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**Together we will protect our crops**

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## Biorobotics in Agriculture--

IN OUR Vol. 2, No. 2 issue we stated, while discussing the place of nano wave in changing the face of agriculture, that while ABI (atomic, biotechnological and IT) technologies dominated the 20th Century, the 21st century will see more dramatic changes with the emerging technologies (genomics, nanotech, robotics). We have discussed the interface of genomics including proteomics and nanotechnology with crop protection. That with biorobotics is more distant. What are the indicators? Let us look into the possibilities very briefly. NASA has been working with agricultural scientists since the 1999 launch of Landsat 7. It leads to improved water management techniques. In July 2007 use of Landsat data continuity mission operational land imager provided pixel ground sampling distances between 14-30 m depending on spectral band.

Key drawers to the technology in agriculture are lack of labour, high employment costs, reduced fertility of soils, the need to raise yields, regulatory requirements relating to traceability and green considerations. The latter include the desire to reduce the usage of pest and disease control chemicals, and to reduce the use of chemical fertilizers.

➤ As well as satellite imagery and GPS (Global Positioning Systems), other technologies that are being utilised include, aerial thermal imaging, visual spectrum and near infrared imaging, image recognition, autonomous vehicles, robotics and wireless instrument networks.

We know PF (precision farming) uses technologies like GPS and GIS (geographic information system) to gather and process large amounts of data which can be analysed to inform farm management decisions. Using aerial and land based observations it is possible to identify areas of a field that require more N, pH adjustment, organic matter, water or treatment for pests. This information is then entered into a GIS and data loaded on an on-vehicle computer. As the tractor traverses the field individual spray nozzles, linked to the computer on a CAN network, are controlled to treat only the necessary areas, or fertilisers are accurately dosed to treat only those areas low in nutrients, based on GIS mapped information and the actual position of the tractor as determined by GPS. Using the technology one farmer reported a 30-40% cut in use of N and 20% cut in pesticide use.

For this form of farming to be effective farmers need to know which part of the field provide higher and lower yields, not just for data of a field as a whole. 17000 of such tools are in use in USA at present. They are mounted on harvesters to provide data on yield per area, wet and dry measures of yield, moisture content and other relevant measurements.

To alleviate the need for so much data about multiple locations (GPS coordinates), field grid systems are being developed to provide soil analysis on the move using various electrochemical, electromagnetic, mechanical, optical and radiometric principles to determine the soil condition. Automated vehicles are now in use for drip irrigation through as many as 170 pumps. As the irrigation machine traverses the field under the control of GPS and GIS, its onboard computer adjusts the water delivery by multiple mid-and low-level precision spray nozzles based on inputs from a base station like the Real time Kinematic (RTK) that provide centimeter guidance accuracy.

Rental use of this expensive network (RTK) is now available in USA. Trimble Ag now covers more than 120 million acres of farmland in USA. Hokkaido University Scientists developed an autonomous guidance system that controlled a tractor for

**AAPP wishes all readers  
HAPPY NEW YEAR 2009**



## The March of the Maldah Mango: Three Varieties from Maldah has got GI Registration--

**Shantanu Jha**, Professor of Entomology, BCKV, Mohanpur, WB, 741252 E-Mail: [shantanujha@gmail.com](mailto:shantanujha@gmail.com)

**WHAT IS GI ?** -- Geographical Indication (GI) in relation to goods identifies such goods as agricultural, natural or manufactured, as originating or manufactured in the territory of a Country, or a region or locality in that territory, where a given quality, reputation or other characteristics of such goods are essentially attributable to its geographical origin. GIs help a community of producer to differentiate their products from competing products in the market. As a collective intellectual property right (IPR), GIs can also be used for protection of products based on traditional knowledge.



Lakshmanbhog



Khirsapati



Fazli

In view of their commercial potential, adequate legal protection of GIs becomes necessary to prevent their misappropriation. This has now become an essential requirement amongst WTO members for such products.

