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Outstanding technologies identified in nat'l R&D week

Metarhizium, Bio N, SNAP hydroponics, and Genetically Multi-Ancestored (GMA) coconut farmers' variety may all sound so high-tech to an ordinary farmer, but not in the near future. Soon, these terms will become household names as our farmers will use these promising farm technologies to improve their production. These are some of the technologies identified and were symbolically turned over by President Gloria Macapagal-Arroyo to the farmers/fisherfolk during the Farmers-Fisherfolk Day on 5 October 2001 at the Bureau of Soils and Water Management Convention Hall. This event was part of the celebration during the National R&D Week on 2-5 October 2001, organized by the Bureau of Agricultural Research (BAR).

Outstanding technologies

Along with *Metarhizium*, Bio N, SNAP hydroponics, and GMA coconut, a CD-ROM on "Knowledge-based systems for sustainable fisheries management" was one of outstanding technologies presented to the President. These were chosen from a list of technologies generated by our scientists.

Metarhizium is a fungus that can kill crop pests such as diamondback moth, cabbage worm, Asian cornborer, rice black bug, and nematodes. A group of researchers from the National Crop Protection Center in UP Los Banos (UPLB) discovered that this fungus can kill an insect pest two days after application. This fungus penetrates the insect pest's skin, multiplies in the blood, and secretes poison. According to the scientists, *Metarhizium* is safe on other insects and mammals. An application of the fungus only costs P250 per hectare and is applied twice, at a maximum, to ensure best results.

Bio N is a fertilizer supplement which contains bacteria that can convert nitrogen in the atmosphere into a form that can be used by rice and corn plants. According to researchers from the National Institute of Molecular Biology and Biotechnology, also in UPLB, rice and corn farmers can save P3,800 per hectare by using Bio N. A farmer will only need P150 to buy 5 packets of Bio N which is good for a hectare. Moreover, this supplement, according to them, can supply half of the chemical fertilizer recommendation for farms.

The Genetically Multi-Ancestored (GMA) coconut farmers' variety, as the name implies, is a "hybrid" from six ancestor coconuts:

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President Gloria Macapaga-Arroyo receives the new gumamela hybrids developed by the Institute of Plant Breeding in UPLB from Biotechnology Network Chair Dawn Jamandre as DA USec. Ernesto Ordoñez looks on during the symbolic turn-over of technologies from the R&D networks.

Thailand, Philippines convene for agri cooperation

Agricultural scientists and leaders from the Department of Agriculture (DOA) of Thailand and the Bureau of Agricultural Research (BAR) convened for their first joint symposium this November to start their cooperation on agricultural research and development.

The joint symposium is the first activity stipulated under the Memorandum of Understanding (MOU) for cooperation in agricultural R&D signed last May 2000 by the two countries. Aside from the joint symposium that will be held every two years, the MOU also identifies the following modalities of cooperation between Thailand and the Philippines: exchange of scientific and technical information, exchange of plant germplasm and breeding materials, exchange training and visits, and joint planning and implementation of research.

The DOA, headed by Deputy Director Prapaisri Pitakpaivan, and BAR headed by Dr. Eliseo R. Ponce presented their current and future research directions and priorities. Technical experts from various disciplines presented scientific papers on crops biotechnology, biofertilizers, biopesticides,

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BAR Director Eliseo R. Ponce and Thai Deputy Director Prapaisri Pitakpaivan discuss the status of collaborative projects during the DOA Thai-BAR Joint Symposium at the Manila Galleria Suites last 27-28 November 2001. In the picture are other Thai delegates.

Prospects for the ornamental industry in the new millennium

by Thea Kristina M. Pabuyon

"Where flowers bloom so does hope."
-L. P. Johnson-

This adage holds true for the more than 10,000 farmers engaged in the country's ornamental business. This industry has come a long way from being a backyard activity or hobby to being one of the country's more promising industries, bringing in millions of pesos in export and local trade earnings.

While the industry is surviving, it is not exactly thriving. Much has yet to be done and be addressed to truly make it bloom and flourish.

The Philippine ornamental industry produces cutflowers, cut and potted foliage, flowering pot plants and landscaping materials, and dried and processed ornamentals. Among these products, cutflowers seem to attract the most attention among researchers and producers alike, evident from the numerous data pertaining to their production and potential.

