduction of irrigation cost.

Dr. F H Ansarey
Executive Director
ACI Agribusiness



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Challenges for Quality Protein Maize (QPM) Development

Maize is one of the world's three primary cereal crops. It occupies an important position in world economy and trade as a food, feed, and industrial grain crop. Several million people in the developing world consume maize as an important staple food and derive their protein and energy requirements from it. In Bangladesh acreage of Maize production has grown over the years and is used by the processing industry as well as feed for the poultry industry. The poor nutritional value of maize grain is well known, and the need to improvement has been recognized for a long time. Most of the protein in a mature maize kernel is contained in the endosperm and the germ. However, because the endosperm constitutes the bulk of the grain, contributing as much as 80% of the total kernel protein, any major improvements for quality protein must target the endosperm.

Serious efforts to improve the nutritional quality of maize endosperm protein began in the mid-1960s, where the biochemical effects of two mutant alleles, opaque-2 (o2) and floury-2 (fl2), shone light on the path towards improving the quality of maize endosperm protein. These mutants altered the amino acid profile and composition of maize endosperm protein, which resulted in a twofold increase in the levels of lysine and tryptophan. Unfortunately, the mutations adversely affected agronomic performance, including yield, and consumer aspects, particularly kernel characteristics. The lower yield resulted from reduced accumulation of dry matter. The appearance of the kernel altered to a soft, chalky phenotype that is unattractive to maize growers in the developing countries. Physiological drying was also affected. The germplasm became vulnerable to ear

rot, resulting in high pest and infestation rates in stored grain.

Researchers in CIMMYT approached the problem in another way, by emphasizing the development of market-competitive Quality Protein Maize (QPM) genotypes with quality protein as a bonus. To achieve this goal, a conservative approach was used initially with respect to biochemical characteristics. Since the opaque gene boosts lysine levels by twofold, efforts were devoted to maintenance rather than further enhancing the levels of lysine at protein levels of 9% to 10% in the whole grain. This greatly facilitated breeding agronomically superior QPM genotypes while focusing on critical and key consumer characteristic problems.

The next step in the breeding process was the development of QPM donor stocks with modified kernel phenotype and good protein quality. This also turned out to be a time-consuming and tedious process, but the incidence of ear rot in QPM materials has been gradually reduced. Practically all QPM research programs in several countries are now using this approach, based on the combined use of the o2 gene and genetic modifiers. Hybrid development efforts in QPM have become increasingly important, as is evident from recent experience. It is hoped that many countries now involved in the QPM network will be able to select one or two of the most promising hybrids for release in their respective countries.

Prof. Lutfur Rahman

Advisor, ACI Agribusiness & Head of Advanced Seed Research & Biotech Centre



Fig: Maize is a promising crop for the stressed areas of the country and improvement in protein will lead benefits for the processing and poultry feed industries.

Innovation and New Products

Krill Meal

On 7 September 2016, ACI Animal Health launched Krill Meal for fish and shrimp which is enriched with Astaxanthin (a natural carotenoid) and Omega. The proximate composition of Krill Meal is Crude Protein $\geq 65.00\%$, Crude Fat 14.30%, Moisture 6.90%, Ash 9.80%, Crude Fiber 2.90%, Carbohydrates 1.20%, Calcium 1.74%, Phosphorous 1.25%, and no Sand. It provides protein of the highest biological value for faster growth of fish and shrimp while ensuring higher palatability of feed to increase feed intake. Krill Meal improves feed conversion ratio (FCR) and meets the mineral demand of fish and shrimp. Preventing scale and fin damage of fish and appendage damage of shrimp, stimulating the immune system and boosting up survival rates of fish and shrimp - are some of the expected outcomes of using Krill Meal. It also increases brightness and ensures good health of fish and shrimp. It is manufactured by the Krill Canada Corporation. Krill Meal is available as 100g sachet.



