



ISSN 1655-3934

# BAR Today

OFFICIAL QUARTERLY PUBLICATION OF THE DEPARTMENT OF AGRICULTURE- BUREAU OF AGRICULTURAL RESEARCH

Volume 5 No. 4

[www.bar.gov.ph](http://www.bar.gov.ph)

October-December 2003



## Mussaenda blooms year-round

### What's inside:

Editorial/ When water is lost•Canned Rice for hungry soldiers•A pioneering technology in rice beermaking•Understanding salt tolerance in corn•Mercury contamination in Agusan river•*Bagunon*: From fishpond pest to mudcrab fattener•Plant protein: the other half to fishmeal for white shrimps•Assessing fisheries impact on coral reefs•*Mussaenda* blooms year-round•Polyethylene plastic: Ideal mulch for off-season honeydew melon•Fighting potato whitefly the indigenous way  
An ounce of prevention can save a flock of birds•A new lease of life for the lahar-laden fieldsVirus-free garlic is a sure winner  
Malunggay: The magic tree•GIS and the hunt for diseases

# When water is lost

**W**ater, water everywhere. This is during the monsoon with so much flooding around and running off for the water to seek its own level. Water, water nowhere. This is during the long dry spell that has just started in our country and to last until April or even May, causing drought and wrecking havoc in many aspects of human life.

And when the water is lost, there are many things or even everything that we lose. Water is central to the survival of humanity. Imagine that there is no water to drink, so how can one ever survive when the water requirement is at least eight glasses of water a day; no water for household use, so how can we cook our food, take care of personal hygiene, wash our clothes, etc. (Oh, we would surely stink!); and no water for agriculture and for the industries (this could be a worst scenario). There would be no agricultural activity and therefore, no products to feed the industries. There would be no electricity generated to light our homes, run the computers, and energize the industries. There would just be nothing to do, no activity, nothing whatsoever. Very simply, there is nothing to eat. At the start, there would be struggle trying to compete for food and when it is exhausted just as the energies in competing for food are also exhausted, there would be silence and resignation for the inevitable.

Water seems inexhaustible because we have the rain that is cyclical, the river basins and other open water resources as well as groundwater resources. The country has 421 rivers excluding mountain streams that swell during the rainy season, 59 natural lakes and more than 100,000 ha of freshwater

swamps. We have five principal river basins, totaling more than 75 000 sq km. These are the Cagayan River Basin (25 469 sq km), Mindanao River Basin (23 169 sq km), Agusan River Basin (10 921 sq km), Pampanga River Basin (9 758 sq km), and the Agno River Basin (5 952 sq km). There are also 18 small river basins (each with an area greater than 1 000 sq km) with 8 of them in Mindanao and one in Negros.

We have groundwater resources and these are found in Cagayan, Central Luzon, Agusan, and Cotabato which when combined with smaller reservoirs would total to about 50 000 sq km. We have six large dams whose capacity when combined with that from the smaller dams would total to 4 753 million cu m (in 1995). These dams are administered by the National Power Corporation to generate the energy for the country. For sometime now, the Department of Agriculture had been investing on small water impounding projects (SWIP) and their capacity would add up to the total water resources for the country except that the water is only available during the rainy season until the early part of the year.

If this is the picture of our water resources in the country, then why worry? The Philippines is composed of more than 7000 islands and being so, it is surrounded by bodies of water. But our observations and experiences show that through the years, especially during summer, water has always been a limited resource. There are many places in the countryside especially the arid areas where people have to go to far distances where there

are 'alive' wells to share and compete for their water. And as always, where there is competition, there would be conflict. It must be our luck that there is a 'living' well in our place so I have seen people around the community converge in this well as early as 3:00 in the morning bringing with them big drums transported on open vehicles or by the *kuliglig*, a steel cart attached to the power engine of tractors and used by farmers in transporting their farm produce. When the water is exhausted, they patiently wait until there is enough

→ Page 4

## Staff Box

### Editor

Virginia Duldulao, Ph. D.

### Managing Editor

Junelyn de la Rosa

### Writers

Ma. Lizbeth Barona

Likha Cuevas

Rita dela Cruz

Junelyn de la Rosa

### Layout, graphics & cover design

Junelyn de la Rosa

### Print Manager

Anthony Constantino

### Circulation

Julia Lapitan

Victoria Ramos

### KMD Chief

Angel Morcozo, Jr.

### Director

William Medrano, Ph. D.

For subscription and questions, contact the Knowledge Products and Services Section Bureau of Agricultural Research 3rd Flr. ATI Bldg., Elliptical Rd., Diliman, Q.C. Tel no. 920-0226 local 161-163 or E-mail at kpsd@bar.gov.ph.

All articles are based on studies conducted by NaRDSAF-member institutions. Articles contained in this publication may be used or reprinted upon permission from the editor.



## How about the *King of Rice* for dinner?

By: Ma. Lizbeth J. Baroña  
lbarona@bar.gov.ph

In the hinterlands of Abra grows a rare rice variety of high quality. Its reputation of being non-adaptive to growing conditions other than the upland conditions where it is being currently grown, makes it a rarity, but not for long. A study conducted to test the adaptability and productivity of this rice variety in lowland conditions will soon change that.

**B**allatinaw, is an indigenous rice raised in the uplands of Abra. It is called "King of Rice" and "Rice for Kings" for the right reasons. This indigenous rice is scarce, is of high quality, and commands a high market price. Truly, *Ballatinaw* is rice fit for royals.

A study conducted by the Philippine Rice Research Institute (PhilRice) will make *Ballatinaw* adaptable to the lowland farming conditions, and increase its yield, as one of the problems with *Ballatinaw* is that it is low yielding.

### *The distant and elusive Ballatinaw*

The local and international markets are showing signs of an increasing demand for this rare rice variety. But the low-yielding characteristic of the rice hinders this market opportunity.

The researchers sought to develop a technology for growing *Ballatinaw* in the lowlands. However, developing the technology to make this possible proved to be tricky as farmer cooperators (FC) in Abra reported that the aroma and good eating characteristics of *Ballatinaw* will be lost the moment fertilizer is applied, or if it is planted in the lowlands. In other words, *Ballatinaw* has to be planted the indigenous way to be able to preserve its good qualities. Farmers claimed that *Ballatinaw* prefers abundant water and produces higher yield in cold

places. Not a single *Ballatinaw* rice farmer claimed to have applied inorganic fertilizer in growing the rice.

The dilemma now for the *Ballatinaw* farmers and Philrice, is how to give the market what it wants, and at the same time, preserve the uniqueness that made the rice in demand, in the first place.

### *Farmers' practices*

The production practices of the farmers were observed as basis of evaluation and comparison with the practice that involved interventions in the production.

Land preparation for *Ballatinaw* growing was similar to the recommended practice. Seedlings were sown in June either on a wetbed or by drilling six seeds per hill in a relatively dry soil. After 35-45 days, usually done in July, seedlings are transplanted. According to the farmers, seedlings should be planted with wide spaces in between to allow the plant to make more tillers. True to the testimonies of the farmers, the rice had never been touched by anything inorganic. Not even in controlling weeds, or pests.

Weeds were minimal in the rice farms because the farmers prepared the bed very well. Stem borers and rice bugs were the

observed infestations, but the farmers ignored them. They did not have any control measures against the pests.

### *... and the Ballatinaw rice intervention*

As an intervention to the farmers' practice, a minimal fertilizer of 5 bags organic and 90-30-30-kg NPK per hectare was applied. The trials were held at lowland setting in Ilocos Norte. Results show that the tillers increased by 67% (from 9 tillers to 15 tillers), and the plant height increased by 17%.

All the *Ballatinaw* rice farms applied with fertilizer consistently got higher yield than that of the standard practice. The farmers' practice yielded 1750 kg to 3250 kg per hectare, while the farms applied with the intervention yielded 2580 kg to 3426 kg per hectare.

This yield increase was equivalent to an added P10,020.00 per hectare. The added cost for fertilizer was P3,954.00 per hectare but still with an increase in net benefits was a little more than P6000.00 per hectare.

The remaining question would be that, after all the success in making the rice yield more, has it retained its original characteristics that made *Ballatinaw* a special rice? Sixty-four percent of those who tested the *Ballatinaw* rice produced in the lowlands versus the rice produced in the uplands, think it had.



# Canned rice for hungry soldiers

By: Likha C. Cuevas  
lcuevas@bar.gov.ph

Bringing *bigas* and *kaserola* to combat and cooking it in the middle of a jungle in Mindanao is quite impractical and downright dangerous. Imagine a scenario wherein the troops are busy attending to their *sinang* but somewhere hiding, a sniper is aiming at their platoon leader...

**T**his prompts the need for ready-to-eat meals that can be lugged around and something that can be consumed even if the hungry soldiers are hiding behind bushes or in ditches. As of today, the carbohydrate sources of Philippine troops in field combat are primarily baked products, which are not quite as filling and satisfying like cooked rice. In addition, traditional Asian staples like rice contain complex carbohydrates that soldiers need

because they expend a lot of energy.

Dr. Maria Patricia V. Azanza of the Department of Food Science and Nutrition, College of Home Economics, University of the Philippines Diliman addressed this need for ready-to-eat rice by preparing prototypes of thermally processed rice and rice meals in cans.

"In situations where cooking is not an option, the provision of raw milled rice grains

as part of the military food rations seem questionable," Azanza reported.

The research project by Azanza was developed through thermally processed rice-based products for the Philippine Military. It also helped establish the profile of rice-based canned products in terms of viand preferences, serving size, and appropriateness for inclusion in the military food ration.

Before working on the canned rice prototypes, the

▶▶▶ NEXT PAGE

## Editorial...

to be drawn by the next person. Not a few conflicts arose when outsmarting one another happened and this led the owner to ultimately close the well.

Water is a precious and finite resource. Even without using numbers for estimation but only our imagination, we can understand that a definite amount or volume when used by many is more easily exhaustible than when shared by few.

The Philippines is not the only country that worries about its dwindling water resources especially for agriculture but the whole world. More water will be used for irrigation in the future as food production is increased to meet the demand of the growing population. Last month, Dr. Santiago R. Obien,

senior technical adviser for institutional development at BAR as well as adviser to the secretary of agriculture was invited to attend and chair one of the six sessions of the "International Conference on Water in Agriculture Production in Asia in the 21<sup>st</sup> Century" in Phnom Penh, Cambodia. One challenge that triggered discussions was the degradation of natural resources and increasing water scarcity. According to him, they reviewed the better uses of water not only for personal and household uses but more so for agriculture; discussed about crops that can be drought-tolerant as well as strategies to make people aware that water is a dwindling finite resource and for them to take action for its conservation. The promotion of irrigated agriculture is side by side with that of efficient and sustainable water use through

management innovation, modernization, and institutional reforms. In fact, Dr. Obien said, that the conference agreed on the motto: "More crop per drop."

