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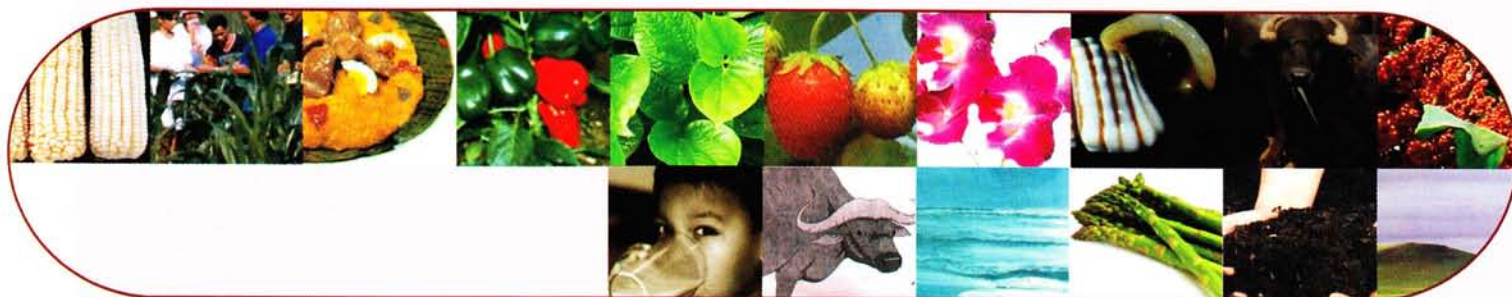
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The Changing Seasons

This is not a literary piece to extol the virtues and beauty of a wet and a dry season, for these are the only seasons that we have. If it is not the wet with its accompanying howling winds, rains on end for two or three days without any let up and which the farmers so much look forward to, then it is the dry with its familiar characteristics that we like or don't like.

It is strange that the seasons have meanings in different places and for different people. It is even stranger for someone to claim that there are virtues and beauty of a season even if there is no changing of colors from greens to reds and gold but only the caking of the soil to finally become a pungent dust where the feet make their imprint as one gingerly steps into it or that which a vehicle loosens and the passengers abhor, covering their nostrils. The hot season brings the discomfort and the smell, too familiar to understand that it is part of the season.

Seasons have come and go. The changing of the season also brings changes to the agricultural landscape in terms of the crop grown. Usually the wet season is the season for rice, the staple of nearly all Filipinos and so throughout the country, rice dominates the landscape and colors it green until it turns golden brown. Many of us assume that because there is plenty of water, the yield is more. On the contrary, more is harvested when the sun is hot and shining. Then finally when the grains are harvested, the field turns dull brown ready for another crop and for another view, for another meaning of life.

I have always enjoyed traveling the length from the city where I work to the place I call home, 12 to 13 hours by bus during daytime and a shorter number of

hours at night time, occasionally now. If I do not go to my home, then I travel where work would bring me. In these travels, my mind becomes more active taking in the sights, processing what is, what might, and what should be—impressions and imprints that are all mine. By the time I reach home, I burst with processed thoughts, only to subside when I am hugged tightly by my loved ones. In time the thoughts come back, like now, when one can become critical but sentimental on how things should really be.

Everybody grows old. Everything gets old— the infrastructures, the plants, the trees, the soil and everything on earth. The supposedly renewable resources like water get depleted. It is a blessing that the air we breathe is inexhaustible but it gets polluted. Can one imagine if the air we breathe is also non-renewable and we compete for it? Could these be the reasons why we have science? Science for the future? Science tries to stall the aging process; finds ways to ameliorate the declining and deteriorating resources; alleviate the destruction imposed by man on his environment. What if science can reverse the trend, from getting old to becoming young or even make the process stand still?

With science and the technologies it generates, has the life of the farmers we had been trying to serve all these years the same, better, or worse? The answer all depends on the person answering the question for he has his own viewpoints and frames of reference. But if we ask the farmers, again different farmers have different answers. When dealing with people, there can be no right or precise answer and due

to the very nature of the social sciences where the study of man belongs, one answer could be as correct or as wrong as the other. Be that as it may, we, who have been working in research through the years can firmly say that we are doing our best under the circumstances.

We cannot freeze the changing seasons, we glide in harmony with it and to say that we can do more with less is a paradox. There has to be enough for us to do the best.—VAD

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Scientist reveals amazing facts about coconut oil

The tree of life has undoubtedly invaded even the medical community. From its long-time tag as an export winner crop, coconut, particularly its oil, is now regarded by medical experts worldwide as a powerful tool against dreaded viral diseases such as Acquired Immune Deficiency Syndrome (AIDS), herpes, and Severe Acute Respiratory Syndrome (SARS).

This is just one of the astounding facts revealed by a well-respected Filipino doctor Conrado Dayrit M.D. (father of Health Secretary Manuel Dayrit) about the health benefits of the virgin coconut oil during the 53rd anniversary celebration of the Philippine Association for the Advancement of Science, Inc. (PhilAAS) held recently at the University of Santo Tomas, Espana, Manila. The event was supported by the Department of Science and Technology (DOST) and participated in by the country's leading health experts and medical practitioners.

Dr. Dayrit, who had embarked on the study focusing on the capability of virgin coconut oil to retard the development of AIDS among patients diagnosed with human immunodeficiency virus (HIV), claimed that the viral counts in 15 HIV-patients considerably decreased after giving them dosage of virgin coconut oil over 6 months.

The results of Dr. Dayrit's study on virgin coconut oil had also been instrumental in deposing the negative image against coconut oil, touting it as contributing to heart disease due to its high saturated fat content.

"The fat present in coconut

is lauric acid. It is NOT cholesterol," Dr. Dayrit stressed.

Lauric acid is a medium chain fatty acid (MCFA), which is converted into monolaurin when processed by the body. Monolaurin is used by human or animal to kill the lipid-coated viruses such as HIV, herpes, cytomegalovirus, influenza, and other pathogenic bacteria like *Listeria monocytogenes* infesting dairy cattle and poultry and *Helicobacter pylori* that causes peptic ulcer.

Dr. Dayrit explained that coconut oil is a more healthful choice over American brand cooking oils derived from corn, soybeans, sunflower, and canola.

"These cooking oils disguised themselves as vegetable oils and are found in shelves of most grocery stores, contain polyunsaturated fats. These fats are converted by the body to linoleic acid that depresses thyroid activity," Dayrit emphasized.

According to American endocrinologist Ray Peat, Ph.D., unsaturated fats block thyroid hormone secretion causing the body to slow down its metabolic rate. When metabolism is depressed, the body's tendency is to build deposits of high-fat fats resulting to weight gain.

"That is the reason why most Americans suffer from obesity and various heart ailments," Dr. Dayrit added.

Dr. Dayrit also disclosed another marvel of coconut oil as a "natural fat burner" and body's energy booster.

One remarkable thing about coconut oil is that it can help



Virgin coconut oil

one lose weight. Replacing the fat intake with coconut oil is one of the most efficient ways to lose excess body fats. This is because coconut oil is composed mostly of medium chain fatty acids that are easily digested and absorbed by the body. Coconut oil also helps the body pump up energy since its digestion is different from that of carbohydrates and proteins. MCFAs are not packaged into lipoproteins and do not circulate in the bloodstreams like other fats, instead they are sent directly to the liver where they are immediately converted into energy, Dr. Dayrit explained.

The health wonders of coconut oil include reduction of cardiovascular disease risks; prevention of bacterial, viral, and fungal skin diseases (ringworm and warts); and strengthening of the body's immune system against infections.

While the versatility of coconut oil is fast becoming popular, several government R&D agencies are eyeing on the potential of coconut oil as substitute for fuel and atmospheric antipollutant. **Mary Charlotte O. Fresco***, S&T Media Service)

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USM develops new corn varieties

Two new higher-yielding corn varieties with moderate resistance to downy mildew (*Peronosclerospora philippinensis*) and corn borer (*Ostrinia furnacalis*) are now available in the market. The University of Southern Mindanao (USM) in collaboration with Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) developed USM Var 9 and USM Var 14 which the National Seed Industry Council (NSIC) has already approved for commercial release.

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Corn is considered as the one of the most important crops (only second to rice) in the Philippines. However, corn production in the country has been declining over the years due to massive land conversion and shifting to other crops by farmers. Since 1993, the area harvested to corn continued to decline, with only an average of 2.63 million hectares from 1995 to 2000. Problems with pests and diseases also add strain to corn yield.

According to studies, the Asian corn borer infestation was observed to occur yearly in study sites and it has been increasing during the last 10 years. On the other hand, downy mildew was observed to be decreasing in some areas but in Cotabato, disease incidence is increasing. Losses due to downy mildew were recorded to be as high as 40%. El Niño also accounted for the drop in corn production, especially in 1998.

Though production is low, the demand is great as corn is used for feed formulations (60% of the total corn requirement) and human consumption, particularly in the Visayas region. It is also processed into starch crystalline sugar (dextrose), corn syrup, and refined corn oil. To augment the needed amount, the country has to import commercial corn grains, which makes the crop more expensive. To boost domestic corn production, efforts were put into genetic resource conservation, pre-breeding, population improvement,

development of special trait materials (like disease resistance), and open-pollinated varieties (OPVs) development. Farmers are encouraged to plant high-yielding new varieties like the OPVs instead of the low-yielding native ones.