**Nodal Department in West Bengal** -- Government of West Bengal notified patent Information Centre under West Bengal State Council of Science & Technology, Department of Science & Technology, GoWB for filing all Geographical Indications of the State vide no

*Brought from page 1*

row-fallowing and end-of-row turning, making it possible to perform all field activities without human intervention. Combining standard GPS with correction signals from RTK base station networks, it is possible to achieve cm resolution of position

Work is in progress on robotic weeders capable of both inter-row and intra-row weeding and has posited the concept of the Ag Ant - an autonomous weeding robot that traverses field on the lookout for weeds. When an Ag Ant finds a patch it calls on other Ag Ants to help eradicate the weeds. It has been suggested that weeds could become the energy source for such robots!

➤ Totally different kind of early warning devices are being developed by plant scientists and engineers in the same fashion as canaries were once used to alert coal miners to harmful gases. But unlike the birds that simply stopped chirping and died in the presence of small amount of CH<sub>4</sub> and CO, the "SMART" technology reveal much. One such system was developed by Prof. Abhaya Dandekar (University of California, Davis) for citrus.

The detection is based on genetic responses used by host plants to communicate stress caused by pests. The responses are measured in highly sensitive electronic devices which read the "biomarkers" or volatile organic

144/ST/P/S&T/MISC-15/2006 dated 24<sup>th</sup> January 2007.

**Lakshmanbhog, Khirsapati (Himsagar) and Fazli as first candidates for GI from WB** -- With the technical support from BCKV (Prof. S.Jha being the member of the Agriculture Advisory Committee of WBSCST coordinated the technical work), the first horticultural crops chosen for GI registration were three mango varieties from Maldah. Nearly 1.08 lakh orchards covering 20.4x10<sup>3</sup> ha of land in Maldah is providing livelihood to several lakhs of farmers of the district. It has been identified that Fazli can very well be

used for production of pulp, Khirsapati for juice and Lakshmanbhog for fresh export to the market of UK and USA. Lakshmanbhog can well compete with Alphonso in the international market for its flavour, colour and shelf life.

These three varieties have been allotted GI numbers 111, 112 and 113. The dates of allotment of the registration no. were 19.09.2007 for Lakshmanbhog and Khirsapati and

01.10.2007 for Fazli which were the actual dates of filing application for registration to the GI Registry office at Chennai.

A well planned post-GI activity is now required for reaping the benefit for the mango growers of our State.

Efforts for GI registration for meetha pan (*Piper betle* L.) is in progress. ■

compounds (VOC) released by plants under attack. Plants also emit scents when under stress from the problems like excessive heat or cold or inadequate nutrients.

A differential mobility spectrometer has been devised by these scientists to sniff out VOCs using the same principle used in oil industry, in explosives and narcotics detection at airports and biological/chemical warfares. Dandekar said researchers intend to decipher host plant symptoms early at the molecular level as by the time symptoms are expressed, management is often rendered fruitless.

Vision Robotics Corporation USA is developing a citrus harvester using stereoscopic vision to pinpoint the foliage-hidden fruits, be it apple or citrus. Potential uses include counts and size of fruits to estimate yield and locating portions of orchards that need more water or fertilizer. The Project Manager, Tim McConnell said that combining research on sensors for VOCs might result in robots with sensors on their arms to gather all sorts of information about tree health or pest control. Integration of GPS technology is planned to guide the robots precisely through groves with virtually no supervision. The economics of robotics are also being evaluated.

On behalf of the Editorial Board  
**Chitreshwar Sen,**  
Editor-in-Chief





● **Occurrence and Management of Terrestrial Garden Slug (*Laevicaulis alte*) in Sriniketan and Santiniketan area of Birbhum District of West Bengal, India--** RECENTLY (since past two years) a veritable onslaught of slugs (*Laevicaulis alte* Férussac) in the Sriniketan and Santiniketan Area of Birbhum district of West Bengal, India is being observed. These animals explore at night and significantly damage the home gardens. Every morning, one finds the dead bodies of large number of slugs on the main road.