Initially, the area planted to ornamentals is small – only a total of 942 ha in1993. In the same year, 10 million dozens of cutflowers valued at P1 billion were produced. Likewise, a survey of different nurseries reported that more than 60% of the products consisted of potted foliage, flowering pot plants, and landscaping materials.

The cutflower industry is strong in the local markets, which comprise about 99% of the total demand for the commodity. Tagged as one of the country's sunshine industries, it enjoys a high demand especially during the peak months of January, February, May, October, November and December, with orchids, chrysanthemums, gladiola, anthurium, aster and rose as the most popular. This demand volume is expected to swell even more in the coming years owing to the increasing number of middle and high income classes, changing consumer preferences, and growth of tourism. However, local producers cannot cope with the increased demand during peak seasons, prompting them to import 30% of the total demand supply. From 1995-1999, the Philippines imported 1,858 metric tons of cutflower at $9 million. Majority of the imports

See Prospects, page 12

UPLB scientists develop new hybrids of Philippine ornamentals

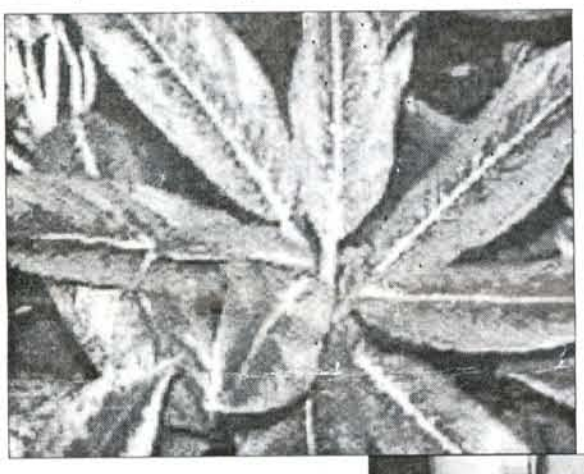
by Rita T. dela Cruz

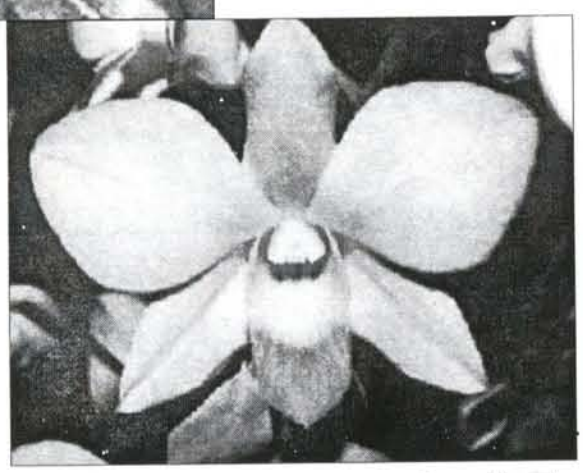
Scientists from the Department of Horticulture, University of the Philippines Los Baños (UPLB) have developed 12 hybrids of ornamental plants --- 9 aglaonemas, 2 orchids, and 1 anthurium.

Aglaonema: The lucky plant

Locally known as La Suerte, aglaonema (*Aechmea fasciata L.*) is a well-liked ornamental plant in the Philippines for the belief that it brings luck to its owners. Aglaonemas are suitable for indoor use since they flourish well in low light conditions.

Today, through the effort of scientists from UPLB, new crosses that are excellent as pot plants and cutfoliage have been produced. The nine new hybrids are more colorful, have thicker leaves and grow faster than those previously cultivated in the early nineties. The selection and breeding of these new cultivars were made possible through the Integrated Ornamental Horticulture R&D Program (IOHRDP) of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development-Department of Science and Technology (PCARRD-DOST). The nine hybrids are: Pearl of the Orient, Platinum, Silver Anniversary, Cory, Ela, Ela's Green, Illumination, Marikit and Miriam.





Illumination(topmost picture) and Ingrid Fancy (above)

. The Pearl of the Orient was bred by Dr. Teresita L. Rosario and Mr. Fernando B. Aurigue of the Department of Horticulture, College of Agriculture, UPLB. This cultivar is notable for its dark green leaves and the broad band of silver that runs along its yellowish midrib. Its petiole is grayish pink to pinkish brown.