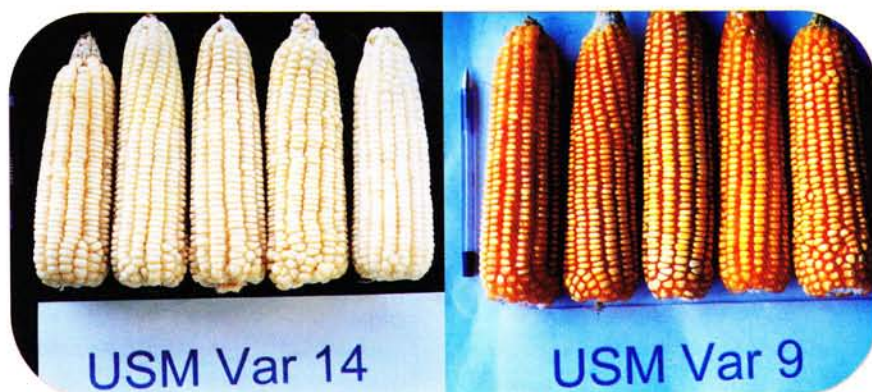
This need for new varieties led to the development of USM Var 9 and USM Var 14 at the USM Agricultural Research Center (USMARC) in Kabacan, Cotabato. According to USM researchers led by F.R. Alejandro, USM Var 9 and USM Var 14 are superior to the commercially available varieties. These varieties are what the Filipino corn farmers need.

The first step in the study was germplasm (breeding stock) collection and evaluation. The researchers gathered corn materials from CIMMYT and other private and public institutions, including USM varieties, and these were screened to see which of these were potential sources of

good breeding lines. Later, experimental varieties that resulted from random cross breeding were screened for downy mildew and corn borer resistance. The plants were tested for their grain yield and the CIMMYT formula was used in the computation of the total grain yield.

USM Var 9 was first coded as USMARC 99149 (with grain yield 6.10 t/ha) and was submitted to the National Cooperative Testing (NCT). At NCT, the variety yielded 5.63 t/ha, which was 1.8% higher than the national check USM Var 5 (5.53% t/ha). It yielded more than the check by 5.60% in Visayas and 5.50% in Mindanao and this made the variety qualify for regional commercial release. The NSIC later approved USMARC 99149 as a commercial variety for Visayas and Mindanao in 2001.

USM Var 14 with grain yield 6.20 t/ha, was first coded as USMARC 9902 upon submission to



➔ next page



Is the Balanced Fertilization Program working?

When the Balanced Fertilization Program (BFP) was introduced to corn growers in some areas of the Bicol region under the MAKAMASA Corn Program, it was aimed to provide a location-specific fertilizer technology to help increase farmers' productivity and income.

Has the technology delivered?

By: Ma. Lizbeth J. Baroña
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USM...

NCT. This variety yielded 4.78 t/ha in NCT, which was 1.05% better than the check USM Var 10/USM Var 8. It also yielded more than USM Var 10 and USM Var 8 by 4.42% in Luzon and by 6.59% in Mindanao. The results made USMARC 9902 for regional release in Luzon and Mindanao and was named USM Var 14 after NSIC approval.

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Gonzales, L.A. The Philippine Corn Industry Global Transition: Some Strategic Issues and Policy Directions. *Proceedings of the 1st Annual Philippine Corn Symposium and Planning Workshop* (1): 9-36 (2003).
Gerpacio, R.V. Setting Priorities for the Philippine Maize RD&E System An Application of the CIMMYT Methodology. *Proceedings of the 1st Annual Philippine Corn Symposium and Planning Workshop* (1): 9-36 (2003).

The Department of Agriculture Regional Field Unit (DA-RFU) in Bicol conducted a study to quantify the benefits and changes created by the program. Specifically, an economic viability analysis, or EVA, was conducted to measure the socio-economic impact of the program, and assess whether the program made a difference in the income level of the corn farmers.

The Balanced Fertilization Program (BFP)

The Department of Agriculture adapted the Balanced Fertilization Program in support of the *Gintong Ani* Program. This intervention provides a location-specific fertilizer recommendation of organic and inorganic fertilizers. It aims to minimize the effects of wide variations of soil and climate type.

The program gave guidelines for a strategic distribution of fertilizers to small farmers, ensure increase in crop yield, and provide a venue for cooperative efforts of fertilizer distributors. It was implemented in 15 corn clusters in Camarines Sur, Albay, and Masbate, during the 1999-2000 wet and dry

planting seasons. These areas are characterized by the four major corn production environments: acidic soil, calcareous soil, volcanic-affected soil, and fertile upland.

BFP vs. farmers' practice

The study used two treatments, the BFP and the standard farmers' practice in fertilization. The BFP included 300 kg of organic fertilizer, with 14-14-14 (complete) and two bags of 16-20-0 basal fertilizer, and 3 bags of 46-0-0 as top dress. The standard farmer practice had no inorganic, organic, or basal fertilizers, but it had two bags (14-14-14) for top dressing and 1 bag 46-0-0. These treatments were replicated in the fields with 10 farmers per cluster.

To ensure the proper implementation of the program, a corn-cluster technician from the local government unit (LGU) supervised all project activities.

During the wet season cropping of 1999 (WS-1999), a total of eight techno-demonstration trials participated in by 24 farmers were conducted in three major corn environments. During the dry season cropping between 1999 and 2000 (DS 1999/2000), techno demonstrations were done in all 10

Now, instant *paella* and *bringhe*

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For a rice-loving country like ours, rice-based recipes of foreign influence are a hit. Examples of these dishes are the *paella*, a rice meal introduced in the country during the Spanish era, and *bringhe*, a dish that traces its roots to India's *bringe*.



The long preparation of the dishes may have also contributed to their unpopularity in most households. They are, therefore, prepared and served only during special occasions. They are also expensive in restaurants, making the dishes out of reach for ordinary diners.

A study conducted by the Department of Food Science and Nutrition of the University of the Philippines Diliman and the Philippine Rice Research Institute (PhilRice) developed a process for quick-cooking-rice-meal-products (QCRMP) *paella* and *bringhe*.

Developing the QCRMP

The basic processes involved in the development of quick-cooking *paella* and *bringhe* include the preparation of the basal quick-cooking rice of *Malagkit Sungsong*, dehydration of the vegetables, preparing the textured vegetable proteins (TVPs) as meat substitute, formulation of the seasoning mix, mixing the ingredients, and rehydration of the QCRMPs.

The rice varieties used in the preparation of the quick-cooking rice (QRC) are the waxy *Malagkit Sungsong*, and IR 42. They were obtained from the Philippine Rice Research Institute (PhilRice) in Muñoz, Nueva Ecija.

The pre-drying procedures for vegetables involved washing, peeling, steaming, blanching, corn-starch coating, and dicing. Vegetables that have undergone these processes were then dehydrated using forced-air

convective dryer until a final moisture content of about 3-8% was achieved.

Textured vegetable protein (TVP) samples, ALIPRO 500 E and ALIPRO 500 CE were used to replace the meat in the formulated instant dish. ALIPRO 500 E, which is red was used as a replacement for chicken. ALIPRO 500 CE, brownish in color, was used as a substitute for smoked fish.

The use of TVPs as meat replacements gave rise to the need of making a flavoring mix to conjure up the chicken and smoked fish flavors. In addition, dehydrated onions, garlic, and tomato were also added to improve the taste.

The quick-cooking equivalents of *paella* and *bringhe* can be rehydrated by boiling in water for five minutes. QCRMP and water ratio is 1 to 1.5.

Sensory Evaluation

The developed QCRMPs were found to be equal, or better than their conventionally cooked counterparts during sensory evaluation. The rehydrated rice meals were found acceptable in almost all sensory attributes. In terms of appearance, the QCRMP appeared brighter and more colorful than the conventionally cooked dishes.

The QCRMPs were also judged to be spicier than the conventionally cooked dishes. The spicy taste was attributed to the use of concentrated forms of

seasonings. Adding the dehydrated onion, garlic, and tomato intensified the overall aroma and flavor of the rehydrated QCRMPs. Some micro-flavor enhancers were also added. These micro-flavor enhancers gave the spicy flavor of the formulated dish.

The QCRMPs were also described as creamier than the normally cooked dish. This was because of the quality of the rehydrating broths produced from the QCRMP seasonings and the rehydrating water. The QCRMP *paella*'s creaminess may have come from the blend of powdered tomato, the chicken flavoring, and the liquid or oil-based meat flavor concentrates. The QCRMP *bringhe* contained more ingredients in its rehydrating broth. It included coconut, curry, turmeric powder, oil-based smoked fish, and chicken flavorings.

In general, the QCRMP *paella* and *bringhe* were found to have more appealing taste and appearance than their conventionally cooked counterparts. The elitist appeal of the dishes will cease, as the study gave an opportunity for the food industry to produce convenience food equivalents of the traditional rice dishes.

Source: Home style quick-cooking rice meal products by Ma. Patricia V. Azanza, Irenei Camila V. Basman, Cathrina B. Tinsay, and Christy G. Tasarra, Department of Food Science and Nutrition, College of Home Economics, University of the Philippines Diliman, Quezon City. picture: www.batista.org.

Asparagus: A vegetable fit for kings

Asparagus (*Asparagus officinalis*) has delighted many a royal palate since the Middle Ages. Louis XVI liked it so much that he called it the "king of vegetables" and it has since been a favorite dish on the royal tables.