The population hike may be due to ecological imbalance or due to shifts in environmental conditions towards population increase. The destruction of natural enemies of these creatures by the use of agrochemicals in the agricultural fields could not be ruled out. To date no report is



Figures: 1a-c: Yellow arrow-heads indicate the species characteristics of *L. alte*; 1d and 1e indicate their feeding behaviour.

available about the aggressive nature of these slugs from West Bengal. However, in India, occurrence of *L. alte* was reported from Andaman and Nicobar Islands, North Eastern hill regions, Rajasthan and Gujrat. The species characteristic is a mid-dorsal straight white line longitudinally (See figure). Observations revealed the existence of chromomorphs (Figure 1b, c). These animals are amphibious, body naked (coiled shell absent), soft, blackish or some times reddish brown with small black elongated spots, and a deep furrow around the margin separates the mantle from the foot.

The slugs are phytophagous. During daytime, they hide themselves under bushes, between stones, cracks of earth, unused earthen pots, and uncared wooden log where shady and humid environment prevails. Their activity increases between 8pm to 12 midnight. They generally attack house hold kitchen garden, flowers (dahlia, marigold, tube rose, poppy, etc.) and other herbs in seedling stage (critical stage for slug attack) feeding on the young shoots, newly emerged leaves etc

Prima facie management practices may include : (1) Hand picked and then killed by using NaCl. (2) Apply copper sulphate (1%) solution) or 5% metaldehyde or endosulfan 35EC @ 0.07%. Metaldehyde (Metadex, meta, Snail-kill) is the only molascicide available in the market. (3) Heaps of grasses, fallen leaves, straws and other farm-yard wastes, dried papaya leaves can be placed near the vegetable garden where the slugs are most likely to hide during day time.

These heaps can be destroyed along with slugs by burning. (4) Larvae of Indian glow worm *Lanprophorus tenebrosus* and of *Tetanocera* sp. lacerate flesh and feed on the slime secreted by the slugs.

**Parthapratim Ghosh, Avijit Bakshi & M. K. Dasgupta.** Sriniketan E-MAIL: oikos\_santiniketan@rediffmail.com.

(Editor's Note: Authors request information exchange on slug infestation records made elsewhere in WB).■

● **Mealybugs Jeopardise Papaya Cultivation in Indonesia and India--** THE MULTIMILLION \$ crop papaya is not only consumed raw as an exotic fruit, its latex papain is used commercially in the preparation of chewing gums, shampoo, tooth paste, tooth whiteness etc. It is also

used as meat tenderiser, in brewing and in textiles.

Papaya mealybug was initially reported from Mexico in 1992. It jumped adjoining countries and had spread rapidly to 13 Caribbean countries

and USA by 2000. In last May a team from IPM Collaborative Research Support Programme (IPM CRSP) found these mealybugs to devastate the crop in Java. Two months later, Dr Muni Muniappan, Director IPM CRSP recognised the telltale residue on papayas in TNAU plantations in Coimbatore! An alert was immediately sounded by the group. The pest is polyphagous and has wide host range (like cassava, eggplants, tomato, citrus, melons, mango etc.). On papaya plant the bug infests all parts of young leaves and fruits, mostly along veins and midrib of the



older leaves. Terminal shoots become bunchy and distorted. Affected trees drop flower and fruits. The bugs secrete a honey dew-like substance that turns into a sooty mouldy growth making the fruit inedible and unusable for papaya extraction.

Fortunately 3 natural enemies have been identified by USDA-APHIS Scientists that includes a parasitic wasp. They occur naturally in the Caribbean but not in SE Asia making the crop more vulnerable in this region. These parasitoids are being cultured in a laboratory in Puerto Rico and are offered free to the countries that request for them.

(Source: Miriam Rich, Newswise Science News. For information: Virginia Tech Univ., www.vet.edu).■

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# THE AAPP organises its 2<sup>nd</sup> AGM bang on time!