Calci-max

Calci-max is an injection which contains calcium in three forms and can be used for treatment of Hypocalcemia and Milk fever. Each 1 ml of Calci-max contains Calcium Gluconate monohydrate 450 mg, Calcium Glubionate 20 mg, Calcium Acetate monohydrate 37 mg, Magnesium Hypophosphite-6-hydrate 30 mg, Boric Acid Q.S, Caustic Soda Q.S, and Distilled Water Q.S. Calci-max is used for the prevention of pre and post-parturition hypocalcemia as well as for the treatment of Milk fever and Shipping fever. It is also useful for the treatment of tetany such as grass tetany of cow (due to magnesium deficiency) and tetany of pregnancy & lactating animal. For the treatment of Paresis, Osteomalasia and calcium deficiency syndrome in early pregnancy of cow, sheep, goat it can be used. Calci-max is applied for the treatment of Allergy, Toxicosis, Parturitional hemoglobinuria, Urticaria, Eruption, Foot rot in horse, Hematuria. It helps to prevent disease and weakness of newborn animal. Besides, it helps to prevent Myoglobinuria in horse. On 25 August 2016, ACI Animal Health launched Calci-max. It is manufactured by WooGene B&G (Korea). Calci-max is available as 100 ml vial.



ACI Seed-KATALYST Haor Project Boosts Nutrition

In September 2016, ACI Vegetable Seed Sector has arranged retailer meetings in the haor areas of Habiganj and Kishoreganj to promote quality seeds and vegetable cultivation. The meetings, supported by KATALYST, were held on 17-18 September 2016 at Sadar Upazilla of Habiganj and 19-20 September 2016 at Itna Upazilla of Kishoreganj. About 30 local participants were present at each meeting and received a certificate. Mr. Abdullah Al Masud (PM, ACI Vegetable Seed) facilitated the training program; Mr. Md. Zakir Hossain (RSM, South-ACI Vegetable Seed), Mr. Md. Nazrul Islam (ASM, Comilla-ACI Vegetable Seed), Mr. Md. Farzul Islam Sunny (SO, Moulavibazar-ACI Vegetable Seed), Mrs. Muniat Fabiha (Senior Business Consultant-KATALYST) and Mr. Asiful Islam (Intern-KATALYST) attended the meeting.

The haor of Bangladesh covers the districts of Kishoreganj (eastern part), Netrakona, Sunam

ganj, Habiganj, Moulavibazar and part of Sylhet and Brahmanbaria. The haor area extends as many as 43 upazilas of the aforesaid districts. The area of the haor is about 932,793 hectares (Haor Task Force Report, 1985). The haor goes under flooding (5 -10 m) from late May to October while it looks like a sea. There is only one cropping season in haor i.e. the Rabi, when Boro rice, potato, groundnut, sweet potato, mustard, pulses and other vegetables are grown. ACI Seed has taken an initiative to ensure nutritional safety through supplying quality seed and providing training on modern crop production technology for the stakeholders and stockiest in these areas. Improving their knowledge of new techniques and technologies, in addition to providing them with any physical resources like quality seeds necessary for cultivation, can dramatically increase the farmers' level of productivity.



Events and Activities

Launch of 'Bumper Organic Fertilizer' in Dhaka

Considering the unleashed potentiality of Organic Fertilizer in Bangladesh, ACI Fertilizer launched its own brand 'Bumper Organic Fertilizer' in Dhaka Region on 22 September 2016 at ACI Center, Dhaka. The same product was launched for Rangpur Region in August 2016. Mr. Bashir Ahmed, Business Director of ACI Fertilizer inaugurated the event with his opening speech. Mr. Shoumendu, Business Development Manager of Acadian Health Plant, Canada was also present

as a special guest. Mr. Mustafizur Rahman, Sales Manager; Mr. Yusuf Alam, Product Manager, and Mr. Asadur Rahman, Product Executive gave their remarks regarding the potentiality, quality, and benefits of Bumper Organic Fertilizer. More than 50 dealers were present at the event and some of them gave important suggestions regarding the marketing and sales of Bumper Organic Fertilizer. Many of them also pre-booked the product during the launching event.