The Platinum is a selection from the offspring of a cross made by the same scientists who bred the Pearl of the Orient under the same program of PCARRD-DOST. This plant has dark green leaves with five prominent irregular silver lines originating from both sides of the midrib and slightly merging near the margin. There are tiny silver islands present in between the lines of the leaves. Lateral veins are visible as dark green lines in most part of the silver markings.

The Silver Anniversary is another product of the Rosario-Aurigue effort. Major portions of its leaves are silver-gray with scattered green markings on its margin. The midrib is conspicuously and irregularly green. The petiole is grayish brown to dark gray-green.

Dr. Romeo Gutierrez bred Cory, another cultivar of the aglaonema which was named after former President Corazon Aquino. Its broad, dark green leaves consist of a herringbone pattern of grayish-silver, with yellow marks along the midrib. Like the sunburst, the yellow coloration of the young leaves becomes conspicuous through proper light conditions. It has white petioles and many suckers.

Other Gutierrez creations are the Ela and the Ela's Green. These aglaonemas were named after his wife. Ela is a very attractive plant with compact growth. It has a dark green and attractive yellow-cream spots scattered throughout the upper surface of its leaves. Like other aglaonemas, its petioles are white.

The Ela's Green is a robust plant with dark green leaves and a herringbone pattern due to its lateral veins, marked with narrow silver-gray.

Illumination, as its name implies, is an outstanding cultivar with white petioles and gold spotted leaves. Yellow spots are prominent on the midrib and adjacent areas of the plant. This hybrid was bred by Dr. Gutierrez and was released in Florida, USA.

Two more cultivars were named after a woman: Marikit and Miriam. The Marikit has narrow, upright, elliptic leaves. Its dark green leaves are almost entirely silver-gray except the midrib and margin. The Miriam, after the former Senator Miriam Defensor Santiago, is a tall, handsome plant with thick stems and upright olive-green leaves. It has a silvery-gray variegation. Dr. Gutierrez developed both these cultivars.

The fashionable orchids

It was during the early nineteenth century when owning orchids became a fashionable status symbol among the wealthy. It swept through Europe and as these collectors brought these fashionable plants to the tropical countries, orchids mania swept in instantly (www.geocities.com/athens/styx/hist

See UPLB scientists, page 11

New management techniques for exportable foliage plants

by Thea Kristina M. Pabuayon

The demand for ornamental products abroad is greater than ever, with major markets of US, Japan, and Europe increasing their annual consumption by 4% to 6% annually. The local producers still have to take advantage of this opportunity and produce quality foliage plants that can be imported to these markets.

To help local growers achieve this, Amelia Nicdao and Herminigilda Gabertan of the Bureau of Plant Industry-Los Baños National Crop Research and Development Center in collaboration with the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development-Department of Science and Technology (PCARRD-DOST) led the project on "Cultural Management of Exportable Foliage Plants," which consequently won an AFMA Best R&D Paper Award for the Unpublished Category at the 2001 National Research Symposium held from 2-5 Oct.

"Gold" (Dracaena sanderiana) grown under partial shade/greenhouse condition.

The researchers collected, propagated and evaluated various cut foliage materials from top ornamental farms around the country and recorded their response to different levels of nitrogen fertilizer, plant spacing, time of pruning, and percent shade. The researchers found that three exportable foliage plants responded well in the open field. These are: *D. marginata* (tricolor), *P. reflexa* (Song of India), and *M. paniculata* (Kamuning). In partial shade conditions, results showed that these plants thrive well: *M punctatum* (Polypodium), *D. sanderiana* (Gold), and *D. godseffiana* (Florida Beauty).

Recommended production technologies

Tricolor

Researchers found that planting tricolor with a spacing of 40 cm between hills and 50 cm between rows plus a nitrogen treatment of 60-0-0 kg per hectare allow the plant to produce at least 55,670 shoots – a far cry from the 18,670 shoots produced by unfertilised plants. This combination can give a return of investment (ROI) rate of 41.78% or a net benefit of P31,340 per hectare.

