

# PHiMech

A man wearing a light-colored cap and a white t-shirt with a green apron is smiling and holding a large bunch of green bananas. He is standing in a banana plantation with many other bunches of green bananas hanging from the trees in the background. The scene is brightly lit, suggesting a sunny day.

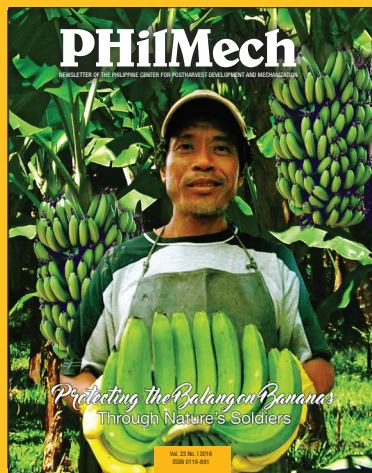
NEWSLETTER OF THE PHILIPPINE CENTER FOR POSTHARVEST DEVELOPMENT AND MECHANIZATION

**Cover Story:**

## *Protecting the Balangon Bananas* Through Nature's Soldiers

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# Issue No. 1

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## About the Cover

The Alter Trade Corporation, a PHilMech partner, has established the proper handling and packaging of Balangon bananas to curb the occurrence of diseases while transporting it to Japan. One of their Balangon banana farmers shows off his export quality banana.

*Photo courtesy of Alter Trade Corporation*

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## Leyte NGO launches soya milk feeding project

**A** NON-GOVERNMENTAL organization based in Leyte launched recently a soya milk feeding project to help reduce the incidence of malnutrition among children in the area.

The Agricultural Rural Alternative Development Options, Incorporated (ARADO) inaugurated its Soya Building along with other projects such as Swine Breeding Station last January 27 in Alang-Alang, Leyte.

A 73 year-old Benedictine nun Sr. Eloisa L. David, heads the ARADO. According to her, she wanted to help reduce the incidence of malnutrition by nourishing kids with soymilk and manna--"a mixture of milled rice, soybean textured vegetable protein and ginger.

Sr. Eloisa, who is a doctor and at the same time an agriculturist, initiated the planting of soybeans in the towns of Alang-Alang, Palo and Pastrana in Leyte. The mentioned areas will be the sources of soybeans for processing.

The NGO is a partner of DA-PHilMech for the pilot testing project on integrated soybean production-processing systems. The project is



During the soya milk feeding project in Leyte

evaluating the technical and financial viability as well as social acceptability of two levels of integrated production --processing systems, namely: household level and a community- based processing center. For the household level, the production and processing machines include the pedal-type thresher and manually operated screw type grinder. The community-based production-processing systems include multi-tilling machine, multi-grain thresher, cleaner/sorter, moisture meter and some processing equipment.

Members of the organization also attended seminars and

trainings on soybean farming and processing conducted by PHilMech.

Recently, ARADO purchased a complete soybean processing facilities worth P430, 000. The inauguration ceremony was graced by Leyte Governor Leopoldo Dominic Petilla, Alang-alang Mayor Loreto Yu, PHilMech Director Rex L. Bingabing, and foreign and local donors. *VBCaliguiran with reports from Ma. Cecilia Antolin*

**T**HE PHILIPPINE Center for Postharvest Development and Mechanization presents to the members of national and local press its two emerging technologies which are under pilot-testing stage.

Director Rex L. Bingabing introduced the fluidized bed dryer and brown rice mill in Solano, Nueva Vizcaya last February 18, 2016. He said that these two newly developed technologies can potentially address the problem on rice postharvest.

“We have to address the two major concerns in rice postproduction; these are drying and milling. These two contribute about 50 percent of the postharvest losses in rice,” Director Bingabing explained.

The fluidized bed dryer can reduce the moisture content of dripping wet paddy down to 14 percent in only three hours compared to the 8 to 12 hours on existing mechanical dryers.

“With the fluidized bed dryer, drying time is significantly reduced by 52 percent and consequently the drying cost is likewise lessened,” the PHilMech Director said.

Recently, PHilMech collaborated with Alay Kapwa Multi-purpose Cooperative



The pilot unit of the fluidized-bed dryer installed in Solano, Nueva Vizcaya for field testing.

## PHilMech readies 2 new rice machines

in Solano, Nueva Vizcaya to setup full-scale fluidized bed drying system. The technology pilot testing aims to validate laboratory results and to assess the socio-economic aspect.

The dryer is fully automated and powered by a biomass furnace.

On the other hand, the village level brown rice huller is currently installed at Ventinilla Farmers Marketing Cooperative in Paniqui, Tarlac.

The brown rice huller is an impeller-type rice mill with an input capacity of 150 kilograms per hour, husking ration of 98% and whole-grain ration of 78%. The machine is powered by 373-watt single phase electric motor.

These two newly developed technologies are set to commercialize as soon as the pilot-testing is completed.

