ASSOCIATION FOR ADVANCEMENT IN PLANT PROTECTION

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Together we will protect our crops

Inside This Issue

From the Editors' Desk :

It sometimes becomes necessary to try and reassess certain issues that at one time in the recent past had seen extensive public debate and thought to have been resolved. This becomes especially relevant when different debatable news are breaking all around, be it in the plant protection front or the AAPP agenda. Breaking news apart, what probably is more meaningful would be to put up some suggestions on a draft policy on '**Jai Kisan: A Draft National Policy for Farmers**' framed initially by the outstanding Swaminathan Foundation which was also instrumental in framing many other policies as base paper for Acts that are being formulated, directed towards various aspects of agriculture and its stakeholders. Although it is belated, some issues may still be pertinent and may be highlighted even now, as it is yet to be transformed into an Act.

Salient features of the suggestions are outlined :

- Sudden spate of National Policies and initiatives related to the agricultural and rural agenda since the beginning of the new millennium show a lot of overlap and if all of these are converted into several Acts, they are likely to provide escape routes to the unscrupulous, the percentage of whom, even if unassessed, are not likely to be insignificant. It will therefore be preferable to have an overall master plan for rural people, rural development and rural management encompassing all aspects of farming, farming communities, their lives, rights and duties. Divided into discrete components and then identifying their compartments and linkages in the form of a flow diagram,there is need to work out the details of each such components and compartments and finally identify the relevant competent authorities for implementation at each level to be identified. The gaps between such components, if any, then can be bridged through supplementary projects assigned to NGOs whose credibility in rural India is already established; the research components thus identified may be assigned as thrust areas for CAUs, SAUs, KVKs, AICRPs etc. A case in point is suggested in the draft plan under the clause 2.1.9.
- The present Policy document entitled Jai Kisan while trying to talk about Farmer's rights encompasses all aspects of farmers, their lives, as individuals, a family, a member of a community and the network over the national scenario giving a comprehensive elaboration of the interacting interfaces. However, an ideal policy is not always a practical, implementable one and such wide canvas over which it is planned is bound to be laced with contradictions both within and between the related policies and acts being simultaneously laid out. While developing a policy, unless the implementing authority is simultaneously planned given the Administrative, bureaucratic, ground level scenario of the different States within the country instead of eulogising or even drawing examples from what has been achieved say in China or Israel or Pakistan for that matter is a redundant exercise. What is achievable in such countries may not be meaningful or achievable in our country given our socio-ethnic and cultural background as well as the democratic and demographic framework within which the country operates.
- As a base paper the document has most of the raw materials necessary for pruning, and fine tuning into a practicable master plan initially. To transform it into a bill, then into an act and finally working out the statutes for smooth operation will be difficult unless the policy, instead of being ideal and all encompassing, is made practicable.
- Since this policy document directly correlates Farmer's rights with scientific research inputs to cater to their immediate needs and especially during crisis or disaster management, some redefining of thrust areas in research is preordained. This particularly includes agrinformatics action research for site-specific cropping systems management.Agricultural Information Network Service should be broadened to National Agricultural Informatics & Advisory Network System, the operative tools of which are Site-Specific Crop Management facilitated through Geographical Information System(GIS) and automatic control of plant machinery. It incorporates Comprehensive Precision Agriculture as being adopted limitedly in Punjab or may use Change Detection Analysis & Monitoring as deviced at IIT, Kharagpur for GIS of wetland and adjacent upland.
- We congratulate the framers for their gigantic effort in developing the base paper.

Some of the contradictions and overlaps in the presentation have been enlisted in detail - clause-wise at the AAPP and, if still meaningful, may be passed on for further consideration to those who need them, if at all, on request.

AAPP has been looking for lasting relationships and if in this or similar agenda we could become partners, it will be lasting, meaningful and commensurate with our objectives.

It is to be hoped that the Newsletter will continue to be printed on schedule. Only there may be a slight change at the head of the Editorial Committee.

Adios!

Chitreshwar Sen

on behalf of the editorial board

THE DEBATE : CLIMATE CHANGE REVISITED

Some time back we focussed on climate change and its relevance to agriculture in general and plant protection in particular.Since then the agenda has heated up and is ready to boil over.

Millions at risk of hunger and water stress in Asia unless global greenhouse emissions are cut - IPCC Report.

Achim Steiner, Executive Director of the United Nations Environment Programme (UNEP) which is a co-founder of the IPCC, said: "*Unchecked climate change will be an environmental and economic catastrophe but above all it will be a human tragedy. It is absolutely vital that international action is taken now to avoid dangerous climate change. Otherwise the consequences for food and water security in Asia, as for many other parts of the world are too alarming to contemplate".*

Action however cannot be confined to curbing greenhouse gases. Some level of climate change is inevitable as a result of pollution already in the atmosphere. Therefore action is also needed at the national level to mainstream 'climate proofing' into all areas of economic life so that countries and communities in the region have a chance to adapt and thus have a chance to avoid some of the more extreme impacts. Water, sea levels, biodiversity and adaptation are key parameters that need immediate attention.

UN Secretary-General Ban Ki-moon said '*slowing and even reversing the effects of climate change is the defining challenge of our age. Concerted and sustained action now can still avoid some of the most catastrophic scenarios in the IPCC forecasts. The breakthrough needed in Bali is an agreement to launch for negotiations for a comprehensive climate change deal that all nations can embrace - developed and developing countries alike. Scientists have now done their work and I call on political leaders to do theirs and agree not only to launch these negotiations but also to conclude them by 2009'.*

IPCC Chairman Rajendra Pachauri said governments have "*a wide variety of policies and instruments*" available to create incentives to mitigate behaviour especially in the area of carbon emissions.

Facing a Threat to Farming and Food Supply

There will be a tripling of world food demand by 2085 because of higher population and bigger economies, and it would not be surprising if one-third of today's agricultural land are devoted to plants for ethanol. So it's going to be a tight race between food supply and demand. The work of developing adaptive plants has begun to pay off. Researchers have discovered ancient varieties of Persian grasses, for example, that have an incredible tolerance for salt water. The scientists are breeding the grasses with commercial varieties of wheat and have found they are growing well in Australia's increasingly salty soils.