A member of the lily family, asparagus is eaten for its succulent shoots or spears which can range from pencil thin to about one half inch thick with thicker asparagus having more flavor than thin stalks.

It is very nutritious containing vitamins A, B and C, glutathione (an antioxidant) and is rich in potassium. Asparagus leads other vegetables as a source of folacin. A 5.3 ounces serving provides 60% of the recommended daily allowance for folacin necessary for blood cell formation, growth, and prevention of liver disease. Because it is rich in nutrients and fiber, asparagus is good for the kidneys, liver, and bowel.

More good news, asparagus is very low in sodium and calories, and zero in fat and cholesterol. Most of it is water (94 percent of its weight) and it has only 14 calories per 4 ounces per serving or less than 4 calories per spear.

Selecting the perfect asparagus

Asparagus is highly perishable and loses quality rapidly at temperatures more than 40°F. It is important to choose fresh, quality spears when you buy them in the market. Choose stalks that are bright green or white spears that are crisp, not limp, and have tightly closed tips. Limp and bruised spears taste bitter compared to fresh crisp ones.

Storing fresh asparagus

To preserve the nutrients of fresh asparagus, refrigerate spears upright with stem ends in water; or wrap cut ends in wet paper towels

or cloth, cover with plastic bag and refrigerate. Refrigerated asparagus keeps up to one week but is best if used within two days.

Spear toughening occurs rapidly at temperatures above 10°C. Bruised and broken tips can also result to toughening. Asparagus is sensitive to chilling injury after 10 days at 0°C. Symptoms of chilling injury include loss of sheen or glossiness and graying of the tips. Severe chilling injury may result in darkening near tips in spots or streaks. Freezing injury (water-soaked appearance leading to extreme softening) will likely result at temperatures of -0.6°C or lower.

Dr. Enriquez and his group at Kagawa University studied the physiological changes that happen when asparagus is stored for five days at 20 °C after harvest. They found that ammonium accumulated at the spear tip increased each day. The scientists said ammonium is considered toxic to plant cells and might be one of the reasons why asparagus is highly perishable.

They also found that at room temperature, asparagus quickly becomes tough and loses sugar content. Thus it is important to cook asparagus immediately if you don't have a refrigerator or to refrigerate them for only two days to preserve their nutrients and eat asparagus that tastes good.

Cooking asparagus

Break or cut the asparagus spears above hard, thick ends. Discard hard ends or

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use them to flavor soups. Classically, asparagus should be gently peeled from the tip down, especially the thicker stalks.

Asparagus can be eaten raw but is best when cooked. Steamed or simmered asparagus is served chilled or at room temperature as a salad, often with mayonnaise or other salad dressings. Served hot, it is generally dressed with olive oil or butter and offered as a first course or side dish. You can have them steamed or grilled or baked depending on your culinary skills and tastes. It does not matter how you cook them, what matters is that you give justice to this truly gourmet and healthy food.

Sources: 1. Postharvest changes in ammonium, glutamine synthetase and glutamate dehydrogenase in Asparagus spears during storage at 20°C by Fabio Gimena Enriquez, Toshiyuki Matsui, Pankaj Kumar Bhowmik, Haruo Suzuki and Kazuhide Kawada, Department of Bioresource Production, Faculty of Agriculture, Kagawa University, Kagawa, Japan
2. Green asparagus: recommendations for maintaining postharvest quality by Dr. Trevor Suslow, Department of Vegetable Crops, University of California
<http://rics.ucdavis.edu/postharvest2/>



betel plant

By: Rita T. de la Cruz
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The betel plant has traditional medicinal uses. In Malaysia, betel leaves are a cure for headaches, arthritis, and joint pains. In Thailand and China, the roots could relieve toothache while in Indonesia it is a good remedy for cough and asthma.

Betel has culinary uses as well. Its leaves are used for wrapping spiced minced meat, and are used as herb. Due to its shiny and smooth features, its leaves are used for decorating platters during festivities.

Its nut has also a special use. It has an active substance, called *arecoline* that could stimulate the nervous system and improve human's capacity to learn and think.

According to the masticators, chewing betel provides a euphoric feeling that eases their breathing and modulates temper. It gives them a cheerful means of relaxation and a nice feeling in the mouth that goes to the brains. This is probably why a lot of people (especially the old ones) consider it a pleasant pastime.

Aside from the medicinal and culinary uses of betel, it was also found to be beneficial in the field of integrated pest management (IPM).

Crude volatile oil (CVO) from betel leaves was found to have insecticidal and fungicidal effects on major cotton pests like cotton aphid (*Aphis gossypii*) and cotton leafhopper (*Amrasca biguttula*). It

Betel oil: Effective against cotton pests

Betel (*Piper betle* L) is a popular plant among tobacco masticator particularly in the province. Its leaves, which resemble those of the black pepper leaves, is a main ingredient for mastication along with tobacco. In the Ilocos region, betel is known as *gawad* and the Tagalogs, call it *ikmo*.

can also kill the eggs of insects like the cotton bollworm (*Helicoverpa armigera*) and pink bollworm (*Pectinophora gossypiella*). These are the substantial results of the study conducted by a team headed by Dr. Aida Solsoloy of the Cotton Development Administration (CODA).

CVO is extracted from betel leaves through steam distillation. The extracted oil is yellowish brown with a strong distinct aromatic smell. It has active ingredients that are responsible for killing the pests. Through an analysis conducted by the scientists, they found that betel has active substances, namely, cadinene, menthone, cineol, phenols, eugenol, and allylpyrocatechol that are responsible for its pesticidal effect.

The crude oil in betel leaves was also found to have fungicide effect on some pathogens. It inhibits the growth of major fungi like *Sclerotium rolfsii*, *Fusarium oxysporum* f.sp *vasinfectum* and *Rhizoctonia solani*.

Results of the field evaluation showed that the occurrence of pests was indeed reduced. Although commercially available insecticides had much astounding results, the performance of the betel oil is still commendable as they are safer to use both to humans and friendly insects.

Due to hazardous effect of chemically prepared insecticides and pesticides, farmers have developed a growing interest in



Cotton



Cotton pests

using botanical insecticides. And betel is considered a very good alternative. The adaptability of betel in killing pests from egg to larval stage could be a helpful control strategy for farmers. More importantly, the growing abundance of betel in the country makes it a viable source of botanical pesticide that is both effective and environment-friendly.

This project was funded by the National Research Council of the Philippines (NRCP).

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2. "Betel leaf" at http://www.herbsarespecial.com.au/newpages/book/sample/sample4_1.html
3. "Uses of betelnut" at <http://www.ajanthasupari.com/ajapages/>

Catching strawberry's invisible enemy

Spider mites are "small but terrible". While these are very minute insects measuring 1/50 to 1/100 of an inch, they can cause serious damage to your strawberry fields.

Three new mite species attacking strawberries in Benguet was reported by Dr. Leonila Corpuz-Raros of the Department of Entomology, College of Agriculture, University of the Philippines at Los Baños (UPLB). These are: cyclamen mite *Steneotarsonemus pallidus* (Banks), lewis spider mite *Eotetranychus lewisi* (McGregor), and the two-spotted spider mite *Tetranychus urticae* (Koch).

Spider mites are sap-sucking insects. Feeding damage depends on the kind of spider mite and plant species. Feeding by spider mites affect the health of the plants reducing the quality and yield and may lead to stunting or death.

These minute insects can be found under leaves, inside buds and flowers making them difficult to detect or hit when spraying pesticides. They reproduce rapidly and also attack many ornamental and greenhouse crops.

To effectively manage spider mites and avoid unnecessary use of chemicals, Dr. Raros said that studying the biology and life cycle of the mites is important.

How do they look like?

A. Cyclamen mite

The cyclamen mite is the



smallest among the three spider mites, its adult measuring only 0.001 inch. Mature cyclamen mites are elliptical, semi-transparent, pinkish orange and shiny. Their hind legs are thread-like in the female and pincer-like in the male. At low populations, cyclamen mites are usually found along the midvein of young leaves and under the calyx or the green, outermost whorl of flower buds. However, when the plant is highly infested, these mites can be found on almost any plant part.

B. Two-spotted spider mite

Two-spotted spider mites are light to dark green with two distinctive black spots on the abdomen. Eggs are spherical and clear when first laid. After hatching the larva has three pairs of legs, but at later stages it will have four pairs. Males are smaller with more pointed abdomen than females.

C. Lewis spider mite

The lewis spider mite looks like the two-spotted spider mite minus the black spots on the abdomen. They are half the size of the spider mites at 0.01 inch.

Biology and damage



Lewis mite



Two-spotted spider mite

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Adult female cyclamen mites may live for one month and can reproduce without mating. Each female lays 2-3 eggs per day for 2-3 weeks. The eggs are laid in moist, dark places in crevices and at the base of the plant. Most eggs develop into females. Nymphs hatch from eggs in 3-7 days, and feed for 4-7 days. Adults emerge in 2-7 days. The two-spotted and the Lewis spider mite thrive well in hot and dry conditions. The typical life cycle (egg to adult) takes 7-14 days, but varies considerably depending on temperature.

Plants that spider mites infest become chlorotic and sickly looking. Chlorotic plants have yellowish to white leaves and stems because spider mites extract the green pigment chlorophyll from them.