WEA Training on 'Soil Mgt & Fertilizer Reco's'

ACI Fertilizer team provided training at the WEA's project training sessions on 19 - 20 September 2016 at SAINT Bangladesh Training Center, Barisal. The training was on 'Soil Management and Fertilizer Recommendations'. The participants were the FA and lead trainers of ACI Fertilizer. Mr. Zillur Rahman, RSM of ACI Fertilizer inaugurated the session. Mr. Mustafizur Rahman Khan, Sales Manager of ACI Fertilizer gave his remarks on the training objectives and expectations. Mr. Akram Hossain, Sr. Executive, Training

of ACI Ltd gave training on Soil, Classifications of soil, and Characteristics of a good soil, Soil fertility & soil productivity. He also focused on Essential elements of plant nutrient and nutrient deficiency symptoms and also Steps of the Sales call. Mr. Yusuf Alam, Product Manager of ACI Ltd. gave a speech on Definition of fertilizer and solution of nutrient deficiency, Products of ACI Fertilizer with its measure feature and benefit and Fertilizer demonstration techniques 'How to make a demonstration successful'.



ACI Animal Health Highest Ever Sales Celebration

ACI Animal Health recently celebrated Highest Ever Sales-265mio for the month of August 2016. MD, ED.AB, ED.FP, other business heads, and team members participated in this celebration program. The program was arranged in ACI Center lawn and started at 4 pm. The poultry portfolio contributed 41% toward achieving their budget. Other portfolios such as cattle, aqua and

vaccine also performed as promising units. Their contributions were 21%, 16%, and 23% respectively. The business is continuously trying to progress in this sector by ensuring proper services to its customers. By stepping toward achieving budget each month, ACI Animal Health is trying to contribute to the society with its highest potential.



Events and Activities

ACI Motors Seminar at Laxmipur



On 5 September 2016, ACI Motors organized a seminar and friendly gathering for the fishermen and boatmen community at Motihar High School Auditorium, Komol Nagar, Laxmipur. The seminar on ACI Diesel Engine gave the audience an opportunity to know about the benefits as well as the efficiency of the product. The program was supervised by Mr. Abdul Kader Khokon, Proprietor of Kokhon Machineries (local dealer of ACI Motors). Local community leaders, including Mr. Mehedi Hasan Liton, Union Parishad Member, Mr. Mokam

mel Kabir Molla, Vice President-Local Troller Boat Owners Society, and Mr. Md. Nurul Alam, Head Master, Motihar High School were present as guests. From ACI Motors, Mr. Md. Majharul Haque, Regional Sales Manager, Mr. Md. Saydur Rahman, Territory Manager, and Mr. Md. Arafat Hossain, Senior Product Executive were present on the occasion. Special promotions and three-day long lottery program were announced during the event to promote ACI Diesel Engine in the community.



ACI Motors: Tour to Thailand for Sales Target Achievers



ACI Motors arranged a recreational tour to Thailand for the incentive achiever Sales Force as well as dealers in recognition of their great achievement in sales target during the last season. The tour held from 19 to 24 September 2016. The team of 30

including 15 dealers visited different places of Phuket, country's largest island and Bangkok. The Thailand trip provided refreshment and motivation for the team for the upcoming sales season.



Plant Research: Breakthrough in Salt-Tolerance

University of Adelaide researchers have made a breakthrough in investigating salt tolerance in plants which could lead to new salt tolerant varieties of crops, and also answer unresolved questions in plant biology. The researchers, also from the ARC Centre of Excellence in Plant Energy Biology and in collaboration with the University's School of Medicine, have discovered that a protein known to control salt balance in animals works the same way in plants. The research, published in the journal *Plant Cell and Environment*, found that in plants, as in animals, a group of proteins, a type of 'aquaporin', can transport salt ions as well as water.

Aquaporins have long been known to act as pores by transporting water across membranes in plants and animals, and they play critical roles in controlling the water content of cells. But, until now, it was not known they could do the same with sodium ions (salt). "In animals, aquaporins are extremely important in water filtration in the kidney," says project leader Professor Steve Tyerman. "In plants they can do the same thing -- filter the water that goes through the plant. But under certain conditions some aquaporins can also let sodium ions through. "This may explain a lot of unsolved problems in plant biology, for instance how salt gets into the plants in the first place." The researchers believe these "double-barrelled" aquaporins may be the elusive proteins that let sodium ions—the toxic component of salt—in and out of plant roots. Since the early 1990s researchers have known that salt enters plant roots in saline conditions via pores in the membrane, but the identity of these pores has remained a mystery. This particular aquaporin is abundant on the surface of roots.