Other research is building on the recent discovery of a gene that helps plants survive prolonged periods underwater. Recent tests on farms in Bangladesh show that a new line of rice containing the flood-resistance gene can live underwater for 10-12 days. Drought resistant maize plants, created by breeding, produced 30 to 50% more corn than traditional.

Crops grown this way also trap carbon more effectively, becoming part of the solution instead of adding to the problem.

Six key elements needed for putting in place effective adaptation responses are:

(1) conviction that climate changes are real and likely to continue;(2) confidence that these changes will significantly impact on their enterprise;(3) technical and other options to respond to the changes; (4) support to make the transitions to new conditions;(5) new infrastructure, policies and institutions to support the new management and land use arrangements; (6) targeted monitoring of adaptations to learn what works, what does not and why (http://www.sciencedaily.com).

The Indian Council of Agricultural Research (ICAR) of the Ministry of Agriculture plans to focus on R&D and deployment of new technologies to cope with the impact of climate change in Indian agriculture. ICAR's two-day National Conference on Climate Change and Indian Agriculture held on 12-13 Oct 2007 recommended a series of policy measures and action plan to increase the country's preparedness for management of likely effects of CC. ICAR recommendations include:

- Strengthen research on impact assessment on production resources, crops, livestock, fisheries and microbes;
- institutionalize the monitoring of phenology as a bio-indicator of climate variability;
- intensify search for genes for stress tolerance and research efforts on marker aided selection (MAS) and transgenic development(GM crops) for biotic and abiotic stress management;
- develop heat and drought tolerant genotypes;
- attempt transforming C3 plants to C4 plants; enhance genetic potential and use of engineered microbes for biofuels;
- develop new land use systems and enhance value added weather management services.
- It also calls for exploring international partnership and establishing' Green Research Fund' to strengthen research on adaptation, mitigation and impact assessment on climate change.

(Source: Crop Biotech Update/ www.icar.org. Nov. 29,2007).

The editors solicit comments & opinions for or against the thought muted above.They will be published in the next issue

ABOUT PESTS & THEIR MANAGEMENT

● **Tracking the Ug-99 Puccinia --** ***We reported the threat of resurgence of black rust sometime back. Is it being tracked?***

The disease spreads by wind-blown fungal spores. In the United States, planting highly resistant wheat varieties in the southern United States where stem rust fungus can survive winter could prevent the disease from taking hold in the South and then spreading to the rest of the country. We reported Ug99 has overcome most of the stem rust resistance genes bred into wheat varieties during the past several decades.

Last year, ARS Cereal Disease Laboratory (CDL) plant pathologist Yue Jin confirmed a new, even more virulent variant of Ug99 in Kenya. His colleague, geneticist Les Szabo, also at the CDL in St. Paul, Minn., leads the stem rust genome project.

Nationally, ARS scientists and university cooperators have planted susceptible and resistant wheat varieties at various locations around the country to watch for new rust strains.

Recently the CDL has taken up an ambitious Project under Dr. R. P. Singh and associates to work out the status, likely migration and strategies to mitigate the threat to wheat production from race UG99 (TTKS) of stem rust pathogen . (http://www.cababstractsplus.org/cabreviews. Last Modified: 01/26/2008).

Detection and spread in East Africa of race TTKS, commonly known as Ug99, is of high significance as most wheat cultivars currently grown in its likely migration path, i.e. to North Africa through Arabian Peninsula and then to Middle East and Asia, are highly susceptible to this race and the environment is conducive to disease epidemics. Identifying/developing adapted resistant cultivars in a relatively short time and replacing the susceptible cultivars before rust migrates out of East Africa is the strategy to mitigate potential losses. Although several alien genes will provide resistance to this race, the long-term strategy should focus on rebuilding the "Sr2-complex" (combination of slow rusting gene Sr2 with other unknown additive genes of similar nature) to achieve long-term durability. A Global Rust Initiative has been launched to monitor the further migration of this race, facilitate field testing in Kenya or Ethiopia of wheat cultivars and germplasm developed by wheat breeding programs worldwide, understand the genetic basis of resistance especially the durable type, carry out targeted breeding to incorporate diverse resistance genes into key cultivars and germplasm, and enhance

the capacity of national programs. A few wheat genotypes that combine stem rust resistance with high yield potential and other necessary traits have been identified but need rigorous field testing to determine their adaptation in target areas.
On the other hand, Yemen's government has launched a campaign to combat a virulent and potentially devastating wheat disease after the United Nations Food and Agriculture Organization (FAO) recently warned of its spread to the Arabian Peninsula from East Africa.
It appears that the Ug99 strain found in Yemen is already more virulent than the one found in East Africa. Samples of the pathogen were sent to the US and Canada for further analysis. There is a high risk that the disease could also spread to Sudan," FAO said.
It is estimated that as much as 80 per cent of all wheat varieties planted in Asia and Africa are susceptible to the Ug99 strain.
In response to this potential threat, the Yemeni Ministry of Agriculture and Irrigation has begun a programme to combat wheat stem rust.
Dr Mansour al-Aqil, General Director of the General Department for Agricultural Information at the Ministry, told that the programme aims to plant detection samples among crops, which help discover the existence of the disease.
Al-Aqil said two experts from the International Center for Agricultural Research in the Dry Areas (ICARDA) and FAO came to Yemen in February 2007 and visited nurseries where they saw samples revealing wheat stem rust in different provinces.
(For more information contact :r.singh@cgiar.org).

● Using beetle biology to protect beehives --

A new way to lessen damage from small hive beetles in honey bee colonies has been developed by Agricultural Research Service (ARS) scientists in Gainesville, Fla. Small hive beetles (*Aethina tumida*) began appearing in U.S. hives during the past 15 to 20 years and now infest bee colonies throughout the East.

Small hive beetles release a yeast that's highly alluring to fellow beetles. When the yeast grows on pollen in the hive, it attracts more beetles and sets off a cascading effect. When the population of beetles explodes, the disturbed bees leave the hive. This leaves beekeepers without honey or their bee colonies.
To exploit the small hive beetle's biology, traps baited with the yeast were installed below test hives belonging to cooperating beekeepers. The traps were separated from hives by sliding doors drilled with conical holes that allowed the beetles to enter the traps, but not to exit.
The researchers believe these traps will solve the problem for small-scale beekeepers, which make up 60 percent of the industry. These small-scale bee keepers tend their hives daily and can clean their traps frequently. If perfected, this trap could be a boon to the bee industry in Florida, which is a common overwintering destination for commercial bee colonies.
(**Source**: http://www.ars.usda.gov 19th Nov.,2007).