Large numbers of mites produce visible webbing, which can completely cover leaves and flowers. Cobwebbing may occur between the leaves. These are areas

Understanding 'Orchid lema'

The Philippines is rich with some of the world's best orchid species. The *waling-waling* (*Vanda sanderiana*) that is endemic to the Philippines has been extensively used for the breeding and production of high quality orchid hybrids. Other top-quality orchid species found in the country are the 'white orchid' (*Phalaenopsis amabilis*) known for its large full flowers and the 'flame orchid' (*Renanthera storiei*) that is widely used in the development of orchid cutflower varieties.

Growing orchids has started from being a hobby, which later grew into a profitable business. But like any growing business, the orchid industry is beset with problems. Some of the major problems in the production of orchids include: low productivity, lack of planting materials, high production cost, and the attack of pests and diseases that damage and reduce the quantity and quality of the orchids.

According to a recent field survey, there are about 67 insect pest species that cause harmful effects to the orchid industry. One of its top five important pests is the 'orchid lema' (*Lema pectoralis*).

What is an orchid lema?

The name 'orchid lema' may give us an affirmative and innocent notion, but for the orchid growers, this name has caused them great concern. In fact, it's one of the reasons why orchid production in the country remains short.

Orchid lema belongs to the *Chrysomelid* beetle or the orchid beetle. The name was proposed and identified by Dr. Victor P. Gapud of the Department of Entomology, College of Agriculture, University of the Philippines Los Baños (UPLB). The name was adopted to distinguish this particular species from the other orchid beetle pests.

The *orchid lema* is a major beetle pest of orchids, particularly *vanda* and *dendrobium*. The life history and habits of the *orchid lema*

have not been well studied and explored. Orchid growers should understand the life history and ecology of this pesky *lema* to effectively manage it.

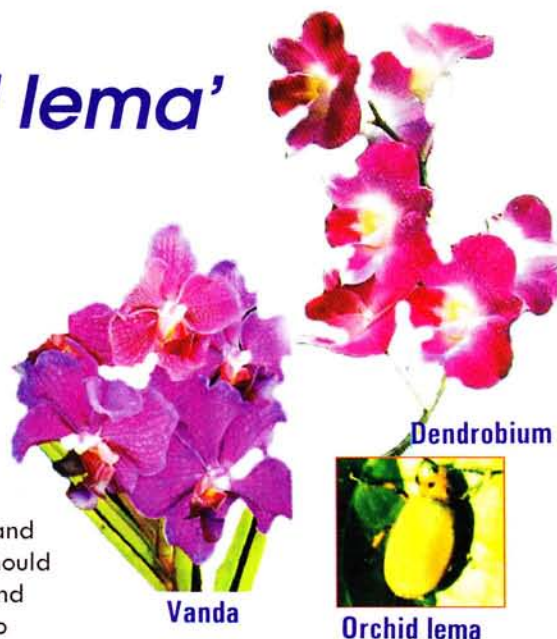
The 'Lema' life cycle

To determine the series of changes of form and activity, scientists headed by Drs G.A. Hirao, B.P. Gabriel, and H.T. Facundo used field-collected adults of *orchid lema*. They were allowed to mate and to lay eggs on *Vanda* flowers for 24 hours in ball jars that were covered with bond paper. The eggs were collected and the developmental stages were observed. The whole cycle from egg to adult takes 21 to 28 days.

Results of the observation showed that *orchid lema* goes through four stages: egg, four larval instars, pupa, and adult.

The incubation period for the **eggs** ranges from three to five days. It has a yellowish color and oval shape and measures to about 1.35 to 1.75 mm long and 0.60 to 0.85 mm wide. These eggs are laid singly or in groups on the surface of the flower. The tips of the eggs turn black, as this will be the head and the mouthpart during the larval stage.

The **four larval instars** look similar except for the size. They grow longer and thicker during their development stage. The four larval-instar stage takes 2 to 5



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days. The larva is yellowish-white to yellow consisting of a distinct black head, antennae (which is not easily seen), and six pairs of simple eyes. Each thoracic segment of the larva consists of a pair of four-segmented legs. The stomach is segmented into ten parts, the first part of which has a pair of hardened and darkened outer skeleton plates that is not found in older stage of instars. The larvae feed on flowers or unhatched eggs and take on the color of the food they eat. They become pinkish when they feed on dark-colored flowers and yellowish-white when they feed on light-colored flowers. Their body is soft and fleshy and is covered by a slimy exudation and fecal materials. When the larva starts to molt, the slimy materials are wiped off. Molting lasts for 30 minutes.

Before the larva becomes a pupa, the mature larva stops feeding and turns yellow. It covers its body with slimy exudation and excretes a meringue-like substance for its cocoon. As it matures, the appendages and compound eyes darken. The pupal stage ranges



Fungi vs. fungi: The quest for biocontrol in sweet pepper

<http://www.biologic.uni-hamburg.del>

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I like sweet peppers in my salads. I like it in my chopseuy and *atchara*. A lot of people like sweet peppers for its taste and it is highly prized by people fond of preserving food, especially pickles. These sweet peppers (*Capsicum annuum* L.) are expensive in this country.

Capsicum, however, is plagued by fungal infections caused by *Sclerotium rolsii* and *Rhizoctonia solani* and these pathogens cause reddish brown lesions at the base of the stem of damped-off seedlings. This spells trouble for farmers trying to raise and earn from sweet peppers.

S. rolsii is a fungus that causes seedling blight, stem rot, and root rot. It has a cottony or fluffy appearance on stems under moist conditions that may apparently disappear as sunlight penetrates the leaf canopy and dew evaporates. Entire branches on plants may wilt and die as a result of the fungus, at which time the fungus produces small black, irregularly shaped *sclerotia* (compact usually dark-colored mass of hardened mycelium constituting a vegetative food-storage body in various true fungi; detaches when mature and can give rise to new growth) that provide positive recognition.

Researchers Fema P. Mariano and Naomi G. Tangonan from the University of Southern Mindanao (USM) in Kabacan, Cotabato looked into ways of eliminating these diseases. Other scientists discovered that some fungi are effective in controlling other fungal species and the USM researchers are tapping into this knowledge. "Ectomycorrhizal association (a symbiotic relationship between plant root cells and fungi) to some extent may control soil-borne pathogens (organism which can cause disease in another organism)," Mariano and Tangonan

said, "though it is a mutualistic association between higher fungi and gymnosperm (a plant that bears naked seeds like the common pine and hemlock) or angiosperm (a flowering, fruit-bearing plant or tree) plants belonging to certain families."

Mariano and Tangonan explored the possibility of some fungi belonging to the group *Basidiomycetes* as possible bio-control agents. Though some *Basidiomycetes* are not *mycorrhizal*, the use of these fungi for bio-control is probable. These fungi have macroscopic (visible to the naked eye) fruiting bodies that resemble crusts, shelves, or mushrooms and most of them feed on or grow upon decaying animal or vegetable matter. They are also abundant the whole year in the Philippines so supply may not be a problem.

The USM researchers conducted the study from September 2001 to January 2002 and tested the effectiveness of seven *Basidiomycetes* (*Rigidoporous* sp., *Phellinus* sp., *Auricularia* sp., *Schizophyllum* sp., *Lactarius* sp., *Fomes* sp., and *Armillaria* sp.) against the pathogen *S. rolsii*.

Results showed that the seven fungi were effective in antagonizing or suppressing *S. rolsii* that causes damping-off in sweet pepper. There was a high difference compared to benomyl (chemical control) and the untreated samples.

The percentage germination of sweet pepper

infected with *S. rolsii* was higher with the help of *Basidiomycetes*. The test with *Schizophyllum* sp. gave the highest number of seedlings germinated and this was also comparable with tests with *Auricularia* sp. and *Fomes* sp.

Schizophyllum sp. had the lowest percentage of damped-off seedlings (29.50%) compared to *Auricularia* sp. (40.25%), *Lactarius* sp. (42.0%), *Fomes* sp. (40.25%), *Armillaria* sp. (43.25%), and *Phellinus* sp. (45%). The chemical control benomyl had 45.75% damped-off seedlings.

The *Basidiomycetes* suppress the growth of the pathogen, the researchers concluded. The efficacy or effectiveness in the screenhouse test in increasing percentage germination of sweet pepper seedlings infected with *S. rolsii* and decreasing the damping-off incidence is now established with this study.

Further studies using these seven *Basidiomycetes* against other plant pathogens are possible and other genera of *Basidiomycetes* may be explored to control fungal pathogens causing diseases in agricultural crops.

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2. Mycorrhiza, pathogen, agriosperm, gymnosperm, sclerotia definitions. [Http://www.hyperdictionary.com](http://www.hyperdictionary.com)
3. *Sclerotium rolsii*. [Http://www.agrobiologicals.com](http://www.agrobiologicals.com)

Getting rid of mud snails

Mud snail (*Cerithidea cingulata*) has become a constant source of worry to fish farmers who raise milkfish in brackishwater ponds. They are hard to control since they are resident species of brackishwater ponds. These snails can affect the size and quality of the milkfish harvest since they compete with the milkfish for food and nutrients.



Mud snail

In the past, these snails were controlled using triphenyltin (TPT) compounds Aquatin and Brestan. But today, TPT is already banned since it was found toxic to other invertebrates, fishes, algae, bacteria and people. Coloso and Borlongan (1999) reported high amounts of tin and TPT in the sediment of brackishwater ponds and in milkfish tissues.

