



CROP AND WEED SCIENCE NEWS

Published by Crop and Weed Science Society, Department of Agronomy,
Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya,
Mohampur- 741252, Nadia, West Bengal, India.

2007

EDITORIAL COLUMN

Low cost input for improving soil health and sustainable agricultural production

In India, particularly West Bengal, rice is the staple food, and the farmers are growing rice for their food, due to their long old habit of rice cultivation and unique adaptability of the crop to varied situations. But the farmers are not getting proper remuneration from rice, at the same time, the land is losing its productivity day by day. So, crop substitution is very essential. In the upland Gangetic alluvial soil of West Bengal, the rainy season legumes like soybean, groundnut, blackgram, ricebean (fodder), cowpea (greenpod) are good substitutes of rice crop. Crop equivalent yields of these legumes are much higher than that of rice. In crop sequence, these legumes show much better residual effects than rice on the succeeding wheat crop. The residual effects can be further augmented if the stover of these legumes are recycled.

In sustainable agriculture, natural resources are to be conserved and used in such a way as to maintain and improve the quality of environment. To improve and maintain soil health and agro-ecosystem, to improve quantity and quality of production, as well as, to increase the efficiencies of inorganic fertilizers, combination of organic matter is of primary importance.

Maintenance of organic matter in soil at high level is more difficult in tropics and subtropics than in temperate zone. On the other hand, the negative effects of high proportions of cereals in the cropping systems can not be balanced by routine doses of nitrogenous fertilizer only. So, the situation necessitates the

suitable cropping system, which will improve the efficiencies of nitrogen use, both of residual and excess fertilizer nitrogen. It will improve the use of crop residues, for which legume is a valuable source. But even legumes, when grown for seed, and the plants are taken away during harvesting, may cause nutrient exhaustion rather than enrichment. The huge mass of legume stover, thus remains unutilized in improving soil health.

Legume residues are good source of plant nutrients especially nitrogen, and can save 30 to 60 kg nitrogen per hectare for the succeeding crop. After threshing and collecting the seeds of legumes, the remaining plant parts are to be chopped off into small pieces, and then spread and incorporated into the soil by ploughing and laddering. Not much extra cost is needed for this, but it will be very much useful through supplying nitrogen enriched organic matter to the soil.

PLANTS FOR HEALTH

Weed can remove third world arsenic danger

A nuisance weed can provide a cheap and effective way to remove arsenic from contaminated water supplies in developing countries. Dr. Parvez Haris, of De Montfort University, Leicester has carried out a series of lab tests using a powdered material made from dried roots of the water hyacinth. The tests have found that adding the dried root powder to contaminated water cut arsenic levels by more than 20 times within minutes. To below the World Health Organisation's safe limit. Dr. Haris has become inspired to start his research after meeting victims of arsenic poisoning on a visit to Bangladesh,



Bio-diesel
Jatropha curcas

Materials intended for publication in the Newsletter may please be submitted to the Editor, Prof. A.P. Patra, Department of Agronomy, BCKV, Mohampur, Nadia, W.B. E-mail : ajitp_bckv@yahoo.co.in

CONFERRING OF DEGREES

Fifteenth convocation of bidhan chandra krishi viswavidyalaya :

Fifteenth Convocation of Bidhan Chandra Krishi Viswavidyalaya was held on April 5, 2007. Hon'ble Chancellor Shri Gopalkrishna Gandhi, Governor of West Bengal presided over the Convocation. Dr. A.P. Mitra, F.R.S., Director General (Retd.) CSIR graced the occasion as the Chief Guest, and delivered the Convocation Address on 'Future world and agriculture in India'. He analysed different parameters affecting food security, and the importance of including physical and social sciences in the curriculum of agricultural sciences. Hon'ble chancellor emphasized on the findings of ways to relieve the women labourers from their problems.



The Viswavidyalaya awarded Ph. D. degree in Agriculture, Horticulture and Ag. Engineering to 53, 13 and 3 students, M. Sc. (Ag.) and M.Sc. (Hort.) to 85 and 19 students, B.Sc. (Ag.) Hons., B.Sc. (Hort.) Hons. and B. Tech. (Ag. Engineering) Hons. To 91, 18 and 17 students, respectively. Ten Gold Medals were awarded to M.Sc. (Ag.), B.Sc. (Ag.) Hons., B.Sc. (Hort.) Hons. and B. Tech. (Ag. Engineering) Hons. students, 14 Merit Certificates to M.Sc. (Ag.), M.Sc. (Hort.) B. Sc. (Ag.) Hons., B.Sc. (Hort.) Hons. and B. Tech. (Ag. Engineering) Hons students, and 2 Book Prizes to M.Sc. (Ag.) and B.Sc. (Hort.) Hons. Students.

