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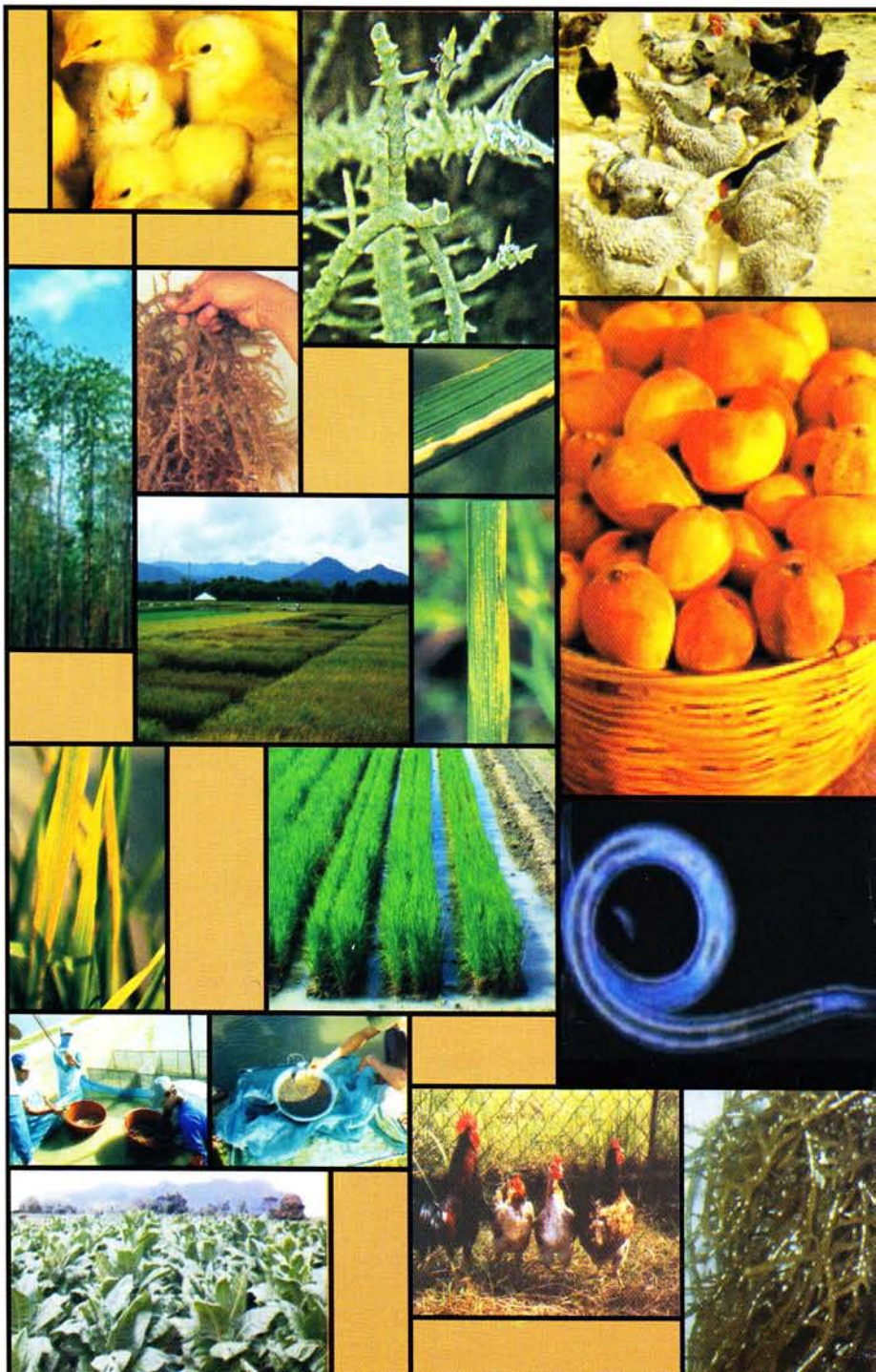
Editorial

Agriculture keeping pace with population growth

What's inside



Agriculture keeping pace with population growth

Often, the question that comes up in development discussions is why can't the agriculture sector provide food sufficiency in the country? This is ironic since we are an agricultural region and the seat of one of the Consultative Group of International Agricultural Research Centers. The presence of the International Rice Research Institute (IRRI) in the country gives the impression that we should have more than enough rice, our staple food. This is because the Institute develops technologies which can be used under our physical and natural conditions. What is the government doing with all the technologies generated by IRRI?

For people who do not clearly understand how development works in the national scheme of things especially in the use of developed technologies, the question is easier asked than answered. There are now about 79 million Filipinos to be served amidst our rapidly dwindling natural resources. There are more mouths to feed. And in no way could balance be made between population growth and productivity. Population keeps on running while food production gaspingly keeps pace at a far distance. Although the agriculture and fisheries sectors are doing their part, it is not enough to catch up with the runaway population.

IRRI is concerned with the world's rice. There are national rice research institutes in countries where rice is an important commodity; in our case we have the Philippine Rice Research Institute (PhilRice). PhilRice has not been amiss in its mission to develop technologies towards the country's rice self-sufficiency. Rice productivity today, except during the Masagana 99 years, is higher. We have good varieties, both inbred and hybrid, that are high yielding and have good eating qualities. We have production and postharvest technologies that can contribute to higher productivity.

The Rice Program has been placed under the Office of the President with the goal of making rice production move faster. We can not ascertain if this move is the wisest thing to do. But even before this, PhilRice has already demonstrated that the country can be self-sufficient in rice through its technology demonstration program conducted across the country. With the right technologies and hybrids, yields could increase from 2.3-3 tons to as high as 10 tons per hectare.

The scenario, after all, is not bleak if we are to gain from the lessons learned from the techno-demo program. First, varieties and seeds should be made available at an affordable price. Second, we need a more responsive extension system and dedicated extension agents. Third, is the commitment of local government units and the private sector to involve themselves into the total food security program of the country through credit, marketing, transportation, and the provision of information for our farmers. Finally, farmers should be more open to embrace new technologies and farming practices.

Research institutions continually develop technologies that adapt to adverse conditions. IRRI is now testing aerobics rice, a high yielding rice plant that can grow on dry irrigated land instead of the traditional flooded paddies. This technology is being tested in Paniqui, Tarlac and if successful could boost our rice production.

Efforts are not only directed on rice but also on other crops like corn. After the first annual national symposium on corn, it was overwhelming to know that corn has multiple uses that are untapped. This is also true with other commodities.

Improving our productivity in agriculture is a complex issue involving all sectors. I remember the lament of our development leaders who had been confronted by some farmers who said: Why the fuss and concern about us? We are happy as we are. Really. We discuss about the farmers and fisherfolk and how they can increase their yield and thereby improve their life. Are they aware that there can be a better life for them because if they are not, then it will be useless coming out with all the technologies that we think can improve their yield. They are not going to adopt them anyway. The point is, we can work with them as human beings and titillate their hopes and aspirations.

Presently agriculture cannot race along population growth but by itself it has gone a long way. Maybe if population stumbles for once, agriculture can catch up with it. ■

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All articles are based on studies conducted by NaRDSAF-member institutions.

High hopes on *Mestizo* rice

by Junelyn S. de la Rosa

Rice farmers have something to smile about these days. *Mestizo* (PSBRc72H), a new rice hybrid that yields higher than local inbred rice varieties, is being introduced to the countryside by the government's Hybrid Commercialization Rice Program (HCRP). It is aromatic and has better eating qualities than the popular IR64.

The HRCP is the flagship program of the Arroyo administration's "Unlad Ani Program" that is geared to make the Philippines self-sufficient in rice in the coming years. Named after a river in Ilocos Sur, *Mestizo* yields an average of 6.3 tons per hectare during the dry season, 25% higher than the best inbred rice varieties used by farmers. This medium-maturing (123 days) hybrid grows up to 97 cm.

Mestizo was developed by the International Rice Research Institute (IRRI) and released in 1997. Since hybrids are location-specific, techno-demo trials were conducted to test whether they are adaptable to a specific area. Results indicated that the hybrid grows well in Bukidnon, Iloilo, Isabela, Nueva Ecija, Laguna, Cotabato, Aurora, and Palawan.

In a related study in Pangasinan, *Mestizo* outyielded the local varieties used by the farmers by as high as 92.175% over PSB Rc82 in Bamban, 47.69% over PSB Rc18 in Gais, and 51.88% over PSB Rc54 at the PSU-Infanta Crop Experiment Station.

The HRCP is directly supported by IRRI, Food and Agriculture Organization (FAO), of the United Nations, Asian Development Bank (ADB), the People's Republic of China (PROC), and Rockefeller Foundation, Inc. (RFI), and, indirectly, by the Japan International Cooperation Agency (JICA).

Results of economic analysis indicate that farmers can profit more from hybrid rice over the best ordinary inbred rice variety.

Pres. Gloria Macapagal-Arroyo during a ceremonial mestizo harvest with (L-R) Nueva Ecija Gov. Tomas Joson III, PhilRice Exec. Dir. Leocadio Sebastian, DA Usec. Ernesto Ordoñez, DA Sec. Luis Lorenzo Jr., and PhilRice Deputy Exec. Dir. for R&D Edilberto Redoña. (PhilRice file photo)

How much does it cost to grow hybrid rice?

The additional cost of growing hybrid rice is cheap at P289 per hectare per season. Actual surveys show that farmers who plant hybrid rice incur a cost of P22,006 per hectare per season as compared to P21,717 average cost of producing ordinary rice.

Farmers need only 20 kg of hybrid rice seed--half of the amount needed if they use certified seeds. Thus, additional cost is from organic fertilizer and labor expenses for gathering and incorporating organic wastes in the seedbed, weeding of sparsely sown seedbed, extra care in seedling pulling and transplanting of 1-2 seedlings per hill, and replanting of missing hills.

How much can the farmer profit from hybrid rice?

Results of the economic analysis indicated that farmers can profit more from hybrid rice over the best ordinary inbred rice variety. The farmer can get a net benefit of not less than P6,000/ha/season, even at a conservative yield of 5 t/ha (100 cavans of palay at 50 kg/cavan). A farmer gets a net return of P24,763/ha. Producing hybrid rice seeds also offers new income opportunities for seed growers, rural farm hands, and women.

Can hybrid rice lead us to self-sufficiency?

Hybrid rice has the potential to make the country self-sufficient in rice. At present, we import around 600,000 metric tons (mt) per year. A minimum yield increase of one mt/ha through hybrid rice cultivation in the 800,000 ha irrigated ricelands in the country means an additional 1.6 mt of palay (960,000 mt milled rice), easily making the country self-sufficient in rice.

However, to achieve the full potential of hybrid rice, farmers need to adopt the ideal cultural management for hybrid rice such as water, disease, and pest management, selecting the right kind of seeds, fertilizers and pesticides.

Any new farming technology spells good news to the industry but whether that technology can deliver its promises, the best judge of it should be the biggest stakeholders in the game – our farmers.

Source: 1) Adaptation of Mestizo (PSB Rc72H) Versus Location-Specific Farmers' Varieties and Some Practices in Western Pangasinan, Wet Season 2001 by Caezar Angelito E. Arceo, April Joy A. Gomez, Crelour A. Alferez, Peter C. Bustamante, Naominida C. Olerma and Elmer C. Vingua of Pangasinan State University, AFMA R&D Paper Awardee during the 2002 National Research Symposium

Developing a rice hybrid resistant to bacterial blight

by Junelyn S. de la Rosa

Bacterial blight (BB) is one of the most devastating diseases in rice and reports show that it could easily wipe out more than a fourth of the total harvest in rice hybrids.

Hybrid rice is gaining popularity as the government's Hybrid Commercialization Rice Program (HCRP) reaches the countryside. It is more high yielding than the inbreds. *Mestizo,* a hybrid yields 15% to 20% higher than the local inbred varieties.

However, the downside of hybrid rice is, they are more susceptible to pests and diseases. Hybrids exhibit "cytoplasmic uniformity". The cytoplasm is the material that surrounds the nucleus, and carries extra-nuclear genes that can provide resistance to pests and diseases. Widespread use of only one or two types of cytoplasm can lead to massive crop failures, as when a fungus wiped out 15 percent of a corn crop in the US in 1970. Almost the entire crop was derived from an identical source of susceptible cytoplasm.