To safeguard fish consumers and the environment, the scientists recommend an integrated pest management (IPM) strategy that incorporate cultural, biological and chemical control methods. However, to design an effective IPM strategy, it is important to study the biology of *Cerithidea cingulata* in relation to the pond environment and to the affected milkfish and microbial mat locally called *lablab*.

Two scientists from Southeast Asian Fisheries Development Center (SEAFDEC)- Ms Imelda Lantin-Olaguer and Ms Teodora Bagarinao studied the gonadal maturation, fecundity, spawning and timing of reproduction of mud snails. They found that mud snails live in ponds at all stages of their life cycle. The snails thrive well in ponds because there are few predators and the enriched sediment (due to fertilizers and feeds) give them the necessary nutrients they need. They are also very hardy since they can tolerate hypoxia or an inadequacy in the oxygen reaching the body's issues.

Male mud snails are apallidic, have narrower shells than

the females of the same length, and have bright yellow-orange testes overlying the digestive gland deep inside the shell. Females have more robust shells, an ovipositor at the right side of the foot, and yellow-green ovaries overlying the digestive gland. The smallest mature males and females measure 18-19 mm and most snails that measure more than 20 mm are sexually mature.

Mud snails sexually mature in one year and spawn throughout the year with a peak in March-September and multiply very fast. Females spawn 6-12 times a year at an average of 1500 eggs and a maximum of 2500 eggs per spawning. At this rate, the scientists said that egg production of snails can be as high as 30-100 billion eggs per year and each meter square could have as high as 5,000 snails, thus controlling them is imperative to protect the food resource of milkfishes.

Recommended control measures include physically removing large numbers of snails (as much of the breeding population as possible) and finding economic uses of them, such as lime production, shellcraft, and duck feeds. Mud snails can be killed within a week by sun-drying or by using ammonium phosphate or urea for three days.

If available, let fresh water stand in snail-infested pond for a week after harvest. Sun-dry the pond bottom completely before

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starting another crop. Complete draining and sun-drying of ponds after harvest kills the adult snails and the egg strings on the bottom. Apply lime and ammonium sulfate in remaining puddles with snails

For an IPM strategy against snails to be successful, there should be a change in the mindsets and perspectives of milkfish farmers and entrepreneurs. Snails must not only be viewed as a constant source of worry but as a potential source of income. Indeed, finding other uses for these snails not only put more money into the threadbare pockets of milkfish farmers but can also be a good example of the Filipinos' ingenuity in turning a pest into a welcome resource. Soon, more farmers will be getting rid of mud snails with more gusto.

Source: Gonadal maturation, fecundity, spawning, and timing of reproduction in the mud snail, *Cerithidea cingulata*, a pest in milkfish ponds in the Philippines by Ms Imelda Lantin-Olaguer and Ms. Teodora Bagarinao of the Aquaculture Department, Southeast Asian Fisheries Development Center (SEAFDEC) at Tel No. 63-(33)336-2965

picture: www.gastropods.com



Catch more fish? Take a cue from the moon

Fisherfolk using set-net to catch fish may soon find the changing phases of the moon critical to their livelihood after a study showed that the lunar cycle actually helps indicate a fruitful fish catch.

The University of the Philippines Visayas and the Kinki University in Japan, conducted a study on the influence of the lunar cycles on fish catch. It aimed to determine whether physical conditions like tide and current affect the fishermen's fish catch, and its composition.

At the Iloilo Strait, located between the islands of Panay and Negros, a series of sampling was performed using a set-net, from November 2000 to June 2001. Daily catch was monitored. Later, total daily catch was recorded, and samples were sorted to determine the composition of the catch.

The moon and fish movements

The moon, being a source of myths even from thousands of years ago, is often blamed for a number of occurrences, including lunacy and menstrual cycles. Even as its mythical powers remain unproven, it gripped people's imaginations by generations. But there's one phenomenon blamed on the moon that may finally have scientific basis: its effect on fish catch.

The moon affects the movement of bodies of water on earth due to its gravitational force. Its phases, which include the full moon, last quarter, new moon, and first quarter, cause movement in bodies of water, which we refer to as tides. Tides subsequently cause current. When tide heightens, it moves towards the shore as a response, following the rule of water seeking its own level. The current flowing towards the shore is what causes fishes to take up certain positions near the shores to feed, "ambushing" smaller creatures washed toward the same direction.

The fishes leave the inshore and feed on small creatures moving with the current, toward the open seas. Set-nets established in the inshore benefit from this water movement, as fishes tend to follow the current moving inshore when the tide heightens, which usually happen on full moons, or during high tides.

Set-net

Observations in the study showed that using a set-net, the maximum catch for a day did not exceed seven kilograms. Daily catch became smaller towards the end of December to mid-May. The most catch between these months did not exceed two kilograms. This results gave the scientists a reason to believe that low level of catch is common with the set-net in the area.

The Southeast Asian Fisheries Development Center (SEAFDEC) is sponsoring a project concerned with introducing the use of set-net as means of resource management in the region. This is to help alleviate the pressure on fisheries resources in the region.

The phase that delivers the most fish

The results of the study showed that the

largest amount of catch was recorded during the last quarter. The least amount of catch was during the first quarter.

Although the study accedes that the cause of this phenomena is yet to be sufficiently clarified, it proved a remarkable correlation between tidal range and set net catch. However, it did not yield evidences of relationship between lunar cycle and the composition of the catch.

Myth or otherwise, the moon has been a perpetual guide of generations of fishermen before they set out to sea.

The bigger the dot - the better the catch, is how fishermen easily put it. The dot being the moon and it may have some sense scientifically.

Source: *Influence of Lunar Cycle on Set Net Catch* by: Ricardo P. Babaran, College of Fisheries and Ocean Sciences University of the Philippines Visayas, and Takeshi T. Yamane, Department of Fisheries, Kinki University, Japan.
www.whopperstopper.net
www.td.seafdec.org
www.electricbluefishing.com
picture: www.arizona.edu

High tides occur during full moons



www.deltaflux.org

Sorghum: Poultry raisers' best alternative to corn feeds

We may not be familiar with sorghum as it is a minor crop in the Philippines. The grain sorghum (*Sorghum bicolor*) plant looks a lot like a corn plant but it is shorter and more colorful. The head is white, yellow, red, or bronze. It is an important staple food crop in Africa, South Asia, and Central America where drought is prevalent. It is the fifth major cereal crop in the world after wheat, rice, corn, and barley.



Sorghum
Inset: sorghum seeds

Aside from food, sorghum is used for industrial and animal feed purposes. The Philippines is a big importer of feed ingredients wherein a big bulk of which goes to corn. As the demand for corn continues to increase so are its price and availability to the livestock and poultry industry. US and Argentina are the major suppliers of corn to the Philippines.

According to GENET-news, the country has an estimated corn shortfall of between 800,000 and one million tons a year. Due to the high cost of corn vis-à-vis its demand and availability in the market, local feedmills, hog and poultry farmers have filled the inadequacy by buying imported corn and other substitutes like sorghum.

It was due to this concern that a lot of various experiments have been done to investigate other possible grains that can replace corn as main energy feed source. Preferably the substitute has to be nutritious but cheap.

The group of Dr. Carmencita D. Mateo of the Institute of Animal Science, College of Agriculture (IAS-CA) in collaboration with other researchers from the Department of Veterinary Clinical Sciences, College of Veterinary Medicine (DVCS-CVM) of the University of the Philippines

Los Baños (UPLB), conducted a study that sought to determine if sorghum can replace corn as the principal source of energy totally or partially and can be well utilized by broilers.

Nutrient composition of sorghum

Every poultry raiser aims to use feeds that aside from being relatively cheap and of high quality must have the essential nutrients to sustain and ensure the quality of their produce.

Sorghum has slightly lower crude protein, crude fat, crude fiber and phosphorus compared to corn. As to pigment, corn has a higher xanthophyll content compared to sorghum but sorghum has a higher value of alanine, valine, sio-leucine and arginine.

Sorghum versus corn

A total of 440 broiler chicks were used to determine their production performance using feeds with sorghum. They were fed with four dietary treatments: T1 (100% corn), T2 (100% sorghum), T3 (50% corn, 50% sorghum), and T4 (100% sorghum + pigment). The pigment used were carophylls red and yellow to ensure

adequate bird skin color for marketability.

To determine the potential of sorghum as the best source of energy and alternative for corn, five parameters were used: body weight gain, feed conversion, mortality and livability rate, carcass evaluation (yield and weight), and economic analysis.

Results showed no significant differences using the five parameters proving the similarity of corn and sorghum in terms of nutritive value. All parameters have indicated positive results. This validates the earlier claim of the researchers that sorghum can replace corn as the principal source of energy totally or partially and can be well utilized by broilers.

Utilization of sorghum in poultry feeds is very limited. Corn is the common source of energy for feeds but it is costly, limited in supply and susceptible to pest. In terms of the total available energy,

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Catching...

where the spider mites have spun webs to connect a path for their feeding efforts.

The two-spotted spider mite feeds on the undersurface of strawberry foliage, especially young leaves in the crown. Feeding causes discoloration, leaf crinkle, and browning and curling of the leaves. When populations of two-spotted spider mites are very high, the plants produce very small fruits or none at all.