● For best pest detection, suit the attractant to the fruit fly--

Several *Anastrepha* fruit fly species that plague Latin American fruit growers are also quarantine pests in the United States. To evaluate lures used to monitor fruit flies in production areas, USDA Scientists recently tested two ammonia-based formulations in the Dominican Republic and found them to differ in effectiveness, depending on the *Anastrepha* species.

Synthetic lures rely on the attractiveness of protein sources to catch hungry fruit flies. One commercial attractant--Biolure, made by Suterra LLC of Bend, Ore.--includes ammonium acetate and putrescine among its components.
Using Multilure traps, both ammonia formulations were tested at different release rates in combination with putrescine on wild fruit flies.
Traps were deployed at study sites with active populations of Mexican fruit flies (*A. ludens*) at several sites, Caribbean fruit flies (*A. suspensa*) and West Indian fruit flies (*A. Obliqua*). Six treatments, including two standard liquid protein baits and four synthetic lure combinations, for periods of eight to 16 weeks were tested, replacing the synthetic lures after four weeks.
The results showed that one lure combination will not be optimal for all species and all regions where fruit flies are pests. Best is to use what works best in the location tested.
(**Source**: http://www.ars.usda.gov, Jan. 18, 2008).

● Scientists identify bacterial pathogen of citrus--

Forensic plant pathologists have identified the original pathogen responsible for the first U.S. outbreak of citrus bacterial canker (CBC), a disease that historically has imperiled the citrus industry.
The project was led by Agricultural Research Service (ARS) plant pathologist John Hartung. The findings were described in a recent issue of the Proceedings of the National Academy of Sciences.
. The scientists selected the 90 oldest specimens from among 741 preserved leaves, bark or fruit peels that showed symptoms of citrus bacterial canker. They carefully cut 10 raised lesions, or cankers, from each selection. Such cankers weaken trees, induce premature fruit drop and reduce the value of the crop.

The researchers also developed a sensitive new technique for extracting and analyzing DNA fragments from the removed lesions. The team then matched the DNA fragments with strain-specific, genetic targets taken from a previously sequenced CBC strain.
Standard bacterial identification methods require intact DNA that has been removed from live bacteria. The new technique is called IES, for insertion event scanning. IES is especially useful for identifying bacterial strains that are present in preserved specimens, in which the bacteria are no longer viable and their DNA has been degraded.
By finding an exact match between CBC pathogens from both Japan and Florida preserved in the herbarium specimens, the researchers revealed the source of the original outbreak of citrus canker in Florida in 1911.
Using the new IES method to solve contemporary problems could shed light on how bacteria are disseminated around the world, according to the author (**Posted:** 21 January 2008. Plant Health Progress).

● The gall of that midge!

Tiny wasps discovered may help blueberry growers put the sting on their crop's top insect pest -- the gall midge.
As larvae, gall midges feed on the blueberry plant's buds, deforming them and endangering the fruition of up to 10 berries per bud. In Gulf Coast states like Florida, the midges are so prevalent some blueberry growers have abandoned rabbiteye varieties, which the pests commonly attack.

However, the pests themselves are fed on from the inside out. The wasps belong to the genera *Synopeas, Inostemma* and *Platygaster*. In blueberry fields, a female wasp seeks out midge larvae hiding inside buds and stings them. She then injects her eggs into her prey's stomach and brain. There, the eggs develop into immature wasps that fight for the chance to feast on their midge host. It's a mandible-on-mandible slugfest that ends when only one wasp remains.
Needless to say, the real losers are gall midges. Sampson has determined that a natural population of the wasps in blueberry fields can kill 40 percent of all midges, controlling them for about 200 days.
(**Source**:http://www.ars.usda.gov/jan08/blueberry0108.htm).

Contd. On Page 7

AAPP organises National Symposium on 'Plant Protection-Technology Interface'

The much awaited first National Symposium organized by the AAPP came of smoothly after much ups & downs and some hiccups that accompanies most firsts. The participation was exceptional and the interactions meaningful. Here is a gist of what transpired

The Inaugural session took off in time and was chaired by the President of AAPP, *Dr. Dipak Bagchi*. *Dr. Santanu Jha*, Secretary AAPP welcomed the guests and participating scientists while identifying the whys of the AAPP and the Symposium. The Chief Guest, ***Sri Naren De***, MIC of Agriculture, GoWB, inaugurated the Symposium by lighting the traditional lamp. In his brief address, he identified some of the transitional phases that agriculture is going through in the State given the contract farming, organic farming and retail marketing scenario and reiterated the possible impacts of climate change and land shrinkage on agriculture. He welcomed as well as coaxed the Scientists to meet head on the impending challenges presented by the changing scenario through the new technologies that are coming in their hands. The Chief Guest, *Dr. R. K. Samanta*, Vice Chancellor, BCKV, delved on the role the University is playing and will continue to play in facing the complex of issues that are clouding the agriculture scenario today. Dr. Bagchi, in his Presidential address traced the chequered performance of AAPP since its inception in 2006. As ex-Vice Chancellor of BCKV he felt AAPP, given the right opportunity could play a major role in bringing all the stakeholders in Agriculture together.

The participants and guests were also addressed by two honoured Guests on the dias, viz., *Dr. H. K. Majumdar*, Working Chairman, WBSCS &T and *Dr. D. K. Basu*, Advisor, WBSCS & T.The session was terminated with a vote of thanks addressed by Director of Research, BCKV, *Dr. S. K. Sanyal*.

