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BAR initiates new policies for R&D networks

A one-billion endowment fund for sustained human resource development. A proposal to integrate national RDE networks into fewer ones. New criteria and minimum requirements for judging network performance.

These are just some of the new initiatives that the Bureau of Agricultural Research (BAR) and the different national R&D networks have proposed for 2003. These new changes and guidelines were discussed during the first quarter National Team Leaders meeting this March.

BAR and the national networks proposed the allocation of a one-billion endowment fund to support the continuous training of R&D scientists. If this fund will be available by 2003, BAR will allocate at least P2.5 million or $50,000 for small research grants, while P0.5 million will be given to joint research programs, which include both paper presentations and exposure trips abroad. Dr. Glenn Aguilar, team leader for Capture Fisheries network, and Dr. Johnny Sanggalang of BAR will head the two committees that will draft the proposals for the P1-B endowment fund. To standardize network operation and improve the networks' overall performance in terms of accountability, efficiency and effectiveness, BAR will adopt new minimum requirements to determine network performance. Under this new scheme, each network is required to prepare its own networking proposals and work plans to be presented at the last quarterly meeting every year. The work plans shall contain activities that are based on five key result areas, namely, improved R&D systems and management, improved research prioritization and allocation, knowledge management, improved monitoring and evaluation, and strengthening of R&D linkages.

BAR has funded a total of 299 R&D programs, projects and researches, and invested at least P400 million in the last three years. However, there have been instances of non-compliance of contract terms and conditions by some researchers. For 2003, BAR, therefore, has proposed a new set of guidelines for the termination of non-complying BAR funded projects.

Under this scheme, a project may be terminated on any of the following grounds: failure to submit technical reports, implementation of fund reprogramming/realignment without prior approval from BAR, and the frequent absences of project proponents in scheduled reviews, monitoring, and other activities. Likewise, an evaluation team may recommend the termination of a project when "the proponent repeatedly fails to incorporate the suggested revisions" and "a substantial negative variance exists between the actual accomplishment and the log frame

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Inside...

DA has four new scientists; two others promoted

The Department of Science and Technology (DOST)-Scientific Career Council (SCC) approved the appointment of six Department of Agriculture (DA) research personnel to scientist positions on 11 February 2002.

Secretaria

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The four newly-conferred scientists are: Ms. Millicent I. Secretaria, Philippine Coconut Authority (PCA) -Davao Research Center, Scientist I; Dr. Gabriel O. Romero, Philippine Rice Research Institute (PhilRice), Scientist I; Dr. Edilberto D. Redoña, PhilRice, Scientist III; and Dr. Rolendio N. Palomar, PCA-Zamboanga Research Center, Scientist I. Meanwhile, two others were awarded higher ranks. They are: Dr. Aida D. Solsoloy, Cotton Development Authority, Scientist I to Scientist II and Dr. Eulito U. Bautista, (PhilRice), Scientist I to Scientist III.

The four appointees

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SCIENCE SCOPING

The farmer as a dynamic component of research

It is enjoyable to work with farmers. This must be the reason why our extension workers love field work more than the office. They speak the language of the farmers, they eat with them and enjoy the things that they enjoy aside from their common interest which is the farm. There was even a time we referred to them as ***eatnicians, goatnicians*** *and* ***glassmates*** *but they would just exchange glances among themselves with a meaningful smile. This was before we enjoyed more our office enclave and have not gone to the field to work directly with the farmers. In time we also learned to love field work, mixed with the farmers, and began to understand them more.*

The farmers love to share their products at the end of every visit. One time, we went to Abra to monitor the farms of our farmer-contestants. Each farmer gave us vegetables that at the end of the day, our vehicle was full of vegetables, so plenty that we could have brought them to the market to sell had it not been night time when we arrived home. At another time, we went to our farmers in Occidental Mindoro. One had a squash farm with very big, ready to harvest fruits. We tried not to comment on the fruits or else he would give us some and we would transport them through the plane, only to find out that he had instructed somebody to put squash in our vehicle.

And worse, I still had to travel 10 hours more going northward where we also had squash plants with mature fruits. We could not leave the gifts for that would surely slight him.

Encounters like this had become our examples during our trainings for extension workers. And yes, they already know about it, that is why they are loved by the farmers because they always get what they give them. We warned them, however, that they should never, never imply that they like to be given something. We know how to reciprocate, they said, by also giving the farmers things that he or his family needs. The extension worker also stands as sponsors during baptisms or weddings such that he becomes a part of the community by social affinity.

It pays to understand the farmers, the small farmers especially, in their microcosm. Their concepts of time and distance as other things in everyday life, are different. What is near and what is far? This is an example: I went to an interior town in Isabela to monitor one of our special extension workers(SEW). He was actually an outstanding farmer whom we employed as an extension agent. I had to drop for our technologist to accompany me to the place but he was nowhere to be found and so with our branch office driver we went to the place. The driver, too, did not know where the SEW lived so we had to ask one farmer. He said that the farmer we were looking for lives across the river. We left the vehicle and rented a banca. We were lucky it was summertime so we could cross the river in a small banca. At the riverbank we asked another farmer. Yes, he knows him, he lives just over there and I was invited to ride on a bullcart. We traveled and traveled along the riverbank until we stopped under a camachile tree and was instructed to pass through a foot trail between cornfields. I asked the driver whether we had been lost but he said that we just move on. At last, after walking through many corn fields with twinkling stars in my vision, we reached the SEW's house and it was already 1:35 p.m.

When a farmer says that somewhere is just over there, then the place is seven hills away. Then how early is early? This is another experience. We were conducting barangay level trainings. We set the start at 8:00 a.m. My companions and I were at the site at 7:30 a.m.to put everything in order before the start of the activity. At eight, not one arrived. At eight thirty, two arrived. At nine, one third of those invited arrived. At 11:00, two thirds arrived. We did not experience this in just one site but in all the sites.

Why did the farmers behave the way they did? The houses are far apart in the rural areas so that even if the distance is far they are still neighbors. And neighbors are near, not only physically but conceptually. In setting time, do we consider the farmer? He can not come at eight o'clock because he has to bring the animals to the farm, eat his breakfast, and do other things that could not be postponed. Besides, had he been consulted when the training was designed? What is the sociology of the farmers? Do we know him enough? In fact, they are disturbed that they are the focus of so much discussions, meetings, conferences, consultations, efforts, and money way back and until now. What has become of him? The implication is, we should know him. We should understand him. What does he really need?

Yes, the farmers are poor but do they know that they are poor. If they have lived so long in their condition and have never seen and experienced what a better life is, they do not know what is the good life. For they are happy as they are. If you go to their house they welcome you graciously and share with you whatever food they have, be it boiled banana, corn, or camote which the urban dweller may not appreciate. But in time also, he learns to eat and savor the sweetness of newly harvested glutinous corn boiled unhusked. And soon he longs to go to the field and mingles with the farmers including their families. It is at this time when the government worker who is the urban dweller begins to understand more the farmer, will work for him and fights in his behalf in meetings, conferences and consultations. (to be continued)

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National Programs

National team leaders plan for the RDE networks

(3rd of five parts)

by Ma. Rowena S. A. Briones

The team leaders of the research, development and extension (RDE) networks for each commodity and discipline plan and orchestrate research programs, and delegate and monitor research efforts and functions. This is the third of a five- part article on the plans, goals and challenges faced by the National Team Leaders of the 22 RDE networks This article is culled from my interviews with them.