Testing for spider mites

To test for the presence of spider mites, place a sheet of white paper beneath the strawberry plant you think is infested. Tap the leaf and if spider mites are present, they will fall onto the paper like pepper grains. Bronzing may also occur on fruit if populations of either two-spotted spider mite, or strawberry mite (cyclamen mite) are high.

Twospotted spider mites can

be detected by checking the underside of leaves and the calyx of the fruit using a 10X hand lens. They are normally found in the crown and unexpanded leaves of the strawberry plant; however, they may also be found under the calyx of the fruit.

Control of spider mites

To rid plants of spider mites, apply insecticidal soap weekly. Be sure to include the undersides of leaves because that is where these pests can be found feeding. Remove and destroy infested plants. Apply insecticides. Pesticides registered for use include diazinon, dicofol, and endosulfan (Thiodan).

Hot-water dips have been used for years to treat plants infested with cyclamen mites. Before planting, plants are treated in hot water at 100 F for 30 minutes.

To monitor for mites, walk diagonally across the field and randomly pick one mature leaf from every other row until 60 leaves are collected. If 25% of the leaves are infested, a miticide spray is recommended.

Spray at seven-day intervals throughout the growing season as long as spider mites, or spider mite damage is evident on the strawberry plants. Make sure that you spray the undersides of leaves where spider mites most commonly feed and cobweb. At the end of harvest be sure to clear away all plant debris and fallen fruits.

Sources:

1. *New Mite Pests and New Host Records of Phytophagous Mites (Acari) from the Philippines* by Dr. Leonila A. Corpuz-Raros
2. *Spider Mites* by Dr. R. Lindquist, Ohio State University, Department of Entomology www.floriculture.osu.edu
3. *Cyclamen Mites in the Greenhouse* by Ric Bessin, Extension Entomologist, University of Kentucky, Department of Entomology, www.uky.edu

Sorghum...

sorghum is second to corn. It is also 78% cheaper compared to corn.

Economic analysis of the study showed that in feed cost, sorghum-based diet was the cheapest during the starter and grower periods while corn was the most expensive during the starter period. Using sorghum-based diet as feed for broilers, raisers can save Ph1.75 per kilogram compared to the corn-based diet.

Moreover, the study showed that the sorghum-based diet has the lowest feed cost. Broilers that were fed with the diet consumed less and attained a good feed conversion ration (FCR). A low FCR leads to a higher net income.

The addition of pigments, although added greater yellow pigment in the skin or shank of the broiler was found to be substantial for the growth in the broiler. Pigments could be an additional cost

for raisers but the good thing about it is that they could market these pigmented chicken at a higher price and at higher profit.

Source:

Mateo CD, DMC Concimino, and JA Acorda (2001): "Comparison Between Sorghum-based and Corn-based Diets on the Production of Performance of Broilers." *Philippine Journal of Veterinary Animal Science*. pp 161-171.)

picture: www.parm.org

Understanding...

from 11 to 14 days

As an adult beetle, it starts to feed after one to two hours after emergence from the cocoon. It has golden yellow color except for the black claws. Its antennae are prominent and yellowish with very fine bristle. A full-grown orchid lema measures eight mm in length.

It attains sexual maturity after two to three weeks of emergence. A female lema lays 97-417 eggs throughout their life.

It is important that orchid growers know who their enemies are so that important pest management is easily adopted.

The Philippines has a wealth of unique and desirable varieties of orchids that have heightened the interest of many orchid hobbyists and commercial growers here and abroad. But as long as the threat of the pesky orchid lema is there, increasing orchids production that are of international standards shall continue to be a hard feat to achieve.

Source:

Hirao GA, BP Gabriel, and HT Facundo (2001): "Life History and Habits of the Orchid Lema, A Major Pest of Orchids." *The Philippine Agricultural Scientist*. Vol. 84, No. 2, pp 166-170.



Drink buffalo milk and fight tumors

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Mom says, drink your milk to be stronger and healthier. Well, mom is always right. Not only does milk contain the essential nutrients needed for growing up but it also has components that can help fight bacterial and viral infections and even prevent tumor growth.

No, it's not an exaggeration.

Human milk, for example, provides various types and classes of bioactive compounds like enzymes, hormones, and growth nutrients. Many studies that investigated the health benefits of human milk led to the discovery of multimeric alpha-lactalbumin (MAL). MAL was discovered to exhibit broad yet selective cytotoxic (cell-killing) activities, wherein MAL induces apoptosis in a variety of transformed cells. Apoptosis is a type of cell death in which the cell uses specialized cellular machinery to kill itself. It is a cell suicide mechanism that enables metazoans like mammals (any animal of the subkingdom Metazoa; all animals except protozoans and sponges) to control cell number and eliminate cells that threaten the animal's survival. Examples of potentially dangerous cells inside the body are self-reactive lymphocytes, cells infected by viruses, and tumor cells.

In short, milk may have a function as an anti-tumor agent.

Custer C. Deocaris of the Cancer Research and Radiation Biology Laboratory of the Philippine Nuclear Research Institute, Richmond L. Gregorio and Yvette Maureen Y. Chua of the Department of Biochemistry, University of Sto. Tomas (UST) determined the presence of selective cytotoxicity of human MAL (HuMAL) in buffalo milk (Philippine carabao milk).

Philippine carabao (*Bubalus*

bubalis L.) milk contains higher fat (10.4%) and protein (5.9%) compared to Holstein cow's milk (3.5% and 3.1%, respectively), which makes it a good source of nutrients. One component of milk protein is the alpha lactalbumin, "an important protein in the synthesis of lactose and its presence is central to the process of milk synthesis," the researchers said.

The researchers found that Philippine carabao's milk, "induces activity via apoptosis in two cancer cell lines, A549 lung adenocarcinoma and SkBr3 breast carcinoma." The cytotoxic activity of buffalo alpha lactalbumin (BAL) isolated in this study is shown through programmed cell death and the analysis suggests that BAL is the apoptosis-inducing component of milk. The amino acid (a type of molecule that forms the basic building block of proteins) sequence of BAL is similar to HuMAL with one amino acid difference. The results suggest that the mechanisms that BAL initiates apoptosis are the same with HuMAL. The initiation of apoptosis is not yet clear but future studies on BAL could lead to the three mechanisms that MAL engages in switching on the programmed cell death

pathway.

Just like HuMAL, this study on BAL opens a new avenue in drug design against a variety of malignancies, the researchers said. Future studies, they suggested, should be done to unravel the processes involved in the tumor-fighting mechanism of BAL. Who knows, there may be a cancer-preventing powdered milk developed in the future. For the meantime, drinking carabao's milk is a step to cancer prevention.

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top picture: www.dns.state.tx

Philippine carabao



Reducing the 'ouch' in carabao castration

By: Likha C. Cuevas
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I don't want to witness a carabao castration in progress.

Castration is one painful operation male carabaos (*Bubalus bubalis*) have to undergo to make them more docile and manageable. This procedure is also done to improve the quality of flesh and to remove the inferior or 'scrub' bulls.

But the common method of castrating the animal is quite brutal for an animal lover like me. Carabaos are physically restrained, cast down, and the testicles are pounded with heavy stone or metal bar. Sometimes the carabao's scrotum is clamped by its neck between two flat bamboo strips and then it is pounded heavily. Then a scream would emanate from the poor bull.

Calls for more humane treatment of animals prompted researchers from the College of Veterinary Medicine, UP Los Baños (UPLB) and the Philippine Carabao Center (PCC) Los Baños Station to find a less painful way of performing castration on bulls. The team of researchers (composed of Dr. Salvador S. Soquilla, Dr. Jezie Acorda, Jesus Augusto Cesar Flor, Esteban Aldrin Bisa, Gilberto Amido, and Bernardo Arenda) used local anesthesia and *electroacupuncture* on bulls to induce analgesia (absence of the sense of pain without loss of consciousness) in castration and then compared these with animals without the treatment. The researchers also determined if stimulation of certain acupuncture points is enough to produce analgesia for bloodless castration in water buffaloes.

Acupuncture? Yes, you got it right. It is the Chinese treatment of pain or disease by inserting the tips of needles at specific points on the skin involving Chi/ki or the life force as they call it. But this time, the researchers used electricity instead

of needles to stimulate these specific points of the animal's body.

The research team used an electroacupuncture machine (Lasper CS 504 electrostimulator, Kanaken Medical Instruments, Inc. Yokohama, Japan) to stimulate acupoint 31 and acupoint 47 (see photo) and Lidocaine hydrochloride 2% for local anesthesia. Pain responses were classified into: 1) *good analgesia*, no pain response; 2) *moderate analgesia*, slight pain response but animal tolerates pain and the procedure can proceed smoothly; and 3) *poor analgesia*, violent response and the procedure was performed with difficulty.