AMAZING NEW CROP VARIETIES

Hybrid pigeonpea produces "quantum leap in yield"

Scientists at the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) and the Indian Council of Agricultural Research (ICAR) announced recently the new hybrid of grain legume pigeonpea, *Cajanus cajan*, known as ICPH 2671, that produces nearly 50 per cent more grain than the popular Indian cultivar Maruti. Agricultural scientist M.S. Swaminathan predicts that the new pigeonpea hybrids, with their "quantum leap in yield", could open the way for a revolution in the production of this important pulse, similar to the transformation of wheat and rice production made possible several decades ago by novel semi-dwarf varieties.

ICRISAT is working closely with a consortium of private- and public-sector seed companies in India to ensure that ample supplies of hybrid seeds can be made widely available within the next couple of years. [Read the news article at <http://www.cgiar.org/monthlystoryu/may2007.html>. (Supplied Prof. R.K. Ghosh, BCKV rkgbckv@yahoo.com)]

Nepali farmers gain more from improved local rice varieties

Ten years after the introduction of a rice breeding project in Begnas, Nepal, Nepali farmers are growing their own rice and successfully improving local varieties by cross-breeding. The global project, coordinated by the International Plant Genetic Resources Institute (IPGRI, now known as Bioversity International), aims to help farmers find ways to conserve local varieties of crops in the face of a global trend of relying increasingly on "modern" varieties bred to survive in diverse growing condition. Nepali farmers were able to develop a new variety of *Pokhareli Jethobudho* rice, a local variety prized for its soft texture and unique aroma and taste.

Contd to p.13

For membership of the Society please contact Prof. R.K.Ghosh, Secretary, Dept. of Agronomy, BCKV, Mohanpur, E-mail: rkgbckv@yahoo.com/rediffmail.com.

where contaminated drinking water is drawn from tube-wells. WHO estimates that nearly 70 million people in Bangladesh are at risk of being affected by exposure to arsenic-contaminated ground water and a variety of health problems, including cancer.

Dr. Haris has said "This much-maligned but beautiful weed has the potential to be turned into a life-saving material to help some of the world's poorest people. [More information at : arsenic-crisis unsubscribe@yahoo ogroups .com.]

Biosynthesis of vitamin E in gm potato tubers

Vitamin E or tocopherol is important for human health. The compound is only synthesized by photosynthetic organisms. Researchers in the United States have investigated the biosynthesis of this essential compound in potato tubers, an underground, non-photosynthetic tissue. Their study reports the first investigation of vitamin E biosynthesis in a non-photosynthetic tissue and the first attempt to elevate E levels in potato tubers. Elizabeth Crowell and colleagues used the *Agrobacterium* method to transform the potato varieties 'Spunta' and 'MSE149-5Y'. The researchers employed high-performance liquid chromatography to determine the expression levels of the *Arabidopsis* genes that were incorporated into the potato varieties. The transgenes used were the *Arabidopsis thaliana* p-hydroxyphenylpyruvate dioxygenase (*At-HPPD*) and *A. thaliana* homogentisate phytyltransferase (*At-HPT*).

Crowell and colleagues have observed that over-expression of *At-HPPD* resulted in a maximum 266% increase in alpha-tocopherol, while over-expression of *At-HPT* resulted in 106% increase. The accumulated amount of tocopherol, however, is still 10- and 100-fold less than the level of tocopherol in the potato leaves or seeds, respectively. The researchers suspect that physiological and regulatory constraints may be limiting the accumulation of tocopherol in potato tubers. [To read more, visit http://www.idrc.ca/reports/ev-110870-201-1Do_TOPIC.html.]

Gm chicory brings hope to african malaria patients

Approximately, 40% of the world's population, mostly living in the world's poorest countries, is at risk of malaria. Every year, more

than 500 million people become severely ill with malaria. Most cases and deaths are in sub-Saharan Africa. Artemisinin is a basic raw material used in ACTs (Artemisinin-based Combination Therapies). The compound is isolated from the shrub *Artemisia annua*, long used in traditional Chinese medicine. However, artemisinin is an expensive plant extract, so, for the drug to benefit patients in poorer countries, the price of production must drop sharply.

Dafra Pharma, a Belgian pharmaceutical company, has commissioned Plant Research International (PRI) to begin new research into optimizing the production method of artemisinin via genetically modified chicory plants. The aim of the research is to realize inexpensive, large-scale production of artemisinin under controllable conditions. [Read more at : <http://sev.pnnewswire.com/biotec/hnology/20070508/3406093en-1.html>]

Use of plant species for medicinal purpose

Boiling of 50 green branches of *Moringa oleifera* in 500 ml water, and using one glass of this liquid continuously for 10 days has been proved effective against arthritis.

Similarly 40 g dried and powdered bark of *Mimusops elengi* mixing with 400 ml water and adding 100 g alum in this mixture is useful for tooth therapy.