**VBCaliguiran**





Senator Cynthia Villar accompanied by DOST Sec. Mario Montejo visits the postharvest machines displayed at the CLARRDEC booth during the Sipag Fiesta.

## PHilMech showcases PCAARRD-funded technologies

**N**EWLY DEVELOPED machines from the PHilMech-Agricultural Machinery Division were unveiled for the public during the Sipag Fiesta held last March 2 to 4 at the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) of the Department of Science and Technology (DOST), Los Baños, Laguna.

The Sipag Fiesta showcased the R&D initiatives of the council from 2010 to 2016 through the exhibit booths of its regional consortia. Displayed at the Central Luzon Agriculture and Resources Research and Development Consortium (CLARRDEC), where PHilMech is a member, is a compact corn mill. Meanwhile, on the main PCAARRD booth was the

PHilMech compact rice mill.

These two machines, both scaled down model, seek to address the small and medium capacity needs of the people. The compact design of the mills allows for their ease of transport in distant area where both machineries can very well serve the milling needs of the area.

The launching of PHilMech-generated postharvest machines is a source indicator of the Center's commitment in spearheading the mechanization and modernization program of the AFMA law of 1997.

The PCAARRD of DOST conducted the event to showcase the best of its agri-aqua research and development (R&D) outputs generated from 2010 to 2016.

The ribbon cutting ceremonies was led by Dr. Mario Montero, Secretary (DOST), Undersecretary Dr. Amelia P. Guevarra, SCU's Presidents and other prominent officials from the government.

During the three-day event, the actual operation of the PHilMech Brown Rice Huller was shown. A total of 475 visitors dropped by the booth. Free information materials were given during the exhibit.

Hon. Senador Cynthia A. Villar visited the booth. She commented that Nueva Ecija is one of the best places for farming. *IDCDavalos*



The operation of the PhilMech soybean sorter/ cleaner was demonstrated during training course held in Isabela.

## Postharvest, mechanization training for HVC held in Region 2

**I**N PURSUIT of PhilMech's mission to empower the agriculture and fishery sectors through research, development and extension, the Technology Management and Training Division (TMTD) conducted the Training Course on Mechanization and Postharvest Technologies for Soybean, Corn and Cassava. The training was held at the DA-Isabela Experiment Station, Gamu, Isabela on March 15-17, 2016.

Thirty two technical staff of the Provincial Local Government Units (PLGUs)

Regional and Provincial Agricultural Fishery Councils (RAFC and PAFC) and Independent City Agricultural Fishery Council (ICAFC) in Region II, DA-Regional Field Office (DA-RFO) II, DA-Cagayan Valley Research Center (CVRC) and organizations involved in soybean, corn and cassava production and postproduction participated in the training. Participating organizations include Brown Gold Isabela Organic Enterprise, Bacnor East Soya Farmers' Association and Panacian Economic Development Association Inc.

(PEDAI)-Quirino.

Experts from PhilMech namely Dr. Renita SM. Dela Cruz and Dr. Ma. Cecilia Antolin of the Socio-economics and Policy Research Division; Dr. Michael Gragasin and Engr. Raymund Joseph Macaranas of the Agricultural Mechanization Division; and Engr. May Ville Castro of the TMTD served as subject matter specialists. Engr. Cristy dela Cruz of DA-CVRC and Engr. Samuel Barut of DA-RFO II also shared their knowledge and expertise on soybean, corn and cassava.



Corn and cassava are the second preferred staple foods among Filipinos. Soybean, on the other hand, is a significant expanding crop because of its many uses. These commodities are also dominantly used in poultry feed formulation and processed into high value and other industrial products.

According to the speakers, there is a wide gap between the production and the demand for these commodities. Also, importation is higher than the local farmers' produce. In the Philippines, for instance, the supply of soybean for food is 99.5% imported and .5% locally produced (FAO).

Moreover, corn and cassava

farmers are concerned about the rising cost of inputs, low quality of grains due to high aflatoxin level, negative effect of climate change, high incidence of postharvest losses, availability of mechanical dryers, storage warehouses and the establishment of more solar dryers.

To address these concerns, the speakers presented the DA development programs. These consist of farm mechanization and recommended postharvest practices and innovations. The speakers also presented the country's industry situationer and emphasized technologies and systems like the village-type corn mill, PHilMech cassava digger, postharvest

and processing system for soybeans, PHilMech soybean sorter, cleaner and grader and other agricultural technologies available for the three commodities. A technology demonstration was also conducted for all the participants.

Meanwhile, the participants appreciated the training's importance. According to them, the training served as an avenue for the technology generators and researchers to impart new knowledge and skills on postharvest and mechanization for soybean, cassava and corn. *SBBanglig*



Field demonstration of the cassava digger

**B**anana is a tropical plant widely grown in the Philippines. It is one of the country's major dollar earners.

Banana has many uses. The fruit is a popular dessert. It is used in making banana flour, chips, meal, wine, catsup and vinegar. Its flower is used as vegetables. Its leaf sheet is also used as baling material.