Drawing out the water and using it for whatever purposes is easier imagined than done. This is because this activity has political, economic, social, and ecological implications. There is much to worry about our dwindling water resources but there is encouragement from the words of the director general of the Food and Agriculture Organization when he said: "Tomorrow's world will have enough water if we start managing it prudently today."

Prudent is a simple but strong word. Its strength lies on our approach to make water last for our and the incoming generations' use. -VAD

researcher assumed that: (a) a typical soldier would require approximately 400 g cooked rice per meal and (b) an acceptable viand would be meat-based with a 1:4 (wt/wt) viand to rice ratio. The canned prototypes were canned rice (CR) and canned rice meal with pork sausage (CRM).

For the project, Azanza used milled Philippine Seed Board Rice (PSBRc) 66 variety from the Philippine Rice Research Institute (PhilRice) in Muñoz, Nueva Ecija. PSBRc66 has high amylose (>25%) content. Amylose content is important because, according to the Cooperative Research Center for Sustainable Rice Production (Rice CRC), "firmness and stickiness are two properties of cooked rice that influence consumer preference." Some types of rice are between 25% and 30% and high amylose levels tend to make the cooked rice firm and dry. PSBRc66 also has high intermediate starch gelatinization temperature (70°C) and medium gel consistency (41-60 mm).

Azanza used the CDO brand of Philippine nitrite-cured, smoked pork sausage for CRM. The process of canning the rice and rice meal includes: washing rice grains, hydration of washed grains to reach a moisture level of 35%, pre-gelatinization of the hydrated rice by steaming up to 45-60% moisture level, packaging in 307 x 409 mm cans using a standard fill-in weight of 400 g rice or rice with sausage, addition of acetic acid water (0.01%) and Tween 80-cottonseed oil emulsion mixture as suspending medium, and thermal processing at 115.6°C for 75 minutes.

After processing, the researcher assessed the physico-chemical characteristics of the CR and CRM prototypes by using these parameters: volume increase, weight increase, clumpiness, breakage, modified Ranghino test for doneness,

and pH. The results indicated that the prototypes have the same characteristics as that of the typical cooked table rice appearance and level of doneness as that of the ordinary boiled rice, with the grains not too sticky nor matted. The prototypes were also found to be low acid food (4.93pH for CR and 5.50 pH for CRM). The gelatinized rice showed an almost 200% increase in volume and weight. This is an acceptable level of gelatinization with minimum presence of chalky centers in the cooked rice kernels.

To test the acceptability of the CR and CRM prototypes, Azanza went to the Bonifacio Naval Station at Fort Bonifacio in Makati. One hundred personnel (who are normally assigned and engaged in military field operations) at the Base were randomly selected to evaluate the canned foods. The respondents were asked to answer questions about demographics, appropriateness of the rice products for inclusion in the military food ration, viand preference, adequacy of serving size, and other comments. Results showed that the prototype CR and CRM were appropriate to be included in military food ration and more than 90% agreed that the canned rice products were suitable for them considering their work in the field. The respondents (50%) preferred meat-based and poultry-based viands like beef jerky (*tapa*), nitrite-cured meat (*tocino*), eggs, and *adobo*. Majority of the



respondents said that 400g serving size was enough but size and net weight could be reduced so that these could easily be carried around.

To make these products more convenient for soldiers, the products could use the easy-open, pull-top cans so the soldiers need not bring can openers with them all the time. Azanza recommended inclusion of the viands suggested by the respondents in further studies and the need for performance testing in actual military operations in areas of assignment.

These canned rice products are a welcome innovation for the many hungry soldiers out there who would welcome a hearty rice meal in a flash.

#### References:

- Azanza, M.P.V. Canned Rice Products as Philippine Military Food Ration. *International Journal of Food Sciences and Nutrition*. Vol. 54, No.3, (May 2003) 235-240.
- Amylose and Amylopectin. *Rice Science*. Cooperative Research Center for Sustainable Rice Production (Rice CRC). [Http://www.ricecrc.org/reader/tg\\_Amylose\\_and\\_Amylopectin.htm](http://www.ricecrc.org/reader/tg_Amylose_and_Amylopectin.htm)



# A pioneering technology in rice beermaking

By: Rita T. de la Cruz  
rdelacruz@bar.gov.ph

Drinking beer is one of the most popular social activities for many years. When the first Egyptians learned the process of fermenting grains, beer became a part of almost every society.



**B**arley is an important ingredient in beer making. Unfortunately, barley is expensive since it is not produced in the country so it has to be imported. According to the International Trade Statistics, the Philippines spent US\$ 315,000 in 2001 to import barley. Imagine what could have been saved if an alternative ingredient for barley is found. Thus, the challenge behind the recent study conducted by the team of Evelyn Bandonill.

The study tried to find out if it is possible to use 100% rice and some locally grown additives in the production of beer. The idea of using 100 % rice in beer brewing has not been explored yet in the Philippines despite the fact that rice is ubiquitous in almost all countries particularly in Asia.

The whole tedious process of beermaking was conducted at the Philippine Rice Research Institute (PhilRice)'s Rice Chemistry and Food Science Division. During the process, three stages were done to malt the rice (*palay*): steeping, germinating and kilning.

According to the preliminary testings, rice was found to be a good material in beer mainly because it is a good source of starch. The properties of barley are not so different from rice. Both grains have husks that are advantageous due to their less fat and protein content and can form filter bed during mashing.

Aside from barley, hops are also important in the beer making business. Hops are added to the beer mix mainly for flavor. They are bitter but they balance out the sweetness from the malt. Hops act as natural preservative to keep the beer from spoiling. Hops are usually in pellet form which make them easier to use.

Through this study, Bandonill and company were able to identify additives other than hops. Additives used in this study are cheap and easy to find. Two locally grown additives: *tañgal* and *duhat*, were used as alternative for hops to improve the flavor, aroma, and color of beer.

Results of the chemical analysis showed that rice beer has a better quality compared to two commercial beers used in the study. When it comes to chemical and sensory quality, the carbonated beer produced from rice has no significant difference from that of the commercial beers. The taste is yet to be subjected for further general acceptability, as it needs more refinement that suits the standards of the consumers. Nevertheless, the potential of rice as main substrate for beer manufacturer has been positive enough to excite our local beer manufacturers.

This technology that uses 100% rice in beer production is first in the country, offers the

consumers with an alternative, low cost, and high quality product, aside from creating additional livelihood and helping the economy in saving our foreign exchange.

This study was presented during the recently held 15<sup>th</sup> National Research Symposium (NRS) and won the *Best AFMA R&D Paper Award* (Applied Research). The NRS is an annually held event coordinated by the Bureau of Agricultural Research (BAR). This study also won the *Best Poster Award* during the 14<sup>th</sup> Regional Symposium of the Central Luzon Agriculture and Resources Research and Development Consortium (CLARRDEC).

Source:

"Optimization of Process Parameters for Rice (*Oryza sativa* L.) Beer Production in the Philippines" by Evelyn Bandonill, Henry Mamucod, and Pricilla Sanchez, Philippine Rice Research Institute (PhilRice), Maligaya, Science City of Muñoz, Nueva Ecija.



# Understanding salt tolerance in corn

By: Likha C. Cuevas  
lcuevas@bar.gov.ph

"Salinity in soil? That's ridiculous! Only sea water is the saline environment I know," one might say.

*Au contraire*, salinity is widespread and about 344 million hectares of land in the world are affected. However, 230 million of the total hectareage are not extremely saline and can be planted with salt-tolerant species.

The ability of crops to tolerate saline environment has been studied by researchers since it has been increasingly necessary to boost crop production using available land that we have. Many studies have focused on understanding the fundamental mechanism for salt tolerance and breeding crops like corn that are suitable for saline soils.

Researchers from the Institute of Plant Breeding (IPB), University of the Philippines Los Baños (UPLB), headed by Dr. Flordeliza Faustino and Dr. Roberta N. Garcia, banked on the knowledge that these studies generated in identifying corn genotypes that are saline-tolerant, the growth responses of corn such as dry matter production, ion uptake, and nitrate reductase (NR) and phosphoenolpyruvate carboxylase (PEPC) activities in response to saline conditions towards revealing the mechanism of salt tolerance in corn.

## Causes of salinity

First of all, what is salinity? "Salinity," according to *Crop Growth in Saline Environment* by Dr. S.M. Alam and M.U. Shirazi, "is a concentration of dissolved mineral salts present in water and soils on a

unit volume or weight basis." The major dissolved solutes comprising mineral salts are the cations of sodium, calcium, magnesium, and potassium and the anions chloride, sulfate, bicarbonate, carbonate, and nitrate.

The problem of salinity is evident in: irrigation and drainage waters, saline and sodic soils, saline groundwater, seawater intrusion and brines from natural salt deposits. The primary source of salts in water and soils is the chemical weathering of earth materials, i.e. minerals that are constituents of rocks and soils. Evaporative salinization, like evaporation of water and transpiration by plants, and rainfall, snowmelt waters and irrigation waters, affect the concentration of dissolved mineral salts. Natural secondary sources of salts include: atmospheric deposit of oceanic salts along coastal areas, seawater intrusion into estuaries due to tidal events, seawater intrusion into groundwater basins in coastal areas due to overdraft, saline water from rising groundwater. Agriculture and related activities that contribute to the salinity include irrigation and drainage waters, soil and water amendments, animal manure and

waste, chemical fertilizer, sewage sludge and effluent, and oil and gas field components.

## What does salinity do to crops?

Salinity has harmful effects on plants and these are caused by two primary mechanisms. One is *osmotic stress* due to dehydration of the plant. Osmosis is the diffusion of salt molecules through a semi-permeable membrane of plant cells from a place of higher concentration to a place of lower concentration until the concentration on both sides is equal. The other mechanism is the *accumulation of toxic ions*, primarily chloride and sodium in plant cells, which can impede important physiological processes.

Plants that suffer from salinity stress have reduced vegetation, scorched leaf tips or margins, leaf premature discoloration and abscission (shedding of leaves following formation of scar tissue in a plant), and underdeveloped and discolored roots.