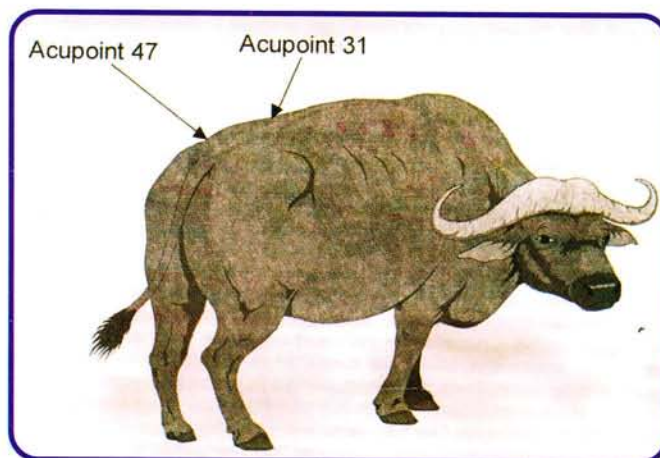
Results of the study showed that the animals that did not receive treatment (control) responded with poor analgesia. In the group with local anesthesia (LA), four animals showed moderate analgesia and one animal with good analgesia. Researchers explained that there is differential sensitivity of nerve fibers to local anesthesia. "Small nerve fibers seemed to be more susceptible to the action of local anesthetics than large fibers," Soquilla *et al.* said.

In the group treated

with electroacupuncture (EA), one of the animals showed good analgesia and as proof, the animal was observed to be eating during the procedure. This showed that stimulation of acupoints 31 and 47 are proven to produce sufficient analgesia. However, not all animals exhibited good analgesia. Three animals in EA showed moderate analgesia and one with poor analgesia. The researchers explained that, "there are some parts of the body that are difficult to render free of pain during acupuncture analgesia such as tail, scrotum, vulva, and perianal region."

The swellings and regression rates testicle sizes were also observed. One week after castration, the swellings were at their highest but they started to regress afterwards. Testicles continue to atrophy (a continuous decline of a body part or tissue, usually a muscle, following a period of disuse or immobility) after the 5th week. The highest swellings were observed in the control group followed by the LA group and then the EA group.

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It's no dead-end for the *Imperata* grassland

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Did you know that the vast, rolling grasslands that make excellent ground for reflective moments, are truly vast, rolling wastelands? Given the resistant nature of the dominant grass species in these areas, *Imperata cylindrica* or cogon grass, making decision on the productive use of these lands is not easy.

Finding a way to make these wastelands productive was the aim of the joint study by the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA), and the Australian National University Centre for Resource and Environmental Studies (ANU-CRES). It was conducted to determine the biophysical and economic effects of land-use change from *Imperata* grassland to maize cropping and *Gmelina* tree plantation.

Persistent, resistant *Imperata*

Cogon grass, is the dominant grass species in these grasslands. Its enduring and competitive growth is due to its fire climax nature. Fire climax refers to the property in a plant life where fire plays a role in encouraging its growth. *Imperata* grasslands represent a soil quality that is acidic, degraded, dry, and has low level of organic matter. This is the type of soil that is susceptible to erosion, making it useless except for pasture use. Revegetating the *Imperata* grassland is also difficult because of its resistance to pests and diseases, and burning.

Models for a lucrative conversion

Pure grasslands occupy 1.8

million hectares of the country's land area.

Conversion of *Imperata* grasslands into upland crop farms has been proliferating at a fast rate. The obvious reasons for this rapid land conversion are pressure from needs of an increasing population, dwindling resources, and migration of farmers from the lowlands to the uplands.

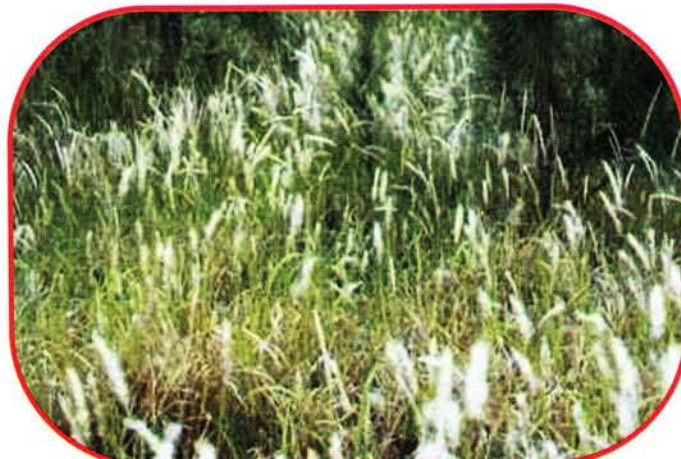
An upland farming system in Salindangan, Isabela, is an example of a successful conversion of a grassland. The conversion was aided by factors like demographic pressure, land tenure, and easy access of farmers to financial assistance in the form of credit. A similar pattern of conversion was also observed in Misamis and Bukidnon in northern Mindanao.

Apart from turning grasslands into corn or rice farms, planting trees in these areas is also an option. Planting multi-purpose tree species or MPTs, can also be an effective means to revegetate and rehabilitate an area for higher productivity. Tree planting is an effective bio-control for *Imperata*. The grass may have fire climax properties, but it needs full

light to survive. The shade from the trees kills the grass.

The study used three land use models: the *Imperata* grassland, maize cropping, and *Gmelina* plantation. The *Imperata* grassland model is simply an uncultivated and unburned grassland area. Maize cropping refers to the grassland converted into a traditional upland farming system where the soil is cultivated before planting maize seeds, and the *Gmelina* plantation model, an area where 833 trees of *Gmelina arborea*, a fast growing tree species were planted per hectare and grown for seven years.

To determine the economic soundness of the land-use systems, the Net Present Value (NPV) of the system is computed using the cost-benefit framework. Products from the land-use systems are bundles of *Imperata* leaves used a roofing material, maize grain from maize cropping, and fuel and timber from *Gmelina*. What were costed in creating the systems were tree establishment, pruning, weeding, harvesting, and log processing for the tree plantation; labor, land preparation, and harvesting in maize cropping; and labor in



www.wssa.net

Now you can make instant compost in 4-6 weeks instead of the usual six months. The new technology uses an "activator" and acidified solution such as 0.5% ammonium sulfate. An activator is a liquid concentrate made up of cellulolytic fungi- these are organisms that decompose or break down waste materials into simpler forms.



www.conterburg.nsw.gov.au

'Instant' compost from scratch

By: Junelyn S. de la Rosa
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Developed by a group of scientists from the Sugar Regulatory Administration (SRA), the technology uses sugarcane by-products like bagasse, mudpress, slops and ash from sugar factories and alcohol distilleries. Bagasse is the pulp or dry refuse left after the juice has been extracted from sugarcane while slop is what remains of the mash after an alcoholic beverage has been distilled.

Composting is a win-win option- not only do you return precious organic matter to the soil, you also get rid of waste materials that are serious health hazards to the community around the factories. Recently, with more people conscious of what they eat and how their food is produced, bio-organic fertilizers are becoming popular as cheap and eco-friendly alternatives to restore

nutrients to poor degraded soils.

Materials for compost pile

Composting is often likened to baking. That is, you add the ingredients, stir and "bake" and out comes your compost. There are three main ingredients: the activator, the sugarcane residues and the acidified solution.

The activator contains cellulolytic fungi such as *Trichoderma koningii*, *T. reesei*, *T. viride*, *T. harzianum* and *Phanerochaete chrysosporium*. These organisms are cultured in liquid media such as a rice bran decoction, coconut water and slops.

Next, you need sugarcane residues such as cane trash, bagasse and mudpress, wastes and manure. The scientists said that mudpress ranks first in nutrients, however, these nutrients are

organically bound which means it needs to be broken down to make it readily available for plant use. This is the work of the fungi in the activator. Manure and green leaves are added to the compost pile since these are rich sources of nitrogen that are needed to promote accelerated growth of the microorganisms.

To hasten the composting process, you need an acidified solution

(distillery slops and furnace ash) containing phosphates and ammonium sulfate.

Recommended mixture is 2:1:1, that is two parts mudpress, one part bagasse and one part manure and green leaves. Addition of activator and 0.5% ammonium sulfate constitute the most essential ingredients for the compost pile. The amount of activator added should be 1% of the total mixture or substrate.

Compost "activator" is available at the SRA Applied Microbiology Laboratory upon advanced notice. Interested individuals may also sign-in for a short training course on how to produce the "activator" at the same laboratory.

Making the compost pile

First, prepare layers of bagasse, mudpress, green leaves, manure, mineral matter and activator using the recommended proportion. Continue layering until the pile is three feet high, five feet wide and ten feet long. Make sure that there are enough green leaves for the nitrogen needs of the microorganisms.

Keep the compost pile moist but not soggy that drops come out when you squeeze it. Too much moisture can delay decomposition.

Compost pile



www.riverrock.com

➔ next page

Instant compost...

Cover it with laminated plastic or canvas and let it "bake" or stand for five days. Temperature of the compost should rise to 65-70 degrees centigrade within 2-3 days. This means that the fungi are doing their work.

To speed up "baking" time, turn over the pile and sprinkle with the acidified solution every three days after the first five days. This is done to allow adequate aeration and mixing of the materials. For the composting to be successful, maintain the acidity of the compost pile from 5.7 to 6.2 pH.

When the temperature drops to 35 degrees centigrade, the compost is ready for harvest. The compost is dark-brown to black and should look like dark crumbly soil mixed with small pieces of organic material. It should have a sweet, earthy smell.

Before drying the compost, add the liquid enricher and incubate for five days. Air-dry the compost

for one day so it will be easy to handle. Put the dried compost in sacks and store in shaded areas. If there are large particles, use a grinder to have a uniform texture of bio-organic fertilizer.

Benefits from compost

Compost is a natural soil conditioner with many benefits. It improves soil structure by creating passageways for air and water creating a better environment for plant growth.