## ALL ABOUT *Banana*



### Tips

#### Packaging of Bananas

Commonly used containers for packaging bananas are plastic crates, wooden crates and carton boxes.

In using crates, tightly pack bananas to prevent bruising due to transport vibration. Also, place perforated plastic sheets on the crates to prevent abrasion of the commodity.

*Source: Postharvest Handling Tips for Horticultural Perishables by DA-AFIS and UPLB-PHTRC*



### Recipe

#### Banana Jam

##### Ingredients

6 pcs (672 g) mashed banana  
300 g sugar  
82 ml calamondin juice  
245 ml orange juice

##### Procedures

- Combine sugar and juice. Stir until sugar is dissolved.
- Add banana, boil and let simmer. Stir constantly until mixture is thick.
- Place banana jam into sterilized jars. Place lid on and seal.

*Source: The Philippine Recommends for Banana by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development*



## Selection

### Non-Chemical Banana Book

Dr. Dionisio G. Alvindia, Scientist III of PHilMech, authored a book entitled, *Fungal Diversity of Non-Chemical Banana and its Environs in the Philippines*. The PHilMech published book provides a visual guide for taxonomists and para-taxonomists in identifying fungi associated to bananas and its environs.

Interested? Avail of your copy at the PHilMech library.

## Trivia

Do you know that the pseudo stem of banana plant can be made into cloth and handicrafts?

## Advisory

### PNAS Minimum Requirements for 'Saba' and 'Cardaba' Banana

The Philippine National Standards lists the following minimum requirements for fresh fruit 'saba' and 'cardaba' bananas:

- The fruit must be reasonably clean, free from diseases, insects, molds and other contaminants.
- The use of chemical process for ripening is allowed provided it conforms with PNS/SAO 74.
- Pesticide residues shall meet the requirements of the Codex Alimentarius Commission Vol. 2.

*Source: PNS/BAFPS 08:2004*

## Equipment

### Banana Chipper

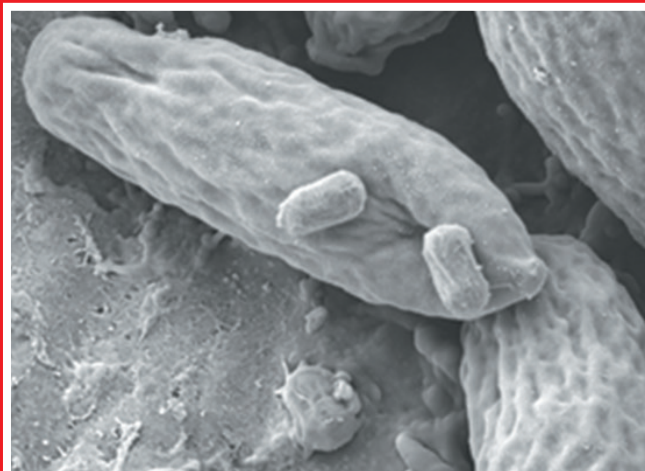
Manual slicing of bananas into chips is slow and laborious. With a mechanical banana chipper, banana chipping is faster and easier. There are banana chippers available in the market today. One of these is the banana chipper designed and fabricated by Irven B. Cuen of the Western Philippines University. The chipping capacity of the said banana chipper ranged from 240 to 260 kg/hr.

*Source: [www.pcaarrd.gov.ph](http://www.pcaarrd.gov.ph)*

NATURE HEALS ITSELF!

## Understanding the Importance of Biological Control Agents

by Elijah Davalos



The bigger ovoid is the pathogen *Colletotrichum gloeosporioides*. The smaller rod-shaped organism on top is the MCA DGA14, a bacterium, which destroys the pathogen upon attaching itself to it.

**I**N THE EARLY 90's, I witnessed two crop protection professors from a prominent university debate during a plenary session the meaning of integrated pest management (IPM). One defended the classical definition of integrating all available pest management strategies including the application of synthetic chemical compounds. His erstwhile opponent took the side of excluding chemical strategies prefiguring

organic agriculture that would come a decade later. The sideshow is symptomatic in that the definition and intent of IPM had been undergoing a change starting from the late 1980's. By that time, biological control strategy had become the core principle of IPM.

### Biological Control Agents (BCA)

A BCA is an organism and any derivative obtained from it, used as pest management tool in crop protection. This broad definition covers botanical, macrobial, microbial and semiochemical categories.

Botanicals are plant and plant extracts possessing pesticidal

properties. The Food Protection Division (FPD) of PHiIMech had notable studies on botanicals as protective spray against storage pests like grain weevils and borers. Among these were ikmo leaves, jathropa, neem and atis seeds.