● **Proceedings of the Annual General Body Meeting of AAPP Held on September, 24, 2008**— THE MEETING started with a welcome address by the Secretary of the Society, Dr. Shantanu Jha. He presented the performance



and achievements of the Society during the last year. He stated that eleven issues of *Newsletter* containing different types of articles have been published by the Society and 3 issues of the *Sashya Suraksha*, the vernacular publication interfaced to the requirements of the agrarian community of the State. The First National Symposium on '*Plant Protection-Technology Interface*' was organised with great fanfare and success. The Biocontrol and Biotechnology sessions saw international participation. For each poster session the top three posters rated by a panel of Judges were awarded citation and mementoes. A special feature was participation of major pesticide industries in a session chaired by Mr Pradip Majumdar, Advisor, Syngenta, wherein they presented plant protection from the point of view of the Industry. Plenary session was chaired by Dr Satyabrata Maiti, Director, Directorate of Medicinal & Aromatic Plants, Boriavi, Gujarat and it was recommended that the Symposium be organised every two years to reassess the technology interface of Plant Protection. The recommendations were circulated among all relevant Administrative organisations. Brain storming sessions on different issues especially on *Impact of Climate Change on Agriculture* and on *Shifts in Pest and Pathogen Scenario* were also organized.

The Secretary appealed to all the agricultural technocrats to join this august organization and getting involved with the activities of the Society. He suggested that since the Society is expanding, a separate office was indicated. He informed the House that the Society is planning to publish a Journal named "*The Journal of Plant Protection Sciences*". He

appealed to all scientific communities and their individuals to send their original research papers for publication in the Journal and proposed that the Ms be communicated electronically through e-mail. He appraised the house that the Society website will be launched hopefully within December, 2008. All queries, articles may be routed through the E-mail.id:aapp\_bckv@yahoo.co.in. Lastly, he appealed to the members for discussion, constructive criticism and fruitful proposals for strengthening the future activities of the Societies.

➤ Secretary's address was followed by the Presidential address. The President *Prof. D.K. Bagchi*, the former Vice-Chancellor of BCKV, in his address praised the Society for significant activities in the publication sector, especially the Newsletter and the *Sashya Suraksha*. He also appealed to the members to act accordingly for the benefit of the agrarian community of the State. He also suggested that the Society-Farmers' Meet be organised at least thrice a year during the three different cropping seasons for identifying the local as well as regional problems. The suggestions and recommendations/remedies may be published in a holistic manner in *Sashya Suraksha* to be fruitfully effective for the agrarian community of the State. During the open-ended discussions that followed *Prof. C. Sen* requested and appealed for the views of the house for improvement of the quality of AAPP Newsletter and expressed his concern regarding the lack of participation of the students and young scientists for contributing their innovative research findings in it. He made a clarion call for greater participation from the young and budding scientific community. *Prof. N. Mukherjee* asked the house for critical discussion and sharing their views regarding the improvement of the quality of the Bengali Bulletin. He also informed that from 2009 quarterly four issues will be published within January to December. *Prof. M Adhikari*, Dean, Faculty of Agriculture, stated that he will provide all



help and cooperation for the benefit of the Society. *Prof. S.K. Mitra*, Dean, Faculty of Horticulture, praised the content and quality of both the Bengali Bulletin and English Newsletter and also suggested for the preparation of crop-wise CD for insect pests and disease management. *Prof. S.K. Sanyal*, Director of Research congratulated the Society for successfully publishing the AAPP Newsletter and



Bengali bulletin. He suggested that Keynote addresses and invited articles on relevant fields should also improve the quality of the Newsletter. He also stated that photographs of the infected field as well as the photographs under recommended managed conditions, if depicted, would improve the quality and impact of the Bengali Bulletin among the agrarian community of the State. *Prof. A.K. Mukhopadhyay* suggested that more efforts be initiated for wide level circulation of the Newsletter throughout the country.

➤ The Audit and Financial Report (2007-08) of the Society was presented by *Dr. S.K. Ray*, Treasurer and was unanimously accepted by the members. *Prof. P.S. Nath* informed the House that more than 200 copies of the Newsletter were sent to different SAUs and ICAR Institutes. *Dr. K. Goswami* thanked the Society for the publication work. He also informed that Sashya Suraksha would be included in different training programmes conducted by the Gayespur KVK.

➤ *Prof. S. Jha*, Secretary, AAPP, appealed to the students and scientists for joining and working together for the Society. He proposed a change in the address of the Society Office from Plant Protection Unit, BCKV, Mohanpur, Nadia-741252 to Plant Health Clinic, Directorate of Research, BCKV, Kalyani, Nadia-741235. The Secretary also proposed some changes in the composition of the Governing Body and EC members. Members present in the AGM approved the proposals so made and requested the Governing Body and EC members to continue functioning for the year 2008-2009.