In response, scientists from the Philippine Rice Research Institute (PhilRice) in collaboration with some hybrid research institutions in China worked on diversifying cytoplasmic sources. They introduced more Cytoplasmic Male Sterility (CMS) types such as the E-shan-ta-bei-gu (STB) and the Zhao-tong-bei-zi-gu (ZTB) types, however both types were found susceptible to bacterial blight.

The scientists were concerned about the findings since bacterial blight (BB) is one of the most devastating diseases in rice and reports show that it could easily wipe out more than a fourth of the total harvest in rice hybrids. Bacterial blight is caused by the bacteria *Xanthomonas oryzae pv.orysae (Xoo).* There are nine kinds of bacteria-causing bacterial blight in the Philippines, thus the Philippines is known as the "capital of bacterial blight".

The scientists enhanced genetic resistance as a sure way of controlling bacterial blight. Using marker-aided selection (MAS), they incorporated any or a combination of the three BB resistance genes *(Xa4, Xa7 and Xa21)* to five maintainer lines of rice hybrids. They reported that lines that contain a pyramid of at least two genes are more durable since it would be more difficult for the pathogen to overcome more than one resistance gene.

Scientists explained that the incorporation of resistance genes into cultivars is the most economical and effective method to control bacterial blight. The availability of the cloned resistance genes, particularly the complete dominant gene Xa21, that has a wide spectrum of resistance to the pathogen provides an important opportunity for improving bacterial blight resistance in hybrid rice.

With the new improved lines, hybrid rice breeders can develop rice hybrids that are resistant to bacterial blight. The scientists are optimistic that hybrid rice breeders will utilize the improved lines and solve one of the country's endemic pest problems--bacterial blight. Finally, scientists say that this technology can help hybrid rice *i.e.Mestizo* reach its yield potential and fill all rice bowls in the country. ■

Source: Marker-aided Pyramiding of Bacterial-Blight Resistance Genes in Maintainer Lines of Rice (Oryza sativa L.) Hybrids by Lucia M. Borines of Leyte State University, Edilberto D. Redoña of the Philippine Rice Research Institute, Marina P. Natural of Department of Plant Pathology of UPLB, Casiana M. Vera Cruz and Hei Leung of IRRI. Winner of AFMA R&D Paper Award and Best Poster Award during the 2002 National Research Symposium

Leaf lesions caused by bacterial blight.

New and improved *Wagwag* varieties

by Thea Kristina M. Pabuayon

Scientists from the Philippine Rice Research Institute (PhilRice) have again come up with a breakthrough. By employing anther culture (AC) technology, the scientists have created 14 stable photoperiod insensitive (PPI) and improved *Wagwag* variants. In a matter of months, some of these varieties might even be up for commercial cultivation.

A bit of history

According to research reports by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), *Wagwag* has been around since 1955 when it was first released by the Philippine Seed Board for lowland cultivation, primarily in Nueva Ecija and in flood affected inland areas of Cagayan Valley. Derived from the Tagalog word *wagwagin* meaning to shake off, *Wagwag* is a traditional rice variety that was extremely popular in the 60s and 70s for its first-class grain quality.

However, *Wagwag's* popularity declined due to a number of factors. First, *Wagwag* is photoperiod sensitive. PhilRice explains that this makes *Wagwag* a seasonal variety that can only be productive during the wet season, when the day length is short and only in areas with abundant irrigation.

Wagwag is also very late maturing, heading at 165 to 200 days after seeding. At 150 to 200 cm, *Wagwag* is also very tall, making it susceptible to lodging. Lastly, it is very sensitive to salinity and submergence.

With these unfavorable characteristics, *Wagwag* was slowly relegated to the background, especially after the International Rice Research Institute (IRRI) released its IR8 variety and other high yielding varieties in the late 60s.

The reinvented Wagwag

Philrice scientist Nenita V. Desamero and other researchers from the Agricultural Pilot Center (APC) in Cagayan Valley and Bicol Integrated Agricultural Research Center (BIARC) in Camarines Sur employed anther culture (AC) rice breeding technology to generate 14 stable photoperiod insensitive (PPI) variants from *Wagwag*. They evaluated these PPI variants in the screen house, laboratory, and field, and advanced them as breeding lines.

According to PhilRice, the AC technology is essentially used to rapidly generate homozygous breeding lines from genetically diverse, heterozygous genotypes. AC generates homozygous double haploid lines (DHL) through, "spontaneous or induced doubling of chromosomes of haploid microspores or immature pollen during *in vitro* cell proliferation." PhilRice explains that AC is an *in vitro* technique that produces variants that may have, "useful agronomic traits, or that may serve as a novel source of genetic variation."

During the study, the scientists produced PPI variants from original photoperiod sensitive (PPS), late maturing, and very tall traditional *Wagwag*.

What exactly are the advantages of the new PPI variants? According to the scientists, the traditional PPS *Wagwag* is not expected to flower or produce grains during the dry season. Instead, it requires short days and long nights to cause flowering. With the new PPI variants, however, there can now be more croppings per season, which may mean more money for farmers.

Aside from this, the PPI variants also are early maturing, semi-dwarf, have excellent kernel quality, high yielding, have intermediate field resistance to tungro, and saline-tolerant. These traits, according to the scientists, are very important in grain crops as, "these extend the area of adaptation and usefulness of the crop, and sustain rice production."

"Tolerance to salinity is a viable strategy in augmenting and stabilizing rice production in marginal areas such as the saline prone rice growing regions," the scientists add. In the Philippines, our saline-affected rice production areas total to 125,00 ha.

In terms of grain quality, the scientists claim that the PPI variants are at par with or even better than IR64, which is the most popular variety to date. "Improved grain quality is now becoming an important objective in rice breeding due to consumers demand for good eating quality rice," they said. They add that for our rice to be globally competitive, "quality is an important consideration, in addition to high yield. Any technology that enhances development of high yielding, good quality rice creates a significant impact in addressing the issue," they add.

Semi-dwarfism in plants, on the other hand, reduces lodging, especially during typhoons

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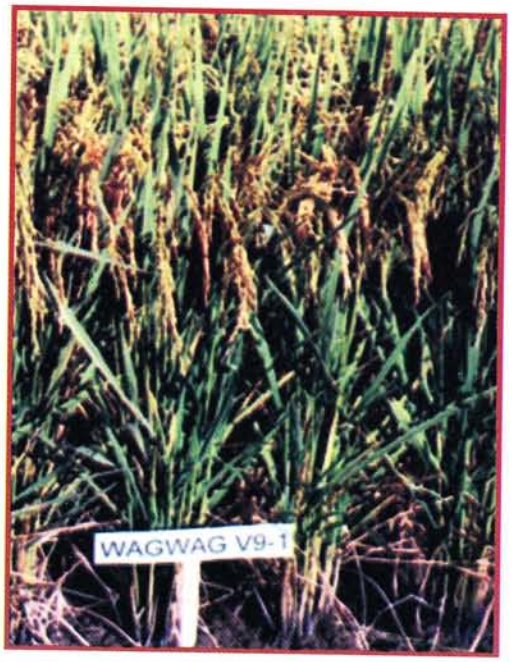

New and ...continued

and strong winds.

The scientists added, however, that pest resistance is one trait lacking in the new *Wagwag* varieties. "Continuous breeding for this trait is necessary to cope with the ever changing environment, including pests. We are in the process of incorporating the genes for bacterial leaf blight and tungro resistance in our AC-derived elite *Wagwag* breeding lines," they said.

Four of these new PPI variants, Wagwag V2, V3, V9-1 and 19, were selected and elevated to the General Yield Test (GYT) as elite breeding lines. *Wagwag* V9-1 or PR30244-AC-V9-1 was included in the 2000 wet season in the multi-location National Cooperative Testing (NCT) for irrigated lowland, under favorable growing condition. It passed the NCT trials for three seasons, and has been elevated to the Multi-location Adaptability Test (MAT) in 2002 dry and wet seasons and is only a season away from being recommended for commercial cultivation.

Similarly, the scientists also developed nine high-yielding elite breeding lines with tolerance to moderate salinity. *Wagwag* V1, V2, V3, V4-1, V4-2, V4-3, V9-1, V17, and V19 passed the GYT for saline-prone areas and have been recommended to the NCT. *Wagwag* AC-V19 or PR30244-AC-V19 was entered in the NCT in 2001 wet season and is also only a season away from being recommended as a pre-release variety for on-farm adaptation and adoption trial. In 2002 wet season, *Wagwag* AC-V2 or PR3-244-AC-V2 was entered in the NCT. The scientists explained the importance of the NCT and MAT saying it is the, "last frontier(s) for the recommendation and release of an elite breeding line as a variety for commercial cultivation."

As a last note, the scientists reiterated the importance and implication of anther culture and their PPI lines. "With this, not only genetic diversity is expanded, but also, the process of improved breeding line development is accelerated, implying a tremendous savings in time and resources for varietal development."

Source: Traditional Rice Variety Wagwag Reinvented by Nenita V. Desamero et al. For more information, please contact Dr. Desamero at (044)4560-285/258/113 local 255 or 243, or e-mail her at nvdesamero@philrice.gov.ph.

Mixing rice cultivars can reduce Tungro, scientists say

by Thea Kristina M. Pabuayon

Rice scientists consider *tungro* one of the most damaging rice diseases in Southeast Asia. During the 90s alone, it devastated a total of 465,555 hectares of rice lands in India, Indonesia and Malaysia. In the Philippines, the disease is an ongoing problem particularly in Central Luzon, Bicol, Cotabato and Davao.

Tungro is caused by the rice tungro bacilliform virus (RTBV) and the rice tungro spherical Virus (RSTV). Generally, tungro causes the yellow-orange discoloration, stunting and mottled leaves in rice. However, not all yellow and stunted plants are infected with tungro. Sometimes infected plants do not exhibit any symptoms at all.

According to the Philippine Rice Research Institute (PhilRice), although there are already methods to control or treat the spread of the disease, scientists have yet to find a cure for tungro. Proliferated by green leaf hoppers which feed largely on young and susceptible rice plants, tungro spreads rapidly in "continuous and asynchronous fields." The continuous fields allow the leafhoppers to complete their life cycle, thus producing several generations of offspring that swell over a wide production area.

Among the treatments used to manage the spread of tungro, planting resistant varieties is the most economical means. However, there is no variety yet that is resistant to tungro. There are, however, varieties resistant to the vector green leafhopper. But now, these varieties have also become susceptible to *tungro*.

All in the mix

Scientists from Western Mindanao State University (WMSU) and UP Los Baños have undertaken a study that involves planting different combinations of rice cultivars to manage tungro. Funded by PhilRice, their study "Effectiveness of Mixtures of Rice Cultivars with Different Types of Resistance for Management of Tungro disease" won the AFMA Best Paper award during the 2002 National Research Symposium held by the Bureau of Agricultural Research.

Jocelyn Pedroso, senior author of the study, and associate professor and associate dean of the College of Agriculture in WMSU claims that the use of cultivar mixtures carrying resistant genotypes that might inhibit pathogen and eventually, disease spread is not new. "Although this has been practiced in many parts of the world, this method has not been tried in tungro management," Pedroso says.

Pedroso adds that at present, there are no known improved rice varieties resistant to RTBV (except *Matatag* lines by PhilRice under field trials) though previous studies have shown that some rice cultivars were resistant to both RTBV and RTSV. However, further studies claim that breakdown of resistance

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Mixing ...continued

indeed occurred after several consecutive seasons of intensive cultivation of formerly resistant cultivars.

For the study, Pedroso and her co-author, Avelino Raymundo, Professor of the Department of Plant Pathology in UPLB analyzed tungro development in pure and mixed stands of rice cultivars with different types of resistance. They conducted their experiments in Barangays Tulungatung, Cawit and Talisayan in Zamboanga City during the wet and dry seasons of 1999.

For the pure stands, Pedroso and Raymundo used four rice cultivars with different types of resistance. These are IR-64, which is resistant to the vector but susceptible to tungro; IR-72, which is resistant to tungro but intermediately resistant to the vector; PSBRc 34, which is intermediately resistant to both vector and tungro; and PSBRc 18, which is resistant to the vector and tungro.