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



Crop field (stock image). Scientists have discovered that a protein known to control salt balance in animals works the same way in plants.

Photo Credit: veeterzy / Fotolia

Climate Change to Increase Plant Photosynthesis?

Doubling of the carbon dioxide concentration will cause global plant photosynthesis to increase by about one third, according to a paper published in the journal Nature. The study has relevance for the health of the biosphere because photosynthesis provides the primary food-source for animal life, but it also has great relevance for future climate change.

Vegetation and soil are currently slowing down global warming by absorbing about a quarter of human emissions of carbon dioxide. This land carbon sink is believed to be in part due to increases in photosynthesis. It is widely accepted that plant photosynthesis will increase with carbon dioxide, so long as nutrients, such as nitrogen and phosphorus, are not limiting. Global Earth System Models (ESMs) all predict that global photosynthesis will increase with carbon dioxide, but they differ by a factor of three in the size of this 'CO₂ fertilization'. The authors of the Nature study, which are based at DLR in Germany and the University of Exeter in the UK, have discovered that the size of the CO₂ fertilization is revealed by how the seasonal cycle in carbon dioxide concentration varies in the atmosphere. Lead author of the study, Sabrina Wenzel of DLR explains: "the carbon dioxide concentrations measured for many decades in Hawaii and in Alaska show characteristic cycles, with lower values in the summer when strong photosynthesis causes plants to absorb CO₂, and higher-values in the winter when photosynthesis stops. The peak-to-trough amplitude of the seasonal cycle therefore depends on the strength of the summer photosynthesis and the length of the growing season."

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



Doubling of the carbon dioxide concentration will cause global plant photosynthesis to increase by about one third, according to new research.

Photo Credit: Tamas Zsebok / Fotolia

Researchers Discover Non-Bt Protein for Corn Rootworm Control

DuPont Pioneer researchers discovered a protein from a *non-Bacillus thuringiensis* (Bt) bacterium source that shows insecticidal control of western corn rootworm (WCR) in North America and Europe.

The researchers said that the insecticidal protein, designated IPD072Aa, was isolated from *Pseudomonas chlororaphis*. Transgenic corn plants expressing IPD072Aa showed protection from WCR insect injury under field conditions. The researchers said the protein could be a critical component for managing corn rootworm in future corn seed product offerings, and suggests that bacteria other than Bt are alternative sources of insecticidal proteins for insect control trait development.

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



Antibiotic Resistance Naturally in Soil Bacteria

U.S. Department of Agriculture (USDA) scientists have found antibiotic-resistant bacteria in prairie soils that had little or no exposure to human or animal activity. Antibiotics have effectively treated bacterial diseases for years, but some bacteria have developed resistance to the antibiotics that once killed them. Agricultural Research Service (ARS) researchers are investigating agriculture-related antibiotic resistance and developing solutions to address food safety, animal production and protection, and the environment. Part of their efforts involves looking at antibiotic resistance in soils.

Microbiologist Lisa Durso and her colleagues at the ARS Agroecosystem Management Research Unit in Lincoln, Nebraska, recently demonstrated that ungrazed prairie soils have measurable amounts of bacteria with antibiotic resistance. Antibiotic-resistant bacteria and antibiotic-resistant genes found in soils where manure was deposited by animals can provide valuable information about what is currently present in a sample site, such as a feedlot. However, the concern is that even if bacteria in manure are dead, their genes can persist in soils.

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



ARS scientists found antibiotic-resistant bacteria occurring naturally in undisturbed Nebraska prairie soils.

Photo Credit: ARS

Good Food Puts Bees in Good Mood

Biologists at Queen Mary University of London (QMUL) have discovered that after bumblebees drink a small droplet of really sweet sugar water, they behave like they are in a positive emotion-like state. We all know what it's like to taste our favourite food and instantly feel good about the world but the same phenomenon may happen in bumblebees. The results have been published in the journal Science.