➤ The AGM ended with vote of thanks by *Prof. S. Jha*, Secretary, AAPP and was followed by a very illuminative and instructive address by the well-known Economist, *Dr. P. N. Roy*.

(Compiled by: *Subrata Dutta*, BCKV, Mohanpur) ■

● **Colloquium on Globalisation & Food Security**— CONCURRENTLY with the AGM a Colloquium was organised on “*Globalisation and Food Security*” with a single speaker, *Prof. P. N. Roy*, Eminent Economist, Former Pro-Vice-Chancellor, Calcutta University & Member, State Planning Board. *Prof. Roy* has a vast repertoire of knowledge base primarily on capital markets.

Defining globalization (G), *Prof. Roy* stated that it could be looked into from the point of view of a political background of an economist or from that of an Historian of which the later has often proved incorrect. The contemporary G is different from present day G which is a resultant of a ‘neo liberalism’. There appears to be an ‘invisible hand’ that harmonises the society which in turn is harmonized by the market (financial). Neoliberalism today speaks of a world order sans neoliberalism of traditional days. The MNCs devised the present day world order calling it the “Washington’s consensus of World order”.

Post Washington imperialism plays a key role in the financial market trends. MNCs propagate a stable World order - a World view of G. Internationalisation relates to international trade apart from the “Commodity push”. G has led to a massive increase in productivity and movement while promoting an unstable economy that introduces

uncertainty leading to the disastrous environmental situation in which we find ourselves today. They happened because in US a large proportion of people do not exercise their rights. When rate of growth exceeds that of production, we have G.

The prime question - is US central to G or is G a broader based phenomenon? One has to remember that G relates to free capital flow not necessarily physical. It may refer only to movement of financial capital. The second point to ponder about G portends the equity market. Lehman Bros., Stanley Morgan etc. estimated that movement of equity was from 120 bil to 14 bil, bank loans from 385 bil to 7.4 tril from 1990 to 1993 and dividends from 259 bil to 1.4 tril from one country to another. It is to be understood that sub-prime market volatility refers to the capital markets and hence its borrowers are not credit worthy. This large movement of funds internationally is the resultant of contemporary G. Mutual funds emphasise on fiscal deficits instead of revenue deficit.

According to *Prof. Roy* the US-India nuclear deal and the agricultural deal actually promoted more corporates towards India. The agriculture deal promoted introduction of Bt related seeds in India especially the Bt cotton.

The end result of this unbalanced flow resulted in a global deflation which shrinks expenditure at all levels and may lead to negative rates of growth in agriculture. Thus, according to IRRI, productivity of rice is reduced resulting in food insecurity especially in sub-Saharan region. The point to ponder is whether we are talking about gross productivity or rate of increase in productivity? Increased investment related to testing of foreign products in Indian soils to increase productivity leads to price inflation. Finally, foreign MNCs, are well entrenched now in Indian soil and are fighting a battle.

The resultant of all this is that foreign investment in Indian agriculture cannot be prevented. This passes the onus onto Indian Scientists who need to develop our own systems for food security bypassing what is being pushed by the MNCs.

*Prof. S. Jha*, Secretary AAPP opened the discussion by



pointing out the risks involved in GM testing. He also emphasised the overt risks of increasing land demands for biofuel crops, again a resultant of G. *Dr. Sanjib Mukherjee* also talked about the biofuel-food security mismatch. *Dr. N. Mukherji* pointed out that the input market is being exonerably taken over by foreign MNCs. *Dr. C. Sen* talked about the praxis of food security.

Finally the Colloquium ended with a vote of thanks from *Prof. S. Jha*, Secretary AAPP. ■



### Pesticides Inducing Mortality of Globally Threatened Sarus Cranes *Grus antigoni*--

THE SARUS crane, *Grus antigoni*, is the only resident breeding crane in India and Southeast Asia, and is the world's tallest flying bird. The current range of these cranes includes the plains of northern, northwestern, and western India and the western half of Nepal's Terai lowlands. The population has declined sharply over the last several decades. This decline is probably continuing, given the species' relatively low enrollment rate within India. These cranes are most common and densely distributed in the Indian states of Uttar Pradesh, Rajasthan, Gujarat, and Haryana; they are less common in Bihar and Madhya Pradesh. The population in Nepal is small (200-500) and apparently declining. In Pakistan, India's Punjab, and western Bangladesh, this crane now occurs rarely. Since 1993, a few have been observed along the Indus River in Pakistan not far from the border with India in Sindh/Rajasthan.