Song of India

A nitrogen rate of 120-0-0 kg per hectare ensures plant growth to at least 100 cm which is 50% taller than unfertilised plants. For calcium fertilizers, the researchers recommend 20 grams per pot.

Kamuning

The researchers recommend a 50-0-0 kg nitrogen per hectare requirement for Kamuning and a planting distance of 1 x 1 m. This combination allows the plant to grow to 121.3 cm which is 33.05 cm taller than unfertilised plants. For calcium fertilizers, researchers recommend 20 grams per pot to allow the plants to grow to at least 115.15 cm. The researchers also recorded a significant improvement in the number of leaves of the plant with an application rate of 5 grams nitrogen per plant at 0 calcium, and 5 grams nitrogen at 7.5 grams calcium per plant. These combinations will allow growers to have an ROI rate of 41.42% and 40%, respectively.

For partial shade foliage plants, these are the recommended light and fertilizer requirements: Polypodium

A 50-70% shade and 10-20 grams of fertilizer per plant will significantly increase the plant's height, allowing it to grow from 58.43 cm to 60.18 cm. Moreover, researchers found that a fertilizer treatment of 10 g nitrogen per plant or 50% shade will give the plant more leaves at 56 and 45, respectively.

Gold and Florida Beauty

For both plants, a 70% and 30%-70% shade requirement was found to be effective in increasing their height, while both performed best at 10-30 grams per plant fertilizer treatments. A 43.21% ROI can be achieved for Florida Beauty with a fertilizer application of 20 grams nitrogen per plant under 30% shade.

(Source: Cultural Management of Exportable Foliage Plants by Amellia M. Nicdao and Herminigilda Gabertan from BPI-LBNCRDC. For more information, you may contact the researchers at (049)536-0285/536-0104 or email them at bpi.eg98@laguna.net orbpi-ocd@laguna.net)

DOA...

part of the electronic fora both agencies agreed to instate.

Nevertheless, both BAR and DOA put high hopes on what the cooperation can do. Deputy Director Pitakpaivan declared that, "even if the pace is slow, if we can come up with a decisive plan of action, we can move faster. We also need success indicators.We are all looking forward to uplifting the livelihood of farmers... if we will not be able to do that, then we'll just be wasting our time and resources." *(Thea Kristina M. Pabuayon and Ma. Rowena SA. Briones)*

In focus

A date with the 'king of cut flowers'

by Mary Charlotte C. Fresco

The king we met in the highlands of Benguet is somewhat different for it doesn't have a sceptre or a crown to boast of, nor a kingdom surrounded by knights. It is a sprawling farm with myriads of splendid flowers in vibrant colors. What we are talking about is the King Louis Farm, dubbed as the "king of cut flowers" not only along the breadth of Baguio, but also across the country.

King Louis Farm General Manager and President Efren Chatto shows us the farm's poinsettia hybrids.

In the early 60's and 70's, no cutflower industry existed. Flowers growing was just a backyard and part time activity among individual farmers and flower enthusiasts. The establishment of King Louis Farm Inc. in 1983 was considered as the driving force for small entrepreneurs to consider cutflowers as a serious business. King Louis Farm General Manager and President Efren Chatto recalls that at that time when farmers were in search of an alternative business venture aside from vegetable production. King Louis Farm started with 4,000 square meters concentrating on producing quality chrysanthemum, roses, carnations, and gladioli. Few less-experienced contract growers and farmers who started with the conventional trial and error methods of production sustained and pioneered its early operation.

After years of experimenting and endless process of acquiring technical skills and knowledge, King Louis now operates on more than six hectares of specialized flower farms and has 40 active contract farmer-growers scattered in various locations in La Trinidad, Benguet. It has a labor force of about 120-150 workers, depending on the season.

"We assist them (contract growers) in constructing their greenhouses and provide them counter funds by linking them to cooperatives and federations engaged in cutflower production. We even had Landbank finance the construction of their greenhouses," added the very accommodating Mr. Chatto.