The findings suggest that insects have states that fit the criteria of emotions and open up new avenues for research into positive emotions in relatively simple nervous systems. "Investigating and understanding the basic features of emotion states will help us determine the brain mechanisms underlying emotion across all animals," said lead author Dr Clint J Perry. The researchers trained bees to find food at a blue flower and no food at a green flower, and then tested the bees on a new blue-green flower. Bees that drank a small droplet of sugar water prior to the test took less time to land on the ambiguous-coloured flower. Other experiments showed that this behaviour wasn't due to bees just getting more excited or searching faster. This indicates that the sweet sugar water may be causing a positive emotion-like state in bees, similar to humans and other animals.

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

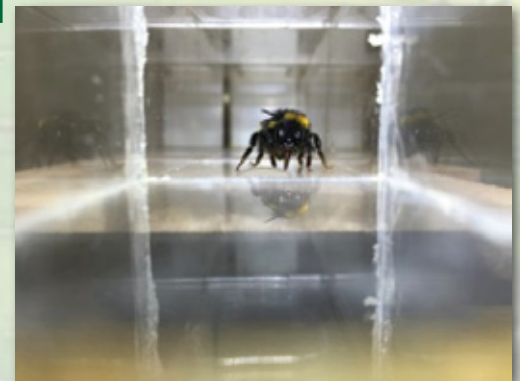


Photo of a bee drinking a droplet of sugar water.

Photo Credit: Clint J Perry

How Plants Respond to a Key Hormone



Researchers at the University of Washington have developed a novel toolkit based on modified yeast cells to tease out how plant genes and proteins respond to auxin, the most ubiquitous plant hormone. Their system, described in a paper published Sept. 19 in the Proceedings of the National Academy of Sciences, allowed them to decode auxin's basic effects on the diverse family of genes that plants utilize to detect and interpret auxin-driven messages.

"Auxin has different messages in different contexts," said senior author and UW biology professor Jennifer Nemhauser. "One cell responds to auxin one way, while its neighbor does the exact opposite -- two different responses from the same chemical. What inside these cells is happening to deliver opposite messages?" As the most widespread plant hormone, auxin affects nearly every aspect of plant biology, including growth, development and stress response. Biologists have long known that auxin acts on stretches of DNA, called promoters, to turn nearby genes on or off. But auxin doesn't simply turn all nearby genes on or off. With auxin, some genes turn on, others are switched off and even more nuanced responses are possible. Plant proteins mediate these varied responses by binding to auxin and then to promoters. Some proteins decrease gene expression, while others do the opposite. "There is a large amount of cross-communication between proteins, and plants have a huge number of genes that are targets for auxin," said Nemhauser. "That makes it incredibly difficult to decipher the basic auxin 'code' in plant cells." So Nemhauser's team switched from plant cells to budding yeast -- a single-celled fungus and popular laboratory tool. The researchers engineered yeast cells to express proteins that responded to auxin, so they could measure how auxin modified the on/off state of key plant genes that they also inserted into the cells. In essence, they jury-rigged yeast to respond to auxin. To Nemhauser, this was a simple shift in approach with a potentially huge payoff.

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



This image shows two thale cress plants (*Arabidopsis thaliana*), common weeds that are distant cousins of mustard and other cruciferous vegetables. The one on the left is wild-type, capable of responding normally to signals provided by the hormone auxin. The plant on the right is a mutant, lacking a key gene that can respond to auxin messages, resulting in severely stunted growth.

Photo Credit: Public Library of Science

Jain Tissue Culture - Better Yields, Greater Profits

JISL pioneered mass micro-propagation and commercial cultivation of an exotic banana variety, Grande Naine (ON), in India. JISL's Banana TC unit currently produces and markets over 10 m (100 lac) GN banana plants per year. As such, this production unit is probably the largest Banana TC facility in India. The six step Jain tissue culture process includes Mother Nursery, Production, Primary Hardening: Greenhouses, Secondary Hardening: Shadehouses, Field Delivery, and Field Support. Jain Tissue Culture location is Jalgaon district, "The Banana Bowl of India", which is eminently suited for Banana Tissue Culture development. Because it has over 48000 ha under Banana cultivation which contributes 16% to the total Banana production of India. Jalgaon has been traditionally growing Dwarf Cavendish varieties. This is mainly on account of conducive climatic conditions, disease-free soil profile for plants as well as dry, non-conducive environment for pests and insects. The area is known to be free from frequent viral incidence. The average yield of non-tissue cultured banana plants is 12 kg/plant. Even this yield is much higher than the state average of 10 kg/plant and national average of 8 kg/plant. Intensive trials were carried out at Hi-tech R&D farms to determine agronomic practices and growth parameters for the select promising varieties from amongst Shrimanti, Basrai, Williams, Zeleig, Robusta and Grande Naine (GN). The main benefit of Jain tissue culture banana plants is that the plants are disease-free, vigorous, uniform and possess high field adaptability.