The Sarus crane is listed as vulnerable on the IUCN Red List 2007 because it has suffered a rapid population decline, which is projected to continue, as a result of widespread reduction in the extent and quality of its wetland habitats, exploitation and the effects of pollutants. Human population growth and intensified agricultural production also have indirect impacts on wetland habitat, including hydrological changes, high rates of sewage inflow, extensive agricultural runoff, and high levels of pesticide residues. These have significantly affected water and wetland quality in India, Nepal, Vietnam, Philippines and other areas - which in turn is the key reason for declining of the Indian Sarus population.

Intensive pesticides use in the crops especially wheat and mustard are also thought to be responsible for declining population of cranes in the Bharatpur region of the Rajasthan state in India. Aldrin has already proved

dangerous to these cranes in Keoladeo National Park of Bharatpur (KNP), Rajasthan. Between 1988 and 1990 the park lost 18 cranes. On 23 November 2000, 15 such cranes and 3 common cranes were found dead in a field adjacent to the KNP where wheat seed had been sown the previous day. Chemical analysis of seed samples from the field and the crane's alimentary tract contents identified residues of the organophosphate insecticide monocrotophos. These different case studies clearly indicated that area expansion and large scale intensification of agricultural systems and random use of organochlorine and organophosphate pesticides has

ultimately affected the wetland habitat and specially threatened the Indian Sarus crane population.

The main threats identified are a combination of loss and degradation of wetlands, as a

result of drainage and conversion to agriculture, wetland pollution from pesticides, fertilisers and industrial effluent, siltation owing to catchment deforestation and river basin alterations. The measures for conservation of Indian Sarus cranes include : (1) enactment of strong laws at the national level to protect them. Conservation awareness campaigns should be conducted among communities in and around important sites of these birds. (2) Identify and secure protection for important Sarus cranes breeding areas in India and control pesticide use and industrial effluent disposal around feeding areas. ■



## GM NEWS

### ● Gene-Silencing Technique to be Deployed Against Soybean Fungus--

THE SOYBEAN rust fungus *Phakopsora pachyrhizi* may meet its match, thanks to a gene-silencing technique that scientists of the ARS-USDA plan to deploy to identify genes that enable plants to naturally resist this fungal foe.

Molecular biologist Kerry Pedley, will use gene silencing to discover plant genes that play a role in orchestrating defense responses to *P. pachyrhizi* in resistant soybeans. The fungus causes substantial losses to soybeans worldwide. Gene silencing allows scientists to identify a gene's function by disabling that gene in plants or other organisms, challenging the organism in some way--such as with exposure to a pathogen--and observing the consequences that result from that gene having been "missing in action."

The ultimate goal of Pedley's research is to streamline the development of new soybean cultivars that can withstand *P. pachyrhizi*, which causes a foliar disease that severely



weakens the plant and diminishes its seed yields and quality.

(Source: Plant Health Progress, November 5, 2008).■

### ● Monsanto Predicts GM Crops Coming to UK Soon--

BIOTECH giant Monsanto is predicting that genetically modified crops will arrive in the UK soon. Monsanto's head of external affairs, Colin Merritt, insists the biotech industry has learned its lessons from the past and is developing and marketing the next generation of GM products with the consumer very much in mind.

However, opponents of GM crops believe the biotech



industry will never win the battle in the UK. They do not believe the industry is capable of producing complex products able to benefit wider society. "The consumer will have the last word. Opponents of GM crops are winning the war, not because of media hype or fear, but because the science is supporting them," Soil Association policy director Peter Melchett said.