Macrobials are insects that kill insect pests, the prefix "macro" meaning big and therefore visible without the aid of instruments. Most often, we associate it with "natural enemy", meaning "enemy" from the perspective of insect pests but "friendly" to human and termed "beneficial insects". Macrobial insects have two types of action; predation and parasitism. A predator (eater or consumer) is bigger than its prey (insect pest being eaten) and the action is instantaneous, taking only one fast movement and the deed is done like consummating a marriage. The FPD had initial



studies using anthocorid bug (*Xylocoris flavipes*) preying on the larvae of grain weevil, grain borer and rust-red flour beetle. On the other hand, an insect parasitizing another insect termed as “parasitoid” is smaller than its host and slowly kills it by laying eggs within the host’s body. The developing parasitoid eggs utilize the substances in the host’s body, desiccating it then emerging from the dead body of the host. The FPD conducted such studies on the parasitoid *Chaetosiphila elegans* against mungbean weevil.

Microbials are microorganisms that kill pathogens. Currently, Dr Alvindia, Scientist III of PHILMech, has been conducting field trials using DGA14 (bacterium) and DGA02 (fungus) to control many pathogens of economic importance, meaning

diseases that directly affects food security and income.

Among the most common and constant threat to postharvest commodities are *Colletotrichum gloeosporioides* (anthracnose) and *Lasiodiplodia theobromae* (stem-end rot). Both microbials were highly effective against crown rot of exported Cavendish Banana and organic Balangon.

In 2015, field trial results of both microbials were at par or even better than azoxystrobin fungicide used as postharvest treatment on “carabao” mango exported to Hong Kong. DGA14 is showing superior control against Sigatoka Disease (*Mycosphaerella fijiensis*) and the dreaded Panama Disease (*Fusarium oxysporum f. sp. cubense* Tropical Race 4) a vascular disease that devastated

the banana industry of that country. The disease is already in the country and poses a threat to the banana plantations in Mindanao.

Semiochemicals are compounds derived from insects such as pheromones. Pheromones are highly specific as to insect species meaning it will work only on the same species, also to its purpose and function. There are sex, aggregate and dispersal pheromones. The FPD had not as yet tried pheromone development projects due to the required high technical skills to extract and synthesize pheromone compounds. The extent of the usage was in its use as bait for trapping by way of monitoring presence of a particular insect species of interest, for example, the quarantine pest Khapra Beetle (*Trogoderma granarium*).



Swabbing the cut crown is the method used by exporters in applying fungicidal treatment on Cavendish banana. The treatment is done after washing and before packing.

## The BCA and its use

The BCA is being studied as a probable alternative to synthetic pesticide use. Its principle of control parallels that of the natural system that ecology uses to balance nature. In this case, it is slow unlike chemical pesticides as its effect is long term and therefore more sustainable. Usage of BCA having an entirely different

***continued on page 20...***



# Protecting the Balangon Bananas through Nature's Soldiers

by Vladimir B. Caliguiran

**I**N FEBRUARY 1989, a non-government organization in Negros Occidental started shipping Balangon bananas to Japan. But the first cargo became black and rotten. They did not stop there; they tried several times until their first successful export by September of the same year.

Twenty-seven years later, the Alter Trade Corporation (ATC) has mastered the trading of Balangon bananas from the Philippines to Japan. Balangon, also known as bungulan, is a local cultivar of Cavendish native in the Philippines.

## The Balangon industry

The ATC was founded in 1980s during the international sugar crisis where Negros Occidental was severely affected—the very reason of the birth of the famous MassKara Festival held every October. The Japan Committee for Negros Campaign (JCNC) was one of the foreign groups to conduct emergency relief among the displaced sugarcane workers. As part of their mid- and long-term support activities, the JCNC imported mascobado sugar and Balangon bananas through the people-to-people trade approach—an alternative trading system. Hence, the

name of the new organization—Alter Trade Corporation.

For almost three decades now, the ATC has expanded its operation outside the Negros Island Region reaching Cebu, Panay, and Bohol and as far as Tupi, South Cotabato in the southern Philippines and Nueva Vizcaya in the north.

According to Ms. Gilda Caduya, president of ATC, they have about 3,000 partner households growing bananas in their respective backyards. On their estimate, they are maintaining at least half a million banana mats.

Weekly, the ATC ships an average of 2,800 boxes of Balangon bananas to Japan. The number rises to 4,000 during peak season.

## Postharvest handling and packaging

The ATCs extensive experience in the Balangon industry and the stringent policy of Japan in importing agricultural products has sustained the production of quality bananas.

The bananas being produced are either organically or naturally grown. The ATC is continuously conducting capacity building activities among their partner farmers. Through the years of experience and research, they had developed their basic cultural management and best farm practices.



The ATC assures that every banana finger consumed by the Japanese is of high quality, and naturally and organically grown, but they don't have any assurance that every banana they harvest will reach the Japanese market. Yes, every banana will reach the land of the rising sun but some will just end in the trash bins.

Banana exporters, especially organic farming, have been long suffering from the crown rot disease. High rejection rates were observed because of this postharvest disease. Experts from the Philippine Center for Postharvest Development and Mechanization (PHilMech) characterized crown-rot disease as 'rotting of the cut tissues of the banana hand or cluster that ultimately destroy the whole commodity.'

The rotting occurs during the shipment period. The ATC hauls their Balangon from their consolidation area in Negros to either Manila or Davao Port then transport it to Japan. The process will take 25 to 30 days but it will take longer when port congestion occurs.