It supplies necessary nutrients to the plants such as nitrogen, phosphorus, potassium, sulfur, and other nutrients. Since compost is made of relatively stable organic matter, these nutrients are slowly made available for root uptake. In this way, nutrients are less likely to be lost through leaching.

Compost holds moisture and immobilizes pollutants.

Compost can hold large amounts of water - many times its own weight. Humus- compost's main ingredient acts like glue, holding soil particles together, making soil resistant to erosion and improving moisture retention.

Compost supplies organic matter to the soil stimulating the growth of beneficial microorganisms that promote root development and make nutrients available to the plants.

Finally, certain microorganisms found in compost suppress some soil-borne diseases and plant pathogens such as *pythium*, *fusarium* and other lawn diseases thus, aiding plant health.

Sources:

1) SRA Recommends Bio-Organic Fertilizer, A brochure published by the Industrial Projects Division, Sugar and Sugar By-products Utilization Department of the Sugar Regulatory Administration (SRA), Philippine Sugar Center, Diliman, Quezon City 2) What does compost do? www.dnr.metrokc.gov

It's no dead-end...

cutting, cleaning, harvesting, and packing of *Imperata* leaves into bundles, for the grassland.

To determine the biophysical component of the models, the Soil Changes Under Agroforestry (SCUAF) model was used. SCUAF is a simple model that predicts crop yield given changes in soil carbon, nitrogen, and phosphorus content.

The system that worked best

Results of the biophysical component of the study showed that the predicted amount of harvest from the *Imperata* grassland decreased continuously. The same results were observed for the harvested maize, which also declined throughout the simulation period. As for the *Gmelina*, there was no annual harvest during the six-year growth. Among the three systems, the *Gmelina* showed the

least decrease in yield. Soil loss was lowest in the *Gmelina* plantation. Continuous cultivation and planting in the maize farm caused the greatest soil loss among the three systems.

In all three systems, the soil carbon decreased throughout the simulation period, the slowest decrease being in the *Gmelina* plantation. The maize system had the highest rate of decreasing soil carbon, followed by the *Imperata* grassland. As to the nitrogen content of the soil the *Gmelina* plantation showed a steady level of nitrogen. The maize system showed the highest rate of decreasing nitrogen in the soil. The same is true with the phosphorus content of the soil, with the maize system losing the most soil phosphorus, and the *Gmelina* exhibiting the least rate of loss.

Using cost-benefit analysis, the predicted annual income of the

Imperata grassland and maize farm was positive, but declined throughout. In contrast, the *Gmelina* plantation gave no positive returns in the first six years. But the net profit it brought in the 7th year outweighed the deficit it suffered in the preceding years, since the trees were harvested in the 7th year.

Using models to study long term impact of land use change is an important tool for decision making. In this case, options regarding the use of grasslands have widened.

Source: Modelling the Environmental and Economic Impacts of Land-Use Change in Tropical *Imperata* Areas by: Damasa B. Magcale-Macandog, Canesio D. Predo; and Patrick Rocamora, SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA) and Australian National University Centre for Resource and Environmental Studies (ANU-CRES) www.asiaforestnetwork.org

JULY

Bringing opportunities closer to farmers through ICT: Open academy for Phil. agri

The world's first and only open academy for agriculture will be established here in the Philippines, according to ICRISAT Director-General William D. Dar during the latest Advisory Council Meeting held at the Boardroom of the Bureau of Agricultural Research (BAR). Easy access to information is achieved through Information and Communication Technology, an important component in research technology management. ICT bridges the digital divide, which connects farmers, scientists, researchers, and extensionists from different regions and communities in the country.

Mindanao farmers benefit from livestock community-based project

One of the regional centers coordinated by the Bureau of Agricultural Research (BAR) has conducted on-farm research trials on indigenous cattle using improved pasture. This community-based project at Barangay Tacunan, Tugbok, Davao City aims to develop and showcase appropriate and sustainable livestock production technology.

BAR participates in library mgt training-workshop

The Bureau of Agricultural Research (BAR) attended the training workshop "Capacity Building for Library Automation in Philippine Libraries for Broadening the Base of the FAO AGRIS Database". The Agricultural Librarians Association of the Philippines (ALAP), in cooperation with the International Rice Research Institute (IRRI) Library Documentation Service, organized this event held on July 23-25 at IRRI,

Los Baños, Laguna.

BAR awards scholarship grants to 6 R&D personnel

The Bureau of Agricultural Research (BAR) through its Scholarship Program has recently granted scholarships to six qualified research personnel from the National R&D System for Agriculture and Fisheries (NaRDSAF) member-institutions: two for PhD and 4 for Master's degree. The awardees were chosen by the Scholarship Committee after a series of evaluations.

AUGUST

DA, DOST converge for agri-fisheries dev't

The Department of Agriculture (DA), through the Bureau of Agricultural Research (BAR) and the Agricultural Training Institute (ATI), and the Department of Science and Technology (DOST), through the Philippine Council for Agriculture, Forestry and Natural resources Research and Development (PCARRD) and the Philippine Council for Aquatic and Marine Research and Development (PCMARD), held a consultative convergence workshop to enhance R&D services to farmers and fisherfolk. This was held at the Oasis Hotel, Angeles City, Pampanga on August 20-21, 2003.

Medrano keynotes HARRDEC RDE Symposium

Bureau of Agricultural Research (BAR) Director William C. Medrano was the keynote speaker at the *Regional RDE Symposium and Farmers' Forum* of the Highland Agriculture and Resources Research and Development Consortium (HARRDEC), in La

Trinidad, Benguet on August 13-14, 2003. The symposium focused on the presentation of technologies and information identified during the in-house reviews of the consortium-member agencies. It served as a venue to disseminate research breakthroughs and significant findings as well as evaluate potential technologies.

Lorenzo graces oath-taking of 769 new agriculturists

Seven hundred sixty-nine new agriculturists filled the Fiesta Pavilion of the Manila Hotel on August 27, 2003 as they took their professional oath and were inducted into the Philippine Association of Agriculturists (PAA). The new batch of agriculturists successfully passed the first licensure examination administered by the Board of Agriculture chaired by Dr. Fortunato Battad, former Central Luzon State University president. DA Secretary Lorenzo inducted them.

BAR receives 159 papers for the 15th NRS

The Bureau of Agricultural Research (BAR) call for published and unpublished papers for the 15th National Research Symposium held on October 8-9, 2003 received a total of 159 papers, 64 published and 95 unpublished.

SEPTEMBER

DA establishes DAGISNet

The Department of Agriculture (DA), through Assistant Secretary for Field Operations Ibarra Poliquit and the Bureau of Agricultural Research (BAR) Director William C. Medrano, initiated the establishment of the DA Geospatial Information Systems Network (DAGISNet). An initial meeting was held at the NAFC Conference Room, DA Compd., Quezon City on September 2, 2003.

Mechanics of the National Research Symposium

For the AFMA Research Paper Award Unpublished Category

Rationale

The AFMA Research Paper Award for unpublished papers is instituted to identify outstanding research papers and more importantly the new technologies and information. It also serves as a medium for evaluation and critiquing for the improvement of promising papers intended for publication purposes. Entries for this award are unpublished reports of R&D projects conducted within the country and completed within the period 2002 to June 2003.

Selection and Evaluation Process

A panel of judges representing the research areas will evaluate the entries. Each panel shall be composed of experts from the concerned fields or discipline.

Unpublished papers will be selected as to the relevance and usefulness of their results to AFMA goals, scientific significance, quality of science and innovations to improve agricultural productivity.

Entry papers garnering an average point score of 80 percent and above shall be conferred the AFMA R&D Paper Award, which consists of a cash prize (PhP 5,000.00) and a plaque of recognition. The authors of selected papers are required to do an oral presentation during the NRS proper on October 8, 2003 for

the best paper competition. The best papers will be selected by the panel of judges in each of the major categories, namely, Basic, Applied, and Adaptive and will be conferred the AFMA Best R&D Paper Award that carries a cash prize and a trophy, provided that it garnered an average point score of 85 percent or higher. 10,000.00

Remarks:

Basic Research is defined as:

Research directed towards increase in knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific application toward processes. Original investigation for the advancement of scientific knowledge which do not have specific commercial objectives

Applied Research are:

Research directed toward gaining knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

Adaptive research are:

Research directed toward adapting or verifying newly developed or adopted technologies and information necessary for determining their feasibility and acceptability toward solving a recognized and specific need

related to agricultural and fisheries production and post-production practices.

For the DA Secretary's Award Published Paper Category

The DA Secretary's Award - Published Paper Category is instituted to encourage Filipino researchers and scientists in the NaRDSAF to contribute to the body of knowledge in their respective field/discipline by publishing in internationally respected journals, which are peer-reviewed and adhere to high standards of scholarship. Only those articles published between 2002 and June 2003 in journals listed as of the date of publication in the Institute for Scientific Information (ISI) Master Journal List may qualify for the award. The ISI master journal lists some 8,000 international journals in the natural sciences and social sciences. Each year ISI's editorial staff reviews close to 2,000 new journals, of which 10-20% qualify for inclusion in the database.

The DA Secretary's Award consists of a cash prize and a plaque. The amount of cash prize to be given in this category will be determined in consideration of the other awards being given by other institutions such as the University of the Philippines and the SEAFDEC. Papers published in the ISI shall also be presented in poster format during the NRS.

There is no limit on the number of entries that a researcher can submit for the DA Secretary's Award.

BAR
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