Some commonly available weed flora in this *Inceptisol* were studied for preparation herbal drug. Mustard oil 100 g is to be boiled with three tea spoonful latex of *Calotropis gigantea* and four tea spoonful leaf extract of *Heliotropium indicum*, then it is mixed with one tea spoonful of oleoresin and two tea spoonful of fresh turmeric juice, and then cooled. This mixture can be used to cure eczema. This drug have already been tested by the peoples of different tribal villages of West Midnapore like Danikala, Dunga, Dinaramchak, Baluri, Gangadaspur, Dadpur, and found successful. [Supplied by Prof. R.K. Ghosh, A. Doloi, S.K. Ghosh, K. Barui, Agronomy rkgbckv@yahoo.com, rkgbck@rediffmail.com.]

PATENT

Patent for underwater sampler

Patent has been granted by the Patent Office, Govt. of India for "Underwater water sampler for collecting water sample for Limnological work (Patent No. 203213 (318/CAL/2001) dt. 31-5-2001) in the name of

Contd.to p15

Chandra Krishi Viswavidyalaya. The sampler has been invented by Dr. Mrinal Dasgupta, Reader (Research) in Fishery, Regional Research Station (New Alluvial Zone), Bidhan Chandra Krishi Viswavidyalaya, Gayespur, Nadia, West Bengal. The sampler is easily portable, and inexpensive. It enables sampling of water from different layers of water column without disturbing its properties or composition.

Other Patent applications in the name of Bidhan Chandra Krishi Viswavidyalaya on inventions made by Dr. Mrinal Dasgupta are on Underwater Soil Sampler (Patent application No. 133/KOL/2004. Dt. 23-3-2004) and Underwater Water Sampler (Patent application No. 635/KOL/2005. Dt. 20-7-2005).

Assistance for filing the Patent application has been provided by TIFAC. DST, New Delhi and DST, PFC, Govt. of West Bengal.

BIO FUEL

New energy crops analyzed for biofuel greenhouse gas releases

Cellulosic biomass, such as switchgrass, alfalfa, reed canary grass and hybrid poplar, proposed as "future dedicated energy crops" can reduce greenhouse gas emissions. This is the result of analysis done by researchers from the Colorado State University, Natural Resource Ecology Laboratory and the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) for their capacity to reduce greenhouse gas (GHG) emissions. Using life cycle analysis and the DAYCENT Biogeochemistry model, they have found that cellulosic biomass feedstocks (switchgrass and hybrid poplar) can reduce GHG emissions by about 115%. Non-cellulosic biomass (corn ethanol and soybean biodiesel) can do the same by only 40%. Reed canary grass can reduce GHG emissions by 85%. Although GHG emitting fossil-fuel-inputs are inevitable in biofuel production, bioenergy crops have the ability to offset this by absorbing CO₂ greenhouse gases while they are grown in plantations. [More information at <http://www.isaaa.org/kc/cropbiotechupdate/news/2007/04/12.html>]

Spanish corn for cars

The leaves and stalks of a new corn variety, developed by Michigan State University (MSU) researchers, are just as important as its kernels. The corn variety contains enzymes that

can easily break down the cellulose and hemicellulose into simple sugars in their leaves for the production of ethanol. In this way, the production of ethanol will be more cost-effective and efficient. The farmers can sell not only the corn grains but also the leaves and stalks for ethanol production. "What is now a waste product will become an economically viable commodity." [Read the news release at <http://newsfrom.msu.edu/site/indexer/3080/content.html>]

BIO-DRAINAGE A NEW CONCEPT OF DRAINAGE

The bio-drainage system involves growing certain categories of plants that habitually draw their main water supply directly from the groundwater or the capillary fringe just below it. A number of trees are included in this group such as *Eucalyptus*, poplar (*Populus deltoids*) and *Acacia* spp. Similarly, non-woody plants like bushes, sedges, grasses are called as 'phreatophytes'. The two species of *Eucalyptus*, namely, *Eucalyptus tereticornis* and *Eucalyptus camaldulensis* are commonly used as bio-drainage plant. These plants transpire luxuriantly when groundwater-contact has been made. These plants obviously use much less than is necessary for normal growth. [Supplied by : Dr. Hiral Banerjee, Lecturer (Res.) Dept. of Agronomy, B.C.K.V.]

GENE CONTROLLING RICE GRAIN SIZE AND WEIGHT IDENTIFIED

A team of scientists led by Prof. Hongxuan of the National Key Laboratory of Plant Molecular Genetics, Shanghai Institute of Plant Physiology and Ecology China, have successfully cloned a gene, *GW2*, which controls the size and weight of rice grains. Rice plants that lack a functional copy of *GW2* produce bigger rice grains with more cells and wider spikelet hulls, which results in an increase in yield. *GW2* acts by restricting the rate at which cells divide during the formation of the grain. As grain size is critical agronomic quality, *GW2* could, therefore, be an important tool for improving production. The research is reported in the latest issue of Nature Genetics. [More information at : <http://english.cas.ac.cn/eng2003/news/detailnew.sb.asp?InfoNo26498>]