Since salinity is a bad condition for important agricultural crops like corn, there is a need to develop new varieties that could withstand saline environments.



## Mercury contamination in Agusan river?

By: Ma. Lizbeth J. Baroña  
lbarona@bar.gov.ph

Going to the market for the family's week-long fish diet is not a difficult task. Only one thing concerns you: freshness. And you have the eyes and meat of the fish to indicate that. But for one to determine whether the fish has mercury in it, what can a hapless mother do?

Mercury is a well-known and dangerous environmental pollutant. Studies have demonstrated that fish and other wildlife from various ecosystems have mercury of toxicological levels that they get from mercury-containing emissions from human-related activities. Human health concerns arise when fish and wildlife from these ecosystems are consumed by humans. Mercury is easily absorbed by the respiratory tract that can result to permanent health damage, particularly brain damage.

Humans can take in mercury in two ways: as methyl mercury from fish consumption, and as vaporous mercury from the air. The vital question whether or not the Agusan River in Butuan that flows out to the Butuan Bay is contaminated with mercury, was the concern of the study conducted by the Mindanao State University, led by Ms. Elnor Roa.

### *How does mercury contaminate our waters?*

Mercury is the only metal that can exist both as liquid and volatile form at ambient temperatures (Sadiq, 1992). This trait makes it easy for the compound to form alloys with metals like gold, silver, and tins, which are called *amalgams*.

The discovery of gold in the 1980s intensified the gold mining operations in northeastern Mindanao. It provided livelihood to 200,000

people in the region. Little did they know that harm is already piling up from metal processing wastes from these gold mines.

It took a news article on the **Bulletin Today** in 1987 to raise alarm of possible mercury contamination in the bodies of water in Surigao del Sur, Davao del Sur, and Agusan del Norte, where gold mining is a major source of livelihood in the area.

Later, it was confirmed by the Bureau of Mines and Geosciences (BMG) that the mercury waste dumped on creeks and rivers by the major gold mine sites in the said areas flowed through the Agusan River, out towards Butuan Bay. A 1999 report by the Department of Health supported the findings of the BMG after it revealed that the mercury content of sediment from the Agusan River has exceeded a level that allows for "unpolluted" sediments.

### *Toxin from the river to dinner plates*

Fishes, and other aquatic organisms in the river ingest this contaminants through water exchange and feeding. If one had been ingesting mercury-contaminated food for years, even at small doses, danger is never far. This is

because mercury becomes toxic through a process called bioaccumulation. Bioaccumulation is the process by which organisms, including humans, can take up contaminants more rapidly than their bodies can eliminate them, thus the amount of mercury in their body accumulates over time, and toxicity builds up.

Agusan River, being one with many creeks and tributaries, is a depository of wastes from Naboc River, a river that receives the wastes from Mt. Diwalwal, the biggest mining area in that part of the region.

### *Testing the river water, sediment, and organisms*

Researchers from Mindanao State University (MSU) led by Ms. Elnor Roa tested the levels of mercury contamination in Agusan River. Water, sediment, fish, and plant samples were gathered for testing. Water samples were pre-treated with 5ml of nitric acid per

➡ next page

*Agusan river*



500ml of sample and kept in containers washed and rinsed with water and nitric acid. Sediment was kept in a Styrofoam box. The plant samples were washed and stored in polyethylene bags, while the fishes were transported in an ice chest.

The fish samples were *Johnius vogleri* ("guama"), *Gobius guirus*, and *Ambassis commersonii* ("ibis"), and *S. sihama* ("aso-os"), while the plant samples were *Lumnitzera* sp., *Eichornia crassipes* or water hyacinth, and *Cyperus alternifolius* or umbrella plant. All samples were oven-dried at 60°C to constant weight before they were analysed for mercury content.

### How bad is contamination in the river?

Mercury level in the water has exceeded the permissible amount of concentration for fish propagation.

The sediment, where precipitated toxic compounds ultimately would reside, was also found to have high levels of mercury content. This finding qualified the sediments in the river to a "polluted" category.

Among the three plants, *E. crassipes* had the highest level of mercury contamination and is recommended for total elimination from the river. *C. alternifolius* had the second highest level of contamination, while the *Lumnitzera* sp. had the lowest.

Mercury was also detected in the four species of fish. Although *G. guirus* and *J. vogleri* are still fit for human consumption, the levels of the mercury content detected in *A. commersonii* and *S. sihama* have exceeded the standards of what is safe for humans to eat.

The study recommended the salvaging of the three contaminated plants through bioremediation, the branch of biotechnology that uses biological process to overcome environmental problems. The people in the area are encouraged to plant more of the species for remediation purposes.

Source: Mercury content of some species of fish and aquatic in Agusan River and Estuary by Elnor C. Roa, Mindanao State University [www.soluco.pltd.com](http://www.soluco.pltd.com)  
[www.thefreedictionary.com](http://www.thefreedictionary.com)

# Bagungon: From fishpond pest to mudcrab fattener

Among the marine products we have in the country, mudcrab (*Scylla serrata*) also known as the 'green crab' due to its distinguished greenish outer shell. It is considered an "export winner" due to its high demand in the seafoods market. It commands high price both in the international and local market.

By: Rita T. De la Cruz  
Rdelacruz@bar.gov.ph

**K**nown for its sweet meat, mudcrab or 'alimango'

has become the main ingredient in some of Philippine's exquisite delicacies.

In the seafood market, underweight mudcrabs are being prohibited. They should be of good size in order to command better price. The bigger the mudcrab, the better is the profit. Thus, fattening is the key towards a profitable mudcrab production.

Conventional feeds for mudcrab include fish meal and trash fish, which are expensive due to their unavailability and high demand. Such is the motivation behind the recent study conducted by Renato Alber of the Camarines Norte State College. He looked into the possibility of formulating alternative feed source that could fatten mudcrabs without incurring additional expenses, an alternative feed ingredient that is as nutritious as fish meal and trash fish but cheap and readily available.

His search came to an end when he discovered the bagungon.

### Bagungon, the telescope shell

It was in the mangrove areas of Camarines Norte that



Bagungon

Alber, noticed the abundance of the bagungon- a large univalve snail with heavy and tall shell that resembles the shape of a little telescope. These telescope-looking shells feed on organic debris and are usually found on exposed mudflats where algae are also situated.

Bagungon is considered a pest in brackish water fishponds because it inhibits the growth of natural food and competes with the stock for food. Although edible and nutritious, bagungon is not preferred as food. They are merely used as extenders in feeding animals.

### Fattening the mudcrabs

The telescope shells are rich in protein. To determine the effect of bagungon in fattening the mudcrabs, the study conducted feeding trials. A total of 150 pieces of mudcrab weighing 200 to 250 grams were

→ next page

## Bagungon...

fed with different formulations consisting mainly of *bagungon* meat and fishmeal. Five feed formulations were used for the study: 100% fishmeal; 100% *bagungon* meat; 75% *bagungon* meat + 25% fishmeal; 50% *bagungon* meat + 50% fishmeal and 25% *bagungon* meat + 75% fishmeal. The mudcrabs were fed twice a day, seven days a week.

To determine the effect of the different feed formulations on the mudcrabs, the researcher used five parameters: growth increment; survival rate; feed conversion ratio (FCR); feed conversion efficiency (FCE); and the return of investment.

### **Fat mudcrab means heavy profit**

Results of the 20 day-fattening period showed that the highest gain in weight was achieved from those samples that were fed with 100% *bagungon* meat. These mudcrabs obtained the highest mean weight gain of 64.77 grams.

Following in weight gain are the mudcrabs that were fed with 75% *bagungon* meat + 25% fishmeal, weighing 63.33 grams. Mudcrabs fed with fishmeal alone weighed 62.47 grams only. The lowest weight comes from those mudcrabs fed with 50% *bagungon* meat and 50% fishmeals, which weighed 57.20 grams.

In terms of the survival rate, all the mudcrabs survived under any of the five treatments. No significant differences were observed in the FCR and FCE of *bagungon* and fishmeal.

In terms of nutrient composition, fishmeal has better crude protein content than the *bagungon* meat but combining it with fishmeal could improve the feeds. This means that the *bagungon* meat could be better substitute for fishmeal up to 100% without significant difference in weight.

Meanwhile, given the good performance of the *bagungon* meat

over fishmeal, cost and return analysis showed that it's the best cheap alternative. Moreover, its abundance makes it a readily available feed source.

Growing mudcrab is a lucrative business. And like any other seafood business, growers must abide by the standard of what is "marketable" and what is not, otherwise, everything goes to waste. Now, with the *bagungon*, fattening mudcrab becomes easy and cheap.

Source:

*"Growth and Survival of Mudcrab (Scylla serrata) Fed with Bagungon Meat (Telescopium telescopium) as Alternative Feed Ingredient in Mudcrab Fattening"* by Renato B. Alber, Camarines Norte State College, Daet Camarines Norte. This paper was presented during the recently held 15<sup>th</sup> National Research Symposium held at the BSWM Convention Hall, on 8 October 2003.

## Understanding...

However, before corn varieties that could stand salt stress are developed in the future, the IPB researchers needed to understand first the mechanisms involved in salt toleration.

### **Effects of increasing saline conditions on developing corn**

The researchers obtained yellow corn inbred lines from the Cereals Division of IPB to screen for corn breeds that are salt-tolerant. The inbreds were subjected to salinity treatment during the seedling stage and the reproductive stage. Twelve tolerant, two moderately tolerant, and six sensitive breeds were identified. Pi 11 and SMCE 21-28 (both sensitive at seedling stage) and Pi 21 and Pi 31 (rated tolerant at both seedling and reproductive stage) were chosen after the physiological and biochemical studies performed on

these inbreds. The growth responses, accumulation of charged particles of salt ( $\text{Na}^+$  and  $\text{Cl}^-$ ), and NR and PEPC enzyme analyses were then performed on the inbreds.

The researchers observed that the salt-sensitive variety decreased by 30% in plant dry weight while the tolerant variety decreased by 25%. The researchers attributed the observed reduction in plant growth to the reduced surface area available for photosynthesis, changes in plant water status and sodium toxicity effects on leaf elongation. The comparison of dry matter accumulation between salt-sensitive and salt-tolerant inbreds suggested the adaptive mechanism of the two types.

"During the period of water deficit," Faustino et al. noted, "dry matter content of the tolerant and sensitive inbreds was lessened within acceptable levels while dry matter accumulation was reduced (even resulting to death of the sensitive plants) during the period of salt toxicity corresponding to exposures to high salt levels." On the other hand, the tolerant inbreds were able to sustain root growth at higher levels of salt.