Feral Chickens Shed Light on Evolution

Different genes are involved during the adaptation of a domestic animal to life in the wild than when a wild animal becomes domesticated. This is the conclusion of a study led by a researcher at Linköping University in Sweden and published in the journal Nature Communications. The results increase our understanding of what happens as a species evolves.

"There are large differences between tame chickens and wild ones. Studying the differences in their genetic material can teach us more about how genes influence animal appearance and behavior. Although a lot is known about how we tame and domesticate animals, very little is known about the reverse, when domestic animals go back to the wild. We have examined this process at the genetic level when tame chickens are released into the wild," says researcher Dominic Wright, who has led the study. For many thousands of years, humans have bred dogs, goats, chickens and other animals to make them suitable for use as domestic animals, in a process known as domestication. Humans have selected the individuals that possess desirable traits and bred them with similar individuals, such that the offspring possess the same traits. The genetic material of the animal has partially changed during the development of the species from its wild form to a domesticated one. The opposite process also takes place, when domesticated animals readapt to life in the wild, in a process known as feralization. By investigating what happens in an animal's genetic material, we can study whether the effects of domestication by humans are long-term or short-term. Can evolution go backward?

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



Hybrid chickens.

PhotoCredit: Dominic Wright



Believe it or not!



- **Honey bees** visit 50-100 flowers during one honey collecting trip!
- A professional shearer can shear a **sheep** in less than 2 minutes and will remove the fleece in one piece!
- Occasionally, a hen will produce **double-yolked** eggs throughout her egg-laying career!
- There are about 600 kernels on each ear of **corn**!
- **Pigs** can't sweat as they have no sweat glands!



Nutrition Chart

Nutrient Contents	Banana (1 medium or 126 g)	Banana (1 medium or 126 g)
Whole Milk	225 ml (1 cup)	150
Paneer (Whole Milk)	60 gm	150
Butter	1 Tbsp	45
Ghee	1 Tbsp	45
Butter Milk	225 ml (1 cup)	38

Source: www.nriol.com

Tips

Some symptoms of boron deficiency (in absence or low supply) are: dying growing tips and bushy stunted growth, extreme cases may prevent fruit set. Some crop-specific symptoms include:

- **Cabbage**- distorted leaves, hollow areas in stems.
- **Cauliflower**- poor development of curds, and brown patches. Stems, leafstalks and midribs roughened.
- **Pears**- new shoots die back in spring, fruits develop hard brown flecks in the skin.
- **Strawberries**- Stunted growth, foliage small, yellow and puckered at tips. Fruits are small and pale.

Boron is an essential micronutrient for plant growth and development, but is required in very small quantities. Although Boron requirements vary among crops, the optimum boron content of the leaves for most crops is 20-100 ppm. Excess boron can result in boron toxicity and the toxicity level varies between plants.

Sharing is caring!

Bonsai trees in full bloom, or bearing fruits, are a spectacular sight indeed. You may have seen Bonsai trees, in reality, or at least in pictures. As we all know, Bonsai, a Japanese term as well as art, is the process of growing ornamental, artificially miniaturized varieties of trees and shrubs in pots. With the widespread art and practice of nurturing Bonsai trees, artisans develop a number of aesthetic miniature gardens of Bonsai trees. Following are some of the most beautiful flowering Bonsai trees you can see.



ACI Agribusinesses

ACI Centre
245 Tejgaon Industrial Area
Tejgaon, Dhaka, Bangladesh
Phone: + 88 02 887-8603
E-mail: biolife@aci-bd.com
sectoedab@aci-bd.com

www.aciagribusinesses.com



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