In a special session chaired by the VC of BCKV, Dr. R. K. Samanta, the two keynote addresses set the tone for the rest of the Symposium. The first delivered by ***Dr. C.D. Mayee***, Chairman, ASRB (ICAR) elaborated on the technology interface of newly bred lines and the various nuances of the IPR (Intellectual Property Rights) that cloud the agricultural development today, the barriers in use of private sector-produced genetically engineered seed material (cotton, mustard, okra, brinjal etc.) and the future outlook in plant protection lucidly through an excellent 3P. Most of these tech-driven varieties, he said, were related to pest resistant lines. The success of management, he said, was related to our ability for rapid diagnosis and this front has taken rapid strides in recent years through molecular diagnostics to which the Symposium has rightly devoted a full session. The second keynote address delivered by ***Dr. Swapan K. Dutta***, Rashbehari Professor of Molecular Biology, CU, explored the potentials and possibilities in the use of genomics and proteomics for developing resistant lines particularly where traditional breeding programmes have largely failed to provide stable resistant lines (Sheath blight of rice, c.o. *R. solani*). Genomics-based strategies for gene discovery, coupled with validation of the transgenes by transgenesis have accelerated the identification of functional profile of the candidate genes.

The first technical session of the Symposium was devoted to *molecular diagnostics*. Chaired by *Dr. T. Chakraborty* IMTEC, Chandigarh, Dr. Chakraborty elaborated on the broad canvass of the microbial world rich in its diversity, while tracing their unity. *Dr VK Gupta* from PAU, Ludhiana emphasized on random markers based upon RAPD profile and polymorphic markers that provide sufficient opportunities for development of more specific SCAR markers for monitoring prevalence and spread of potentially dangerous biotype of sweet potato/cotton whitefly, *Bemisia tabaci*. *Dr Sudarshan Ganguli* (IARI, ND) emphasized on a combination of molecular approach involving sequence information of rDNA and RFLPs of ITS regions with morphological data for authenticated identification of IPN species. Using similar approach, she described new species of EPN (*Steinernema thermophilum*) and its bacteria (*Xenorhabdus indica*), both being first and the only species of these genera from India. *Dr. A. Ganguli* also emphasized on the track being followed at the IARI for molecular diagnostics of nematodes.

Dr. DK Ghosh (NRC Citrus, Nagpur) pointed out the precision that has been achieved in budwood certification programme of citrus through use of sequencing tools while *Dr. P. K. Chakraborty* (CICR, ICAR) elaborated on the nucleic and protein based diagnosis of pathogens of cotton. Among nucleic acid based methods both PCR and non-PCR based approaches can be used, he said. A ready to use PCR kit for detection of *X. malvacearum* strains was developed and submitted for patenting. PCR primers for diagnosis of fungal pathogens namely *Ramularia areola*, *Rhizoctonia* species and *A. macrospora* were developed based upon the diverse sequences within the ITS regions of rRNA genes. Finally, *Dr. A. Samad* (CIMAP, Lucknow) observed that phytoplasma is emerging as an important plant pathogen infecting agricultural, ornamental, vegetables, medicinal and aromatic plants. Phytoplasma can be detected by using PCR and nested-PCR.

The **concluding session (II)** of the first day was primarily presented through courtesy of Crop Life India who focussed on the *view point of the pesticide industry* when plant protection is at cross roads, and was chaired by ***Mr. P. K. Mazumdar***, Director, Syngenta. Two lead lectures were presented by Mr. P. K. Mazumdar and Mr. S. Kumarswamy, Chairman, Agrochemicals Policy Group. Six invited lectures by Dr. P. K. Guha (Isagro Asia Agrochemicals), Dr. Rajendra Prasad (Dhanuka), Dr. Preethi Rath (Monsanto), Mr. K. S. Thyagarajan (GM, BASF Agro), Dr. N. S. Butter (PAU) and Dr. A. Bhattacharya (BCKV) and one oral presentation by Dr. K. Banerjee – all elaborated on the theme that chemical pesticides are indispensable to increase crop production vis-a-vis trends of increasing population. They emphasized that farm lands can not be increased and land producing food has gone up by only 2%. Plant protection is an important tool in crop production. as pest/diseases losses of about 26% in terms of quality and quantity is known. All of them suggested that improved pest control tools should be developed through IPM for better quality and safety in food production (cereals, horticultural crops and others) which ensures eco-friendly nature of management approaches. For this purpose plant protection needs cultural, mechanical, biological and chemical control measures sequentially.

Industry should support continuous research and development for searching of new and safer plant protection chemicals which will be specific in target pests and have long duration effect, low use, prevent and delay resistance building capacity and improved formulation. *Dr.A. Bhattacharya* made an elaborate presentation of a variety of new molecules that are on the anvil. *Dr. Rajendra Prasad* of Dhanuka Group focused on a success story regarding industry and public partnership in agricultural extension in the heart of Madhya Pradesh. *Dr Thyagarajan* in his brief, emphasized on horticultural crops and recommended use of polymers in innovative packaging of such crops to avoid huge losses in the F & V segment. While *Dr. Butter* cautioned on the flip side of the use of pesticides, *Dr Bannerjee* focused on multiresidue analysis of pesticides for simultaneous confirmation. The Chairman concluded that the pesticides are here to stay but the Industry is constantly working on their safety, on their reduced used through precision application technology while making them cost effective. At the same time

Industry should support the research and development on genetically modified crop for drought resistance, pest tolerance etc. Regarding genetically modified crops there was a deficiency in technical personnel for field demonstration, to understand and standardize the process to develop internal competency.

The second day started with **session III** on *biological control*, chaired by the illustrious ***Dr. A.N. Mukhopadhyay***. Dr. Mukhopadhyay presented an overview of the researches on *Trichoderma* clearly demonstrating the fact that *Trichoderma* based biopesticides have tremendous potential for management of large number of plant diseases including nematodes. *Dr. M. A. Ansari* (Univ. Swansea, UK) reported control of white grub and black vine weevil insects in horticultural crops by entomopathogenic nematodes and fungi particularly with *Metarhizium anisopliae*. It acts synergistically with chemical pesticides and neem cakes. *Dr. S. Pan* (BCKV) informed the house about the changes in efficacy of *T. harzianum* and *T. viride* in Tsunami affected islands of Andaman and Nicobar. The Tsunami affected strains lost much of their efficacy. *Dr. K. Karmakar* (BCKV) explored the possibility of biological control of phytophagous mites that causes serious damage on chili plants with predatory mites specifically *Agritemus fleschneri*. *Dr. D. K. Chakrabarti* (NDUAT, Kumargunj) reported the application of bioagent *T. viride* through seed and soil application in controlling diseases of opium while tracing excellent back up information on the life cycle of *Peronospora arborescens*. Dr. M. Alam (CIMAP, Lucknow) presented experimental results on effects of mycorrihza (*Glomus aggregatus*) on different crop diseases like lethal yellow disease of citronnela, pyrethrum wilt and diseases of safed musli & *Rauwolfia serpentina*. Dr. V. K. Dhingra (Bio*tox*, ND) added a different dimension by elaborating on the regulatory mechanism of marketing, rules of registration and market potential of bioagents.