Dr. Wilfredo David
Irrigation and Drainage RDE Network

This year, we will focus on leaner priority research areas due to budgetary constraints. The areas will be on aquifer characterization, irrigation design criteria, performance of existing irrigation systems, and pressing policy issues in irrigation development.

We spent billions on development of large irrigation systems but we realize only less than half of the potential benefits from them. The systems are deteriorating very fast. Thus, we are pushing for shallow tubewell irrigation systems, small water impounding structures, and other minor irrigation schemes that are more sustainable. These systems are cheaper and easier to construct and maintain.

To come up with site-specific design criteria for the various modes of minor irrigation, we will do aquifer characterization through collection, analysis, and evaluation of lithologic, hydraulic and hydrologic characteristics of groundwater systems. We will also characterize the flows of streams and rivers based on dependability and occurrence of extreme events. Alongside these, we will develop strategies to improve water use efficiencies and performance of existing irrigation systems. We need to have cost effective irrigation and water management technologies so that we can slowly reduce irrigation and drainage investment and maintenance costs. We hope to come up with designs for improved and low cost drilling rigs and efficient, effective well drilling and well development technologies. These technologies should not only be technically sound but also socially acceptable, economically viable, and environment-friendly.

Our focus will be on location-specific problems to come up with measures to improve the performance of irrigated agriculture. Irrigation can improve the yield of crops only to a certain point. To sustain the increase in harvest, the technology that we develop for farmers should be site-specific and the approach is holistic. We should also offer them parallel technologies in pest management, soils and fertilizer management, seeds and seedling management, and farm mechanization.

We would like to carry out research on how to improve the performance of our irrigation from different standpoints. For instance, how do we improve water use efficiency so that we can irrigate more area for longer periods? What are the needs and level of technical skills of our extensionists in local government units and our farmers? How do we unify the fragmented initiatives that we have for irrigation development in this country, where agencies involved have different projects? I believe that research and development can improve the sub optimal performance of our irrigation systems.

We know what needs to be done and how we are going to do it. The question is whether we can do it. Our problem is the perennial delay in the release of funds. We have a very large network and it took years to build it but because of lack of funds, we only have few projects. Much as we want to accomplish something, our movements are very limited. It is a reality: networking activities will only work if you have money.

I also see something wrong with our focus on commodity-based projects. Consequently, our outputs tend to be too specialized. We forget that discipline-based approach in doing research is more economical because the technologies that we develop will cut across commodities and will be more useful to our farmers. The technology that farmers avail of for a particular crop can still be used for other crops once they decide to diversify into other crops.

Mr. Carlos Carpio
Coconut RDE Network

For a plan to work, it should have clear directions and purpose. Our plan is to solve the problems faced by the industry and we tap people to spearhead it. This is the idea of networking. The network works this way and I think we are doing well. As network team leader, aside from setting research directions, I determine who has the competence to do our projects. It is important to me that I do this fairly. I am with the Philippine Coconut Authority (PCA) but the network does not have any project with PCA. Why? Simply because other agencies have more expertise to handle our four high impact projects (HIPs).

All of these HIPs are in their last leg. We have a project with the Nutrition Center of the Philippines meant to check, once and for all, if indeed coconut oil is bad for the health. We have another one with the Food and Nutrition Research Institute on vitamin fortification of coconut oil. We also have participatory planning and monitoring as a follow-up on the *Maunlad·na Niyugan* project before. We have a research on molecular markers for the hybridity

see NTLs, page 8

Luzon R&D managers revitalize OFR program

New name, new perspective.

The need for these in revitalizing the Department of Agriculture-Bureau of Agricultural Research's (DA-BAR) on-farm research (OFR) program arose in the meeting among Luzon's regional R&D managers held at the Philippine Rice Research Institute in Muñoz, Nueva Ecija, 4 March 2002.

BAR Director Eliseo R. Ponce, (front left), PhilRice Director Leocadio Sebastian, (front right), and participants during the first day of meeting

Newly dubbed as "Community-based Participatory Action Research: The OFR Program of the DA;" when translated in Filipino is, "*Sama-samang Pananaliksik ng Pamayanan sa Agrikultura: Ang Programa ng DA sa Pananaliksik sa Kabukiran.*" This revitalized program imbibes the following concepts: total farm, total technology, total family, and total community approaches.

Dr. Eliseo R. Ponce, BAR director and chair of the meeting, explained that this new perspective will provide a more holistic approach in facilitating effective research-extension interface.

In this new perspective, Dr. Ponce said, research managers should look at the whole production system; provide farmers the technology options and other alternative technology packages; and determine opportunities for meaningful family and community involvement.

OFR, according to BAR's definition is "research conducted at farmers' field and managed by farmers to compare a package of new technologies with farmers' practice aimed at increased total farm productivity and income."

To effectively carry out the project, Dr. Ponce said that each region should draft its respective technology game plans. These plans, he said should clearly indicate the methods, resources available, and outputs of the program.

Dr. Ponce, likewise announced that BAR will provide up to P700,000 in grants for each region, with them putting up a counterpart fund.

BAR's Regional Programs Division organized and facilitated this event. It was attended by technical directors for R&D, regional integrated agricultural research center (RIARC) managers, assistant RIARC managers, and the Bureau's regional technical advisers for Luzon area. (*Laarni C. Anenias)*

BAR...

with no valid reason, as a result of neglect."

Atty. Dennis Gumpal, legal officer of BAR will still review the guidelines for termination.

Lastly, BAR has proposed a new system for network integration. This will allow for greater effectiveness and efficiency, and the streamlining of the organization of the national R&D programs in the light of the recent changes in resource allocation by the DA. Under the proposed system, the existing networks, sub-networks, and special programs will be grouped into major sectors. These are grains (corn, rice and legumes); horticulture crops (vegetables, ornamentals and rootcrops); fruits; plantation crops (fiber, sugarcane, coconut, rubber, cacao and coffee); fisheries (capture and aquaculture); livestock and poultry; biotechnology; social science and policy; postharvest, food science and nutrition; and natural resource management (soil and water, irrigation and drainage, agricultural engineering, crop protection, urban agriculture, and plant genetic resources). An inter-disciplinary committee made up of representatives from the different sectors will implement the network integration. (*Thea Kristina M. Pabuayon*)

(With notes from Bing Bayot of the BAR-National Programs Division)

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decorticating machine, an effective device in "defiberizing" coconut husk; and coconut husk processing machine, used in converting coconut husk into coir fiber and dust.

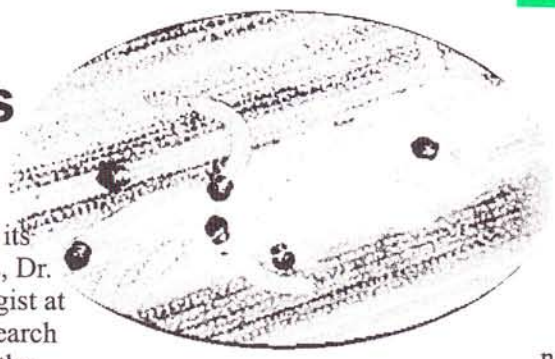
The appointees were initially screened by DA-Scientific Career Evaluation Committee, with BAR Director Eliseo R. Ponce as chairman. They were evaluated based on their scientific productivity, which include having pioneered scientific works and new inventions; scientific publications (national and international refereed/non refereed journals); teaching experience; and professional standing.