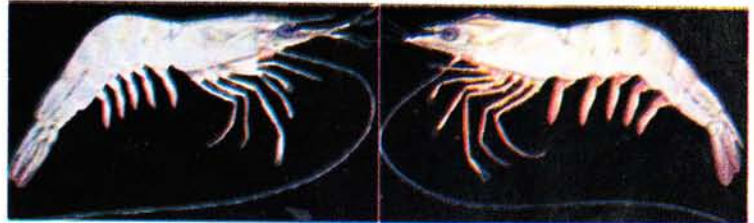
In the salt particle (ion) accumulation test, the researchers observed that there is consistently low sodium uptake combined with high potassium absorption in the tolerant inbreds. "The high potassium content in the cells of the salt-tolerant inbred corn may contribute to its ability to adapt to salt stress by compensating the ionic imbalance caused by the excess sodium and chlorine ions," the researchers concluded. This means a better growth performance of the tolerant inbreds.

The researchers observed that root NR of the salt-tolerant Pi 31 showed higher activities while Pi 21 gave the highest leaf NR activity in most salt levels. The results indicate that the tolerant Pi 31 can withstand wider range of salinity compared to the sensitive Pi 11. The researchers concluded that, "the capability of NR and PEPC enzymes

# Plant protein: The other half to fishmeal for white shrimps

By: Ma. Lizabeth J. Baroña  
lbarona@bar.gov.ph

The country's shrimp industry is almost synonymous to the black tiger shrimp (*Penaeus monodon*). In the 1980s, shrimp production emerged as "sunshine" industry following breakthroughs in research such as induced spawning, shrimp seed production in the nursery, and the completion of the life cycle of the tiger prawn in captivity.



Left- *Penaeus indicus*, Right-*Penaeus merguensis*

**T**he good news is, white shrimps (*Penaeus indicus* and *Penaeus merguensis*), usually secondary crops to tiger shrimps, is enjoying an increasing demand in local markets. The bad news is, the protein source for white shrimp is an expensive fishmeal, making the business of growing white shrimps unappealing to growers. A 1992 Philippine Prawn Industry Policy Study by the Auburn University placed cost of feed as the most serious economic concern for prawn growers.

There is an obvious need for an alternative source of protein. Hence, a study by the Southeast Asian Fisheries Development Center (SEAFDEC) in Iloilo examined the growth and survival of white shrimps fed with a cheaper partial protein source. Fishmeal, the expensive animal protein source, will be partially replaced with plant protein.

Combined protein sources has been proven to be a more efficient source of protein in shrimp than having only one source. For instance, the effectiveness of soybean meal as partial protein source for shrimps has already been proven. There have been studies conducted to determine the effect of partially replacing animal protein source with plant protein, but none

has been made for shrimps.

## The feeding trials

Three trials were made. In Trial 1 for *P. indicus*, soybean, yeast, and leaf meals of kangkong, papaya, and *Cassia tora* L. were tested as partial sources of protein. In Trials 2 and 3 for *P. merguensis* and *P. indicus*, changes were made in the ingredients by decreasing the amount of fish meal and increasing soybean and yeast substitution.

*P. indicus* was tried in trials 1 and 3, while *P. merguensis* was tried in trial 2. The shrimps were first acclimatized with commercial diets, after which they were starved for 18 hours before finally stocking them in fiberglass tanks. Each treatment contained 10 shrimps. A flow-through water system was used and a net was placed on the top of the tank to prevent the shrimps from escaping.

Since cannibalism is prevalent among shrimps, the trials were conducted for only 37-42 days. Survival from cannibalism, the study recommends, could be solved by more frequent feeding to prevent the shrimps from attacking one another.

## How the shrimps responded

In Trial 1 for *P. indicus*,

survival rate was highest after the shrimps were fed with a diet of 20% yeast, 10% papaya, and 10% yeast. Weight gain was highest among shrimps fed with *Cassia tora* L., although survival rate was low using this plant protein source. Total biomass was highest with shrimps fed with 20% yeast, but not significantly different with those fed with diet containing 10% yeast and 10% papaya. In Trial 2, the biomass of shrimp fed with 10% yeast was the same with that fed with 20% yeast and 26% soybean. Weight gain was highest with those fed with 20% yeast, while survival was highest 20% yeast and 26% soybean.

The performance of white shrimp varied with different levels of yeast and soybean. The *P. indicus* performed best with 20% yeast, and 34% soybean, while the *P. merguensis* showed best responses with 10% yeast, 26% soybean.

The partial replacement of fish meal with plant protein sources can be employed to lower feed costs. But the use of these protein sources needs to be studied further as survival was low in all treatments. The study also recommended changes in rearing techniques such as frequency in feeding as the study concedes that part of the low survival among the shrimps is cannibalism.

## Sources:

Evaluation of plant proteins as partial replacement for animal protein in diets of *Penaeus indicus* and *Penaeus merguensis* juveniles, Veronica Penaflorida, SEAFDEC, Iloilo, Philippines, [www.gatewayphil.com](http://www.gatewayphil.com) and [www.aciar.gov.au](http://www.aciar.gov.au)

# Assessing fisheries impact on coral reefs

By: Likhia C. Cuevas  
lcuevas@bar.gov.ph

"Due to accessibility and lack of adequate management measures to protect these vital habitats, only about 5% of the Philippine coral reefs remains in excellent condition."

This was according to Jose Ingles of the Institute of Marine Fisheries and Oceanology, University of the Philippines Visayas (UPV). Because of this scenario, Ingles, with Jimely Flores of Davao Gulf RSA Project and Tatsuro Matsuoka of Kagoshima University, conducted a study to assess impacts of fisheries on coral reefs in the Philippines. Methods of assessment were formulated together with a set of parameters to determine which would work in the protective management and recovery of coral reefs.

## Reef destruction

Coral reefs are important for many reasons and one of them is that they provide protection and shelter for many different species of fish. They are also important in controlling how much carbon dioxide is in the ocean water. The coral polyp turns carbon dioxide in the water into a limestone shell. Without coral, the amount of carbon dioxide in the water would rise dramatically. This would be disastrous to all living things, marine or terrestrial. Coral reefs also protect coasts from strong currents and waves by slowing down the water before it gets to the shore (barrier reefs) and they provide a barrier between the ocean and the shore.

It has been studied that coral reef destruction can be broadly characterized as man-made and

natural. About 10% of the coral reefs are destroyed and according to studies, the Philippines has the worst coral reef destruction (70%). According to Ingles, fisheries are considered as among the main causes of reef destruction, "the quantification of impacts of fisheries has remained largely on cursory level because of lack of any acceptable standard measure to quantify and qualify these impacts." It is quite difficult to determine what preventive strategic actions to take. Ingles said that policies generated on this vague information are often sweeping and highly controversial that only result to failures. "A quantitative assessment of fishing gear impacts would allow the identification of the root cause of the damage to mitigate the problem appropriately," he said.

## Fishing through the years

The data used in this study are from various reef assessments done in the past. Data from Palawan were part of the results of the Biodiversity Conservation Studies of Northern Calamianes, Palawan in February 1999 conducted by Conservation International. The data from Davao Gulf is part of the on-going study of the Assessment of Coral Reefs under the Fisheries Resources Management Program of the Department of Agriculture -



Bureau of Fisheries and Aquatic Resources (DA-BFAR). Other data came from the study conducted by the Japanese Society for the Promotion of Sciences (JSPS).

The most traditional fishing grounds in the country are the coral reefs because they are accessible. The fishing methods then were gleaning (collection of slow-moving animals), spear fishing, and using non-baited fish pots. These fishing methods did not require boats. In the 1960s, however, the fisherfolk started to use boats in reef fishing and hooks and line. Motorization of fishing boats in the 1970s allowed fishermen to exploit off-shore reefs. In the 1980s, the hookah or use of air compressors started and is an accessory to spear fishing and then blast fishing and poison fishing ensued. There was also the proliferation of destructive fishing methods like *muro-ami* (sending a line of divers to depth of 30-40 ft with metal weights to bang on corals to drive fish into waiting nets). Some large trawl companies rig trawl nets with roller bobbins to operate in low-relief areas.

In the 1990s, there was a proliferation of gillnets and the use of octopus lures and longlines. Since there was overharvesting of fishery resource, blast fishing became more

→ next page

rampant to address increasing demand despite low fish population and destroyed reefs.

## Fishing and reefs

"Without doubt, fishing activities on the coral reefs have resulted in physical and ecological damages," Ingles said. According to data collected by the researchers, 15 gear types that were used on the Philippine coral reefs were identified. Only the octopus lure did not result to physical damage and hook and line fishing without compressor resulted to minor physical damage. In the ecological damage through fishing, unregulated extraction of any part of the population of fish is always detrimental to the reef ecosystem. The primary effects are: loss of biodiversity, local extinction, and changes in the fish/reef community structure.

To quantify the physical damages brought about by the fishing gears, Ingles proposed the following indices: (1) Fishing Gear Litter (FGLI); (2) Blast Fishing Impact (BFI); (3) Cyanide Fishing INDEX (CFI); and (4) Fishing Gear Damage Index (FDI). For ecological impacts, two indices were proposed: (1) Reef Fish Biomass (RFB) Index and (2) Target Species Index (TSI).

Results showed that the four indices fully explained all the possible physical damages by the fishing gears on coral reefs. "Each index represents a damage due to a specific cause, the summing up of all the damages would give an overall physical damage index," Ingles observed. The physical damage inflicted by fishing correlated well with the remaining live coral cover. However, there seemed to be no correlation if the individual index is plotted against live coral cover since not only a single index can explain the damage. If one of the indices correlates to live coral cover, it is because the index used was so large that it could account for most of the

physical damage. The proposed set of factors to be determined or measured along a plot transect set both in the reef slope and reef flat can be used to quantify physical damage on the reefs. The proposed methods could identify the root causes of physical destruction and so the problem can be lessened. This could be possible if the damage inflicted was recently done. Ingles explained that the degree of bleaching and the amount of algae and epibenthic (living on the surface of bottom sediments in a water body) overgrowth on the broken coral parts are some of the indicators that would approximate time when the damage was done.

On the other hand, the researchers proposed the use of fish target index to quantify ecological damage since it is the estimate of the fish density of a fish species that is the target of a particular fishing gear. "It is a powerful tool in determining the extent of fishing pressure on the reef area of a particular target species or fish group," Ingles concluded.