In the case of ATC, they incurred an average rejection rate of 7% last year and recorded as high as 20%. Some companies treat the disease with chemicals; however, residue contamination remains a threat to human health.

## Bio-control agents: nature's soldiers

At PHilMech, a government institution mandated to address the postharvest problems of agri-fishery industry, the Food Protection Division has explored

Scientist Ill, had recommended practices to reduce the occurrence of postharvest diseases in banana like the anthracnose, crown rot, finger rot and freckles. Among his recommendations include proper handling and packaging



The antagonism exhibited by DGA02 resulted into a crown rot-free export organic Balangon Banana 29 days after treatment (left). Using the company standard, organic bananas suffer an average loss of seven percent per shipment (right).

the utilization of bio-control agents in pest management. *(Read related story on page 10)*

Dr. Dionisio G. Alvindia has been closely working with the Alter Trade Corporation to combat crown rot disease in Balangon. The partnership started during Dr. Alvindia's postgraduate studies in Japan where he studied disease control for Balangon together with his Japanese professor, Dr. Keiko T. Nasauki. Coincidentally, his professor was providing technical assistance to the ATC.

Dr. Alvindia, Supervising Science Research Specialist and

system and improved cultural and postharvest practices.

Recently, he successfully discovered a number of bio-control agents with antagonistic effect against pathogens that cause crown rot. His laboratory experiments on BCA showed significant results in combating the said postharvest diseases.

To validate the result of Dr. Alvindia together with his colleague, Mr. Elijah Davalos, conducted a field evaluation of the BCAs in managing the crown-rot disease.

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## FIELD EVALUATION OF BIOCONTROL AGENTS IN MANAGING CROWN ROT DISEASE OF BANANA

Elijah Z. Davalos, Dionisio G. Alvindia, Miriam A. Acda, Monica F. de Guzman



Export-driven banana cultivation, while providing social equity and financial security in the countryside, suffers considerable rejection rate due to crown rot disease caused by *Colletotrichum musae*- *Lasiodiplodia theobromae* – *Thielaviopsis paradoxa* – *Fusarium spp.* The disease is characterized by rotting of the cut tissue of the banana hand or cluster that ultimately destroys the whole commodity. The impact is most felt in organic farming while chemical farming remains subject to residue contamination and food safety issues.

Two species of epiphytes, *Bacillus* spp strain DGA14 and *Trichoderma* spp strain DGA02, were tested for antagonistic effect against pathogens that cause crown rot. To validate laboratory results, six field trials on commercial export scale were conducted along divergent farming systems, chemical farming (FEDCO-Davao City) and organic farming (Alter Trade-Dumaguete City). The trials were scheduled during the rainy season when selection pressure was at its most severe.

Seven liters of candidate BCA was mixed in a plastic drum with 90 liters of tap water. Thirty-two replicates per trial were designated for each BCA. Samples were submerged for 20 minutes in the Alter Trade trials while various treatment exposures were tested in the FEDCO trials. Treatment was assessed by quarantine officers

of the importing country. Crown Rot Index (0 to 7 where 0 means disease-free), Visual Quality Rating (1 to 6, where 6 denotes excellence) and Peel Color (0 to 7, where 7 means yellow) were monitored.

Results showed that regardless of treatment time, samples in the FEDCO trials showed a 100 percent recovery in all three trials, 21 days after treatment (DAT), with CRI = 0, VQR = 6 and PC = 5, comparable with the standard pesticide treatment the company employs.

Organically-grown bananas likewise showed a minimal rate of rejection (1.5 per cent), 29 DAT with average values of CRI (0.5), VQR (4.8) and PC (2.15) while control treatment resulted to 7.24 percent loss in the first trial. As for the second and third Alter Trade trials, Control Check totally deteriorated causing total loss of profit due to shipping delays whereas BCA-treated bananas suffered only 18 per cent rejection with a delay of five days (compared with the first trial of 29 days) in the second trial and 34 percent rejection rate for 11 days delay in shipping.

Moreover, the cause of rejection was largely due to production diseases like freckle caused by *Phyllosticta musarum* and anthracnose caused by *Colletotrichum gloeosporioides*. In terms of cost of treatment, BCA application is more affordable than expensive agro-chemical input.

Table 1. Trial 1 quality results, washed, 10-min treatment time

TREATMENT	CROWN ROT INDEX (0 to 7)		VISUAL QUALITY (1 to 6)		PEEL COLOR (1 to 7)	
	FEDCO	ATC	FEDCO	ATC	FEDCO	ATC
DGA14	0.0	0.6	6.0	5.0	5.0	5.0
DGA02	0.0	0.475	6.0	4.75	5.0	4.75
Control Check	0.0	7.0	6.0	1.0	5.0	1.0

Note: The control check for FEDCO uses chemical treatment while the samples from Alter trade were treated organically.