(Source: Alistair Driver, Farmer's Guardian, 25th Nov., '08) ■

### ● **Vietnam to Grow Genetically Modified Crops--**

VIETNAM plans to test genetically modified (GM) agricultural crops from now until 2010 and then grow them on a large scale. Agriculture Minister Cao Duc Phat announced the plan in a National Assembly session this week, said the state-run Vietnam News Agency. Under the government plan, Vietnam would from 2011 plant GM species of maize, cotton and soybean, said the news site Vietnamnet quoting experts attending a recent biotechnology Workshop. The Ho Chi Minh City Biotechnology Centre plans to grow a GM maize variety from the Philippines on a trial basis. GM technology has been highly controversial, praised by some for increasing yields and improving varieties, and condemned by others for creating " Frankenfoods " that pose dangers to the environment and people's health.



## PESTS AND THEIR MANAGEMENT

● **Tillage, Rotation impacts Groundnut Crops--** THE INCREASING popularity of reduced tillage on crops has not only been an important development in combating soil erosion, but it has also been associated with increasing organic material and producing high crop yields. For groundnut crops, however, reduced tillage has not gained a large acceptance as a viable practice, as findings of inconsistent yields have not encouraged farmers to make a switch from conventional tillage systems.

New research study was conducted on the effects of tillage systems and crop rotation on groundnut yield and pest development in the crops. The study, conducted at North Carolina State University, was recently published in Agronomy Journal.

The study found that there is an independent relationship between tillage and rotation practices with respect to groundnut yield and pest development.

The primary objective of this research was to determine interactions of crop rotations and tillage systems with respect to peanut. The study did find that the tillage system used have an effect on the development of tomato spotted wilt, a disease common in southern growing states.



Environmental group Greenpeace has called for a worldwide recall of GM foods.

(Source: Yahoo News!, 14<sup>th</sup> Nov., '08) ■

### ● **GM Crops Found to Affect Reproduction in Mice: Austrian Study--**

GENETICALLY-MODIFIED maize can affect reproduction in mice, The long-term study commissioned by the Austrian health ministry found that female mice that had been given a diet consisting of 33 percent genetically-modified (GM) maize had fewer babies and fewer litters than those fed on non-GM food after a few generations.

But the authors of the study pointed out that these were only initial findings and that further tests were needed to confirm the effect of GM foods on other animals and on humans.

Environmental groups like Global 2000 and Greenpeace were quick to seize on the study to call for a ban on all GM crops. Considering the

severity of the potential threat to human health and reproduction, Greenpeace is demanding "a recall of all GE (Genetically-engineered) food and crops from the market, worldwide," the group said in a statement. Distributing GM foods was "like playing Russian roulette with consumers and public health," added Greenpeace's GM expert Jan van Aken.

(Source: <http://news.yahoo.com> AFP/DDP/File Nov. 12, 2008) ■

Additionally, the research also determined that the most effective method found to increase crop yield and manage pests is to increase the number of years between groundnut plantings.

Additional research is needed in other geographical regions to study alternative crops, soil characteristics, and other pest complexes.

(Source: *Agron J*, 100:1580-86 (2008). ScienceDaily (Nov. 10, 2008). ■

**Bean Leaf Beetles on Soybean --** SOYBEANS grown for seed or late maturing beans need to be monitored for bean leaf beetle damage as leaves begin to yellow and pods start maturing. Pod surface become scarred. During maturation these pods often crack leaving a jagged hole for air-borne plant pathogens that

may cause discoloured, mouldy, shrivelled seeds of poor quality. The extent of damage depends on the number of beetles present and stage of pod development. Yellow and matured pods hardly attract the



beetles and infestation at yellowing stage attracts no management schedules. Population of beetles can be determined using a sweep net. Five sets of 20 sweeps usually

suffice. This beetle is especially important as it is also the vector of Bean Pod Mottle Virus. The virus symptom includes green stem and hilum bleeding. Most treatments for beetle control are warranted if the beetle population crosses a threshold early in the season (8-12/pods per season while pods are still green).

(Source: <http://extension.entm.purdue.edu/pestcrop/index.html>).