It is difficult in damage assessment to determine the cause of destruction or damage if it was done a long time ago or if the new damage has been inflicted by a combination of several factors. Ingles suggests that monitoring of reefs be done regularly to fully assess the condition of the reefs.

These set parameters, Ingles said, have great advantage of being used in all reefs and would be ideal in assessing whether protective management or recovery of reefs works.

Reference: Ingles, J., Flores, J., and Matsuoka, T. Methods of assessing impacts of fisheries on coral reefs in the Philippines. *UPV J. Nat Sci.* 6: 184-195 (2001).

Coral reef destruction and conservation. Oceanworld.

<http://oceanworld.tamu.edu/students/coral/coral5.htm>

Muro-ami and pa-aling fishing methods. World Resources Institute.

[http://pubs.wri.org/pubs\\_content\\_text.cfm?ContentID=123](http://pubs.wri.org/pubs_content_text.cfm?ContentID=123)

Epibenthic. Hyperdictionary.com.

<http://www.hyperdictionary.com/search.aspx?define=epibenthic>

## Dynamite fishing



# Mussaenda blooms year-round

Now, flower enthusiasts and gardeners can enjoy the spectacular display of Doña Aurora (*Mussaenda philippicavar aurorae*) and Doña Luz (*Mussaenda erythrophylla*) for they now bloom any time of the year. Scientists from the Institute of Plant Breeding of the College of Agriculture (IPB-CA) at the University of the Philippines Los Baños (UPLB) have made this possible with the new technology they developed that induces flowering in potted *Mussaendas* even if it is off-season.

By: Junelyn S. de la Rosa  
jdelarosa@bar.gov.ph

## Characteristics of *Mussaendas*

**M**ussaendas' spectacular beauty comes from its colorful bracts in large trusses- Dona Luz has large dark pink bracts, peach or pink bracts while Doña Aurora has white bracts with small yellow flowers in the center. Their leaves are pale-green and hairy. Both varieties are named after former first ladies.

Aside from being a showstopper, *Mussaendas* are versatile plants that are relatively easy to grow. Most *Mussaendas* need lots of sun and thrive well in sandy soil. They can grow up to three meters.

*Mussaendas* become dormant by shedding their leaves between December and April. At this time, they look dried up and dead. This happens when the temperature starts going down in the last week of December. Dormancy has also been linked to rainfall pattern and soil moisture.

## Controlling the time of flowering by pruning

To induce *Mussaendas* to bloom even during the dormant period, the scientists single-pruned the seedlings leaving three healthy pruned stems per plant. The plants were fertilized once a week with urea and complete fertilizer alternately for a month. Dona Aurora



Doña Luz

Doña Aurora

Weeks. Also, *Mussaendas* pruned in April and May took 4 to 5 weeks to flower while those pruned in June and July bloomed after 5 to 7 weeks.

After the experiment, the scientists developed a protocol for producing small-potted flowering *Mussaenda* using cuttings of flowering shoot tips as the propagation materials. Backyard growers/cooperators in Los Baños were trained on the production of small-potted *Mussaendas* using the protocol below.

## Protocol for producing small-potted flowering *Mussaenda*

**Step 1. Harvest shoots at stage 1 flowering**

**Step 2. Cut the basal end of the cuttings**

**Step 3. Apply hormone at the basal end of the cuttings**

**Step 4. Plant cuttings in pots with a mixture of 1 part sand, 1 part coir dust and 1 teaspoon Multicote**

**Step 5. Place the cuttings in a misting chamber for 4 weeks**

**Step 6. Transfer rooted cuttings from the misting chamber to a place with partial shade for hardening**

**Step 7. Condition cuttings under partial shade**

The mass propagation trial using the protocol was successful. The first flowering shoots were harvested in the first week of November 2001 and sold to Ayala Property Management Corporation. A cost and return analysis showed that the venture could be profitable for grower-cooperators. This is good news for farmers and entrepreneurs who are interested in selling *Mussaendas* especially during the Christmas season when these show-stoppers could be used to substitute the poinsettias that adorn many a Filipino home and workplace.

Source: Year-round production of small potted flowering *Mussaenda* through off-season production of flowering shoot by Primitivo Jose Santos, Calixto Protacio and Reynold Pimentel of the Institute of Plant Breeding, College of Agriculture (IPB-CA) in the University of the Philippines at Los Baños (UPLB)

# Polyethylene plastic: Ideal mulch for off-season honeydew melon

By: Rita T. De la Cruz  
rdelacruz@bar.gov.ph

Like any other types of melon, honeydew melons (*Cucumis melo*) are dry-season crops. They require full sun and well-drained soil. Ideally, they should be planted after the danger of excessive rainfall has passed and when the soil temperature has started to rise. Honeydew melons have smooth whitish outer layer and green flesh.



In the Philippines, honeydew melon is prevalent in Southern Luzon particularly in Mindoro Occidental where it's one of the major products traded outside along with tuna, seaweeds, and precious stones.

One of the major problems of propagating the honeydew melon, aside from pest and diseases, is wet season production. Wet season is the off-season for producing honeydew melon. The excessive rain causes low yield and poor fruit quality resulting to great loss in production.

This scenario was the reason for the recent study conducted by Albino Aquino and Renato Mabesa of the Department of Horticulture, College of Agriculture, University of the Philippines Los Baños (UPLB). The main objective of the study is to find an effective and practical means to produce off-season honeydew melons using mulch and row cover.

This study was presented during the recently held National Research Symposium (NRS), an annual event organized by the Bureau of Agricultural Research (BAR) wherein top scientists and researchers from various state colleges and universities and premier research institutions gather to present the most promising researches and technologies developed and generated in the year. The paper won the AFMA Paper Award for the Published Category.

## Mulching: Improving honeydew melon growth

Mulching is one of the simplest and most beneficial management practices that could improve the moisture and consistency of soil. As is it easy to do, mulching is inexpensive and does not require much effort. Mulching refers to the spreading of materials on the surface of the soil as protective layers, whether organic or inorganic, loose particles or sheets. Generally, mulching is used to protect the soil from erosion, reduce compaction from the impact of heavy rains, conserve moisture, reduce the need for frequent watering, maintain soil temperature, and prevent weed growth.

In this manner, mulching could improve off-season production of honeydew melon. Previous studies conducted involving other fruits showed that mulching could promote early plant development, increase yield, and enhance quality of produce.

## Mulching materials

Mulching materials could be either organic or inorganic. Among some of the most common inorganic mulching and row cover materials are plastic. Studies showed that this type of mulching materials could modify the

microclimate of plants and effectively improve plant growth. Likewise, the rise in air and soil temperature increases the flowers of watermelon.

For this particular study, three mulching materials were used: reflectorized polyethylene plastic (PEPrs), #50 black nonwoven fabric (NWFb), and rice straw. For the row covers, Aquino and Mabesa used 0.076 mm clear polyethylene (PEPc), #17 white woven fabric (NWFw), and white nylon net.

To determine the effectivity of the different mulch materials used, the researchers used five parameters: effect on microclimate, soil chemical properties, pest incidence, yield, and horticultural characteristics.

## Ideal mulch and row cover

Results of the study showed that among the mulch materials used, polyethylene (PEP) proved to be the most advantageous and effective. Specifically, mulching with the reflectorized polyethylene plastic and clear polyethylene (PEPc) and white nonwoven fabric (NWFw) as row cover increased the soil temperature and produced better nutrient uptake. There was also an

➡ Page 22



## Fighting potato whitefly the indigenous way



Potato whitefly

For a small insect like the whitefly, the damage that it inflicts on crops is hard to imagine. They are often found in the leaf undersides. As their name implies, they are white, powdery, and soft-bodied insects. They measure about .5 to 1 inch. Both early and adult stages are destructive to the plants. They suck the sap of the plants and transmit viruses. Whiteflies are prolific insects. The female whitefly can lay 25 eggs in a day. Its life span could extend up to 36 days depending on the temperature.

By: Rita T. De la Cruz  
rdelacruz@bar.gov.ph

Whitefly infestation has become a major problem in the Philippines, particularly in Region 10, since year 2000 when potatoes are grown throughout the year. The presence of the whiteflies peaks during the dry season. The use of insecticides is no longer effective as it encourages the build-up of whitefly population. Due to lack of effective means to control whiteflies, most farmers still resort to insecticides that are both hazardous to human health and the environment. The whitefly does not only attack potatoes but other commercially important crops like squash, tomato, beans, cutflowers, and ornamentals.

A group of researchers from the Northern Mindanao Integrated Agricultural Research Center (NOMIARC) of the Department of Agriculture (DA) saw the urgency to solve the problem. According to them, whitefly management depends greatly on the severity of damage to the crops and at what particular stage they attack.

IPM experts and researchers have long recognized the use of indigenous botanicals as alternative means to control pests and insects. They are readily available, cheap and safe to humans and the

environment.

Botanical insecticides are derived from the extracts of plants with active ingredients that are poisonous to certain pests and insects. Even before the use of synthetic insecticides, botanical insecticides have been used for centuries and found to be useful and effective.

Botanical insecticides are processed into different forms such as crude plant material, extracts or resins. The crude plant material is usually ground in powder form and applied in full strength or diluted with extenders like talcs or clays among others. Another form is through extraction, wherein the extract could be sprayed directly on the plants, or through chemical preparation, which involves isolating the active ingredient from plants.

Researchers from NOMIARC tried, tested, and evaluated the efficacy of 13 types of indigenous botanicals as potential insecticides against whitefly. Among these indigenous botanicals are: *madre de cacao* leaves, eucalyptus leaves, sunflower leaves, tobacco leaves, neem leaves, *lagundi* leaves, *adelfa* leaves, *dulaw* rhizomes,

*panyawan* vines, neem seeds, *atis* seeds, hot pepper fruit, and *tubli* roots.

Specifically, the purpose of the study is to determine the level of effectiveness of these indigenous botanicals in controlling whiteflies. Evaluations were done using two conditions: laboratory and screenhouse. The researchers also determined the influence of these botanicals on crop yield.

Results of the experiment showed that certain botanicals were able to reduce the population of the whiteflies. Among the 13 plant extracts tested, four were evaluated to be the most toxic against the whiteflies with fast-acting effect both in the lab and screenhouse conditions. These are: tobacco, hot pepper, *dulaw* rhizomes, and *tubli*. These botanicals were transformed into plant extracts and used as sprays at 5% concentration.