Source: PHilMech Annual Report 2014



## Agricultural Profile

Farming, fishing, poultry and livestock production are among the major industries of Davao del Norte. Major crops include rice, corn, coconut, fruit trees, and banana which is intended both for international and local consumption.

## Postharvest Situationer

One of the factors contributing to the postharvest losses is the insufficiency of postharvest facilities. Thus, determining the province' existing postharvest facilities is necessary to get an accurate picture of the farmers' needs and subsequently reduce their postharvest losses.

An analysis of the status of postharvest facilities in the province was conducted in 2007. Results revealed that there was a surplus of drying capacities. There was also enough threshers to meet the province' threshing needs. However, shellers were insufficient to handle the corn produce of the province. Although there were enough corn mills, there was a lack of rice mills. There was also a deficit of warehouse/storage capacities in the province during that year.

## Proposed Postharvest Projects

- ▶ Community –based drying service center,
- ▶ Mango packing house,
- ▶ Bagsakan center for fish,
- ▶ Banana processing plant,
- ▶ Durian processing plant,
- ▶ Mango processing plant,
- ▶ Minimal processing and packaging plant for vegetables, and
- ▶ Cold chain system in existing bagsakan center

*Source: Davao del Norte Postharvest Development Plan (2008-2018) by the Provincial Government of Davao del Norte and the DA-BPRE*



## Davao del Norte

The province, located in the southern part of Mindanao, is subdivided into eight municipalities and three cities. Its capital is Tagum City.

Popular tourist attractions in the province include world class resorts, diving sites, white sand beaches, and underground waterfalls. Davao del Norte is also known for its vast banana plantations.

## AFMech RDE agenda incorporate livestock, poultry regional concerns

**A** REGIONAL consultation workshop on the formulation of Agriculture and Fisheries Mechanization (AFMech) Research, Development and Extension (RDE) agenda for livestock and poultry was organized by the Planning, Management and Information Technology Division (PMITD) of PHilMech at its main headquarters at the Science City of Munoz, Nueva Ecija on March 15-17, 2016. The workshop aimed to identify the technological gaps and issues, thrusts and strategic directions on livestock and poultry mechanization at the regional level.

Sixty-two participants representing DA offices in Regions 1 to 13 and the Cordillera Autonomous Region participated in the workshop. Director of PHilMech, Engr. Rex L. Bingabing aired his hopes that the inputs on animal waste management as well the value adding technologies for poultry will be updated.

Non-edible parts of poultry according to him can be processed using rendering facilities, similar to that in Bulacan, where chicken heads and feet are being processed to become feeds. He also challenged the participants to think of some cheap ways of processing

packaging the edible and non-edible parts of poultry to create new opportunities and potential international market like China and Taiwan where consumption of such products is high.

The regional workshop featured paper presentations and focused group discussions. Issues identified during the group discussion included input management, production, postproduction, waste management and transportation. Researchable areas and responsible agencies that will address and resolve issues and concerns were also identified.

The group outputs will be incorporated in the National Agriculture and Fisheries Mechanization RDE agenda that is being consolidated by PMITD of PHilMech. PHilMech Deputy Director Raul R. Paz congratulated the group for coming up with a collective output. He challenged everyone to translate these plans into actions in the near future.

*continued on next page...*



Mr. Wilmer Faylon of DA-RFO 4A facilitating the discussion during the small group workshop.





**PHilMech Float.** The muses and the escort from PHilMech awe the crowd during the 3rd Uhay festival civic parade.

## PHilMech participates in 3rd Uhay Festival

**T**HE PHILIPPINE Center for Postharvest Development and Mechanization (PHilMech) participated in the 3rd Uhay Festival of the Science City of Muñoz, Nueva Ecija. For this year's event, the theme was, "*Ani ng Sining at Agham.*"

Employees of PHilMech actively participated in the Uhay Grand Parade last January 20, 2016. The parade symbolized the unity of the people and agencies based

in the Science City of Muñoz. It was a day of camaraderie and collaboration among all agencies and organizations, both public and private that showcased the creativity and resourcefulness of the citizens in the city.

The Uhay Grand Parade was one of the most awaited parts of the month long celebration of the 15th charter anniversary and 103rd foundation of the Municipality of Muñoz.

PHilMech was declared as second runner up for the Best in float. Other winners were the Department of Environment and Natural Resources (DENR), first runner-up, and Department of Education (DepEd), the champion.

To further promote its employees and services, PHilMech also participated in the Employees Night on January 8, 2016, and Job Fair on January 14, 2016.  
*GMZCarganilla*

### ***AFMech from previous page...***

For more than a year, PHilMech has been actively spearheading the organization of the National Agricultural and Fishery Mechanization Research, Development and

Extension Network, also known as the AFMechRDEN, in support to the AFMech Law (RA 10601).