The newly conferred scientists will be entitled to salary increases, fringe benefits, and allowances, which will be paid by their respective agencies.

Since the adoption of Scientific Career System in 1991, the System has conferred 25 appointments for the ranks of Scientist I, II, III, and IV. (*Mary Charlotte O. Fresco*).

Slowing the resistance of caterpillars to *Bt* plants

by Junelyn S. de la Rosa



Caterpillars are killed after eating Bt plants but through time they can survive and develop resistance to Bt plants.

Many insects have become resistant to widely-used insecticides, including Bt products that are applied as sprays. Even insects such as the brown planthopper (*Nilaparvata lugens*) and the Asian rice gall midge (*Orseolia oryzae*) that were controlled using resistant varieties have also adapted to resistant rice cultivars produced by conventional plant breeding.

The target caterpillar pests for Bt rice such as the yellow stem borer (YSB, *Scirpophaga incertulas*), the striped stem borer (SSB, *Chilo suppressalis*), and leaffolders (*Cnaphalocrocis medinalis*) could become resistant to Bt plants in the long run.

As the vigorous debate on the Bt technology continues to rage almost everywhere in the Philippines, countries like the United States of America (USA) Australia and Canada are already far-off in their debates. When these countries released Bt maize, cotton and potato five years ago, they already had procedures in place to extend the life span of the Bt technology in the field.

Scientists agree that the most practical tool to delay the caterpillars' development resistance to Bt plants is the "high-dose plus refuge" resistance management strategy. In fact, this strategy is being implemented by governments for Bt corn, maize and potato in the USA, Bt maize in Canada, and Bt corn in Australia.

During the recent Bt symposim organized by the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) at its headquarters in Los Baños, Dr. Michael Cohen, entomologist at the International Rice Research Institute (IRRI) discussed the "refuge/high-dose" strategy and Bt plants that have two Bt toxins- both practical steps to sustain the Bt technology in the field.

He said that the refuge strategy involves maintaining "refuges" in the fields. These refuges are non-Bt crop plants that will maintain the population of Bt susceptible insects. "Refuges" can be fields of non-Bt plants or of non-Bt plants within fields. When the susceptible insects mate with the resistant insects, the offspring is usually susceptible. These insects are killed if the Bt cultivars have a high dose of toxin. Therefore, the combination of refuges plus plants with a high dose of toxin can keep the population of resistant insects at extremely low numbers.

In the USA, the government has enforced the "refuge" system in the countryside. Farmers who plant Bt crops must allot 4-20% of their land to non-Bt crops and these refuge fields must be approximately within one kilometer of their Bt fields. In the Philippines where the average landholding is less than a hectare, "refuges" should be planned and maintained by the community or village farmers who choose to grow non-Bt cultivars. This would also serve as refuges for their neighbors. The government should help to maintain seed supplies of non-Bt cultivars.

Dr. Cohen dispelled the belief that stemborer damage will likely increase in non-Bt fields since moths could not detect whether the plant is Bt or non-Bt. "It is very likely that the stemborer population in non-Bt fields will more likely decline than increase after introduction of Bt rice," he said.

Another strategy is to plant Bt rice cultivars containing two Bt toxins. Dr. Cohen said that insects that are resistant to cultivars that contain two high-dose toxins will be extremely rare. And since resistant insects will be very rare, then fewer susceptible insects will be needed to ensure that resistant insects do not mate with each other. Thus, smaller and fewer refuge fields are necessary to maintain the effectiveness of Bt plants.

The scientists recommend that when the time comes, the government should be proactive in implementing and sustaining this technology on the farm by monitoring resistance and maintaining "refuges" in the field.

It is very important that the government bases its decisions on short-term and long-term benefits. In the final analysis, we should make sure that the Bt technology achieve its great potential and a lot of people especially the farmers benefit from it. (*Junelyn S. de la Rosa*)

Source: Bt rice: practical steps to sustainable use by Dr. Michael Cohen, Entomology and Plant Pathology Division, International Rice Research Institute; F. Gould, Department of Entomology, North Carolina State University and J.S. Bentur, Department of Entomology, Directorate of Rice Research, India E-mail: m.cohen@cgiar.org

Project Development Unit

PhilFruits: Changing ways, improving lives

by Carmela B. Brion

Summer is here once again, and surely, most of us are gearing up for swimming parties, out-of town vacations, swimsuit shopping, or simply filling up that big, old drum in the backyard. The heat is definitely on, and let us not forget that this hot season also offers us plenty of soul-satisfying and thirst-quenching tropical fruits – mango, pineapple, watermelon, among others.

Thanks to our tropical climate, the Philippines has become a famous producer and exporter of exotic fruits all over the world. In fact, the carabao mango, cayenne pineapple, and cavendish banana helped our country create a niche in the global market. Statistics from the Food and Agriculture Organization (FAO) revealed that, from 1997 to 1999, the Philippines ranked fifth among the 46 countries in Asia in primary fruit production. Our country is followed in rank by its neighbors - Indonesia, Thailand, Japan, and Vietnam.

FAO's report validated the Philippine's potential in fruit production. Thus, to keep the country's momentum in fruit production, the government should focus on modernizing the industry to maintain our competitiveness in the global market. Modernizing the fruit industry requires the establishment of infrastructures and rehabilitation of facilities, among others. This is where the Philippine Tropical Fruits Research Institute (PhilFruits) enters the picture.

Since January of this year, the Bureau of Agricultural Research (BAR) has been in constant coordination with the Bureau of Plant Industry (BPI) in the preparation of the proposal on the improvement of R&D infrastructure of the PhilFruits.

The project is being proposed to the Japan International Cooperation Agency's Grant-in-Aid program. Upon approval of the grant request, PhilFruits will soon rise at the 4,774-hectare compound of BPI in Davao City. It shall serve as the country's first research, development, and extension (RDE) site for fruit researchers, scientists, extension workers, entrepreneurs, farmers, and for the other 10 million people working in the fruit industry. To top it all, the building will house critical laboratory equipment and tools necessary to conduct fruits RDE. Thus, PhilFruits shall serve as the perfect place for people whose livelihoods are anchored on the fruits industry.

The establishment of PhilFruits is in response of the Department of Agriculture's mission to advance fruit RDE. Eventually, PhilFruits will institutionalize all fruits RDE efforts in the country.

Innovations in conducting RDE at a national level promote an accelerated generation of appropriate and effective fruit technologies, which are necessary in bringing the country to a sustained agricultural development.

Achieving the condition of a sustained agricultural development is synonymous to happy farmers, competitive fruit industry, and consumers enjoying the summer season that is full of fresh, affordable, and thirst-quenching supply of tropical fruits. ■

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brought significant breakthroughs in rice molecular genetics. He developed the first molecular genetic map of Japonica rice. He also pioneered the use of molecular marker information important in diversifying the genetic base of Philippine hybrid rice germplasm. One of his outstanding achievements was the discovery of 352 experimental rice hybrids, which yield 20% higher over their parental varieties. He has published and written several scientific papers, technical journals, and proceedings.

The other appointee, Ms Secretaria, a science research specialist at PCA Zamboanga Research Center, pioneered the development of a Lotus 123-based computer program for fertilizer recommendation in coconut. Her exemplary contribution helps facilitate faster assessment of the nutritional status and fertilizer needs of existing coconut stands. She has written and published 17 scientific research papers, journals, and scientific articles.