The session emphasized the need for a clear cut policy on the production and marketing of *Trichoderma* based products. The Government should formulate guidelines for fast track registration of such products since *Trichoderma* is native to soil and does not require stringent regulations like chemical pesticides. However, Prof. Sen questioned the veracity of this given the significant reports of COPD due to its spores.

The ***session IV*** on *IPM and other innovative pest management strategies* was chaired by ***Dr. OM Bambawalle*** **(**Director, NC IPM**,** ND). *Dr. M. K. Dasgupta* (Vis*v*a Bharati) set the tone through a critical evaluation of epidemiological parameters contributing to development of site specific IPM strategy that included AUDPC, loss modeling and forecasting. Potato leaf blight, apple scab, DNA sequencing, synoptic analysis on field problems were taken as examples. The influence of PA was conceived as an IT strengthened agriculture management system, using GIS for nematode sampling. *Prof. S. K. Mukhopadhay* (Visva Bharati) presented an overview covering a wide agenda that included biotechnology, herbicide resistance, development and use of bioherbicides, microbial toxins and allelochemicals genetically engineered microbes as softeners, site specific weed management, remote sensing, GIS and GPS for their use in mapping the weed population. *Dr. Abraham Vergheese* (IIHR, Bangalore) gave a detailed view o*f the* picture on farm level implementation of IPM on fruit fly. He emphasized on areawide IPM instead of individual farmer based one. Jaggery and banana were found to be best baits for fruit flies. The economics of this technology was reported to be highly promising with a CBR of 1: 7. He also reported development of an indigenous bottle trap named "*IIHR bottle trap".*

Dr. C. Chattopadhyay (NRC Mustard, Bharatpur) presented forecasting models for major diseases and aphids of oilseed brassicas based on the pest incidence data of various regions and their correlation with abiotic factors data from near surface of Advanced Very High Resolution Radiometer TIROS (Television and Infrared Operational Satellites). Garlic (*Allium sativum*) bulb aqueous extract (1% w/v) application based on forecast of the aforesaid parameters helped in tackling the pest menace. Similarly, *Dr. D.K. Das* (NCIPM, ND) discussed the weather based forewarning of gram pod borer, *Helicoverpa armigera* in chick pea and pigeon pea. His team has developed thumb rules using the pest population and monthly rainfall data collected during 1983-1995 at ICRISAT, Hyderabad. Similar models for this pest were also developed for other agro-climatic zones like Punjab (cotton, chickpea), Central and Western Uttar Pradesh (chickpea). *Dr. Amitava Banerjee* (BCKV) discussed incidence pattern of pulse aphid, *Aphis craccivora* and its natural enemies on green gram in lower gangetic plains of West Bengal. He observed that highest incidence of syrphid and *Chilomenes* predators were coincided with peak population of aphid.

Prof. Ramesh Chand (BHU) narrated how to exploit slow disease development traits for IPM. He has found that the traits responsible for slow disease development are component based and highly heritable with the genes regulating the slow disease development being limited to 2-4 genes in most cases. This will help plant breeders select for yield traits with slow disease components from a segregating population. These factors have been successfully identified in wheat rust. He emphasized the need for molecular markers to provide an added advantage for the pyramiding slow disease components under one head. *Dr. N.A. Khandekar*, BCSIR, Bangla Desh narrated the role of biopesticides in the suppression of major insect pests and yield of oilseed crops under different climatic conditions in Bangladesh. He found that the treatment *with a* the mixture of neem seed oil and sesame oil has controlled sunflower pests, viz., *Spilosoma obliqua, Heliothis armigera* and *Epilachna septima* and yielded highest. *Dr. P.P. Ghosh* (Visva Bharati) discussed disease management options against bacterial wilt of potato in red and lateritic region of West Bengal. Whole tuber planting and supervised management with well decomposed cow dung at land preparation, seed piece treatment with carbendazim+streptocycline and eradicative bleaching powder drenching along with eradicative banding with cow dung manure, oil cake, SSP and MOP (20:5:3:1) were the best treatment in terms of their responses to yield, disease management and higher returns. *Dr. AK Bajpai* (Director, CSTRI, Berhampur) elaborated on IPM of mulberry pests as deviced at their Institute.

Dr. A.K.Chowdhury (UBKV, Cooch Behar) reported the serological changes that are associated with induction of resistance in soybean plants following treatment with phytoalexin inducers. *Dr. R. Goswami* (RMVU, Narendrapur) elaborated *on* the role of Farmer Field Schools (FFS) in implementing IPM and their role in providing sustainable livelihoods. He narrated the changing trend and present status of FFS functioning experiences drawn from all over the world. He detailed the concept of sustainable livelihoods framework and tried to incorporate the FFS functioning within it. Finally, the Chairman *Dr. Bambawalle* focussed on the need for promoting biopesticides through development of adequate R & D facilities failing which the products in the market are quality poor, cost ineffective and have variable performance making development of meaningful IPM systems difficult. To cap it pest monitoring systems are often grossly inadequate; so are CIB registration and IPR related parameters of secrecy protocols.

Finally, the synergies between Ministry of Agriculture, CIPMCs, SADs, SAUs and ICAR Institutes and Research Centres within and with private sector industries, entrepreneurs, KVKs, NGOs etc. need to be strengthened for promotion of biopesticides in IPM systems,he emphasised.