**Neem tree** has an active ingredient called *azadirachtin*, which can be extracted, from its seeds and leaves. This active ingredient is responsible for killing whiteflies especially during their earlier days. It repels the insects and deters their feeding and growth process.

The nicotine in **tobacco leaves** is the toxic ingredient that

→ next page

# An ounce of prevention can save a flock of birds

By: Junelyn S. de la Rosa  
jdelarosa@bar.gov.ph

Taking extra sanitary precautions can save your birds from Newcastle disease or Avian pest - a highly contagious and fatal disease in poultry and wild birds that attacks the birds' gastrointestinal, respiratory and nervous systems and can cause up to 100% mortality.



## Fighting...

poisons the insects. It has a fast-acting effect that disrupts the nervous system of the insect once ingested. It is also helpful in fumigating pest-infested greenhouses as it kills other soft-bodied insects. Aside from insects, extracts of tobacco are also effective in controlling nematodes.

**Tubli** has rotenone, an active ingredient extracted from its roots. It poisons the stomach of insects causing them to lose appetite and die in a few hours after ingestion. The substance is also deadly to fish. At a given concentration, the extract of eucalyptus is effective in controlling the bud infestation of whiteflies.

Meanwhile, the botanicals that lowered the population of whiteflies with relatively slow-acting effect are: neem leaves, neem seeds, madre de cacao, panyawan and sunflower. Botanicals with the biggest return of investments include those with 5% crude extracts from neem leaves, panyawan, tobacco, sunflower, and hot pepper.

Source:

*Evaluation of indigenous botanical insecticides for the control of whitefly under greenhouse condition by B.F. Tatoy, F.N. Abragan, F.C. Makabugto, J.B. Salvaní, C.T. Apiag, L.A. Ramos. DA-NOMIARC, Dalwangan, Malaybalay City*

## Concerned with the estimated

P6 billion peso loss from Newcastle disease each year, Department of Agriculture (DA) Secretary Luis Lorenzo announced a strategy that will cut the incidence of Newcastle disease in backyard farms by 50% in 2007.

The strategy was launched by the Bureau of Animal Industry (BAI) and involves massive vaccination of susceptible chicken and birds, monitoring and surveillance, implementation of quarantine measures and mobilization of public support through intensive information campaigns.

The campaign's first and second phases are from August to December 2003. In the first phase, 300 random samples from each province will be collected in 213 provinces while the same number of samples per province will be collected in 243 provinces in the second phase.

## What is Newcastle disease and what are its symptoms?

Newcastle disease is caused by a kind of virus called *paramyxovirus*. It infects all domestic and wild birds. Poultry, including chickens, turkeys, pheasants, pigeons, quails, parrots and guinea fowls are most

susceptible to the disease. Some birds can be carriers of the disease without showing clinical signs themselves. The disease affects the respiratory, digestive, and nervous system of the birds. Infected birds can die quickly after developing symptoms. What is worse is, it may take an infected bird up to 21 days for clinical signs to appear.

Initial symptoms can be a cough or a snicker while in the advanced stages, symptoms could be head twisting and tremors. Other clinical signs are: depression, drop in egg production, pale shelled eggs, nasal discharge, coughing and sneezing, and head twisting and nervous symptoms.

## How is it spread?

Newcastle disease is spread either by direct physical contact with infected or diseased birds or contaminated equipment and feces. The virus excreted in the chicken dung or manure can be carried by the wind and infect other birds many kilometers away. Contaminated equipment, carcasses, water, food, clothing and footwear are also common sources of infection. People can also carry the virus from one shed or farm to another through contaminated apparel and footwear.

➔ Page 23

# A new lease of life for the lahar-laden fields

Fertilizers in capsules? It sounds incredible, but for the farmers in Central Luzon who have been dealing with marginally productive lands since that fateful day on June 15, 1991, this is music to their ears.



By: Ma. Lizbeth J. Baroña  
lbarona@bar.gov.ph

Researchers from the Central Luzon State University (CLSU) and Industrial Development Technology Institute of the Department of Science and Technology (ITDI-DOST) have come up with an applied fertilizer technology that increases nitrogen efficiency in lahar-laden soils and coarse agricultural lands, the types of soil the farmers have to till after the Mount Pinatubo eruption.

## Barren lands

When the second largest volcanic eruption of this century happened more than a decade ago, the world felt its magnitude. Global temperature was temporarily affected, and nearly 20 million tons of sulfur dioxide was injected to the earth's stratosphere, sending warning signals to environmentalists around the globe.

In the surrounding provinces of the devastating volcano, however,

are dwellers whose concern are far graver than that of the world's. Materials from the eruption blanketed the countryside, converting formerly productive rice and sugarcane fields into a barren land.

Even after more than 10 years, lahar from the volcano is still heavily embedded in the lands. The soil has very low nutrient content with poor water holding capacity. Heavy leaching of nutrients is intensive in this type of land, making the application of fertilizer useless.

## Controlled-release fertilizer (CRF)

Fertilizers are classified in into three broad groups: soluble, highly soluble, and slow release. Easily soluble fertilizers are those that release almost 100% of their nutrients into the environment immediately after they are applied. Controlled release fertilizers are classified under the slow-release fertilizer. CR

fertilizers are coated with semi-permeable material through which nutrients are slowly diffused. This allows CR fertilizers, usually capsulated, to release nutrients in a determined fashion. In addition, nutrients are released at a rate and concentration that counters the

specific needs of the plants.

Researchers from CLSU and ITDI-DOST studied the nutrient release characteristics of CR fertilizers in lahar-laden and coarse textured soils both under submerged and upland conditions on onion, tomato, and rice.

First, a test was conducted to determine the release pattern of nutrients from four CRF formulations manufactured at the ITDI-DOST. These formulations were diammonium phosphate (13-35-0), potassium chloride (0-0-42), complete fertilizer (10.5-7.5-8), and urea (37-0-0). Set-up was terminated as soon as the CR fertilizers released 90-100% of their nutrients.

A pot test was also done to study the efficiency of CR fertilizer. Pots filled with 8 kg of lahar were planted with rice, onion, and tomato. Nine treatments were assigned in each pot, with each treatment replicated 3 times. These treatments are: control (T1), recommended rate for onion at 190-70-70, rice at 150-35-35, and tomato at 90-60-60 kg NPK/ha (T2), 1/2 RR (T3), 1/2 CRF (T4), 1/2 RR+CRF (T5), full CRF (T6), RR+1/2 CRF (T7), RR+1 ton ha organic (T8), and CRF+1 ton ha organic (T9). Coated urea and complete fertilizer were weighed and placed in nylon screen bags. The bags were buried in the center of the pots at the depth of 5 cm. Nitrogen was applied thrice in onion and twice in tomato. In rice, N was applied twice in the first cropping and five times in the second.



➔ Next page

## A new...

Field test of CR fertilizer was done by placing nylon screen bags containing the formulations, buried 5 cm below the surface in rain-fed rice field and eggplant fields.

The performance of onion treated with full CR fertilizer was best among those treated with conventional inorganic fertilizer, even those applied with combined with organic fertilizer and inorganic fertilizer. The onion applied with full CR fertilizer had the largest bulb diameter reaching 27.86 mm, while its marketable yield increased to 91 grams. It also grew highest among the other tests. The same was observed in tomato. After being treated with CR fertilizer instead of the conventional inorganic fertilizer, it yielded the highest with the difference of 1.65 tons per hectare. Fertilizer efficiency was also increased from 35 percent in conventional inorganic fertilizer to 52 percent in CRF.

Rice yield increased with the application of recommended amount of nutrients from either pure CR fertilizer, CR fertilizer combined with either organic fertilizer or full conventional inorganic fertilizer. Those treated with conventional inorganic fertilizer (150-35-35 kilogram per hectare N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O per hectare) grain yield was at 3.73 tons per hectare. Yield increased by 1.87 tons per hectare or 50 percent. Reasonably, fertilizer efficiency increased from 57 to 90 percent.

Decades after the tons of lahar and sulfur material cascaded down the slopes of Mt. Pinatubo, finally there's a glimmer of hope for the lahar-blanketed rice and sugar cane fields.

The place does not seem too barren anymore.

## Source:

Controlled-release fertilizer for increased nitrogen efficiency in lahar-laden and coarse-textured agricultural soils by Clarita Aganon, Ariel Mactal, Maribel Mananguit, Ron Ryan Mark Ucol, Glenda Gagelonia, Nora Dominguez, Jose Pontevida, Central Luzon State University (CLSU) PCARRD-DOST-ITDI. [Wrgis.wr.usgs.gov](http://Wrgis.wr.usgs.gov)

## Virus-free garlic is a sure winner

Finally, there is good news for the literally ailing garlic (*Allium sativum* L.) industry. Scientists have developed a new technology that can produce virus-free planting materials of garlic using an improved technique of shoot tip-meristem culture.



By: Junelyn S. de la Rosa  
[jdelarosa@bar.gov.ph](mailto:jdelarosa@bar.gov.ph)

The scientists say the technology can reduce the high incidence of viruses and diseases in garlic such as bulb rot, downy mildew, *Cercospora* leaf spot, purple blotch, tangle-top disease, and nematodes and increase the crop's very low yield of 2.78t/ha, compared to that of other countries such as Thailand at 10.6t/ha.

The technology consists of pre-treatment methods and tissue culture to produce safe planting materials, virus indexing to ensure virus-free planting materials and field planting to increase the number of planting materials (cloves/bulbs). It was developed by scientists from the Institute of Plant Breeding (IPB) at the University of the Philippines at Los Baños (UPLB), and the Asian Vegetable Research and Development Center (AVRDC) with support from the Bureau of Agricultural Research of the Department of Agriculture (DA-BAR),

Before conducting the *in vitro* culture, the cloves are separated and cleaned using detergent and water and pre-treated by storing them in a refrigerator (5°C) or at room temperature for 1-4 weeks then putting them in a water bath at

50°C for 2 hours (thermotherapy). Cold pre-treatment and thermotherapy have been found effective in eliminating the viruses that are not destroyed during tissue culture.

Pre-treated cloves are sterilized for 15-20 minutes using commercial bleach and a drop of Tween 20. After 1 to 1.5 months, multiple shoots are divided into single shoots. The shoots are then checked for viruses using Enzyme Linked Immunosorbent Assay (ELISA). Only virus-free shoots are cultured and transplanted to a potting media in a greenhouse for 3-4 weeks after which they are transplanted to the field to produce the first generation (G<sub>1</sub>) bulbs. For the next season, the farmers can use the G<sub>1</sub> bulbs to produce the next batch of planting materials. The cycle can be repeated up to the 4<sup>th</sup> generation bulbs after which new bulblets from tissue culture need to be multiplied again.