A long time specialist at PCA Zamboanga Research Center, Dr. Palomar developed the design of coir wood-cement-board (CWCB), a potential alternative construction material. The new product is now being used as practical substitute for plywood, asbestos, cement, and hollow blocks. Among his utility models are: prototype coconut husk

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IPB develops long shelf papaya

Biotechnology in the Philippines made another leap as scientists at the Institute of Plant Breeding (IPB), UP Los Baños successfully cloned a new variety of papaya with long shelf life.

The project is in support to the country's move to make our agricultural products such as high value commercial fruits hold a place in the global market.

Dr. Evelyn Mae Tecson-Mendoza, project leader of the study, expressed that with this new technology, consumers could now avail of fruits that could remain fresh for long periods of time without using artificial chemicals or refrigeration. Another main benefit of this new papaya variety is the reduction of big postharvest losses.

The new papaya variety was cloned through tissue culture using other cultivars with excellent characteristics such *Sunrise Solo, Kapoho* and *Eksotica*.

The researchers adopted the genetic manipulation strategy to delay fruit ripening, which involved suppressing the release of a key enzyme called ACC synthase. The ACC synthase is responsible for the production of ethylene - the chemical emitted by newly harvested fruits that trigger ripening.

The papaya plantlets are now grown and monitored in Biological Containment Level 2 (BL2) screen house, a special type of greenhouse wherein plants are individually planted in containers. Some of the papaya trees are now bearing fruits, an indicator of normal growth. As soon as the papaya fruits reach maturity, they will be brought to the Postharvest Horticulture Training and Research Center (PHTRC), also in Los Banos, Laguna for further evaluation.

The Australian Center for International Agricultural Research (ACIAR) and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) funded this project.

Aside from Dr. Mendoza, the other researchers involved in the project are Drs. Antonio C. Laurena, Pablito M. Magdalita, Violeta N. Villegas, Ms Bessie Y. Perez, and Ms. Marie Sol P. Hidalgo.

Two-week old transgenic papaya

The researchers hope that this new product of Philippine biotechnology will soon reach distant countries such as Japan, Hongkong, United Arab Emirates, and other Middle East countries. (*Mary Charlotte O. Fresco*)

(*For more information, please contact Dr. Evelyn Mae-Tecson-Mendoza or Dr. Antonio C. Laurena at IPB Plant Biotechnology Program, UP Los Banos, College, Laguna at telephone no. (049) 536-3304 or 536-2298)*

Women scientists discuss new dev'ts on GMO

In observance of the National Women's Month, the Natural Sciences Research Institute (NSRI) and the Women Association of Scientists in the Philippines (WASP) held a symposium, "GMOs for National Development," at the Miranda Hall, University of the Philippines (UP) Diliman, Quezon City, 7 March 2002.

The half-day activity featured the latest developments on genetically modified organisms (GMOs) in different fields. The presentation was divided into five parts: development of GMOs for pest resistance in rice; GM crops developed at the Institute of Plant Breeding (IPB); development of DNA vaccine against hog cholera; diagnostic kit for detection of dengue fever; and regulation of GMOs in the Philippines.

Presentors during the activity were: Dr. Rhodora Aldemita, chief science research specialist at the Philippine Rice Research Institute (PhilRice); Dr. Desiree Hautea, director of IPB in UP Los Baños; Dr. Celia Torres-Villanueva, associate professor at the National Institute of Molecular Biology and Biotechnology, UP Diliman; and Dr. Filipinas Natividad, director of the Research and Biotechnology Division, St. Luke's Medical Center.

Dr. Saturnina H. Halos, senior program development adviser of the Bureau of Agricultural Research (BAR) and president of WASP, discussed the regulation of GMOs in the Philippines.

The activity aimed to inform the public on the latest developments in GMOs. Most of the participants were students and researchers. (*Rita T. dela Cruz*)

NTLs...

of coconuts so that farmers will have a way of knowing the breed of the coconut that they buy.

For this year, we will have a project on ecological valuation of coconut. There has never been such a study that looks into the effect of coconut on the environment. We also have a research on intercropping coconut with other crops. We hope to have projects on the socioeconomic characteristics of the coconut planters.

You see, everything is interrelated hence, the approach should be holistic. I do not know everything that's why I invite the leaders of the discipline-based networks to become part of our network. For instance, if we have a project in biotechnology, the national team leader should know about it, and even have a role in that project. In networking, aside from defending that particular funds should go to this agency, we also train people either by involving them in projects or sending them back to school. Trainings give a vantage view on problems of the industry. We have enough share of that.

In this country, coconut is a political commodity. We have very few buyers who don't even own lands or plant coconuts but they control the price and the market structure. They are the ones who become rich and rake in the profits. The farmers end up displaced and taken advantaged of. We hardly do value-adding on our coconut products because we can't compete with the multinational companies that demand only raw materials from coconut. We also do not have any law or policy for coconut when in fact we are its biggest producer. There was even a time when we had zero R&D output because we didn't have any money for it.

And there is that thorny issue of coconut levy. All other issues in the coconut industry revolves around that. We hope we can encourage the farmers to organize themselves into cooperatives. We have the hybrids, the pesticides, but coconut farmers find these too expensive. I cannot blame them because most of them are really poor. They expect that all technologies that we develop will be free because of coco levy. They will tell us, "why should we give you some more money when you have not returned what you have taken from us?"

The approach in researches should be multi-disciplinary and I hope we don't look at it using the cost-benefit perspective. If we want the industry to prosper, we should invest on R&D and at least have the patience to wait for a long time to see the concrete results of researches.

It is nice that Dr. Ponce understood the magnitude of the problem of the industry. I hope that the issue between the Bureau of Agricultural Research and the Philippine Council for Agriculture and Natural Resources Research and Development will be settled so that we can devote all our energies and pool all our resources on similar goals. When we work together, we can do greater things and therefore have stronger impacts. *(to be continued)*

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Solsoloy

emerged from the eight nominees evaluated and endorsed by the DA Scientific Career Evaluation Committee to the Council.

Dr. Bautista, a chief science research specialist at PhilRice, studied the adaptation of Vietnamese flatbed batch dyer and rice hull stove technologies to fit local conditions. This endeavor resulted to the *Maligaya* flatbed dryer and *Maligaya* rice hull stove, which is used in the rural areas using rice hull for cooking. His discoveries and inventions include the following: liquid urea injector, for applying dissolved urea to rice plants to minimize nitrogen losses; power-tiller-mounted soil auger, a high-powered seeder; animal-drawn plow seeder/fertilizer applicator; compost maker; improved fertilizer injector; drum seeder; walking-type light stripper harvester; and multi-crop flour mill. He also has published and written numerous scientific research papers, journals, proceedings, and other scientific publications. He has been a recipient of national and institutional awards for his achievements in his field of specialization.

Dr. Solsoloy, a full-fledged cotton specialist, developed the proper sequencing of chemicals to effectively control serious pests in cotton such as cotton bollworm. She has written and published 14 scientific research papers/journals, scientific proceedings, and papers. She received several awards for her achievements in her field such as the *Gawad Sentenaryo/Makasaysayang Kababaihan sa Larangan ng Agham at Teknolohiya*, and Outstanding Women in the Nation's Service (TOWNS) award.