● **Sugarcane Early Shoot Borer Management** -- SUGARCANE is grown mainly during December-May in Tamil Nadu. The main sugarcane planting seasons are categorized as early planting (Dec -Jan), mid planting (Feb -March) late planting (April-May) and special season (June -Sep) grown in parts of Tiruchirapalli, Perambalur, Karur, Salem, Namakkal and Coimbatore districts. The crop grown in the special season is mostly damaged by early shoot borer and other insect pests. The pest damages mostly 1-3 months old crop.

The caterpillars of the shoot borer cause dead hearts in young plants. The dead hearts in young plants formed at shoot stage can be pulled out easily. They emit foul odour and the canes are also damaged.

Small pale greyish brown moth lays white flat eggs in clusters of 8-60 eggs in 3 to 5 rows on the under surface of the leaf sheaths. The larvae that hatch from the eggs in 1-6 days get scattered and enter the stem by making a hole just above the ground level. The larva may migrate and attack a number of shoots similarly. It becomes full grown in 25-30 days and pupates inside the stem. Adult moth emerges in 6-8 days. The total life cycle is completed in 35-40 days.

Early season planting is ideal to evade the pest damage:

(1). Intercropping with green gram, black gram, daincha effectively checks shoot borer. (2) Spray granulosis virus twice on 35 and 50 days after planting or release 125 gravid females of *Sturmiopsis inferens*/ha on 30 and 45 DAP. The virus should be applied with teepol (0.05 per cent) during evening hours immediately followed by irrigation.

(Source: The Hindu, Oct.30, 2008)

● **New Genetic Resources for Cereal Crops--** SCIENTISTS have developed a special population of



plants of the wild grass *Brachypodium distachyon* (Brachypodium) that will help speed up scientists' search for genes that could help wheat and other major crops resist diseases such as Ug99, a form of stem rust that threatens 80 percent of the world's wheat.

The plants developed by ARS plant geneticist David Garvin are the first recombinant inbred line (RILs) population of Brachypodium. This means offspring of each line in the population will

retain the same genetic identity in perpetuity. This allows

scientists to more efficiently explore the genetic and molecular basis of a range of traits.

The ability to work with large numbers of plants with the same genetic makeup gives scientists the opportunity to obtain highly accurate information on the number of genes that control a trait. This provides a strong start toward identifying the location of these genes on Brachypodium chromosomes.

It took Garvin more than three years to create the RILs. The research involved crosses and growing the entire population to maturity repeatedly to fix the genetic make-up of each plant.

(Source: Plant Health Progress, Posted 10 November 2008)

● **Scientists Pit Fungus Against Apple Pest--** A COCKTAIL of gaseous compounds emitted by a beneficial fungus may offer a way to biologically fumigate stored apples, ridding them of codling moth larvae.

That's the implication of studies conducted by entomologist Lerry Lacey and others at the Agricultural Research Service's (ARS) Yakima Agricultural Research Laboratory in Wapato, Wash. In earlier studies, they showed that a blend of alcohols, esters and other gases released by the fungus *Muscodor albus* killed adult

potato tuber moths and larvae, costly pests of stored tubers.

In the Pacific Northwest, codling moths (*Cydia pomonella*)



are problematic for both growers and distributors. Stored apples are often fumigated with broad-spectrum chemicals when the fruit is destined for foreign markets. However, biobased treatments may provide options for codling-moth control with economic and environmental advantages over standard chemical fumigation.

Lacey placed adult codling moths inside special fumigation chambers and exposed them for three days to fungal fumes that killed 83% of the insects. Similarly exposing the larvae killed up to 87%, depending on their developmental stage. The fungal gases even reached larvae that burrowed inside apples, killing 73% of the pests.

Although the initial short-exposure tests didn't yield results comparable to broad-spectrum chemicals, biofumigation's full potential has yet to be evaluated within apple cartons, where the pests will be exposed to fungal fumes for prolonged periods of time. For example, 14-day exposures of the moth's overwintering stage--cocooned larvae, which are the hardest to control--resulted in 100% mortality.

Research by AgraQuest and others has also shown *Muscodor*'s potential to kill other fungi and bacteria harmful to stored fruit and vegetables and to humans.

(Source: *Biological pest control*, From Wikipedia, the free encyclopedia. Posted Oct.25, 2008)