Each cultivar was sown separately. After 12 days, the scientists transplanted three to four seedlings of each cultivar at a distance of 20 x 20 cm. The inoculums used were taken from naturally infected plants that were present every season.

Every week, 10 days after transplanting (DAT) and 15 DAT, the scientists gathered data on tungro incidence and severity during the wet and dry season, respectively.

For the mixed stands, experiments were conducted for two croppings in the same sites as that of the pure stands. Although a similar design was used in laying out the experimental units, the scientists used four methods to determine tungro dynamics in mixed stands. The first method used was the **plot mixture (PM)** wherein three plots measuring 12 x 12 m each were prepared in each site, and equally divided into sub plots depending on the mixtures used. Each sub plot was randomly selected and planted to a single rice cultivar of known resistance. The plot mixtures were: Plot mixture A (PMA) where one half of the plot was each planted with IR-64; Plot mixture B (PMB) where one third of the plot was each planted with IR-64, PSBRc 18 and IR-72; and Plot mixture C (PMC) where one fourth of the plot was each planted with IR-64, PSBRc 18, IR-72, and PCBRc 34.

The second method was **plot mixtures with varying population densities.** Three 12 x 12 sq m plots were planted with the same cultivars of different resistance genes at a population of 250, 000, 160, 000 and 333,333 hills per ha. Each cultivar was transplanted at 20 x 20 cm, 25 x 25 cm and 15 x 20 cm spacing, respectively.

The third method was placing **cultivar mixture in rows within a plot (VR)** that used the four cultivars mentioned. In this method, 0.5 kg of seeds of each cultivar was thoroughly mixed before planting to ensure diversity of genotypes.

The fourth and last method was placing **cultivars in alternate rows (AR).** In this method, the four cultivars mentioned were also used. However, each cultivar was planted alternately every 1.5 m in a 12 x 12 m plot, therefore each cultivar appeared twice in a plot.

More mix, less disease

According to Pedroso, their study showed that disease incidence rose over time but varied among the three barangays between seasons. Mostly, infection was high in both pure and mixed stands during the wet season due to the early development of disease at 10 days after transplanting.

Tungro incidence also differed between locations, with high disease incidence in both stands in Brgy. Cawit during the wet season and in Brgy. Talisayan during the dry season due to the different amounts of inoculum in the area and the farmers' own practices of spraying, fertilization and weeding. The differences in disease incidence and severity in the cultivars used either in pure and mixed stands can also be attributed to the existence of different virus genotypes in the fields, Pedroso says.

However, most cultivar mixtures had low disease incidence compared to susceptible cultivars. Pedroso observes that the reduced infection was comparable to or even lower than that in resistant pure stands. According to the scientists, this suggests that spatial heterogeneity made the mixtures effective against the virus and leafhoppers.

Pedroso further explains that the progression of disease was slowed down in

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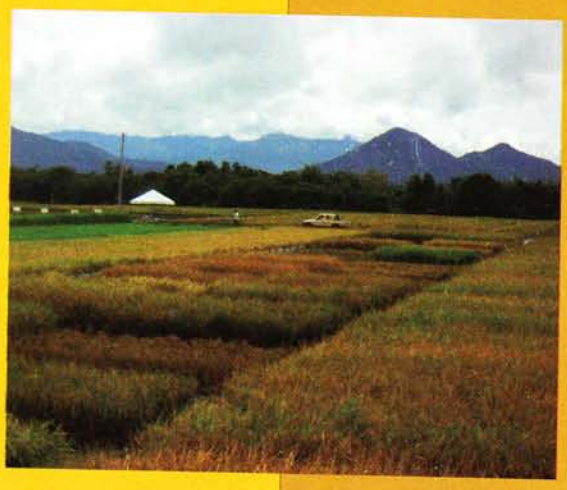


Coconut oil: Safe as mother's milk

by Junelyn S. de la Rosa

The same health and nutritional benefits in breast milk can be found in coconut oil. The medium-chain fats in natural coconut oil called lauric oils are similar to the lauric oils found in breast milk.

Lauric oils are becoming popular as natural enhancers of the immune system. Like breast milk which makes babies more resistant to sickness, coconut oil can help us from getting sick.

Half of the fatty acids in natural coconut oil are lauric acids, which are converted to fatty acid monolaurin in the body. Monolaurin works like a soldier by destroying lipid-coated viruses such as herpes, cytomegalovirus, influenza, and various pathogenic bacteria and protozoa.

In the past, there was misconception that coconut oil increases one's cholesterol levels and result to heart disease. This was based on an overblown hypothesis that all saturated fats are bad for the body. Coconut oil has a high level of saturated fat. It is only recently that scientists discovered that some saturated fats are in fact good for the body.

Medium chain triglycerides

The fatty acids in coconut oil are medium chain triglycerides (MCTs). MCTs are a class of fatty acids whose chemical composition is shorter than the long-chain fatty acids present in most other fats and oils, which accounts for their name.

Also called lean fats, MCTs differ from other fats in that they have slightly lower calorie content and are more rapidly absorbed and burned as energy, resembling carbohydrates more than fats.

Because of their structure, MCTs do not raise serum cholesterol or contribute to heart disease like the long chain triglycerides found in seed oils. Negative information on coconut oil was also based on scientific studies that used hydrogenated coconut oil instead of natural coconut oil.

Trans fatty acids

Hydrogenated coconut oil contains trans fatty acids (TFAs). Scientists say TFAs lower the "good" HDL cholesterol and raise the "bad" LDL cholesterol, raise total serum cholesterol levels; increase blood insulin levels, increase risk for diabetes; affect immune response by lowering efficiency of B cell response and increasing proliferation of T cells; interfere with utilization of essential omega-3 fatty acids; and escalate adverse effects of essential fatty acid deficiency.

In short, TFAs are bad for you. We should steer clear or minimize eating processed foods which usually contain TFAs i.e. margarine, potato chips and baked goods that contain hydrogenated or partially hydrogenated oil.

Today, coconut oil is called an important functional food for the 21st century. That is because coconuts provide health benefits over and beyond the basic nutrients according to Dr. Mary Enig of Michigan State University.

Current research is also done to test the effectiveness of coconut oil in lowering the viral load of HIV/AIDS patients and to increase body metabolism and lose weight in thyroid patients

Cloning coconut's ACP thioesterase gene

Recently, a group of scientists from various institutes of the University of the Philippines at Los Baños (UPLB) successfully cloned one of the genes responsible for producing the medium-chain fatty acids in coconut oil.

Called the acyl-acyl carrier protein (ACP) thioesterase gene, this gene is responsible for the enzyme which determines the length of fatty acid chains during biosynthesis.

The scientists employed three cloning strategies to isolate the acyl-ACP thioesterase gene: RT-PCR, RACE, and library screening and used five and six-month old endosperm tissue from the drupe of the coconut variety Laguna Tall. Coconut meat was freshly obtained for the isolation of RNA.

Scientists are optimistic that identifying the gene will set the groundwork for identifying other coconut genes and is a step nearer to the ultimate goal of creating a transgenic coconut that will have more lauric acids.

If all goes well, this designer coconut will be more valuable in the market and will produce other novel products to ensure the sustainability of the Philippine coconut industry.

The project is part of the UPLB PCARRD-DOST funded project entitled "Cloning of Important Genes of Coconut

Source: Cloning and Partial Characterization of the ACYL-ACP Thioesterase Gene in Coconut (Cococ nucifera L) by Marni Cueno, Rhea Antonio Laurena, Ma.Jamela Revilleza and Ma. Mae Mendoza of the Institute of Biological Sciences (IBS), Institute of Plant Breeding, Institute of Chemistry of the University of the Philippines at Los Baños (UPLB). Health and Nutritional Benefits from Coconut Oil, Important Functional Food for the 21st Century by Dr. Mary G. Enig of Michigan State University

Photo from www.coconutoil-online.com

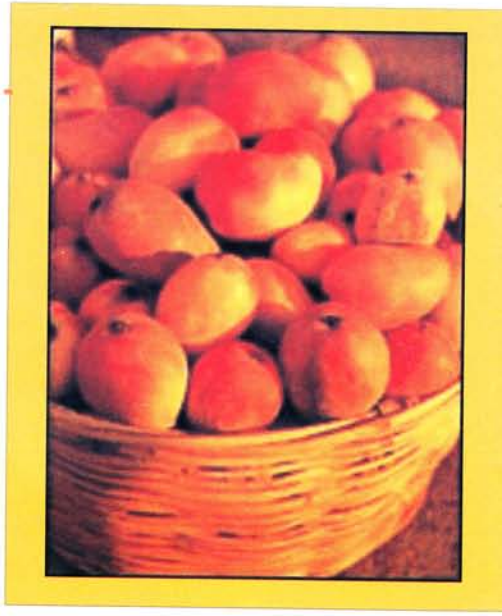
Lauric oils are becoming popular as natural enhancers of the immune system.

Like breast milk which makes babies more resistant to sickness, coconut oil can help us from getting sick.

At Leyte State University (LSU), a group of researchers developed a simple postharvest heat treatment called the Hot Water Dip or HWD to improve the postharvest handling of mangoes and banana.

Hot water dip improves banana and mango fruit quality

by Rita T. dela Cruz



The banana and the mango industries play an important role in boosting the country's economic growth. These fruits top all other fruit crops in the country in terms of production area and demand by the domestic and foreign markets. However, problems in packaging and handling continue to hamper the development of these fruit industries.

The key to good postharvest handling is careful harvesting. The quality of perishable foods is achieved from the moment they are picked or harvested. From this point, farmers should maintain postharvest conditions so that deterioration is minimized, and quality is at its best.

Bananas and mangoes bruise easily and have short shelf lives. Under hot condition, fruit injuries are hard to avoid. Ripening starts at once after the picking then they become vulnerable to diseases.

To extend the lives of these fruits, refrigeration becomes the only alternative. However, this results to chilling injuries such as discoloration and abnormal ripening due to the sudden change of temperature.

At Leyte State University (LSU), a group of researchers developed a simple postharvest heat treatment called the Hot Water Dip or HWD to improve postharvest handling of mangoes and banana. Dr. Antonio Acedo Jr., Marilou Benitez, and Dr. Ma. Cherry Abit determined the effectiveness of this method in bananas and mangoes that have been exposed to normal, hot and cold conditions. This research won an AFMA Best R&D Paper Award in the 14th National Research Symposium (NRS) organized by the Bureau of Agricultural Research (BAR).

Employing the fruit hot bath

Previous studies show that employing postharvest treatment effectively lessens the responses of fruits to stressful conditions, controlled insects and diseases, and inhibited the ripening process.

To determine the usefulness of HWD, the researchers used the *latundan* (*Musa* ABB) and *saba* (*Musa* BBB) bananas and *carabao* mango. They dipped the bananas and mangoes into water tanks at 47-49 °C and 51-53 °C, respectively, for 10 minutes. Meanwhile, chill treatment for the fruits were maintained at 8-10 °C for 8-10 days after the fruits were dipped into hot bath.

Healthier and better quality fruits

According to the researchers, HWD was able to reduce the incidence of disease, particularly *finger rot* and *anthracnose infection*. In terms of ripening, they noted no substantial effect on the fruits that were exposed to hot surroundings for five to six days. Under low temperature, HWD proved effective in minimizing fruit injuries. *Saba* bananas that were subjected to HWD turned ripe-soft two to three days later than the untreated bananas. They also had improved quality and had little or no diseases and infections. According to the researchers, HWD-treated fruits were anthracnose and finger rot free. During chill treatment the HWD-treated fruits also had less chilling injuries and only slight surface discolorations.

For *latundan*, softening was slowed down significantly even if the bananas were exposed to high temperature. HWD also inhibited the degree of finger rot and anthracnose infection.

The carabao mangoes that were immersed in hot water, had delayed ripening, 2-3 days after they were treated with HWD. Disease incidence was lower and the occurrence of anthracnose was very minimal. Also, the number of fruits infected by *stem-end rot* was lower compared to the untreated mangoes, and had less chill injuries.