Having specialized in the field of genetics, Dr. Romero pioneered the Gene Bank Database Management System (GEMS) in PhilRice. This system allows easy information access on rice germplasm collection. He has written and published 32 scientific research papers/journals/proceedings and articles. He received the first prize in the 1997 Philippine Talent Search for Young Scientists and is also a recipient of other national awards.

Dr. Redoña's expertise

see DA, page 6

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ERP cites strategies for R&E linkage

How can research and extension be organizationally linked? What are the mechanisms to strengthen research and extension?

Dr. Eliseo R. Ponce, Bureau of Agricultural Research (BAR) director, averred that we should treat research and extension activities as part of a single continuum that "begins and ends with the farmers/ fisherfolk".

He said this when he served as resource speaker during the Study Meeting on Integration of Agricultural Research and Extension, held at the EDSA Shangrila Hotel, 18 March 2002.

To form an effective linkage between research and extension, Dr. Ponce gave as an example the strategies that are being implemented by the Department of Agriculture (DA) - the lead agency mandated to orchestrate the overall agricultural development in the country - and BAR, such as the formation of regional RDE networks and implementation of on-farm research.

These regional networks are composed of regional integrated agricultural and / fisheries research centers, training and extension centers, regional state colleges and universities, private R&D institutions, local government units (LGUs), and provincial institutes in agriculture and fisheries. This integration puts together the major research and extension players in every region, with the main task of developing their respective agenda and programs.

On-farm research, anchored on the community participation approach, is also another strategy to effectively link research and extension, according to Dr. Ponce, along with the creation of research and extension centers at the provincial level, and developing a funding facility for it.

There is still a long way to go before our farmers/ fisherfolk can fully enjoy the benefits from this research-extension linkage. According to Dr. Ponce, the government still

see ERP, page 8

Search for new AVRDC director general is on

"The position requires a highly experienced professional who has a good combination of the qualities appropriate to lead an institution..."

Thus, is the announcement of the Asian Vegetable Research and Development Center (AVRDC) as it seeks the right person to fill the position of Director General (DG) by year 2003. The term is for three years and renewable.

AVRDC is an internationally funded, autonomous, non-profit research, development and training organization, based in Shanhua, Tainan, Taiwan. The Center was originally created for Asia, but due to its encompassing mission to alleviate poverty and improve nutrition, its mandate expanded globally. It is now

see Search, page 6

Inside...

SCIENCESCOPING

The farmer as a dynamic component of research

All R&D efforts are focused and revolve around the farmer with the goal of improving his productivity, thus his income and consequently, his quality of life. This is what one hears in gatherings where progress and development are topics. It is often the rationale behind a development project. It is like a litany. And like litanies, the response is already set and mechanical. The only difference is that the supplications are directed to humans and humans to give the answer. This has worked but not as effectively as expected because the farmer, until now, has not improved his life. Could this be because the farmer has been a detached entity in the overall scheme of things? He is just there at the receiving line to accept what has been proposed and decided for him. He is not there to sound off and elucidate what he needs and what he wants. He is not there to discuss and plan what is good for him and how things should be done by him. He is not there to make decisions for himself so that he, too, will be accountable for what he does. If he does not increase his yield, then it is partly his fault and there is no one to blame.

In the preceding issue, I mentioned about the comments of farmers on their being the center of discussions and debates when they themselves are not even afraid nor concerned about their situation. Comments like these give us a reason to redefine our strategies in reaching the farmers. Actually, the farmer had not been relegated to the background but had not been involved as much as he is involved today.

I remember that in the past we categorized our tobacco farmers into outstanding, middle level, and low level farmers using different criteria to classify them into these categories. We found that the outstanding farmers were the more educated and articulate ones. They had more resources and more access to information and more extension agent contacts. And they had been winners in contests where yield and quality of produce had been the number one criteria in their winning. During annual research planning reviews, these farmers were invited to participate during paper presentations and it had been an exhilarating experience listening to them talk about their experiences, travails, problems, and even aspirations. From there, the planning ensued but the farmers are no longer involved but their inputs during the open forum had been guide to the researchers in planning their work especially those that needed immediate solutions such as insect pests and diseases.

By virtue of winning the contests and their being outstanding, we assumed that these farmers were influential and so we tapped them to do on-farm research or demonstration farms. We conducted field days, with them talking about the technologies they adopted in their farms. Field days were at their heydays and we got so many participants. Well, it could be that the rides were free, snacks and lunch were served and chemical companies conducted raffles and there were plenty of giveaways. But whatever was the reason behind the big attendance, there were intelligent interactions among the farmers and we felt that the strategy worked for the yield increased and the quality of the produce improved.

On our part as the coordinator of training and field days, we learned more on how to deal with farmers and in time we became more efficient and effective even on how we related with the other tobacco agencies. We had harmonious relationship and we worked as one.

In time, the outstanding farmers became our R&D partners. We organized them by tobacco types and trained them annually. During such training, the modules discussed were both technical and social. Technical so that they were able to extend to their co-farmers the newest technologies, and social so that they could dispense well their functions as trainor and communicator. In essence, they became our extension agents to beef up the government's extension service. In the absence of an extension agent in the community, the ordinary farmers could just consult the outstanding farmer. And for all that he was doing for his co-farmers and for the tobacco agencies, the outstanding farmers did it with a smile minus a fee.

Lastly, we federated the organization of the outstanding tobacco farmers and they registered their federation with the Securities and Exchange Commission. This group became so strong that it lobbied for better prices from the traders and policies for the benefit of the small farmers. Later, we felt that they could even be better extension workers than those in government so we employed them as special extension workers in areas difficult to reach by extension agents.

I have to acknowledge that the concepts tried were those of Dr. Santiago R. Obien, the first director of the then Philippine Tobacco Research and Training Center, with inputs from his staff whom he sent to graduate school. (VAD)

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National team leaders plan for the RDE networks

(4th of five parts)

by Ma. Rowena S. A. Briones

The team leaders of research, development and extension (RDE) networks for each commodity and discipline plan and orchestrate research programs, and delegate and monitor research efforts and functions .

This is the fourth of a five-part article on the plans, goals and challenges faced by the National Team Leaders of the 22 RDE networks.

This article is culled from my interviews with them.

Dr. Domingo A. Angeles
Ornamentals RDE Network

We have six program themes in the National Program. These include adoption of cost efficient production systems; improved post production system; environment- friendly pest management; biodiversity conservation and utilization; investment strategies, advocacy and policy reforms; and promotion of appropriate and sustainable technologies.

We have also identified priority crops. These are orchids, chrysanthemum, roses, mussaenda, and anthurium, among others. Research areas are based on the needs of a particular crop industry.

For this year, we will conduct interphasing workshops in Regions IV, XI or XII, and CAR. We would like to communicate the national plans and programs to them so that we can refine our national and regional programs and ensure that we serve the industry.

We will update our website so that we can put more relevant information. We want to produce publications containing updates about the ornamental research that we are doing. Our projects right now are on development and commercialization of Mussaenda; varietal improvement of orchids; and development of appropriate control measures against white rust in chrysanthemums and orchids using biological control.

We will also evaluate designs of greenhouses according to strength and cost of materials and control of the environment. This way, we will know what design is suitable for a particular plant.

Although the results of these studies will be ready this year, we can only produce knowledge products. We can not have extension activities. We will wait for the Agricultural Training Institute to initiate extension activities. I hope the time lag between development of technologies and dissemination of this is not long.