Session V on *Biotechnological approaches to plant pest management* was albeit brief yet loaded with quality output. Chairing the session, ***Dr. Indranil Dasgupta*** (DU) described a strategy for combating rice tungro virus, using the DNA sequence of RTBVORF for generating RNA Cassette. He clearly established the low accumulation of RTBV and RTSV in transgenic plants which can also reduce the GLH-mediated spread of the viral complex. To develop transgenic RNAi mediated against RTBV, the ORF IV encoded by the virus was cloned in both sense and antisense orientation under a constitutive promoter in a binary vector. *Dr. Sampa Das* (Bose Inst., Kolkata) also working with rice tungro described how a leaf lectin of *Allium sativum* inhibits an endogenous bacterial protein symbionin of green leaf hopper which ultimately restricts the transmission of RTBV into rice plants. A chimeric construct of 25kDa *A. sativum* leaf lectin coding gene (ASAL) when transformed into IR64 inhibited detrimental effects of several insects in 2 lines. *Dr. S.K. Chakraborti* (CPRI, Simla) described several molecular methods for virus diagnosis in the laboratory. He also presented several important findings of their Institute related to differential degree of resistance in potato by using RB gene and PR proteins. Finally, *Dr. Amitava Mitra* (Univ. of Nebraska, USA) elaborated on the importance of broad spectrum resistance against multiple pathogens using the phenomenon of innate immunity and PR proteins as the target gene to be transferred. He described a powerful gene silencing method, DRIGS (Direct-Repeat-Induced-Gene-Silencing) which can bypass the use of cloning of sense and antisense strands of a gene in the same cassette. The discovery of DRIGS, he claimed has significance for dissecting the gene silencing mechanism and for efficient generation of silenced phenotypes useful for research and agricultural biotechnology products. Dr. Mitra said that they have used the DRIGS technology for obtaining simultaneous resistance against 8-10 viruses by linking small virus sequences to a silencing locus.

Posters: A stupendous 71 papers were placed under Posters divided into two sessions. To do justice to those excellent presentations, a competition was instituted for those willing and nearly 52 of them were assessed by a team of 3 experts, *Prof. M.R. Ghosh, Dr. N.S. Butter* and *Prof. N. Mukherjee.* The adjudged presentations were :

Gold Medal (First) : *Sekharappa* (UAS, Dharwad)*:* Biological control of earhead caterpillar, *Helicoverpa armigera* in sorghum.

Silver medal (Second): *Santhakumar, M.V. et al*.(CSRTI) Development of weather-based forecasting models for major mulberry pests in Murshidabad district of West Bengal.

Bronze medal (Third*): Dutta, S. et al*. (BCKV): Evaluation of biocontrol potentiality of native plant growth promoting bacteria against *Rhizoctonia solani* mediated damping off disease of tomato.

All winners were given a medallion and a certificate.

Plenary: *Dr. Satyabrata Maiti* (Director, NRCMAP, Boriavi) chaired the Plenary session. Initially, he emphasised on the need for a global networking system for PP scientists vis-a-vis the immediate requirement for devicing management strategies for both individual pests and all the significant pests in a cropping system to mitigate the nearly 42% losses from crop pests alone that could substantially meet the projected global food shortages. He summed up the salient features as presented in the plenary session and pointed out following recommendations and hoped the relevant authorities will give due cognizance to these recommendations and action thresholds defined for future improvement in our existing pest management systems:

Recommendations

- Importance of molecular characterization, diagnostic development, and molecular marker based identification of insect pests, nematodes and pathogens was highlighted by several workers. Although molecular biotechnology is an useful tool but facilities are still not in easily available form in most of the research labs. Therefore, it is recommended that every plant protection research lab must create the facilities for such research activities. Funding agencies must be approached for generous funding for this important line of work. Funding agencies are requested to prioritise diagnostic related inputs.
- The ICAR may be approached for developing an AICRP on molecular diagnostics for insect pests and pathogens by networking the research laboratories in SAUs and ICAR for developing various reliable tools.
- For supply of quality seed and planting materials free from diseases and insect pests and nematodes, fool proof certification programme is recommended to be created in most of the SAUs. Strong co-ordination should also be made between R & D institutions with other local stakeholders.
- Refinement of diagnostic techniques should be a continuous programme so that several pathogens could be detected simultaneously by multiplex PCR technique, which will subsequently reduce the cost for diagnostic purposes.
- Industry must invest more money on research and development purposes for efficiently faster, quick replacement of chemicals or biotechnological outputs.
- Improved pest control tools should be through IPM for better quality and safety of food products.
- Success of IPM would be visible when it is implemented on a large area basis; therefore, IPM modules must be tested on a large scale before recommending the same to the farmers.

Additional recommendations (from AAPP):

- More, stringent parameters be set for quality product marketing of biopesticides. For this, scale up procedures may be developed skillfully identifying quality markers and provided to business groups and monitored on site.
- Plant disease managers may look for something more from our rich, biodiverse strata and give up there overdependence on trichodermas that are normally poor competitive saprophytes and hence require a very high cfu to be effective - a cfu that is difficult to maintain in the soil microbial milleu for any significant period of time.
- Biotechnological possibilities of harvesting resistance may be explored more intensely in the laboratories while developing systems of tracking the gene flow in nature for their untoward impacts, if any, and keeping the people's perception in view.
- More practical liaison with the Industry be established if necessary through NGOs to develop a synergy that will provide proper guidance to the end stakeholders of Agriculture -- the farmers.

The Session and the Symposium ended with a word of thanks from the secretary of AAPP, Dr. Santanu Jha.

(Brought from page 3)

New diagnostic tests for EnviroLogix's for ToANV & TSWV are critical to tomato production–

EnviroLogix, a leader in the development and manufacture of diagnostic test kits for GMOs and plant pathogens, released new diagnostic test kits for Tomato Apex Necrosis Virus (ToANV) and Tomato Spotted Wilt Virus (TSWV). EnviroLogix' QuickStix™ Kit for ToANV and QuickStix Kit for TSWV are immunoassay Lateral Flow Devices (LFD) for the detection of these plant pathogens in the field or in the lab. EnviroLogix also offers a high-throughput QualiPlate™ Kit for TSWV, a two-hour ELISA plate test for use in the lab. These test kits will help growers, breeders, seed producers and seed multipliers diagnose and initiate treatment for these severe tomato diseases.