HWD is economical

Through a cost-benefit analysis, researchers determined the economic practicability of resorting to HWD. For *saba*, researchers reported a gross profit of P0.54 per fruit and a net profit of P0.44 per fruit. This indicates that for every peso invested in HWD, there is an ensured net return of P4.4 (per fruit basis). Meanwhile, for fruits exposed under hyperthermal condition, farmers who used HWD would have a net profit of P0.40 and a return of investment of P4.0 for every fruit.

For *latundan*, fruits exposed for a shorter period under hyperthermal conditions have a higher return of investment of P5.00 per fruit compared to those that were exposed longer with only P1.61 net return per fruit. HWD treatment for *carabao* mangoes is more profitable than in bananas. At ambient conditions, employing HWD gave a gross profit of P23.75 for every kilo of mangoes and a sure return of investment amounting to P14.83.

(For more information about this study, please contact Drs. Antonio L. Acedo Jr., Marilou M. Benitez, and Ma. Cherry Abit at Leyte State University (LSU), Baybay, Leyte or you may call them through these numbers: (053) 335-2628 or 563-7113 or fax 3352752 or e-mail at acedo@philwebinc.com or junacedo@yahoo.com)

Total farm productivity by integrating fruit bearing crops

by Rita T. dela Cruz

Limited space is not always equated with limited productivity. Farmers, particularly those smallholders of land, could still produce given that a suitable farming system is well adopted. Total farm productivity can be achieved by maximizing every space of the farmers' holdings.

A field study conducted by the Department of Agriculture-Regional Field Unit 9 (DA-RFU) developed two alternative farming systems that are both economically viable and environment-friendly for sustainable upland farming. The team that tried this systems in the field was headed by RFU researchers, Ruben Baltonado and Homer Mendoza.

Alternative farming system is an integrated grain cash farming system that aims to increase the net returns of farmers without reducing their main produce. The system is concerned more on developing the totality of the farm rather than extending land holdings for better productivity. Specifically, this type of farming entails maximizing farm spaces by integrating diversified/multiple crops in-between the main crops of the farmers. In this case, the researchers are introducing fruit bearing crops (FBCs) to diversify with corn, which is the main crop of the farmers.

To study the effects of alternative farming, researchers introduced the idea to corn-based farmers who own hectares of land. Majority of the farm holders in Zamboanga del Sur rely mainly on upland rice and corn as their important source of income and food. But since the production of farmers is just enough for their food and source of livelihood, operation for large-scale farming is hard to achieve. Added to this, production continues to decline because of farming malpractice and soil erosion.

Specifically, the study evaluated the potential of incorporating FBCs in corn-based areas. Likewise, the study sought to maximize the use of farm resources given the limited unit of land and to encourage farmers to manage the totality of their farms effectively and efficiently.

The project was designed for long-term observation and was started during the first cropping season of 1995 to 2002. The farm used for this study was a three-hectare experimental field located in Zamboanga del Sur. To determine the potentials of alternative farming, three cropping patterns were compared.

The first pattern was the mono-cropping system consisting mainly an outlay of corn-corn. This is the most usual and the most dominant cropping pattern used by farmers in Zamboanga del Sur and is referred to as the *farmers practice*. This served as the control for the field study.

The second pattern employed consisted of corn + fruit bearing crops (FBC)-corn + FBC. The FBC included banana and mango. This pattern is referred to as *alternative farming#1*, FBC were planted in between the corn.

The third pattern is diversified/multiple crops + FBC, thus referred to as *alternative farming#2*. Crops for the multiple cropping included corn, rice, mungbean and peanut.

The FBC were interplanted along the contour lines while the diverse/multiple crops were planted along the bay or space in between the contour lines.

Alternative Farming #1

Since there was a slight cutback in the land area allotted for corn, its yield was reduced compared to the yield under the mono-cropping system. Instead of planting corn, the space was used to plant fruit bearing crops. But the seven-year field data showed that the yield loss in corn was well compensated by the harvest of banana and mango. To date, the farm was able to obtain four times much higher net returns compared to the mono cropping system. The highest net return of P59,413 per hectare of land was obtained using this type of alternative farming.

Alternative Farming #2

This cropping pattern resulted to a decrease yield for corn. Nevertheless, the reduced yield was well compensated by the harvest of the diverse crops i.e., rice, legumes and fruits. The highest net return was computed at about P79, 200 per hectare of land. Moreover, the income will increase once the mango crops bear fruits.

Aside from the high net returns,

employing these two alternatives farming also help the environment since it was able to reduce the slope area to 4%. Planting the contour lines with crops enabled the farm to have terraces and at the same time get rid of the waterlines or waterway along the field.

(This study won the AFMA R&D Paper Award under the Crop Science-Downstream Category. For more information please contact Ruben Baltonado and Homer Mendoza of the Department of Agriculture-Regional Field Unit 9, General V. Alvarez St., Zamboanga City or call them at telephone number (062) 991-2594 or fax at (062) 992-1485)

Pili nut cracker goes high-tech

by Rita T. dela Cruz & Arnulfo P. Malinis

The difficulty of processing pili forced the farmers to sell their pili to traders at very low prices, and making them get most of the benefit. With the use of the pili nut cracker, the farmers are assured of an additional income of 1.50 per kilo of pili nut.

As pili nut is indigenous only in the Philippines, the government has long since recognized its economic importance in the country as a potential export crop. It ranks second to cashew nuts and has been a good stand-in for macadamia nuts. Pili nut is produced and processed mostly in the Bicol region.

As the demand for pili continues to grow, the supply is hardly met. One main problem of the industry is in post-production operation and processing. Most of the workers still resort to traditional de-shelling using bolo.

The first prototype pili nut cracker was developed in 1995 by the Agricultural Engineering Department of the Camarines Sur State College (CSSAC). It used steel rollers to crack the pili shells. Unfortunately, the shells were cracked in irregular manner, thus eventually damaging the kernel.

The Catanduanes State College Laboratory High School (CSCLHS) also developed a four-part pili nut cutter made from indigenous materials. The four-part cutter consisted of a framework, case, hammer, and blade. Result showed great improvement in the efficiency of de-shelling. It was 80% more time efficient than the manual method. However, the developed cracker was still insufficient to deliver the acceptable capacity.

There were several pili nut crackers fabricated after the first cracker from the steel rollers-operated machine to the mechanically-operated pili nut cracker. But there were still problems in terms of efficiency or capacity, either the shells are unevenly cut, thus damaging the kernel or the cracking capacity is low. O... and conv... and the ... crack pi... tools a... Bicol U... Forest ... Depar... Posth... BPRE... DA-F... lates... was ... Est... BU...

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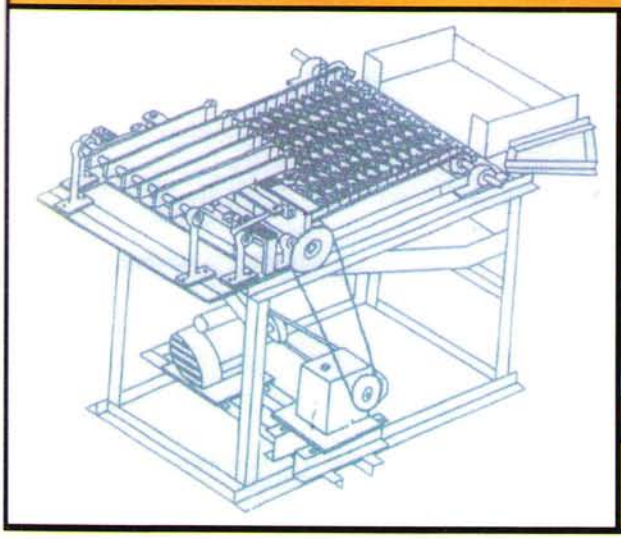
The prototype consist... cracker powered by a 1hp electric motor. The motor's energy consumption is 0.41 kwhr. The machine consists of five major parts: the cracking unit, conveying unit, stand/frame, transmission, and primemover. The prototype was tested with the help of local cooperators from Casiguran, Irosin, and Guinobatan using three major parameters: cracking capacity, the cracking efficiency and economic viability.



Technology verification of the prototype showed that on the average, it can crack 204 ...(117 kg/hr) with a ... with 89% ...nan operated ... dried pili nuts ...ut cracker. For ...chine could ... result is ...r persons in one ...

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...ssing pili forced the ...ders at very low prices, and making ... most of the benefit. With the use of the pili nut cracker, the farmers are assured of an additional income of 1.50 per kilo of pili nut. With this technology, the adoption of a village level pili-processing system is slowly established. Farmers will be trained to use the pili machineries and other equipment for postharvest processing, thus enabling them to develop their own micro-enterprise to sell pili products at prices they set. Farmers are able to sell pili not as fruit but as kernel at a higher price. Also, the mechanization of the de-shelling process will create job opportunities for the unemployed women in the region.

The technology developed by BUCAF was presented during the 14th National Research Symposium on 27 November 2002 at the BSWM Convention Hall. It won the AFMA Outstanding R & D Paper Award for Agricultural Engineering, Processing and Post-harvest (downstream research).

For more information about the mechanical pili nut cracker, please contact Engrs. Arnulfo P. Malinis, Estrella A. Calpe, or Alan P. Rabe at Bicol University College of Agriculture and Forestry (BUCAF), Guinobatan, Albay or you may call them through these numbers: 484-6336 (Bayantel) or 838-0297 Digitel

Paper making from tobacco stalks

by Likha C. Cuevas

Filipino handicrafts are one of the most unique and marketable goods craved by western buyers. Some are Christmas décor made from handmade paper and paper pulp. Mrs. Irma Yang, an exporter of paper handicrafts, said that paper is a versatile medium.

However, exporters cannot meet the demand for paper-based products due to low supply of cellulose --- the fiber that makes up paper. Cellulose is a major biopolymer and can be found in cotton (94% cellulose) and wood (45-50% cellulose).

To address this demand, Dr. Shirley Agrupis, and her colleagues from the National Tobacco Administration (NTA) are using tobacco stalk as an alternative source of cellulose. Tobacco stalk contains cellulose, lignin, hemicellulose and extractives found in wood. Tobacco stalks are also produced in huge volumes annually as waste.

However, the conventional process of producing cellulose yields harmful chemicals. In pulping, the use of sodium hydroxide or sodium sulfide and other delignifying chemicals produce black effluents, while in bleaching, the use of chlorine-based agents results to chlorinated compounds that forms dioxin. Both waste products are hazardous to the environment.

Environmental and health hazard

According to the World Health Organization, "dioxin is a persistent organic pollutant. Once dioxin enters the environment or the body, they are there to stay due to their uncanny ability to dissolve in fats and to their rock-solid chemical stability." The WHO Fact Sheet reported that short-term exposure to dioxin may result to skin lesions (chloracne and patchy darkening of the skin) and altered liver functions. Long-term exposure may lead to impairment of the immune system, the nervous system, the endocrine system, and reproductive functions. Chronic exposure to dioxin may result to several types of cancer. TCDD (2,3,7,8-tetrachlorodibenzo-para-dioxin), a family of dioxin, was evaluated by the International Agency for Research on Cancer (IARC) in 1997 and was categorized as a, "known human carcinogen."

According to Agrupis, et al., they are searching for a bleaching process that would eliminate this problem without sacrificing the strength of the bleached pulp.

Bio-mechanical pulping process

In this process, pulp is produced with the help of microorganisms without using chemicals. Dried tobacco stalks are soaked in water for 24 hours and then crushed by a compactor. These materials are then chipped (to increase surface area) and treated with fungal strains (*Pleurotus ostreatus, Phanerochaete chrysosporium, Trametes versicolor and Coriolus versicolor*) and cassava-powder-rice water medium (CPRWM), a fungal nutrient medium. The nutrient medium helps in degrading lignin but still retains the cellulose amount of the pulp. The nutrient medium serves as 'starters' for the fungi before turning to the tobacco material as food source. Tobacco stalk pulp treated with *P. ostretus* and *P. chrysosporium* even increased the amount of cellulose content because of the massive hyphaenation on the tobacco stalks. Hyphae, the thread-like branching formation of fungi when growing, are considered cellulosic (made from cellulose) materials.

The fiber length of the fungal treated pulp ranged from 0.5-1.0 mm (which was considered long) while the conventionally treated pulp reduced fiber length (compared with the original pulp). According to the researchers, this indicated the degrading effect of chemicals and shortening of fibers. What's the significance? Fiber length is directly related to mechanical strength of the pulp-- the longer the fibers, the stronger they are.