We hope we can improve the quality of our ornamentals and encourage investment in the industry. There is a big demand for good quality ornamentals. We even import these during peak seasons.

The network can only do so much. Aside from a very limited budget, release of budget is often delayed. Our projects end up being delayed also.

Dr. Teresita Espino
Biotechnology RDE Network

We have new projects for risk assessment and molecular markers for GMOs that are marketable. We would like to develop a model system for GMOs so that we can do risk assessments.

Most of the high impact projects will be finished this year or early next year but the problem is lack of funds. Our network budget was really reduced. We may not travel now as often as we did before to monitor the projects and to do consultation. We need facilities and budget for continuity of projects because research in biotechnology take years before it can be completed.

Our high impact projects are validation of kits and vaccines, risk assessments, policies and communication strategies in biotechnology. Results of these will be disseminated to private and public sector through our website and publications.

We will focus on these media to showcase the latest products and services that the network can offer so that at least Filipino consumers are aware of biotechnology.

(to be continued...)

A second look at jackfruit

by Rita T. dela Cruz

Who doesn't know jackfruit or *langka*?

In the Visayas, jackfruit is a priority commodity. In fact, major jackfruit growing areas in the country are located in Western, Central and Eastern Visayas wherein almost half of the total land area is allotted to jackfruit production.

To many, jackfruit is grown mainly at backyards because it used to be mainly for family consumption, either as vegetable when it is still young or as dessert and processed food when mature or ripe. It is planted erratically and usually left to grow until it bears fruits. Jackfruit trees are not demanding and bear fruits about 5 to 6 years after planting.

Aside from its usual use, jackfruit has other uses. The rags or the non-edible portion of the fruit is very rich in pectin and can be used in the preparation of jelly. There is now a great demand for it among local manufacturers. Unknown to many, its wood is used in the manufacture of guitars.

At the international market, the potential of this fruit lies on the processed products. In 1995, the Animal Husbandry and Agricultural Journal reported that the Philippines export earnings from jackfruit averaged about half a million dollars annually.

But this earning could go higher if the jackfruit's potential is developed. Likewise, the country could develop the other uses of this multi-purpose fruit tree for value-added benefits.

Low production

The low production of jackfruit in the country is attributed to the poor cultural management practices of our farmers, which could be due to the lack of sufficient information and technical skills of the farmers or producers. Or they produce only a volume that they think is enough for their own consumption.

To boost production and, likewise, advance commercialization, the Eastern Visayas Integrated Agricultural Research Center (EVIARC) of the Department of Agriculture launched a five-year on-farm technology demonstration project in Region 8.

The techno demo is done right in the farmer's field so that farmers could right away see for themselves the result of using the package of applicable technology (PAT) under local environmental conditions.

The on-farm techno demo

The on-farm techno demo aims to improve the technical and economic efficiency and productivity of jackfruit farmers by showing them the relative advantage of the recommended package of applicable technology over that of the farmer's practice.

Thirteen techno demo projects were established, each having a one-hectare area for the key production areas (KPAs) for fruit trees in Region 8 with 6 sites in Leyte, 2 in Biliran, 2 in Samar province, 1 in North Samar and 2 in Southern Leyte.

Recommended varieties of jackfruit were planted in the farm demo site. The planting schemes used were monocropping and intercropping.

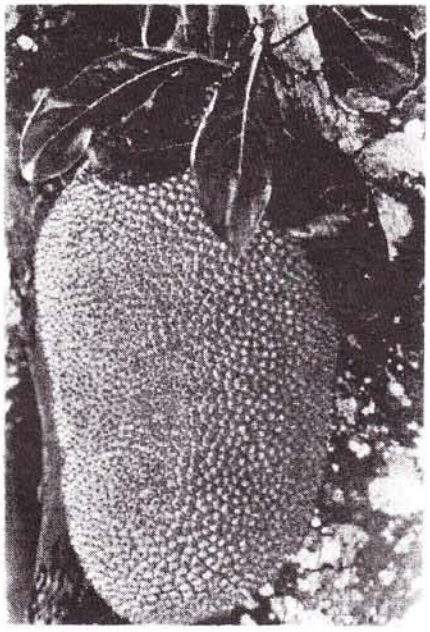
The recommended package technology used asexual reproduction in planting since grafted planting materials bear fruits so much earlier than those sexually propagated.

The technology also included limiting the number of fruits per tree per year for them to reach full maturity while all the other fruits on the tree have to be removed. The reason of which is to produce bigger size and better quality of ripe fruits.

Products of technology

In terms of the number of years before fruiting, the jackfruits planted on the demo sites yield more fruits at shorter period of time. For instance, in two and a half years from their establishment, about 40-50% of the 450 jackfruit trees planted had reached full bearing stage and increased to 60-80% for the following year. Remarkably, all the jackfruit trees bear fruits after four years.

The demo project also proved that asexual planting materials bear



fruits earlier than those sexually grown since it took only 4 years for the trees to bore fruits instead of 5-6 years.

The number of productive trees in techno demo farms is much higher with 77% as compared to only 55% of non-techno demo farms. Meanwhile, in terms of the number of fruits produced per tree, jackfruits planted in techno demo farms averaged higher with 18 fruits per tree. The fruits are much larger and heavier averaging to about 18 kilograms as compared to only 9 kilograms from the non-techno demo farms.

Fruits from the techno demo farms ranged from 11to 26 fruits per tree with an average weight of 10-15 kilograms per mature/ripe fruits.

In terms of cost, the techno demo farm incurred three times more than the non-techno demo because farmers spent for fertilizer, pruning and other activities during the development stage of the crops. But since production is higher, the farmers netted more. For instance, for the first five years after the techno demo was estblished, a one-hectare jackfruit farm in Ormoc was able to earn a total income of Pph 805,500 with a total production cost amounting to Pph 282, 830. That means, the net returns per hectare has amounted to Pph 522, 670.■

(Source: "Jackfruit Technology Demonstration Project" by Bebian C. Cajes, Danilo B. Palang, Elvira C. Torres, and Rufino B. Ayaso of the Eastern Visayas Integrated Agricultural Research Center or EVIARC, Department of Agriculture Region 8, Bagong Silang, Babatngon, Leyte.)

Protein-enriched animal feeds from sweet potato waste

by Mary Charlotte O. Fresco

Poultry feeds are considered as "complete" feeds because they are formulated to contain all the protein, energy, vitamins, and minerals necessary for proper growth, egg production, and health of the birds. However, due to the continued increase in price of commercial feeds (as 60% is imported from other corn producing countries), large and small-scale raisers fail to maintain a balance diet ration for their flock. Farmers, in efforts to meet the recommended diet requirement, resort to mixing other feed ingredients, which in turn impair the balance of nutrients in the "complete" feed.

As this problem continues to pose threat to our livestock production efficiency, experts from the Tarlac College of Agriculture (TCA) in Camiling, Tarlac, developed a practical alternative to help our farmers reduce feed costs. Researchers were able to come up with a protein-enriched feed product from sweet potato pulp, a solid waste derived from making starch.

How did they do it?