Concomitant with this network organization is the formulation

of the AFMech RDE Agenda. Several efforts have already been done in 2015 to be able to integrate and harmonize the researchable thrusts and areas of various commodities.  
*RNAngeles*

## PHilMech Juanas vote for women's agenda priorities

**T**HEY CAME in droves wearing white T-shirts with a thumbprint of women's issues and concerns. Juanas and Juans of different government agencies, private and civil society groups and individuals gathered, 16th of March, at the Burnham Green, in front of the Quirino Grandstand, Rizal Park, Manila, to be part of the 2016 National Women's Month Celebration. They were one in saying: "*Kapakanan ni Juana, Isama sa Agenda!*"

Twenty delegates from the Philippine Center for Postharvest Development and Mechanization (PHilMech) attended the event. Ms. Miriam Acda, chief science research specialist of the Food Protection Division (FPD) and focal person on Gender and Development (GAD) of PHilMech, led the group.

The Juanas of PHilMech along with other Juanas and Juans in the government and the private sectors voted for the top five priority agenda items of women they want to be addressed in the coming years. These development agenda for women are categorized into the following:



Mrs. Winnie Monsod delivers the keynote address.

economic empowerment; social development; security, justice and peace; climate change and disaster risk reduction; and gender-responsive governance.

Ms. Solita "Winnie" Monsod, a respected broadcast journalist, economist and a women's rights advocate, delivered the keynote address. She talked about the global gender gap index and how the Philippines ranked among the 145 countries studied.

According to the 2015 global gender gap report, Philippines ranked 7 among the most gender-equal societies in the world, with Iceland, Norway and Finland as top three performers. The global gender gap index report

ranked countries "on the gap between men and women on health, education, economic and political indicators".

Ms. Winnie Monsod also emphasized the need for women empowerment in the country. "If we are not empowered, we lose our competitiveness in the world."

March is a women's month celebration in the country. Republic Act No. 6949, s. 1990 declares March 8 of every year as National Women's Day. Meanwhile, Presidential Proclamation No. 227, s. 1988 enjoins the observance of March as the Women's Role in History Month. **MBGonzalez**



## Employees avail of beauty and health care seminar, services

**I**N CELEBRATION of the women's month, PHilMech treated its employees to a beauty, health care and seminar. Haircut, manicure and pedicure, therapeutic massage and seminar were given free on March 21, 2016 at the PHilMech Training Hall, Science City of Munoz, Nueva Ecija.

A total of 44 Juanas and 2 Juans availed of the beauty and health care services .

Ms. Madelyn R. Marzan, reflexologist and massage therapist, gave a lecture and demo on massage therapy.

Meanwhile, Policarpio Jacob, hair stylist, gave hairstyling tips and haircut to avid customers.

Unveiling the Beautiful You: a Beauty and Health Care Seminar was conducted under the Gender and Development (GAD) program

of PHilMech led by Ms. Miriam Acda, GAD focal person.

Republic Act 7192 (Women in Development and Nation Building) stipulates that all government agencies shall ensure women benefits equally and that they participate directly in all development programs.

**MBGonzalez**



## **Nature Heals ...from page 11**

mode of action compared with chemical pesticides might be effective in breaking the resistance problem posed by pests.

With its broad scope, BCA practically covers all stages of crop growth and development. For example, MCA can be used as dipping solution to banana suckers before planting to ensure that it would be absorbed and made part of the growing banana plant as vaccine against probable occurrence of vascular diseases. It can also be sprayed as prophylactic treatment against onslaught of leaf diseases or in the case of Dragon Fruit, a curative treatment against *C. gloeosporioides*. It is effective as postharvest treatment against Crown Rot of banana and pine apple, anthracnose and stem-end rot of mango. BCA can be sprayed in all season especially the development of organic stickers and spreaders. On-going field trials are being made to assess their capability to eliminate latent infections on banana, mango and papaya.

Practically, BCA can be applied on almost every crop. In particular, MCA can

be effectively used in rice, vegetables, fruit and ornamental productions including as bio-remediation agent on fishponds with severe ammonia conditions. Botanicals can be used either in its natural form like hanging leaves of alagao to ward off mites or their extracts like ikmo against stored product pests. Macrobiales can be applied by releasing reared predators and parasites in infested storage area as augmentation with the local population to boost their killing capacity thus bringing down population of the target pest. Microbials can be used as spray, soaking, swabbing and dipping solution. Pheromones, as semiochemicals, are used as baits on traps.

### **Specifications of the technology**

The BCA as a form of novel technology is not really new. Rather it is the oldest method by which nature suppresses the devastation of one species or the other. However, with new findings and more refined scientific tools, the technology catches the interest of the public and policy-makers. Neem as botanical is marketed as a liquid solution and MCA is being marketed as spore suspension and flowables. Macrobiales are mass-produced in special rearing houses then released in the field.

The DGA14 and DGA02 at the concentration of  $1 \times 10^8$  spore per millilitre of water kill target pathogens in in vitro tests. In the crown rot management

study, the ratio is 1:14 of MCA to water, respectively. As adjunct to hot water treatment, pure suspensions were used subject to further optimization trials. Commercial forms of botanicals show the recommended doses on their labels to treat specific pests on a particular crop.