Using this technology, the farmers can have a continuous supply of healthy and safe planting materials. After 3-4 years of recycling the bulbs in the field, the 3<sup>rd</sup> or 4<sup>th</sup> generation bulbs can be easily replaced with new virus-free planting materials. Also, using vigorous planting materials, farmers can harvest more and sell healthier and better-looking garlic.

→ Page 22



# Malunggay: The magic tree

There is good news for people who are fond of the bittersweet taste of *malunggay* (*Moringa oleifera*) leaves in their soups. *Malunggay* is packed with essential nutrients- it has 7 times the Vitamin C in oranges, 4 times the calcium in milk, 4 times the Vitamin A in carrots, 2 times the protein in milk and 3 times the potassium in bananas.

By: Junelyn S. de la Rosa  
jdelarosa@bar.gov.ph

**T**hese nutrients protect us from a number of diseases. For instance, Vitamin A protects us from eye disease, skin disease, heart ailments and many other diseases; Vitamin C can prevent colds and flu while calcium gives us healthy and strong bones and teeth. Potassium is essential for the functioning of the brains and nerves and proteins are very important since they are the basic building blocks of all our body cells.

### *Its many uses*

*Malunggay* is one of the world's most useful plants. Almost all of its parts-leaves, fruits, and roots have been used for a variety of food and medicinal purposes. The leaves are a popular vegetable and can be found in salads, in vegetable curries, as pickles and for seasoning in many parts of Southeast Asia, Africa and India. The leaves are also used as feed for livestock or pounded and used for scrubbing utensils and for cleaning walls.

Its seeds are eaten raw or cooked. Seeds contain 38-40% oil that is used for cooking or as a lubricant for machines. *Malunggay* oil has become popular because it is clear, sweet, odorless and never becomes rancid. It is used in making some perfumes and hairdressings.

Pulp from *Malunggay* wood has been used for different kinds of

wrapping, printing and writing papers and for textiles and cellophane.

Leaves can be applied as poultice to sores, rubbed on the temples for headaches, and said to have purgative properties. Bark, leaves and roots are acrid and pungent, and are taken to promote digestion. Oil is somewhat dangerous if taken internally but is applied externally for skin diseases. Bark regarded as antiscorbutic, and exudes a reddish gum with properties of tragacanth; sometimes used for diarrhea. Roots are bitter, act as a tonic to the body and lungs, and are used as an expectorant, mild diuretic and stimulant in paralytic afflictions, epilepsy and hysteria.

### *Chemical composition*

*Malunggay* is a powerhouse of important nutrients needed by the body. Studies show that every 100 grams of pod contain 2.5 grams protein, 0.1 grams fat, 8.5 grams carbohydrate, 4.8 grams fiber, and minerals such as Calcium (30 milligrams), Phosphorus (110 milligrams), and Iron (5.3 milligrams). It has Vitamin A, niacin, and Vitamin C.

Leaves (per 100 grams) contain 7.5 grams water, 6.7 grams protein, 1.7 g fat, 14.3 g total carbohydrate, 0.9 grams fiber, 2.3 grams ash, and minerals, Calcium (440 mg), Phosphorus (70 mg), Iron (7 mg), Copper (110 ?g) and

Vitamin A, and Vitamin C. The leaves also contain different amino acids and estrogenic substances, including the anti-tumor compound, sitosterol, and a pectinesterase.

Seed kernel (7074% of seed) contains water, protein and fiber. The seed oil contains 9.3% palmitic, 7.4% stearic, 8.6% behenic, and 65.7% oleic acids among the fatty acids.

### *Cultivation*

*Malunggay* is cultivated using cuttings and thrive best in loose or sandy soil. Branches that are 1-1.5 meters in length easily take root in a few months. *Malunggay* is a fast grower and a high yielder- it can grow at 3-4 meters in a year and can produce 400 to 1000 pods every year. First fruits may be expected within 6-8 months after planting. Regular pruning is recommended to have a robust tree with lots of branches and pods. *Malunggay* is a handy tree and can tolerate drought and some diseases.

Thus, the next time you lament having these humble leaves in your soups or salads for dinner, it would be wise to remember its excellent nutritional value and share it with your friends or family members.

Sources: 1) *Moringa oleifera* Lam at [www.hort.purdue.edu](http://www.hort.purdue.edu)  
2) *Moringa oleifera* Lam at [www.mobot.org](http://www.mobot.org)  
3) *Moringa oleifera* Lam at [www.le.ac.uk](http://www.le.ac.uk)

# GIS and the hunt for diseases

The hunt is on for bunchy-top and mosaic diseases for abaca.

Rather, it is the hunt for the diseases' 'hot spots' and characteristics.

Bunchy-top and mosaic are the two virus diseases of abaca that have caused millions of losses in terms of fiber yield and export. It is now a priority of the Fiber Industry Development Authority (FIDA) to eradicate these diseases. Through the use of new technologies, like the Geographic Information System (GIS), the progress of the abaca integrated pest management (IPM) program on these two diseases is assured. GIS is a great tool in decision-making for projects that cover large areas.

## GIS in agricultural research

What is GIS? This effective and efficient research and research management tool integrates common database operations such as query and statistical analysis with unique visualization, geographic representation, and analysis given by maps. It can integrate and analyze data from various sources and present the output\* geographically. GIS geographically targets technologies developed in agriculture and fisheries then integrates the biophysical, climatic, and socio-economic databases for efficient and effective resource allocation. A specific example of how GIS is used in agriculture was in 1993 when some scientists used the technology to see how grasshopper population densities are connected to elevation and ecological conditions. With maps, which presented pest distribution, identification of areas that differ in pest intensity was made possible.

Dr. Avelino D. Raymundo of the Department of Plant Pathology at the University of the Philippines Los Baños (UPLB) and his research team used GIS to map the spread of the abaca bunchy-top and mosaic diseases. Supported by FIDA and the National Agriculture and Fisheries Council (NAFC), this project concentrated on abaca plantations in the Bicol and Eastern Visayas regions.

## Abaca and its diseases

The Philippines supplies 85% of the abaca (*Musa textilis* Nee) or Manila hemp (as it is called internationally) demand worldwide. This durable fiber is made into many things, from ropes used in seaports to tea bags and currency paper. Today, our abaca plantations are afflicted by bunchy-top and mosaic that are caused by viruses that are transmitted by an aphid (vector), *Pentalonia nigronervosa*. An aphid is a homopterous insect (belonging to the suborder Homoptera, characterized by sucking mouthparts) that is under the super family Aphidoidea. *P. nigronervosa*'s primary host is the banana plant.

According to Raymundo, "the diseases can be controlled by eradication but this approach has not yielded the desired results, due to, among other important reasons, inadequate understanding of the dynamics of the abaca-virus-vector relationship." The information on the diseases' epidemiology (the field of study that deals with the intensification and spread of diseases) "is limited despite the importance of these diseases," Raymundo added. It is not exactly known where these diseases are particularly destructive and their magnitude of severity remains to be ascertained.



*Musa textilis*

By: Likha C. Cuevas  
lcuevas@bar.gov.ph

This is where GIS comes in.

## Disease devastation

Using the GIS software ArcView (Environmental Systems Research Institute, Inc.) for mapping the distribution of bunchy-top and mosaic in abaca-growing areas in Bicol and Eastern Visayas, the study of Raymundo and his team revealed that the two diseases are rampant in both regions. There also had been reports that bunchy-top has been devastating plantations since the 1980s.

The study showed that disease incidence (particularly bunchy-top) appeared to be aggregated. The insect vector of both diseases is considered a reluctant traveler, preferring to live in colonies on sheltered parts of the abaca plant, another study explained. This behavior of the aphids (that carry the viruses causing the diseases) makes the spread of the disease very slow and significant spread can only happen when winged forms develop resulting from overcrowding.

➡ next page

## GIS...

The study reported that the two diseases have intensified and spread to adjoining areas despite the limited migratory tendencies of the aphid. Raymundo explained that weather disturbances during the rainy season (including gusty winds) that carry the aphids to great distances may also play a role in the dispersal. The recurrent dispersal of the aphids and the viruses has been happening year after year in the course of normal abaca farm activities. The increase in the spread of the diseases may have been due to, "the lack of sustained eradication programs since the time these diseases were first detected in abaca," Raymundo said. He further explained that the increase in *inoculum* (living elements of the parasite able to infect a host-plant), is aggravated by the presence of bananas in and around many abaca plantations.

### Maps and pest control

The maps generated through GIS can be used to plan a sensible

disease eradication program. With the maps showing the 'hot spots' (areas of highest concentrations of the disease), "the first wave of eradication aims at an immediate reduction of the virus inoculum in these areas," Raymundo said. Then areas near the 'hot spots' with lower disease incidence can be targeted after the first pest eradication. According to FIDA, "when the pest control is sustained for a long time, it is possible that the diseases can be contained at a manageable level, if not totally eliminated." This happens especially if all the aspects of the abaca-virus-vector are considered.

### Future with GIS

Researchers hope that the spatial and temporal data gathered on continuing abaca IPM project can be inputted and translated as GIS maps to form a broader basis of a long-term disease management strategy. It is not only in the eradication of the bunchy-top and mosaic diseases that the GIS maps can be of use.

The epidemiological information the GIS maps provide can also support other pest management strategies, like manipulation of environment through cropping systems and the use of enemy organisms against the vector. This can also be applied to other plant diseases plaguing the agriculture sector.

And the hunt for other plant diseases can be possible through GIS.

References: A.D. Raymundo, Bajet, N.B., Sumalde, A.C., Cipriano, B.P., Borromeo, R., Garcia, B.S., Tapalla, P., and Fabellar, N. Mapping the spread of abaca bunchy-top and mosaic diseases in the Bicol and Eastern Visayas Regions, Philippines. Contact [billyray@laguna.net](mailto:billyray@laguna.net) Agriculture and Fisheries Research and Development Information System (AFRDIS) Status Report 1999-20001. Bureau of Agricultural Research. July 2002.

Cuevas, Likha. GIS application in irrigation emphasized. BAR Chronicle Vol. 4 No. 5. April 2003. Crop Knowledge Master. *Pentalonia nigronervosa*. <http://www.extento.hawaii.edu/kbase/crop/Type/pentalon.htm> Inoculum. HYPP Pathology. [www.infra.fr](http://www.infra.fr)

## Polyethylene...

increase in growth and flowering.