The researchers of this study employed the protein enrichment technology. The technology sounds so simple yet the procedure is complex. Some of the critical processes involved are: use of non-protein nitrogen sources (urea, ammonium phosphate, ammonium sulphate) in preparing the substrate and application of fungus (*Trichoderma harzianum, Aspergillus niger, Rhizopus oligosporus*) to ferment the pulp. Also, they determined the degree of pulp wetness (low-moisture and high moisture) to find out which substrate can generate high percentage of crude protein. Crude protein is the amount of nitrogen present in the feeds that can be converted into protein.

Results of the study showed that sweet potato pulp that underwent protein-enrichment increased its protein content to 17-20%. Sweet potato pulp with high moisture content was found to be a good fermenting material, and thus, could manufacture large amount of crude protein.

When it comes to the application of non-protein nitrogen source, sweet potato pulp (with high moisture content) applied with urea had an increase of 29.37 % in crude protein content. Meanwhile, the fungus *Trichoderma harzianum* worked well in fermenting the wet pulp and was found efficient in enhancing the crude protein value of the pulp.

According to the researchers of the study, the marked increase in the crude protein content of treated sweet potato pulp was brought about by the bio-conversion of carbohydrate materials present in the pulp into amino acids by microbial activity. The microbial activities are enhanced when there are sufficient amounts of nitrogen and other minerals in the pulp.

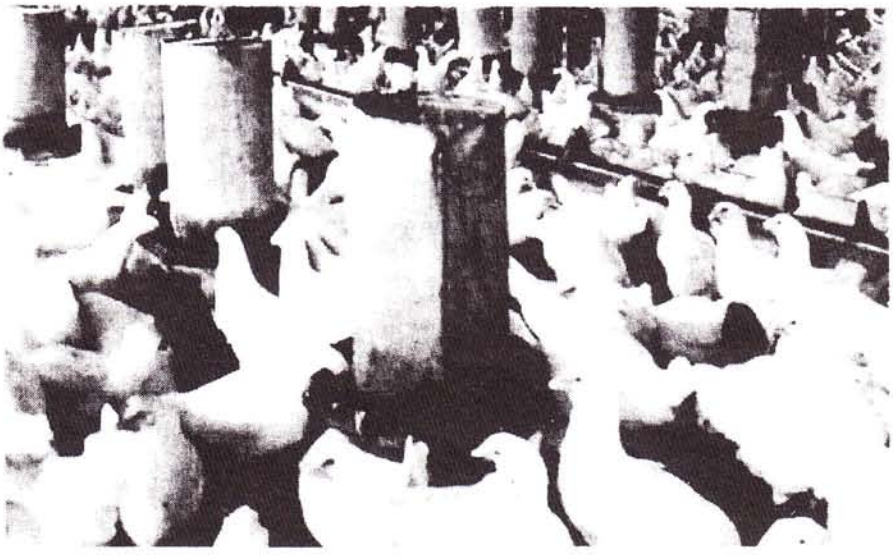
Results of on-farm feeding trial

The researchers conducted on-farm feeding trials among commercial poultry growers. They found that broilers fed with finishing mash incorporated with protein-enriched sweet potato pulp increased their body weight by 0.7 to 3.8%. Likewise, the birds' feed conversion efficiency was increased by 6.4-15.8%. Based on the cost efficiency analysis made, a farmer can save from P2.54 to P3.81 per bird at finishing stage and P0.49 to P3.06 per bird during the growing-finishing stage. Moreover, the protein-enriched sweet potato feeds are guaranteed safe since the broilers fed with this new feed product showed no mortality or allergic reactions.

The researchers added that the technology is also applicable to other agricultural and industrial by-products and wastes such as pineapple pulp, sugarcane bagasse, rice bran, corncobs, banana peeling, as well as weevil infested and non-marketable root crops.

To date, the on-farm feeding trials are now at the village level and soon will be ready for national application.

The DA-Bureau of Agricultural Research funded the this study.■



For more information, please contact Ma. Teresa SJ. Vldez, Rodolfo A. Demo-os, and Mariano c. Macapili, Jr., at Tel. No. (045) 934-0752, Tarlac College of Agriculture, Camiling, Tarlac .

IDG strengthens RFRDC region 2 research capability

In pursuit of strengthening the research and development (R&D) capability of regional research centers, the Bureau of Agricultural Research (BAR) recently awarded to BFAR-Regional Fisheries Research and Development Center (RFRDC)–Region 2 an Institutional Development Grant (IDG) of P500,000.

The grant is intended to support the Center in crafting its Master Plan and to procure computer, digital camera, audio-visual projector, and printer to expedite the promotion of existing fishery technologies in the region.

The Master Plan is the blue print for the establishment of an integrated and operational research center for Region 2.

To date, the RFRDC has four research outreach stations and two fish health laboratories that undertake research studies on freshwater, marine, brackishwater and sustainable aquaculture. The sub-center, Claveria Brackishwater Fish Farm located in Pata East, Claveria, Cagayan , has a total land area of 17 hectares. The station specializes in marine and brackishwater applied researches.

With the establishment of a nerve center, researchers hope that more research activities such as technology verification and demonstration will be conducted at the village level. (*Mary Charlotte O. Fresco*)

Search...

the leading agency in international vegetable research.

The search for the new DG is the main agendum for the First DG Search Committee Meeting scheduled to take place on 13-14 April 2002 at Tainan, Taiwan, Republic of China. Bureau of Agricultural Research (BAR) Director Eliseo R. Ponce chairs the Search Committee.

After the DG Search Committee Meeting, Dr. Ponce will also attend the 35th AVRDC Board Meeting, an annual gathering of the members of the Board's Executive Committee (EXECOM), Program Committee (PROCOM), Auditing Committee (AUDCOM), and Nomination Committee (NOMCOM).

This will be held on 15-18 April 2002, also at the AVRDC base station. The first day of the activity will be the separate meeting of each committee afterwhich, the Board will meet on the 16th and 18th to discuss the agenda of this year's meeting.

The AVRDC Board is composed of 15 members from Italy, Korea, Republic of China, Kenya, USA, France, Thailand, Japan, Ireland, Germany, and Philippines.

Dr. Ponce will represent the Philippines. Aside from heading the DG Search Committee, he is also the chairperson of the Board's EXECOM.

This is his second year in this position since he was elected for the position on 3 April 2001. (*Rita T. dela Cruz*)

Unfolding...

another set of field testing to evaluate the Bt plants' performance during the dry season. The first field trials were conducted during wet season. Biotech scientists from the University of the Philippines at Los Baños (UPLB) have become very optimistic with the results of the first Bt corn trials and have urged policymakers and the media to support science by ensuring that this technology be put to good use so that majority could benefit from it. Indeed, we could all do our share in ensuring that the Bt saga will have a happy ending.

Source: Cry proteins from Bacillus thuringiensis: from laboratory to field application by Dr. Edwin Alcantara of the National Institute of Molecular Biology and Biotechnology, UP Los Baños, College, Laguna at Tel. No. (049) 536-3438.