Tomato Apex Necrosis Virus (ToANV), a torradovirus, confused for some time as a new strain of TSWV, was first identified in the state of Sinaloa, Mexico in 2007, and has since been reported in other areas. This virus has been described as causing "significant mortality of plants and unmarketable fruit," resulting in severe economic loss.There are two reasons for the development of a field test for ToANV. First, it has symptoms similar to TSWV (and other tomato diseases), and a test that can distinguish these diseases will help in making good treatment decisions. Second, ToANV is a new disease, and early and accurate detection in the field is critical to establishing the boundaries of the disease and to managing it. *Tomato Spotted Wilt Virus (TSWV),* a tospovirus, is a disease that has been identified in tomato fruit and seed production fields around the globe for many years. According to agriculture specialists, researchers, diagnosticians and business practitioners TSWV ranks as the plant virus with the "greatest prevalence, economic impact and demand for diagnosis." .

The new QuickStix tests for ToANV and TSWV, and the new QualiPlate test for TSWV are part of a growing line of plant pathogen diagnostics from EnviroLogix.

(**Source**:. http://www.envirologix.com/Jan.24, 2008).

PESTICIDE INDUSTRY NEWS PESTICIDE INDUSTRY NEWS PESTICIDE INDUSTRY NEWS

● **Syngenta promotes Axial herbicide--**

The Environmental Protection Agency has granted registration for Axial® XL herbicide for use in spring wheat, winter wheat and barley in N. Carolina. Available for the 2008 growing season,new Axial XL combines Axial and a spray adjuvant into one convenient formulation. Like the original formulation, Axial XL provides the same excellent, broad-spectrum control of troublesome grass weeds, including yellow and green foxtails, Italian ryegrass, wild oat and Persian darnel. It also offers growers a wide application window on both crops and grass weeds with excellent crop safety in wheat and barley. (http://www.syngenta.com.)

Syngenta also announced that the EPA has approved Endigo™ insecticide for use in potatoes. Endigo is an enhanced product with two modes of action that combines knockdown and residual activity for sucking and chewing pests. It protects potatoes against key pests throughout the season including Colorado potato beetle, aphids, potato leafhopper, European corn borer and potato tuberworm. Syngenta recommends field scouting and applications of Endigo at 2.5 to 4.5 fl. oz. per acre, usually at intervals of seven or more days, when insect populations reach locally determined economic thresholds. The product can be used rotationally with organocarbamates.

(**Source**: http://www.syngentacropprotection-us.com/January 3, 2008).

● **Contans WG fungicide for Sclerotinia control to be marketed by Advan LLC--** Advan LLC is granted the right to market Contans® WG, a fungicide for control of *Sclerotinia* in vegetable and field crops, in the U.S. by the manufacturer of Contans®, Prophyta Biologischer Pflanzenschutz GmbH of Poel, Germany. Advan is a tactical marketing company that specializes in products that solve pest management problems in unique ways. Contans joins the company's extensive biorational product line.

Sclerotinia sclerotiorum and *Sclerotinia minor* affect more than 380 ornamental, field, vegetable and herb crops by causing stem rot in soybeans, white molds in a wide variety of vegetable crops and potatoes, lettuce drop, stem rot of tomatoes and potatoes, and head and stalk rot of sunflowers. The active ingredient in Contans® are fungal spores of *Coniothyrium minitans*, a parasite that attacks the resting state (sclerotia) of *both S. sclerotiorum* and *S. minor*.

The fungus *C. minitans* in Contans® attack Sclerotinia in the soil before it can infect a susceptible plant. Once applied as a pre-plant, planting or post-harvest treatment, *C. minitans* attacks and destroys the black sclerotial bodies, which are the resting survival structures of Sclertotinia. This breaks the "cycle of disease" by reducing or eliminating the disease-causing fungus from treated soil. Contans® is OMRI approved. Its water dispersible granular formulation is stable and easy-to-mix and apply through conventional spray equipment. It can be tank-mixed and applied with many herbicides.

● **Sinochem, China** has acquired butachlor and alachlor from Monsanto for use in certain Asian countries and India.

● **DuPont** has received US EPA approval for Agility SG herbicide on wheat. Agility contains four active ingredients and two modes of action in a single formulation.

● **American Vanguard Corporation** has acquired the pentachloronitrobenzene fungicide product line from Chemtura including the Turfcide and Terraclor brands.

● **Bayer CropScience** presents details of a new herbicidal mixture for pre-emergence weed control in corn based on thiencarbazone-methyl, a new sulfonyl-amino-carbonyl-triazolinone (SACT), and isoxaflutole combined a new safener cyprosulfamiden. The US Animal and Plant Health Inspection Service (APHIS) Investigative and Enforcement Services fails to find "the exact mechanism for introduction" of Bayer CropSciences' LL traits into the commercial rice supply.

● **The Spanish Environmental Police (Seprona)** detained eleven suspects and seized 2,200kg of illegal pesticides in Almería (www.epca.com).

● **EU Environment Commissioner Stavros Dimas** has confirmed his refusal to authorise the cultivation of two varieties of genetically modified corn in the EU, because of risks to the environment.

● Agrochemicals firm **Punjab Chemicals and Crop Protection** has acquired a 30% stake in US-based Source Dynamic.

● The Agricultural Products Division of **BASF** has announced that it will step up its worldwide fight against illegal pesticides.

● **Fine for testing crops without permission-US Model–** Scotts Miracle-Gro Co will pay a $500,000 fine over allegations it failed to comply with U.S. rules while testing a genetically engineered grass variety that could one day be used on lawns and athletic fields, the Agriculture Department said on Monday.

Thousands of crop varieties depart for Arctic seed vault --The cornucopia of rice, wheat, beans, sorghum, sweet potatoes, lentils, chickpeas and a host of other food, forage and agroforestry plants is to be safeguarded in the facility, which was created as a repository of last resort for humanity's agricultural heritage. The seeds will be shipped to the village of Longyearbyen on Norway's Svalbard archipelago, where the vault has been constructed on a mountain deep inside the Arctic permafrost.

The vault was built by the Norwegian government as a service to the global community, and a Rome-based international NGO, the Global Crop Diversity Trust, will fund its operation. The vault will open on February 26, 2008.