Non- conventional bleaching

Tobacco pulp was bleached using camias, lime, and detergent. The camias juice used was in its pure form while lime and detergent were used at 15% concentration at 10% pulp consistency. In biological bleaching, *Trametes versicolor* and *Phanerochaete chrysosporium* were used without additional nutrients.

The pulp treated with fungi gave the highest pulp yield (63-64%), while camias gave the highest bleached yield (51.6%). Next was lime with 49.5% pulp yield and detergent (48.7%). Non-conventional bleaching did not cause cellulose degradation compared to the conventional bleaching (10% CaClO), which gained 39.83%-52.33% pulp.

Non-conventional bleaching agents did not degrade lignin but decolorized the polymer. Detergent was most effective in purifying the tobacco stalk pulp.

The researchers also measured the mechanical strength of the tobacco stalk pulp, the burst index, tear index, folding endurance, and tensile strength. Burst strength refers to the amount of hydrostatic pressure required to rupture a piece of paper while internal tear resistance is the energy required to propagate an initial tear through several sheets of paper at a fixed distance. Tensile strength, pertains to the longitudinal stress a piece of paper can withstand without tearing apart. Stress refers to the force per unit width of a test

specimen. Folding endurance is the measure of the number of double folds a piece of paper 15 mm wide can endure before its tensile strength falls below the standard value of 1 kg. Lime-bleached tobacco stalk pulp had the highest mechanical strength.

The scientists recommend the biological bleaching method followed by mild chemical treatment and thorough washing to remove the chromophore compounds which darkens the pulp.

Technology for the countryside

The National Tobacco Administration has been producing tobacco pulp using this technology since 1994. Handmade paper from tobacco stalks has caught the interest of local manufacturers. NTA has invented equipment to meet the growing demand. Today, NTA is the only supplier of tobacco handmade paper.

How can the common Filipino use this technology that requires scientific knowledge? "I believe NTA is always there to assist," Agrupis said.

Agrupis quoted NTA Administrator Carlitos S. Encarnacion, "The goal of this project is to introduce this technology to empower tobacco farmers using their own agricultural wastes. It is our hope that in the future, farmers can sell tobacco stalks for added income or even produce the pulp and paper on their own. That is NTA's dream."

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Growing money on trees

by Likha C. Cuevas

In the Philippines, it's not surprising to see mountains and hills that look like green or yellow-green mounds. Some are entirely green, some have only patches of greens. Upon closer inspection, the green expanse is due to cogon grass *(Imperata cylindrica)*. More often than not, trees are sparse, or not present at all.

Usually, mountain grasslands are products of *kaingin* or slash-and-burn cultivation. If the forest land is frequently burned or grazed, pyrophytic (regenerates after fire) grasses like cogon invades and replaces the formerly dominant woody plants and trees in the area. Easily dispersed by wind, *Imperata* flourishes with lots of sunshine and can tolerate poor soil in erosion-prone areas.

Grasslands

Grasslands are for grazing or cropping using traditional farming and/or shifting cultivation. Studies show that over-cultivated upland areas result to extreme soil loss which threatens the sustainable productivity of the upland.

According to Dr. Canesio D. Predo of Leyte State University (LSU) and Dr. Herminia A. Francisco of UP Los Baños (UPLB), "the Philippine government is concerned with rehabilitating vast areas of grasslands in the country through reforestation and other tree-based plantation establishment, including agroforestry." This land use system can increase income and improve water supply, carbon sequestration, reduce soil erosion, and enhance biodiversity.

Based on this premise, the team conducted a survey to evaluate the environmental and economic benefits of alternative land use options in some grasslands in Claveria, Misamis Oriental in Mindanao.

Results indicate the benefits from carbon sequestration in tree-based farming systems. "Carbon sequestration," Predo and Francisco explained, "refers to the process by which trees use carbon dioxide that otherwise could pollute the atmosphere." By reducing carbon dioxide in the atmosphere, trees can mitigate global warming or climate change.

Predo and Francisco also clarified that it is important to provide farmers with incentives to encourage them to adopt tree-based farming.

next page

Gmelina arborea
Photo from www.dfsc.dk/gmelinaforside.htm

Alternative land-use systems

The study used six models of land use systems to rejuvenate *Imperata* grasslands. These were:

- IMPLUS *Imperata* land use for animal pasture or grazing system
- FPLUS farmers' current practice of annual maize cropping system (100% of the area devoted to corn); soil is cultivated before planting corn; inorganic fertilizers were applied
- TIMPLUS timber trees with *Imperata* for animal pasture or silvopastoral system; 85% is allocated to *Imperata* while 15% is planted to trees
- TCLUS timber trees planted in hedgerows with annual maize cropping system at the alley areas; 85% is devoted to corn and 15% to timber
- TCSFLUS social forestry model of agroforestry system wherein the bigger areas are devoted to timber trees in hedgerows with annual maize cropping at the alley areas; 40% devoted to timber while 40% is devoted to corn
- TPLUS timber plantation land use system

The tree species used were the *Gmelina arborea* (non-nitrogen fixing tree) and *Acacia mangium* (nitrogen-fixing tree). In all of the systems, 60% of the tree component is *Gmelina arborea* and 40% *Acacia mangium*. In the TCSFLUS system, the tree components were equally distributed (20%-20%).

Results showed that it was profitable to retain *Imperata* grassland for animal grazing purposes; however, it was not the most efficient type of land use," the research team said. "Conversion of *Imperata* grassland into tree-based systems were more efficient than other land use systems."

TPLUS (timber plantation system) was the most efficient land use system among the tree-based systems because of the high value of harvested timber, lower predicted soil loss, and high level of soil nutrients sustained. From data collected over 20 years, the researchers concluded that TPLUS system had the highest NPV over 20 years, followed by TCSFLUS system. Losses in the FPLUS system increased due to lowering yields from high soil erosion.

If tree-based systems are profitable, why do farmers insist on the traditional farming system (FPLUS)? The researchers explained that smallholder farmers do not want to risk their income from crops with the projected income from trees.

Benefits from trees

So how will farmers adopt tree-based farming if it's too risky and the benefits are not immediate? The study showed the potential of the TCLUS system where farmers can get income from corn while waiting for timber to grow. Predo and Francisco projected that farmers can get their money back from timber in seven to ten years.

There are also environmental benefits of tree-based systems. Soil erosion can be reduced by 20% - 91% compared to farmers' practice, with soil loss up to 75%.

Tree-based farming was introduced by the World Agroforestry Centre (ICRAF) in Mindanao in cooperation with LGUs, farmers associations, and other government institutions. In the Visayas, ICRAF, and LSU/Cornell University are involved. "In Northern Luzon, farmers are planting trees because of the demand for wood by a private company," the team reported.

"Farmers like tree-based farming systems. It makes the soil fertile, the environment cooler, and it increases their income," Predo and Francisco replied. The farmers also said this system is a good investment for their children. However, some farmers are hesitant to adopt this system because of small farm size, lack of capital, and lack of access to planting materials.

But with proper policies, good governance, and support, it's not impossible for farmers to plant trees for a better future.

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Acacia mangium
Photo from www.forest.go.Th/Private/images/mangium02.jpg

Screening viral arthritis in chicken

by Rita T. dela Cruz

Viral arthritis (VA) also known as "tenosynovitis" or "reovirus infection" is characterized by swelling and stiffening of joints in chicken and is caused by viral infection.

Drs. Ma. Suzanneth Lola, Calcita Morales, and Rosemarie Antegro of the Bureau of Animal Industry (BAI), were able to develop a reovirus antigen that could detect viral arthritis agent in chickens.

Arthritis is not only common to humans, it's also prevalent in chicken. In fact, it is one of the many viral diseases common in poultry production. Viral arthritis (VA) also known as "tenosynovitis" or "reovirus infection" is characterized by swelling and stiffening of joints in chicken and is caused by viral infection.

The disease is attributed to reovirus strain *WVU 2939*. Reovirus is a virus that contains double-stranded RNA and is associated with various diseases such as pericarditis, hydropericardium, pasting, malabsorption and femoral headnecrosis. It is usually found in meat-type chickens particularly those between 4 to 8 weeks of age.

VA is marked by inflammations of both the flexor and the lower part of the leg (extensor tendons) causing lameness and thereby restricting body movements. The diseased portion is manifested by the swelled tendon, which is easily examined in one or both legs.

When the infection becomes chronic, tendonitis persists and could lead to the rupture of gastrocnemius muscle. Meanwhile, in mild cases, swelling only affects the flexor tendons of the chicken causing no severe pains and limping.

The mortality rate of chickens infected with VA is under 1% but it may increase to 10% because of the lack of effective means to screen and monitor this kind of infection.

The incidence of the disease varies according to areas affected. Outbreaks occur when the synovitis (a clear viscous fluid that lubricates the linings of joints and the sheaths of tendons in chickens) is damaged.

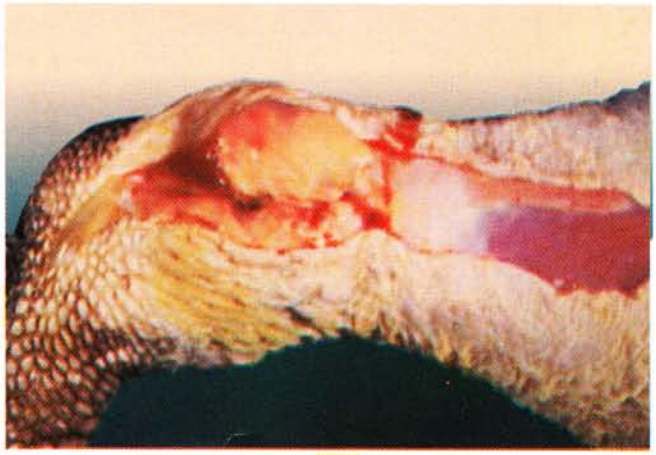
Dr. Ma. Suzanneth Lola, Dr. Calcita Morales, and Dr. Rosemarie Antegro of the Bureau of Animal Industry (BAI), were able to develop a reovirus antigen that could detect viral arthritis agent in chickens. An antigen is a substance, usually protein, on the surface of a cell or bacterium that stimulates the production of antibody. Having assessed the value of this screen tool, the group studied its efficacy through Agar Gel Precipitation Test (AGPT). The efficacy of the AGPT was determined using two important factors: the *sensitivity* of the test in giving positive result to the diseased animal and the *specificity* to give a negative result to a healthy animal.

To determine if the reovirus antigen is effective in terms of the sensitivity and specificity parameters, the researchers used three farms each having six chickens as samples. A total of 24 serum samples was collected and evaluated using AGPT. Serum is the fluid that separates from clotted blood, similar to plasma but without clotting agents. The result of the tests gave 100 % specificity and 100% sensitivity to AGPT. Thus, the field test showed that the reovirus antigen developed by BAI proved to be effective as screening diagnostic tool for VA.

This technology is part of BAI's disease diagnosis and surveillance program and greatly contributes to the local poultry industry. Moreover, since the cost of production is low and the availability of materials is immediate, the reovirus antigen aside from its proven efficacy is practical and economical. It was found that a milliliter (ml) of the prepared antigen could be used for 60 tests.

This technology was one of the R&D paper entries during the 14th National Research Symposium, which is being annually coordinated and facilitated by the Department of Agriculture (DA) through the Bureau of Agricultural Research (BAR). It won the AFMA Best R&D Paper Award under the Animal and Veterinary Science-downstream category.

For more information about the reovirus antigen, please contact Ma. Suzanneth G. Lola, Calcita M. Morales, and Rosemarie N. Antegro at Philippine Animal Health Center of the Bureau Animal Industry (PAHC-BAI) or you may call them through these numbers: 927-0971, 926-6883 or fax at 920-0429.



Chicken part infected with reovirus
Photo from www.poultrymed.com

Screening flocks for antibodies using locally produced antigen

by Rudyard R. Roxas

Screening breeder flocks for traces of antibodies is important in poultry management. This helps poultry raisers develop the right vaccination program for controlling the spread of diseases such as Infectious Bursal Disease (IBD). The Department of Agriculture Regional Field Unit (DA-RFU) 7 evaluated the sensitivity of their IBD antigen by comparing it with the expensive imported antigen available in the market.