More female flowers matured earlier than expected. The insect and pest disease incidence were lesser. The fruit quality was better and the yield was higher compared to other melons under study.

Using the rice straw as mulch in combination with the non woven fabric as row cover also gave a favorable results but not as effective as the polyethylene.

Meanwhile mulching with rice straw alone resulted in highest arthropod pest infestation and diseases incidence due to the harboring of thrips and mites. It gained the highest air temperature and soil moisture retention, which are conditions suited for microbial growth. Nevertheless, using rice straw provide a few benefit. A

notable increased in soil phosphorus, potassium and cation exchange capacity were observed after the cropping.

The use of nylon net as row cover allowed light to penetrate into the canopy thus resulting in the lowest air temperature due of its porous nature. Researchers concluded that nylon net is not as effective as the polyethelene or the nonwoven fabric as row covers.

### Source:

"Off-season Production of honeydew Melon (*Cucumis melo* L.) Using Mulch and Row Cover" by Albino T. Aquino and Renato C. Mabesa of the department of Horticulture, College of agriculture, University of the Philippines Los Baños. This paper was presented during the 15<sup>th</sup> National This paper was presented during the recently held 15<sup>th</sup> National Research Symposium held at the BSWM Convention Hall, on 8 October 2003.

## Virus-free...

Finally, the technology is also good news to the millions of consumers who are aware of the health benefits from garlic such as its ability to reduce bad cholesterol, increase lipoproteins or good cholesterol and lower blood pressure. Soon, we can all look forward to having a healthy clove of garlic a day to keep the doctor away.

Source: Technology for production of certified virus-free garlic (*Allium sativum* L.) planting materials by Lilian Pateña, Lolita Dolores, Alice Bariring, Ramon Barba of the Institute of Plant Breeding, College of Agriculture (IPB-CA), University of the Philippines Los Baños (UPLB); Erdharg Barg of BBA, Germany and Sylvia Green of the Asian Vegetable Research and Development Center (AVRDC), Shanhua, Taiwan, Republic of China

## Newcastle...

Studies have shown that the *paramyxovirus* can survive in human nasal passages for an extended period of time. If possible, anyone who has been to an infected premise should not go near any other birds or poultry farm for at least seven days.

### How to control Newcastle disease?

- The key to controlling and successfully eradicating any disease is to detect it as early as possible and prevent its spread. Newcastle disease is highly contagious and a few sick birds could start a very serious outbreak. Also, contaminated equipment and people could carry the disease from one place to another.

"Prevention is very important, carrying out sanitary precautions such as disinfecting poultry equipment and apparel can protect your flock from an outbreak", said an official from the Bureau of Animal Industry (BAI).

Also, it is recommended that birds should be frequently checked for symptoms of the disease, such as

gasping, coughing, diarrhea or paralysis. Birds showing initial symptoms should be separated as early as possible or killed. Carcasses should be disposed of properly and equipment should be disinfected and dried under the sun to kill the virus. If birds are sick, or if there is unusual death loss, call the veterinarian or animal health officials, so that samples may be collected for testing.

So far, control of Newcastle disease is principally based on vaccination measures. However, a single vaccination does not guarantee lasting protection. To prevent unnecessary cost and stress from frequent vaccination, scientists usually determine the immune response of the birds using Hemmagglutination Inhibition Test (HIT).

The HIT is used to check the presence of antibodies against Newcastle disease in vaccinated chicken and to detect Newcastle disease infection. At present, the Newcastle disease antigen used for HIT is imported and, therefore, expensive.

In a related study, scientists from the Regional Field Unit 7 of the Department of

Agriculture (DA-RFU 7) Biologics Vaccine Production Laboratory have successfully produced and tested an antigen against Newcastle disease. Using the commercial antigen as control, they found that the new antigen is reliable, stable and economical.

The scientists are optimistic that with support from the local government units and commercial poultry growers, they will be able to mass produce the Newcastle disease antigen and provide a cheaper alternative to poultry growers. Surely, a cheap vaccination plan coupled with proper sanitary measures can save not only a flock of birds but can even save the poultry industry from an epidemic.

### Sources:

- 1) *Evaluation of the DA-RFU 7 Produced Newcastle Disease (NCD) Antigen Through Hemagglutination Inhibition and Challenge Test* by Rachel Cadeliña, Doris Capuno and Vivian Batoy of the Biologics Vaccine Production Laboratory, DA-RFU 7, Cebu City
- 2) *Contagious Newcastle Disease Hits Backyard Poultry*
- 3) *Epidemiology of Newcastle Disease and the Economics of its Control* by Professor P.B. Spradbrow of the Division of Veterinary Pathology and Anatomy, University of Queensland

## Understanding...

to function effectively under saline conditions may have also provided a mechanism for the enhanced assimilation and production of organic acids for plant growth."

### Mechanisms for salinity tolerance

Faustino and her team concluded that high potassium concentration in the cell and enhanced NR and PEPC activities might have provided a mechanism to the tolerant inbred lines to adapt to salt stress. These two enzymatic processes, "may have contributed positively to the ability of the tolerant inbreds to grow robustly at higher salt concentrations than the sensitive ones." The researchers suggested that further studies be

done on the differential potassium, sodium, and chlorine uptake processes and NR and PEPC molecular properties of salt-tolerant and salt-sensitive corn varieties.

### References:

- Faustino, F.C., Garcia, R.N., Agtarap, M.L., Tecson-Mendoza, E.M.T., and Lips, S.H. *Salt Tolerance in Corn: Growth Responses, Ion Accumulation, Nitrate Reductase, and PEP-Carboxylase Activities*. Philipp. J. Crop. Sci. 2000. 25(1) 17-26
- S.M. Alam and M.U. Sshirazi. *Crop Growth in Saline Environment* [www.pakistaneconomist.com](http://www.pakistaneconomist.com)
- Effects of Salinity to Crops. [www.agrisupportonline.com/Articles/salinity/salinity](http://www.agrisupportonline.com/Articles/salinity/salinity).
- "Osmosis", "homeostasis", and "abscission" [www.hyperdictionary.com](http://www.hyperdictionary.com)

## How...

The interventions disproved the farmers' claim that applying fertilizer, and planting the rice in the lowlands would make the rice lose its exceptional characteristics.

The findings have belied the myth that had made *Ballatinaw* exclusive for upland dwellers, but at the same time lose its name as the King of Rice..

Source: Participatory approach in technology development: Dispelling the myths of *Ballatinaw* Rice Production, by NQ Abrogena, SP Liboon, AC Aguinaldo, PC Alquiza, MU Bayangos, SV Briones, and RC Castro, Philippine Rice Research Institute, Batac Ilocos Norte.

## NEWSBITS

### OCTOBER

#### **MOU on DA-DOST convergence signed**

Directors William C. Medrano of the Bureau of Agricultural Research (BAR), and Patricio Faylon of the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD), Rafael Guerrero III of the Philippine Council for Aquatic and Marine Research and Development (PCAMRD), and Alberto Maningding of the Agricultural Training Institute (ATI) signed the memorandum of understanding (MOU) of the Department of Agriculture (DA) Department of Science and Technology (DOST) RDE Convergence Initiative at the PCARRD Headquarters, Los Baños, Laguna on October 3, 2003.

#### **Medrano wins 2003 Pantas Award**

Bureau of Agricultural Research (BAR) Director William C. Medrano received this year's Pantas Award for Outstanding Research Administrator. The Pantas Award is given by the Department of Science and Technology Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (DOST-PCARRD) to deserving and highly competent Filipinos that have contributed significantly to the advancement of the country's agriculture, forestry, and natural resources R&D.

#### **Senator Magsaysay gives cash incentives to AFMA R&D awardees**

Winners of the Agriculture and Fisheries Modernization Act (AFMA) R&D Awards received an unexpected additional P5,000 cash gift from Senator Ramon Magsaysay, Jr., Chair of the Senate Committee on Food and Agriculture, where he was guest speaker during the National Research Symposium on 8 October 2003 at the Bureau of

Soils and Water Management (BSWM) Convention Hall, Elliptical Rd., Quezon City.

#### **BAR-UPLB RDE partners find a home**

The Bureau of Agricultural Research (BAR) and the University of the Philippines Los Baños (UPLB) inaugurated the building that houses the DA-BAR-UPLB research, development, and extension (RDE) networks on 22 October 2003. Department of Agriculture (DA) Secretary Luis P. Lorenzo was the guest of honor.

### NOVEMBER

#### **First Luzon Conference: Yam takes center stage**

Yam took center stage when the Northern Philippines Root Crops Research and Training Center (NPRCRTC) of the Benguet State University (BSU) organized the first *Luzon Conference on Yam Production, Processing, and Marketing Promotion: Focus for the Decade* at BSU, La Trinidad, Benguet on 26-28 November 2003.

#### **BAR gets tips on resource generation**

A seminar sponsored by the Open Academy for Philippine Agriculture on *Resource Mobilization for Agricultural Research and Extension: Practical Tips in Developing Projects and Dealing with Donors* was held at the BAR-ATI Conference Room, November 12, 2003. Rex L. Navarro, Information Resource

Management Office Head of the International Crops Research Institute of the Semi-Arid Tropics (ICRISAT), was speaker at the seminar.

### DECEMBER

#### **Philippines plans for 2004 International Year of the Rice**

Headed by the International Year for Rice National Steering Committee chair and Department of Agriculture (DA) Secretary Luis P. Lorenzo, the country kicked off with an awareness campaign for the IYR Philippine Celebration through a press briefing at the DA-ITCAF conference room, 12 December 2003. The event primarily aimed to create awareness of the year-round activities on the country that give tribute to the value and importance of rice. These events will be formally launched next year.

#### **BAR Chronicle wins 2003 Gawad Oscar Florendo Award**

The *BAR Chronicle*, the official monthly newsletter of the Bureau of Agricultural Research (BAR), bagged this year's 2003 *Gawad Oscar M. Florendo Award* for Outstanding Public Information Tool (Print Category-Newsletter). The awarding was held at the Tejeros Hall, Camp Aguinaldo, Quezon City on 3 December 2003. Receiving the award were BAR Director William C. Medrano, Knowledge Management Division Head Angel Morcozo, and BAR Chronicle Editor Virginia A. Duldulao.

**BAR Today**

Entered as Second Class Mail at Quezon City  
Central Post Office Permit No. 752-01 NCR  
Subject for Postal Inspection