This first installment from the CGIAR collections will contain duplicates from international agricultural research centers based in Benin, Colombia, Ethiopia, India, Kenya, Mexico, Nigeria, Peru, the Philippines and Syria. Collectively, the CGIAR centers maintain 600,000 plant varieties in crop gene banks, which are widely viewed as the foundation of global efforts to conserve agricultural biodiversity. Many traditional land races of these rice, wheat, maize and bean crops would have been lost had they not been collected and stored in the gene banks.

Storage of these and all the other seeds at Svalbard is intended to ensure that they will be available for bolstering food security should a manmade or natural disaster threaten agricultural systems, or even the genebanks themselves, at any point in the future. (**Adapted** from materials released by Consultative Group on International Agricultural Research).

● **National food security mission impossible--**

The Centre's grandiose booster plan for agri produce, the Rs.4,883-crore National Food Security Mission (NFSM), seems to be built on targets that hardly keep pace with the projected increase in domestic demand by the end of the 11th Five-Year Plan.The NFSM was launched last year and aims at a 4% growth for the farm sector by hiking rice, wheat and pulses production by 10 million tonnes, 8 million tonnes and 2 million tonnes, respectively, by 2012.

The targets for rice are no different from atrocious targets for wheat. Rice production was 91.7 million tonnes in 2005-06 and 92.7 million tonnes in 2006-07 but the farm ministry has ignored that and settled for a base of 88 million tonnes. That means that the NFSM will only garner 98 million tonnes in production up to 2012, when the projected domestic demand is 98.79 million tonnes, leaving a gap of 0.79 million tonnes. (**Source**: 25 Jan, 2008, IST, Prabha Jagannathan, TNN).

● **India may turn big producer of GM rice, vegetables by 2010'--**

India has the potential to become a major producer of transgenic rice and several genetically modified (GM) or engineered vegetables by 2010, according to a research report by Rabo India Finance Ltd on the Indian agri-biotech sector. 'It has emerged as one of the leading destinations for investment in biotechnology in the recent years. It is also emerging as an important destination for both biomarkers and validation services', the report said.

The report said most research and development works in the country are being done in the public sector.

Research work is being carried in 19 crops. They are rice, wheat, cotton, potato, banana, tomato, rapeseed, mustard, coffee, tobacco, eggplant, cabbage, cauliflower, melon, citrus fruit, black gram, groundnut, chickpea and pigeon pea.Four kinds of tracts are being tackled: Resistance to attacks by insect pests, viral and fungal diseases (biotic stress); drought tolerance, water logging and salinity; and delayed ripening and increasing shelf life, the report said.

Bt cotton is in. On Bt brinjal, the report said it could be the next important biotech crop with several public institutions and private companies developing improved varieties of drought tolerant ones. These plants are also being developed to resist shoot and fruit borer. While transgenic tomato is aimed at curbing damage from leaf curl virus and other infections such as buck eye rot of fruits, septoria and early blight, transgenic potato, being developed by public institutions, was yet to attract the private sector's attention. "On the regulatory front, it is in the final stages of development".

Challenges : *Intellectual property is one of the deterrents to growth of the biotech industry as foreign players feel there is no sufficient patent protection and access to patent litigation in the country.*

(**Source**: Rabo India: M.R. Subramani, 23.01.08)

● **EU block use of BASF potato, Monsanto corn --**

European Union governments blocked approval of a genetically modified potato made by BASF AG and three corn varieties developed by Monsanto Co., hampering EU efforts to expand the biotech-crop market. The opposition by health regulators from countries including Italy, Poland and Hungary prevents fast-track approval of the Amflora potato for animal feed and the corn types for feed and food. The European Commission, 27-nation EU's executive, must now ask government ministers to give their verdict in a step that will add months to a process the U.S. says is too slow.

BASF genetically altered the potato to enhance its starch content for industries including textiles, packaging and adhesives. By-products from the starch-extraction process would be used for animal feed. The three Monsanto corn varieties are hybrid versions of products that have won EU approval for feed and food use. The three products are called MON863 X NK603, MON863 X MON810 and MON863 X MON810 X NK603. Recently,(Feb., 2008) President Nicolas Sarkozy defended the ban on Monsanto's GM 810 maize in France.

Earlier, Prime Minister Francois Fillon said at the end of last week that France would activate a "safeguard clause" in European law to suspend the commercial use of MON 810, a maize developed by U.S. biotech giant Monsanto.

But Environment Minister Jean-Louis Borloo told the National Assembly that the clampdown on MON 810 was a precaution that would only last until the release of an European re-evaluation of the crop in the coming months. *It is a precautiary measure that applies for a certain period lasting until the setting up of a European stance on the MON 810.*

She also called on researchers to keep on working on plant biotechnologies. "If they renounce, if they leave the country, we will have turned our back on our future," she said. "It's out of the question."

(**Source**: Jonathan Stearns,jstearns2@bloomberg.net. Editing by Michael Roddy). Oct. 10, 2007.)

● **Biotech companies desert international agriculture project –**

Biotechnology companies developing genetically modified crops have withdrawn from a major international project to map out the future of agriculture, after it failed to back GM as a tool to reduce poverty and hunger.

The International Assessment of Agricultural Science and Technology for Development aims to focus attention on the problem of how to feed the world's growing population. Monsanto, Syngenta and BASF resigned after a draft report from the project highlighted the risks of GM crops and said they could pose problems for the developing world.

Croplife International, the agriculture industry trade body of which Monsanto, Syngenta and BASF are members, told the project's leaders it was unhappy that the views of its members had not been reflected in the draft report. In an editorial criticising Croplife International's decision, the science journal Nature said: *"The views outlined in the draft chapter on biotechnology, although undoubtedly over-cautious and unbalanced, do not represent the rantings of a fringe minority. The idea that biotechnology cannot by itself reduce hunger and poverty is mainstream opinion among agricultural scientists and policy-makers."*

Greenpeace stated, *" It is such a shame to withdraw from such a good initiative, simply because your business plans do not fit with sound science and experts voiced a more balanced opinion than yours."*

(**Source**::David Adam, guardian.co.uk,Tuesday January 22 2008).

The views expressed in the different columns of this Newsletter are those of the source persons.The publicatrion of this doesnot mean either endorsement or acceptance of such views/products.

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