To screen or not to screen

From the backyard-type growers to large-scale commercial producers, poultry production is steadily growing in the country. Its production from January to September last year was pegged at P40.3 billion--14.46% higher in gross receipts than in 2001. Gross receipts from chicken alone grew by 5.24% as a result of expanded production.

Increase in broiler production and higher inventory of native chicken accounted for the subsector's 15.43% increase in total agricultural output.

Range-type upgraded native chickens are preferred over imported exotic breeds due to their ability to reproduce regularly and to withstand harsh tropical climate with the least care and management.

Despite their inherent good qualities, native chickens must be screened for presence of diseases or viral infection, such as IBD (otherwise known as Gumboro disease) a contagious disease affecting young chickens.

Since its first appearance in the early 60s, Gumboro disease is considered as an economically important avian disease that affects chickens' growth and reproduction. This spurred the Viral Laboratory of the DA-RFU 7 in Cebu City to develop a local IBD antigen for screening broilers for antibodies against IBD virus (IBDV).

How the disease develops and spreads

The virus' incubation period is very short. Once infected, IBDV attacks the chick's actively dividing B-lymphocytes especially in the bursa of Fabricious, the globular shaped organ responsible for disease protection in young birds and maims the immune system.

Depending on the age of chicken, IBD takes on two forms: clinical and subclinical. Infected chicks two weeks old and above manifest clinical signs or observable characteristics within 2 to 3 days of infection. These signs are presence of whitish, watery or mucoid diarrhea in the flock; soiling of vent feathers and listlessness; and dehydration with poor feed conversions.

Infected broilers 1-14 days do not manifest observable symptoms like watery diarrhea, soiled or unkempt feathers and prostration. This subclinical infection leads to suppression of the chicks' immune system. Without a functioning immune system, they are prone to secondary diseases such as E. coli infection, Marek's disease, gangrenous dermatitis and inclusion body hepatitis.

The disease is highly contagious and could spread rapidly among infected and susceptible birds through contaminated feeds, water, litter or utensils. Initial outbreak of the disease is usually most severe and subsequent outbreaks in succeeding broods are often unnoticed. Morbidity approaches 100% and the mortality is from 20 to 30%.

Antigen from embryonated egg

Using the Agar Gel Precipitation Test (AGPT), a four-man research team composed of R.B. Cabeliña, D.B. Capuno, V.G. Batoy, and E.D. Togonon of the DA-RFU 7 Viral Laboratory evaluated the sensitivity of the IBD antigen extracted from chicken eggs.

The antigen was produced using ten 11-day old embryonated chicken eggs. After disinfecting the eggs, a 0.1 ml IBD field isolate was injected on each egg through an air space on the membrane.

Inoculated eggs were incubated at 37ŞC for five days. The eggs were checked daily for dead embryos, which were discarded after 24 hours following inoculation. On the fifth day of incubation, the eggs were chilled (4ŞC) overnight.

The produced antigen from the egg membrane was extracted. The harvested IBD antigen costs PhP 2,189.75/ml as compared to the PhP 10,200/ml of imported antigen.

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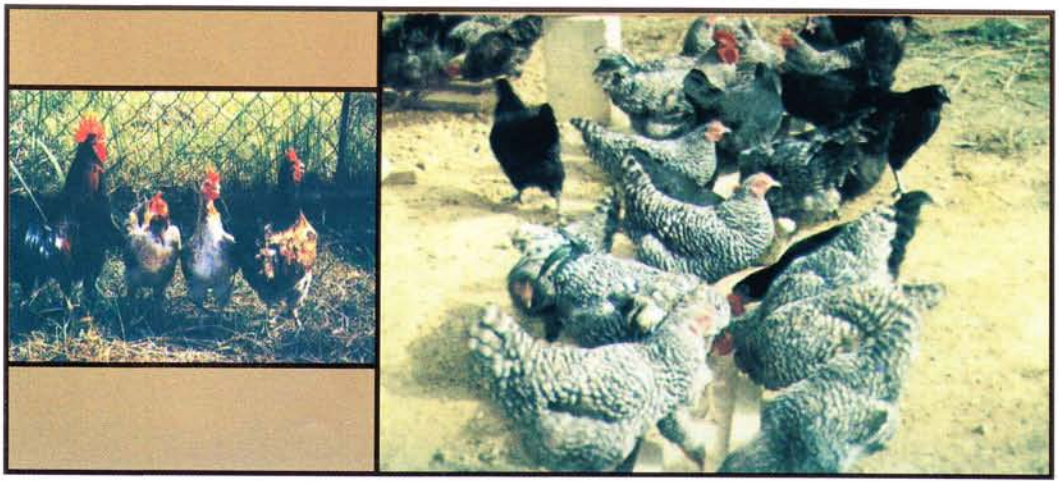

Diversity of Eucheuma and Kappaphycus seaweeds

by Thea Kristina M. Pabuayon

The Philippine seaweed industry has come a long way since its first export venture in the 70s, and today, is one of the world's leader in the production of carrageenan-producing seaweeds.

Carrageenan is an important powder derived from processed seaweeds and is used as enhancer, binder, thickener, and fat, foam and emulsion stabilizer in milk water food products, cosmetics, pharmaceuticals, and other non-food products.

In the Philippines, the seaweed industry is successful due to the large-scale cultivation of *K. alvarezii*, a kappa-carrageenan-producing species, and *E. denticulatum*, an iota-carrageenan-producing species. According to the Bureau of Fisheries and Aquatic Resources, these species are the most economically important seaweeds in the country, and ranks third among fishery products in export returns.

Although these seaweeds are very important commodities, little is known about their genetic diversity. With the support of DOST, PCAMRD, and UNDP, Dr. Arturo O. Lluisma of the Marine Science Institute in UP Diliman headed a team of scientists to investigate the different *Kappaphycus* and *Eucheuma* cultivars found in the Philippines and compare their commercially important characteristics such as growth rates, yield and quality. His study won an AFMA Best R&D Paper Award in the 14th National Research Symposium organized by the Bureau of Agricultural Research in 2002.

According to Lluisma, the industry can fully utilize and conserve these seaweeds if their cultivar-specific characteristics are known. "Accurate identification is needed in the carrageenan industry as some commercially important characteristics, like carrageenan yield and quality, may be species- or even strain-specific," Lluisma explained. "Our findings expand the known genetic base that can be exploited for improving these seaweed crops," he adds.

The seaweed investigation

Dr. Lluisma and his team collected 11 cultivars of *K. alvarezii* and three cultivars of *E. denticulatum* from farming areas in northern, central and southern Philippines. To investigate the genetic diversity of the two seaweeds, the team used Random Amplified Polymorphic DNA (RAPD) technique--a tool developed for the analysis of genetic fingerprints--for all 14 cultivars, and sequence analysis of the rbcL gene and rbc spacer for selected *K. alvarezii* cultivars.

Based on morphological and molecular analyses, the scientists found that the *K. alvarezii* cultivars were more genetically diverse than *E. denticulatum*, as revealed by the high polymorphism of the RAPD fingerprints. However, the three *K. alvarezii* cultivars also had low sequence divergence in both rbcL and rbc spacer regions, consistent with findings of previous research on other red algae. According to the scientists, the rbcL and rbc spacer sequences among the *K. alvarezii* cultivars were "highly conserved". "The sequences formed a tight group in phylogenetic trees, indicating that the Kappaphycus cultivars are closely related and quite distinct from Eucheuma species," Lluisma explained.

Based on morphological and molecular data, "Sacol", a fast-growing variety of *K. alvarezii*, emerged as the most divergent, though still closely related to the other Kappaphycus cultivars. The scientists pointed out, however, that since their cultivars were collected from three sites only, it is likely that their study revealed only a fraction of the actual diversity of the country's Kappaphycus and Eucheuma genetic resources. According to them, "the extent of diversity of the cultivars used by farmers in the different regions of the country remains to be evaluated."

In this regard, the scientists recommended further studies. They believe that a full inventory of these genetic resources will not only make possible the optimal use of these resources but perhaps more importantly, ensure their conservation as well.

Source: Genetic diversity of Kappaphycus and Eucheuma cultivars in the Philippines by Arturo O. Lluisma, et al. For more information, contact Dr. Lluisma at Tel. no. 922-3959 or 9205301 local 7427, or email him at aol@upmsi.ph.

E. denticulatum

K. alvarezzi (brown)

K. alvarezzi (green)

Microworms : The perfect live feed for grouper fry

by Junelyn S. de la Rosa

A new feed alternative for fry or larvae of the orange-spotted grouper *(Epinephelus coioides)* is the microworm *(Panagrellus redivivus)*. Microworms are tiny, nutritious and easy to culture hence, are better substitutes for the commonly used rotifers *(B. plicatilis)* and brine shrimp *nauplii* which require more labor and have become increasingly expensive to produce.

Microworms are free-living nematodes measuring 0.5 to 2.0 mm in length and 0.05 mm in diameter. Since they are very small, microworms can be fed to fish that are too small to take a brine shrimp *nauplii*. They are white, unsegmented and move continuously. The tail end is pointed while the mouth end is more rounded. They multiply easily in vast numbers and live for six to eight hours in freshwater, by which time they should all have been eaten.

Microworms reproduce sexually. The males have a curved tail, are smaller, more slender, and less numerous than the females. Microworms are very prolific producing 10 to 40 larvae every 1 to 1.5 days for a 20 to 25 day life span. On the average, each female produces 300 young. The young sexually matures in three days and grow three times larger during the first day and five to six times larger in the next three days.

It has the same or more nutrients than *Artemia nauplii* containing 48% protein, 21% lipids, 7% glycogen, 1% organic acids, and 1% nucleic acids. Approximately 70% of the lipids are fatty acids while 30% are phospholipids.

Cultured since the 1930s, microworms are suitable for some larval shrimps, aquarium fishes and carp species such as the bighead carp, marine fish larvae and Asian catfish larvae.

Microworm culture

Microworms are easy to culture. They can be cultured in a shallow, flat, watertight container using a moist paste of powdered oats and saline water at a 4:10 ratio. The mixture should have a very thick paste-like consistency. Five grams of baker's yeast is dissolved in 65 ml of saline water and five ml of the yeast solution is added to the culture media every 7 days.

The culture media is kept moist by adding 5 ml sterilized saline water daily. The containers are incubated in open shelves at 20°C for 10-14 days and covered with gauze to keep insects away.

Microworms can withstand temperatures below 32°F but can reproduce more under higher temperatures; however, cultures last longer at lower temperatures. The microworms feed on the yeast and bacteria produced from the oatmeal. After 3 to 7 days, the surface of the media glisten with the movement of the microworms, and they start climbing up the sides of the container.

Harvesting the microworms

The microworms are harvested after the incubation period (10-14 days). Into each container is added 4 liters of pre-aerated chlorinated seawater and strained twice using two kinds of sieves (300 and 150μm). The sieved mixture is allowed to settle for three hours after which three-fourths of the water is siphoned out.

The mixture is centrifuged at 5000 rpm for five minutes to concentrate the

nematodes. After discarding the liquid on the surface, 50% sugar solution is added to the precipitate and centrifuged again to separate the nematodes from the debris. The nematodes that float are scraped off and rinsed several times with chlorinated seawater. The collected nematodes are suspended in water from which samples are taken. The clean nematodes are then fed to the grouper fry.

A more cost-effective way of harvesting the microworms is by simply scraping them from the sides and top of the container. A paint-stirring stick laid on the media provides additional surface from which to harvest. The 8" x 12" culture provides a harvest of approximately 1 to 1-1/2 teaspoons of microworms daily for three weeks or more.

Maintaining the culture

The surface of the culture should be stirred every week to maintain production. As the yeast utilizes the oatmeal, the mixture becomes thin and soupy, although the production of the worms remains the same. A piece of sponge can be placed on the media to soak up

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Produce quality tilapia the cheap and easy way

by Thea Kristina M. Pabuayon

Counter-clockwise from top: a. Tilapia seeds grown in ponds. b.Tilapia eggs being harvested in a local fish farm. c. Tilapia seeds from a local breeding farm. Photos from www.tilapiaseed.com and www.aquaculture.ph.