### **Future Prospects**

The surface of the earth has undergone extreme changes. However, insect and microbes proved resilient and attain comparatively successful evolutionary responses required to survive such harsh conditions. This survival capacity of these organisms must gain respect and recognition in that the abuse of chemical pesticides did not completely eliminate pests. Instead, let us learn the lessons that nature teaches us.

Sustainability requires patience. The loss of profit due to unproductive farming system should be considered "tuition fee" as we learn the lessons that nature and experience teaches us. At least we do. IPM had seen its fruits during the past administration.

The Organic Act had been turn into law in 2010 followed by the Food Safety Act of 2013. The implementation of the ASEAN economic integration in 2015 forces us to harmonize our quality standards emphasizing the principles of Good Agricultural Practices. The adoption of the BCA technology fits well into the noble objectives of food security and sustainability.





Mr. Crispin Nartatez VIII



Dr. Alexander G. Gibe

## Two PHilMech sons pass away

**T**he management and staff of PHilMech mourned the sudden death of fellow personnels –Dr. Alexander Joel Gibe and Mr. Crispin Nartatez VIII. The former died of acute respiratory failure, the latter of a motorcycle accident.

Dr. Alex, 53 years old was the chief science research specialist of PHilMech's Laboratory Services Division. Last year, he was conferred Scientist I rank by the Scientific Career System of the Department of Science and Technology.

In 2002, Dr. Alex obtained his doctorate degree in Pesticide Toxicology from the Chiba University in Japan.

In 2006, he finished his postdoctoral fellowship at the National Horticultural Research Institute, Rural Development Administration in South Korea.

The research results of Dr. Alex had been published in numerous international refereed and non-refereed journals and presented in technical symposia and conferences here and abroad.

Meanwhile, Mr. Crispin Nartatez VIII, 62 years old, was the Administrative Aide IV of the Applied Communication Division of PHilMech. In the early eighties, Mr. Crispin spent his college years at the Gregorio Araneta University Foundation.

Prior to his work at PHilMech, he worked at the Bureau of Agricultural Extension, National Food Authority of the Department of Agriculture and the Department of Agrarian Reform.

Both PHilMech sons had been with the agency since it was still named NAPHIRE, then BPRE. Dr. Alex had worked for 30 years while Mr. Crispin had worked for 32 years at PHilMech.

Endeared by family, friends and colleagues, Dr. Alex and Mr. Crispin shared common traits. Aside from being dedicated government employees, both are loyal husbands, responsible fathers, and talented singers.

## Protecting the...from page 13

In partnership with the ATC, the group tested two species of BCAs, the DGA14 and DGA02. BCA-treated samples together with organically treated bananas as control check were sent to Japan for evaluation by its quarantine officers.

The researchers monitored three factors namely, crown rot index (0 to 7, where 0 means disease-free), visual quality rating (1 to 6, where 6 denotes excellence), and peel color (0 to 7, where 7 means yellow).

Their Trial 1 reported promising results with a low rejection rate of 1.5%, 29 days after treatment. The crown-rot index were also very low at 0.6 for DGA14 and 0.475 for DGA02 compared to the 7.0 of the control check. In terms of visual quality, the BCA-treated bananas were almost excellent with rating of 5.0 and 4.75 for the DGA14 and DGA02, respectively. The same result was also observed on the peel color of the Bulungan, the DGA14-treated bananas had a rating of 5.0 and the DGA02-treated recorded 4.75 while the control check was 1.0. (*Read study report on Research Section on page 14*)

*"Malaki ang maitutulong nito kapag naging successful (This will be of great help if it becomes successful)," the ATC President said.*

According to her, the group need to further conduct evaluation of the BCA to have a establish report, thus, ensuring the Japanese authorities and consumers of better quality bananas. Since the DGA14 and DGA02 are newly discovered BCA, the ATC is working for the approval of the use of these microorganisms to preserve the quality of organic Balangon bananas.

"Addressing crown rot would mean increased profit rate for the ATC, then we have budget for our social projects for our partner communities," said Ms. Caduya.

Ms. Caduya also shared that their postharvest experts and Dr. Alvindia are now working to address the problem of farmers on diamond spot. The group will also explore the effectiveness of BCA on the said disease.

*"In addressing diamond spot, kapag mas kakaunti ang rejects sa farm gate mas madadagdagan ang income ng ating mga farmers (if there are lesser rejects at the farm gate, our farmers will have a better income)," the President added.*

### Quality bananas

Being nature's soldiers, bio-control agents have a great potential in protecting and preserving the produce both organically and naturally.



Ms. Gilda Caduya, ATC president

The ATC has come a long way in assisting farmers to produce export quality Balangon bananas. With their continuous learning and networking with R&D institutions like PHILMech, time will come that no more black and rotten bananas will reach the foreign market.

### References:

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Losses...?



Drudgery...?



Low Income...?



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## **Export Quality Banana**

These sweet-tasting bananas are grown in the tropical countries like the Philippines. Available all year round, they make nutritious appetizers, desserts and snacks.