Unfolding the *Bt* saga

by Junelyn S. de la Rosa

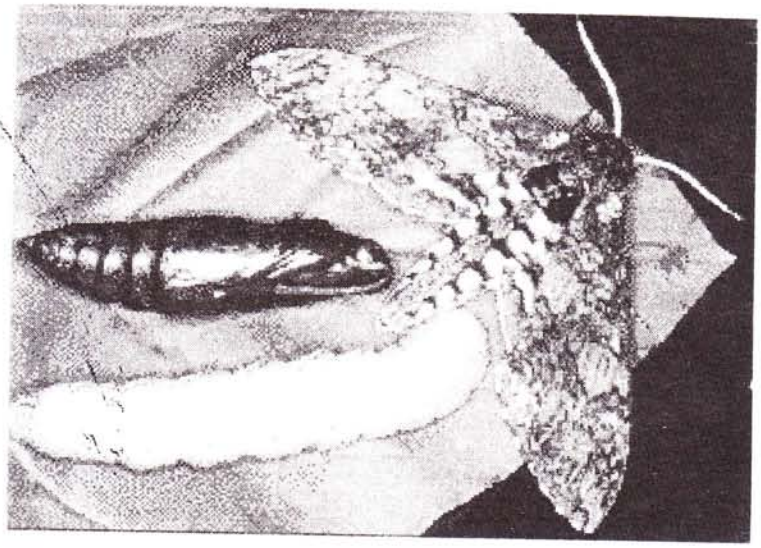
Never has there been any technology that has spurred forth a volatile mix of feelings, reactions, misconceptions, commentaries, debates and rallies by people from all walks of life - scientists, politicians, students, yuppies, farmers and even the pious clergy. The Bt technology has become the hottest topic since the first Bt corn field trials were conducted last year by Monsanto Philippines. While most of us have only heard of Bt very recently, the Bt story has spanned a century.

Bt stands for *Bacillus thuringiensis*- the scientific name of a rod-shaped bacteria that occurs naturally and is commonly found in soils worldwide.

Currently available Bt hybrids are very effective against European corn borer, stalk borer, and southwestern corn borer, and they can reduce damage by armyworm and corn earworm. Bt was first discovered infecting silkworms in Japan where it was known as the Sotto disease by Japanese bacteriologist S. Ishiwata at least a century ago. But it was only in the 1950s that research was done to test its potential for controlling some insect pests.

In 1958, the first Bt pesticide was sold in the market. Since it is not a synthetic chemical, it is not harmful to beneficial insects and degrades rapidly in the environment. Bt pesticides gained fast popularity even among organic farmers.

Today, it is the most widely used biopesticide in the world. Bt is highly specific affecting only certain species of insects and has no effect on others. Today, there are many Bt subspecies that are useful for different groups of insects. BTK is the abbreviation for *Bacillus thuringiensis var. kurstaki*, the subspecies that controls caterpillars. BTI for *Bacillus thuringiens is var. israelensis*, a subspecies that kills young larvae of mosquitoes and black flies and BTT or *Bacillus thuringinesis var. tenebrionis*, which affects the larvae of some species of beetles.



In1990, Mycogen Corporation made waves when it successfully transferred the gene containing the Bt protein crystal (Cry) by using another bacterium-*Pseudomonas fluorescens*. This was made possible by the discovery of plasmids or circular deoxyribonucleic acid (DNA) which contain the gene coding for the Cry protein. While plasmids in Bt was discovered by Zacharyan in 1976, it was five years later that Gonzales et al. reported that Cry protein production is associated with the presence of plasmids.

Thereafter, scientists focused more research on the Cry proteins found in the spores of Bt. Cry proteins are any of the several proteins that comprise the crystal found in spores of *Bacillus thuringiensis* (Bt). Susceptible caterpillars have a strong alkaline digestive tract (in contrast, humans and other animals have acidic digestive tracts) that dissolves the crystals and release the proteins. These proteins disrupt the lining of the caterpillar's gut, which causes the caterpillar to starve and die eventually. The first Bt crops such as Bt cotton, Bt potato and Bt corn were commercialised in 1985-1986.

While Bt corn is still being studied in some field trials to test its effectiveness under local Philippine conditions, other countries like Australia, China, Mexico, India and the United States, are now implementing resistance management strategies to ensure the sustainability of the Bt crops in the farmers' field. Considering the tumultuous history of the debate over Bt corn and genetically modified organisms (GMOs), a month ago the government announced the second set of field tests by Monsanto to know how these Bt corn will perform in the hands of farmers. The tests which will be monitored by the National Committee on Biosafety in the Philippines (NCBP) were conducted in Bukidnon, Camarines Sur, Pangasinan, Isabela, Ilocos Norte and South Cotabato. Results of the first field trial revealed that on the average, Bt corn yields are higher by 41 percent as compared to traditional corn hybrids. Despite the positive results, Monsanto said they want

see Unfolding, page 6

Farmers can save more with zero tillage

Farmers can save money through *tipid-saka* or zero tillage. By using herbicides and doing without the usual plowing and harrowing done before planting crops, farmers can increase their yields, save costs on weeding and hired labor and earn more money in the long run.

Zero tillage or "*Tipid-saka*" is a technology developed by Monsanto Philippines two years ago. They recommend this technology to farmers who plant corn or other vegetables after rice in rainfed lowland areas.

The technology was tested on-farm in barangays Mangarin and Mabini in San Jose, Mindoro Occidental. Results showed that the highest yield of yellow corn (*Var Cargill 818*) can be obtained using zero tillage and applying POWER™ herbicide. This treatment also reduced the rate of fertilizer and used 1 kg per hectare of BIO-N, a microbial-based fertilizer for rice and corn. It is mainly composed of microorganisms that convert nitrogen from the air into ammonia which is needed by the plants.

BIO-N is considered a better alternative to commercial fertilizers since it does not leave any harmful residues in the soil or in bearby bodies of water. In this study, the commercial fertilizer used was reduced to half at 600 kg of ammosul or ammonium sulfate per hectare.

The zero tillage treatment obtained the highest yield at 5.44 tons per hectare. This was followed by the farmer-cooperator that used convention al tillage at 5.33 tons per hectare.

Instead of the usual plowing and harrowing, farmers sprayed the rice stubbles and other weeds with POWER™ herbicide at the rate of six to eight liters per hectare. They planted a day after spraying the herbicide using the "bugsok" method.The "bugsok" method is manually planting the seeds using a pointed wood called "bugsok". If the soil is hard, the field is flooded two to three days before spraying the herbicide.

The other two treatments, namely, the farmers' tillage and the conventional tillage which is the usual plowing and harrowing before planting. For farmers' tillage, the farmers prepared the land by 1-2 plowings and one harrowing twice using an animal-drawn plow or a hand tractor. Seeds were planted using the "bugsok" method at a rate of one seed per hill with a 70cm x 20 cm spacing.

For conventional tillage, the land was plowed and harrowed twice. Using a "farmalite" (manual corn seed planter), seeds were planted at a rate of one seed per hill using a 70 x 20 cm spacing.

Scientists sum up the zero-tillage technology into three foremost advantages: better management of the soil, improving the soil's ability to produce crop and less production cost. In the final analysis, farmers should be able to get more returns from this technology and that is the foremost consideration of most if not all farmers. (*Junelyn S. de la Rosa*)

Source: Conservation Tillage Practices in Corn Production After Rice: A Case in San Jose, Mindoro Occidental by Romeo Labios, Leonardo Tamisin Jr., Jocelyn Labios, Cynthia Medina, Edicer Ocampo Jr., Dennis Boy Meciano, Jupiter Tividad and Jasper Manalo of the Farming Systems and Soil Resources Institute, UPLB, College, Laguna.

ERP...

has to tackle a number of issues such as the capacity of LGUs to implement extension programs and mechanisms for effective communication between research and extension. But they are assured that the DA is well on the right track in forging a strong research-extension linkage for effective agricultural development. (*Laarni C. Anenias)*

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