For the past decade, the Philippine aquaculture industry has been continuously growing, with tilapia as one of the more popular species.

Dubbed by fishery experts as "aquatic chicken", worldwide production of tilapia even surpassed that of salmon, shrimp or mussel species in 1999, reaching 1.6 million MT.

In that same period, the Nile tilapia *(Oreochromis niloticus)* accounted for 80% of that growth, while the Mozambique tilapia *(Mossambicus L.)* came in close at 45,000 MT. In 2000, the Philippines' tilapia production was 75,000 MT.

The popularity of tilapia can be attributed to a number of characteristics that make it suited for a wide range of aquaculture systems. According to fishery experts, it eats anything and is prolific. Likewise, it has been known to resist parasitic infections and various diseases. By being "euryhaline" or salinity tolerant, the tilapia can also be cultured in brackish waters. This practice can help avoid the conversion of croplands to aquaculture, and alternatively, saline lands too salty for crops can be used to build tilapia ponds.

According to Dr. Zubaida Basiao of the Southeast Asian Fisheries Development Center (SEAFDEC), fish farmers in the Philippines depend on centralized distribution centers for improved fish seeds. Basiao observed that most of the genetic improvement programs undertaken in the Philippines (and other Southeast Asian countries) are large scale, with dispersal done through national fishery agencies, foundations, research institutions and universities.

However, as the tilapia industry has grown, breeding farms fail to supply fish farms the needed seeds to meet increasing market demands. Moreover, the seeds are of low quality, with farmers complaining of poor survival rates among young fish and low growth and fertility.

Likewise, "the diversity of locally domesticated breeds is threatened by the national or international promotion of relatively few superior strains of fish," Basiao adds.

The cheap and easy way

Together with Dr. Roger Doyle of the Dalhousie University in Canada, Basiao embarked on a project that proposed a small-farm, low-cost selection program as a means to make genetic improvement sustainable in the private sector and make local breeds affordable, while maintaining genetic diversity of aquaculture species. Aside from these features, the selection program is done with farmers' participation.

This program would have its advantages. "This farmer-oriented approach to developing multiple breeds of fish may prove more effective in meeting the farmers' needs instead of supplying them with improved seeds from a centralized source. Likewise, developing multiple breeds would also enable genetic diversity to continue to evolve at the breed level," Basiao explains.

In their study, Basiao and Doyle employed mass selection, which according to previous studies, is the cheapest and simplest procedure to teach farmers. Scientists modified the mass selection technique with the collimation technique to improve the fish's quality and vigor. Collimation is a repetitive

next page

Produce ...continued

process wherein the fingerlings are graded according to size and the largest fry are selected and used for spawning. In this study, the scientists graded the Nile tilapia fingerlings at a very early stage before rearing them in hatchery ponds.

Mass selection and progeny testing

Basiao conducted the study in a 3 ha tilapia nursery farm in Calauan, Laguna. The Nile tilapia being used by farmers was used as test fish.

The scientists randomly chose and spawned 100 pairs of tilapia breeders in a *hapa* cage. The females measured 106.58 mm (length), 6.06 mm (diameter) while the males were 114.92 mm (length) and 7.46 mm in diameter. After 15 days the breeders were removed while the fry were reared for three weeks in the same cage.

After three weeks, 5000 fingerlings were graded into three size groups: size 24 (16 mm), size 22 (23 mm) and size 17 (37 mm). Size 24 and size 22 fingerlings were reared in another nursery pond for eight more weeks.

After eight weeks, the fishes were again measured. The largest fishes (522 total) measured 85.59 mm in length and 33.89 mm (diameter). The largest fishes were labeled "selected line" while fishes measuring close to the mean 72.29 mm (length) and 2.16 mm (diameter) became the "unselected control line". The "unselected control line" fishes were fin-clipped for identification. All fishes were grown together for 12 weeks in the nursery pond.

When the fishes were mature and their sex already distinguishable, the scientists again selected 100 biggest males and 100 biggest females and labeled them "selected breeders". The same number of mean-sized males and females were chosen as "unselected control breeders".

Then, for four weeks all the males were grown together in one cage, while all the females were also grown together in another cage.

After a month, the selected males (134.55 $\pm$ 5.63 mm) and the selected females (118.05 $\pm$ 7.26 mm) were spawned together in one cage while the control males (118.39 $\pm$ 4.53 mm) and females (101.55 $\pm$ 5.93 mm) were also spawned together in a separate cage.

Results showed that fishes produced by using this cumulative technique were much bigger with a difference of 16.16 mm or 2.87 mm for males and 16.50 mm or 2.27 mm for females.

"The fingerlings of the selected parents were divided into four groups, size-matched with the fin-clipped control fingerlings (same to within 1 mm). Each group was grown in a separate cage."

"On farm genetic improvement and conservation of aquatic breeds should be viewed as a good option for long-term preservation and natural improvement of existing breeds. It is an option that fisherfolks can easily relate to," says Basiao.

After the initial size-matching, the scientists measured all fishes monthly for three months.

According to Basiao, the positive response after one generation of selection is highly significant. Between the selected and control lines within cages, the mean difference increased from 6.79% in the first month, then 8% in month two, and eventually to 9.25% in month three. In addition, the mean pair difference is 6.00 mm or 7.26%.

Striking a balance

Because of the promising results of this modified mass selection technique, tilapia farmers can look forward to producing bigger fishes the cheap way.

"On farm genetic improvement and conservation of aquatic breeds should be viewed as a good option for long-term preservation and natural improvement of existing breeds. It is an option that fisherfolks can easily relate to," says Basiao.

Basiao encouraged aquaculture research to consider local knowledge in drafting breeding programs for small-scale farmers, which they employed during their research. According to her, our fish farmers already have the knowledge and skills and are more familiar with the environment where they raise fish. "Farmers are scientists, too. They have been developing, testing and adopting their own technologies even before the emergence of a new breed of an elite class of international and national aquaculture experts, specialists, and technicians," says Basiao.

"Researchers who will develop genetic programs for subsistence aquaculture should learn to strike a balance between their theoretical and scientific knowledge and that of farmers' practical and local knowledge," Basiao adds.

Sources: Farm-based approach to tilapia broodstock improvement in the Philippines by Zubaida U. Basiao. Winner in the 14th National Research Symposium of the Bureau of Agricultural Research; Basiao, ZU and Doyle RW 1999; Test of size-specific mass selection for Nile tilapia, Oreochromis niloticus L., cage farming in the Philippines. Aquaculture Research 30:373-378. For more information, you may e-mail Dr. Basiao at zed@compass.com.ph or zbasiao@aqd.seafdec.org.ph.; www.globefish.org; Marid Agribusiness Digest, Vol. 13. No. 9. January 2003.

Mixing ...continued

these mixtures due to the, "barrier effect of resistant plants as these differ in their resistance to single virus genotypes or to unspecialized variants in the field."

Furthermore, Pedroso claims that by planting both resistant and susceptible cultivars in equal proportions in the field, resistance could easily be overcome. By adding two or more resistant cultivars in a mixture, farmers may hinder disease development since bigger areas of susceptible cultivars will be reduced with more areas of resistant components. She further claims that all plot mixtures of two, three and four cultivars, equally hindered the development of tungro.

With these findings, the scientists could easily say that indeed, cultivar mixtures can significantly reduce the incidence and severity of tungro under field conditions.

Although the performance of these mixtures vary depending on the amount of inoculums and weather conditions, the scientists claim they can be more effective in wider scale planting, citing the case of the rice blast control in China as a key example.

In terms of cost, Pedroso claims that cultivar mixtures may appeal to farmers since these are not prohibitive. Aside from reducing infection, the yields obtained from the mixtures are often higher than that of the individual components. However, farmers must see to it that appropriate combinations of mixture components are used to ensure effective tungro management.

In terms of mixtures, Pedroso recommends the mixture of three cultivars as the best option to reduce tungro infection. This mixture needs to be planted at a distance of 20 x 20 cm between rows and between hills.

The scientists recommend that a nationwide program on testing and deployment of cultivar mixtures be implemented as soon as possible given the continuing damage caused by tungro to date. Accordingly, "this program would save millions of pesos worth of rice losses due to tungro disease every year," Pedroso concludes.

Source: Effectiveness of mixtures of rice cultivars with different types of resistance for management of tungro disease by Jocelyn Pedroso and Avelino Raymundo. Disease Management article at www.philrice.gov.ph. For more information, you may contact the authors at 062-992-4280, College of Agriculture, Western Mindanao State University, Zamboanga City and 049-536-2617, Department of Plant Pathology, UPLB.

Screening ...continued

Assessing the flock

A good immunization program involves formulating a vaccine with just the right dosage and administering it at the right time when the maternal antibodies are waning. The timing of broiler vaccination depends on the level of maternal antibody present in the chicks. High levels of maternal antibody at the time of vaccination neutralize the vaccine virus. This is the reason why an assessment of the breeder flock is important.

The most common and reliable means to assess breeder flocks are the ELISA and the AGP assay.

The ELISA (Enzyme-Linked Immunosorbent Assay) is the most commonly used serological test for evaluating IBDV antibodies in poultry flocks. While this method produces rapid results and is less costly in terms of man-hours, it has its setbacks in terms of availability and high cost of reagent.

Meanwhile, AGPT is also usually adequate, is relatively cheap and can be easily performed using standard laboratory equipment.

The AGPT also known as Ouchterlony technique, Agar Gel Immuno Diffusion Test (AGIDT) or double immuno diffusion test involves the diffusion of antigen and antibody through an agar gel matrix.

Detecting antibodies using a known antigen (or detecting antigens using a known antibody) is as simple as looking for a precipitation line that forms in the gel. Precipitation occurs because each antibody can bind into more than one antigen and each macromolecular antigen can be bound by more than one antibody.

By any means, the information collected from any of these methods indicates the flock immunity level from which the proper immunization program for both breeder flocks and progeny will be developed.

The produced antigen was found to be sufficient to the needs of Regional Diagnostic Laboratories and at the same time the study established a profile on the susceptibility of native chickens to IBD to help farmers and the poultry industry.

Immunization is an important part of the IBD control program. With the development of a local IBD antigen, people in charge of laboratories and poultry farms can formulate an effective breeder and broiler vaccination program for range-type native chickens.

Sources: *Evaluation on the Sensitivity of DA-RFU 7 Produced Infectious Bursal Disease Antigen.* R. B. Cadeliña, D. B. Capuno, V. G. Batoy and E. O. Togonon; Data on poultry production obtained from the DA websitehttp://www.da.gov.ph/welcome.html; *Agar Gel Precipitation Assays*: 'Gezondheidsdienst voor Dieren' (Animal Health Service) website http://www.gddieren.nl/pages/English/elab/diagnost/elagar.htm

Microworms ...continued

the excess moisture. Eventually, as the oatmeal is exhausted, reducing the nutrient supply for the yeast, the harvest of microworms diminishes and a new culture should be started.

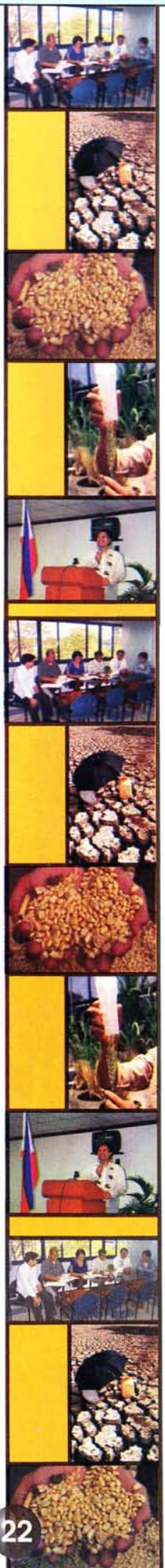
Feeding the grouper fry

The grouper larvae could be fed with microworms as early as three days after hatching. Optimum feeding density is 75 nematodes for every milliliter. Scientists say that nutritionally-enriched nematodes did not significantly improve growth and survival of the larvae.

This means that local fish breeders can culture microworms at home instead of buying expensive fish feed or supplements and be sure that their grouper fry are getting the nutrients they need.

Indeed, fish breeders should try microworms as a better alternative for grouper fry. It is inexpensive, readily available and easy to raise and most importantly new fry and small fishes love them.

Source: Free-living nematode (Panagrellus redivivus) as alternative live feed for grouper (Epinephelus coioides Hamilton) larvae by Ofelia Reyes, Marietta Duray, Corazon Santiago, and Manuel Ricci of Southeast Asian Fisheries Development Center (SEAFDEC), SEAFDEC-AQD and Biotechnologie, B.T., Pantalla di Todi, Italy; Microworm Culture for Aquarium Fish Producers by R.W. Rottmann. This document is Fact Sheet FA-9, one of a series of the Department of Fisheries and Aquaculture, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. October, 1988. Please visit the FAIRS Web site at http://hammock.ifas.ufl.edu.



JANUARY

Philippine biotech moves forward

The Department of Agriculture (DA) together with the Bureau of Plant Industry (BPI) and other DA agencies held the first meeting of the DA-Biotechnology Advisory Team on January 2003. The team met with representatives from BPI, Bureau of Agriculture and Fisheries Products Standards (BAFPS), Bureau of Animal Industry (BAI), and Fertilizer and Pesticide Authority (FPA) to discuss AO No. 8 or the "Rules and Regulations for the Importation and Release of Plants and Plant Products Derived from the Use of Modern Biotechnology."

P.3M support for plant genetics and seed system proposed

The Bureau of Agricultural Research (BAR) proposed an allotment of P300,000 to support the development of plant genetics and seed system in the regions. The proposed amount is part of the basic institutional grant of P5 million, awarded by BAR to each regional research center in support of infrastructure and human resources development. According to BAR, it is time to push such initiatives since many big national and international research institutions have adopted saving biodiversity and conserving plant genetic resources as core of their research and development agenda and programs.

GSDP strengthens grain sector

The Bureau of Agricultural Research (BAR) created the Grains Sector Development (GSD) Scholarship Program, which cover master of science (MS) and doctor of philosophy (PhD) degrees. The GSD is given to researchers from the Department of Agriculture (DA) Regions 2, 5, 7, 10, 12, Autonomous Region of Muslim Mindanao (ARMM), and leading state colleges and universities (SCUs) such as University of Southern Mindanao (USM), Central Mindanao University (CMU), and University of the Philippines Los Baños (UPLB).

Lorenzo envisions a dynamic corn industry

Department of Agriculture Secretary Luis P. Lorenzo gave an inspirational message during the 1st Annual Philippine Corn Symposium and Planning Workshop held at Montevista Resort, Pansol, Calamba City, Laguna on January 15-17, 2003. In his message, Lorenzo said that he would like to see the results and the resolutions proposed during the workshop translated into doable common sense objectives. He also discussed Philippine agriculture in relation to the global market, the six commodities his administration is focusing on, and the need for practical applications of scientific researches and establishing linkages.

Scientists, leaders discuss El Niño

The Unites Nations Economic and Social Commission for Asia and the Pacific-Coarse Grains Pulses Roots and Tubers (UNSCAP- CGPRT) Center, the Bureau of Soils and Water Management (BSWM), and Farming Systems and Soils Research Institute (FSSRI) of the University of the Philippines Los Baños (UPLB) organized the, "In-Country Seminar on El Niño Impacts and Strategies." This was held at BSWM, Diliman, Quezon City on February 7, 2003.

BAR, ASTI collaborate

The Bureau of Agricultural Research signed a memorandum of agreement (MOA) with the Advanced Science and Technology Institute (ASTI) on January 29, 2003 at the UP Technology Park, Diliman, Quezon City. The MOA provides for a joint project on the "Development of a High-Performance Research and Education Network (The Philippines' Research Education, and Government Information Network or PREGINET)," funded by the Department of Science and Technology (DOST).

Postharvest restructures networks and subnetworks

The Bureau of Agricultural Research (BAR) issued a memorandum to restructure the National Postharvest, Food Science and Nutrition Network (PFSN) and transform the Grains Postharvest Subnetwork into the National Product Quality Systems Sub-network (PQSN) and Postproduction Network (PPN). The restructuring involved significant changes on the network composition and priority programs.

FEBRUARY

BAR director sets 7-point agenda

Dr. William C. Medrano, the new Bureau of Agricultural Research (BAR) director, formally assumed office on February 17, 2003. Medrano succeeded Dr. Eliseo R. Ponce who started as BAR director in 1998. With his seven-point agenda, Medrano is intent on having BAR play a more proactive and dynamic role with urgency to realize President Macapagal-Arroyo's mission of a modernized Philippine agriculture.

BAR strategically charts plan for 2003

The Bureau of Agricultural Research strategically mapped out its plans for the first quarter of the year through an evaluation and planning workshop on February 6-8, 2003 in Calamba, Laguna. The Bureau evaluated its performance and discussed its resource allocation to provide clearer options in the prioritization of programs and activities given the limited funding for research and development.

Luzon Zonal Research Center readies for action

The Luzon Zonal Research Center for Agriculture (ZRCA) held its first quarter meeting for 2003 in Lucap, Alaminos, Pangasinan. Department of Agriculture Regional Field Unit (DA-RFU) II and the Cagayan Valley Research Integrated Agricultural Research Center (CVIARC) coordinated and organized the activity. The agenda included the finalization of the Zonal Framework Plan, conceptualization of zonal RDE projects common to all regions, planning zonal activities for 2003, and discussion of actions taken on identified issues during its last meeting in September 2002.

Medrano chairs CABI's executive council

The Philippines, represented by new BAR Director William Medrano, is the 2003 Chair of the Executive CAB International. Medrano succeeded former BAR Director Eliseo R. Ponce, who is the Philippines' official representative to CABI. CABI is a global technical agency that supports the generation, access to and use of knowledge for sustainable agriculture, environment management and human development.

MARCH

BAR undergoes reorganization, streamlines governance

Bureau of Agricultural Research Director William C. Medrano reorganized the Bureau's structure and staff assignments after several meetings with the Executive Committee (ExeCom) and meetings with Medrano's Council of Advisers. The new structure puts the Technical Assistance Group (TAG) composed of the Bureau's consultants, the Internal Control Unit (ICU), the Legal Unit (LU), the Executive Support Staff, the Public and International Relations Unit (PIRU), and the Policy and Planning Unit (PPU) under the Office of the Director (OD).

Likewise, the ten divisions were integrated and reduced to four: Program Development Division (PDD), Institutional Development Division (IDD), Knowledge Management Division (KMD), and Administrative and Finance Division (AFD).

Medrano meets key regional R&D officials

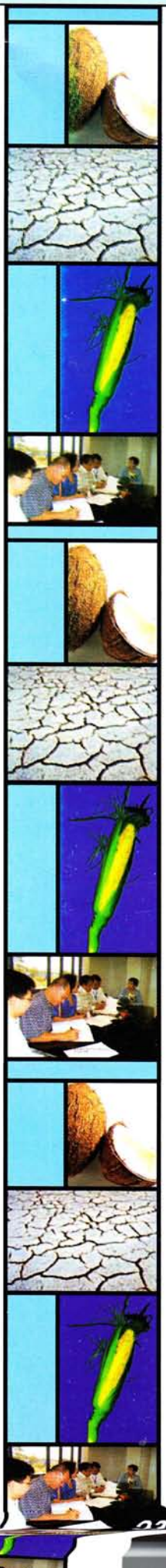
Bureau of Agricultural Research (BAR) Director William C. Medrano met with various regional R&D officers in a special R&D management meeting and presented and discussed his policy pronouncements particularly in the planning and implementation of regional R&D programs. According to Medrano, the policies are to improve BAR's efficiency and effectiveness in managing the country's R&D. This is part of the on-going reorientation of R&D officials following the change of leadership at BAR last February

ICTD, ASTI attend school on the internet

The Information, Communication Technology Division (ICTD) of the Bureau of Agricultural Research (BAR) joined the Advanced Science and Technology Institute (ASTI) in a virtual class lecture of the School On the Internet (SOI) Asia Project Realtime ASEAN Interaction. This internet-based lecture was viewed from ASTI Building, Technology Park Complex, UP Campus, Diliman, Quezon. BAR and ASTI viewed and participated in the on-going videoconference of several SOI Asia Partner Organizations. The topic of the videoconference lecture was, "IT Networking for Human Resources Development and Cooperation in ASEAN."

BAR attends GEF biodiversity indicators workshop

The Bureau of Agricultural Research (BAR), through Mr. Angel Morcozo, Knowledge Products and Services Division (KPSD) OIC and Ms. Ligaya Santos of the Regional Programs Division (RPD), joined the, "Philippine Inception Workshop of the GEP Biodiversity Indicators for National Use Project," at the Visitors Center, Ninoy Aquino Parks and Wildlife Nature Center, Diliman, Quezon. The Bureau of Fisheries and Aquatic Resources (BFAR) and the Protected Areas and Wildlife Bureau (PAWB) sponsored this workshop, which identified the key information needs and questions of decision-makers and users of biodiversity, designed monitoring systems for selected ecosystems, and produced a workplan for developing biodiversity indicators. The activity also served as a venue to enhance efforts in ensuring the sustainability and biodiversity of the country's marine and coastal resources.



Meet BAR Director William C. Medrano

Making his mark

by Virginia A. Duldulao

He looks back to see the road he traversed. It has been a rugged and stony way and he had no choice for there was no other way. Now he heaves a sigh of triumph and relief as he scans his surroundings. Could all these be true? The nine-year old boy who carried the burden of taking over where his father left off is now a man whose feet are firm on the ground, certain of what he wants, and whose vision is focused on a better tomorrow not for himself but for the greater majority of those who have less in life.

Today, on the shoulders of this man is a different burden, no longer mundane and personal, but on a wider scale and proportion and the responsibility is great. This time he is ready to carry that burden steadfastly and unfaltering. His preparation is solid. He is tempered by experience. He is inherently endowed with potentials and with faultless humility.

Dr. William C. Medrano, the once nine-year old boy who realized early the cruel meaning of poverty and experienced responsibility at a tender age is now one of the stalwarts of Philippine agriculture today. His stint as director of the Bureau of Agricultural Research (BAR) may be short but like those positions where he had been assigned through the years he will surely make a mark.

The relationship between Medrano and the Isabela State University (ISU) had been mutual. The ISU was his benefactor and training ground and in return he gave his school the best of his professional life. His school provided him job while struggling financially for his college education and he did not leave it for better opportunities after graduating cum laude but grew with it from instructor to the highest level of professorship. Even after finishing both his Master of Science and Doctor of Philosophy degrees from the University of the Philippines at Los Banos, his loyalty to ISU remained strong. He was chairman of the Department of Animal Science and director for Research, Extension, and Development.

When he was tapped to become the director of BAR, he was Professor VI at ISU and concurrently vice president for research, development, extension and training of the same university and director of Cagayan Valley Agriculture and Resources Research and Development (CVARRD) center. The consortium is composed of 17 government line agencies in Region 2. He was in the last position since 1991 to the present and for that period he brought prestige and honor to the consortium by capturing the Ugnay Award in 1998 and for three more consecutive years (2000, 2001 and 2002) from the Philippine Council for Agriculture and Resources Research and Development (PCARRD). His appointment to head a research institution at the national level was understandable since he was already moving about in familiar grounds.

Director Medrano shared his expertise and leadership to various institutions. He was livestock specialist to the Orient Integrated Development Consultants, Inc. from 1990 to 1996; team leader or member of projects by PCARRD, ISU Development Foundation, Inc., Commission on Higher Education, and the European Union-Department of Agriculture. He was either an author or co-author of technical papers published in various publications. He has gone to many places including that of Korea, Netherlands, and Australia, either to share what he knows or to learn some more. He has garnered many awards and citations as a student, professional and leader. Presently he is the president of PCARRD Scholars Association, the Philippine Society of Animal Science (Cagayan Valley Chapter) where he is a life member, and president-elect of the Philippine Association of Research Managers (PhilARM).

Learning is a lifetime endeavor for people who love to learn. Sharing one's knowledge is a commitment to those who realize that they can contribute something to make this world a better place to live in. Learning and sharing thrive best where humility is a virtue that is in the heart. Usually, people with the common touch manifest these attributes. And Medrano has that touch.

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