Even the varieties of cutflower King Louis Farm produces have grown extensively, including chrysanthemums, poinsettias, carnations, roses, liliums, gladioli, liatris, potted mums, kalanchoe, Impatients, and many more. The company is adopting modern farming technologies that are being used by other countries operating large cutflower farms. King Louis employs drip irrigation systems, sprinkler systems, supplementary lighting, large cold storage facilities, and refer vans.

In the early 90s, with its growing operations and number of wholesale consumers, King Louis Farm tried its luck in exporting cutflowers to Japan. "We had a hard time in meeting their standard of quality. *Medyo mahirap pumasok sa quarantine nila.* Second is the quality of flowers we produce. Our country's climate is not the best to produce high quality flowers that can compete globally. And the price in our local market is more competitive," he explained. The largest farm, which is devoted to rearing quality poinsettias, is simply exhilarating. Aside from the common red poinsettia, which most of us are familiar with, at King Louis there are three more exciting rare colors – white, pink and a combination of pink and red. They also have their own way of grading the poinsettias based on the size of the bracts. Poinsettias coded as B, C, and D command higher price. According to Mr. Chatto, this is done

See A date, page 7

Brighten your homes with Aglaonema

by Thea Kristina M. Pabuayon

For most urban dwellers, there seem to be not enough greenery around. In the city, tall and concrete lampposts and structures instead of big, healthy trees adorn the streets. The surroundings are monochromatic and cold, not a leaf rustling, and not a hint of nature exists except for the occasional skinny and dirty bird that we see perched on jumbled electrical lines above, or the scraggy bushes around buildings.

It is comforting to know then that we can have the feel of nature in our own homes or even offices with the help of indoor pants or foliage such as the Aglaonema or *La suerte* as it is locally known.

The beauty of the foliage plant Aglaonema lies in two things: its brilliantly patterned leaves and its ability to survive in low-light conditions. Some say the last attribute is probably what makes Aglaonema the most popular indoor plant, it seemed to have been invented for dim corners. It is tough and attractive, often surviving long periods of time in potbound conditions. Aglaonema, known world-wide as the Chinese Evergreen, was first cultivated in China before eventually finding its way to Europe and America. Hybrids were then developed in Southeast Asia, specifically Malaysia, Philippines, and Thailand. Among Aglaonema's 50 or so species, the 'Silver Queen' is the most widely cultivated in the world. Growers of all nationalities have been fascinated with its white and silver blotched grayish green leaves. Locally, producers are growing 'Manila Whirl', 'Emerald Beauty', and 'Malay Beauty.' Aside from these, they have also acquired new cultivars like the 'Superba', 'King of Siam', 'Emerald-on-ice', and some of the *Aglaonema crispum* and *A. nitidum*.

Because of the many variations and sizes of these plants, growers have many choices on how to use and grow them. For our local conditions, researchers from the Institute of Plant Breeding, the Department of Horticulture and the Philippine Council for Agriculture, Forestry and Natural Resources in UPLB have developed these various techniques for growing Aglaonema.

To propagate using seeds, choose only mature, orange or red seeds. Remove the fleshy pericarp by washing before planting in the germination media. The medium may be composed of "either pure coconut coir dust, pure sphagnum moss or a mixture of one part sand and one part coconut coir dust." The seedlings will be ready for transplanting in five to six weeks.

Manila Whirl

The plant's suckers – the shoots that extend up from the ground, can also be used to propagate Aglaonema. Cut the suckers from the parent plant during transplanting or repotting to avoid damaging the roots and the base.

The third technique for propagation is by using the shoot tip cuttings of the aglaonema. Use only tip cuttings that have a minimum of five leaves. Remove the two older leaves and directly stick the cuttings in a rooting medium composed of a mixture of one part sawdust and one part burnt rice hull. Water every

See Aglaonema, page 10

King in red and green

by: Maria Rowena Briones

Among the tropical ornamental plants, Ti plant or *Cordyline terminalis*, is known as the king. This indoor plant is popular because of the delightful combination of shades of red and green in its leaves. This is also known as a 'good luck' plant in Hawaii.

Growing this plant, be it small or large scale, is easy. If the place is cool and elevated, you can just prepare the soil and stick the sturdy stem cuttings of the Ti plant. With enough water and minimal sunlight exposure, Ti plant can grow on its own.

The Institute of Plant Breeding of UP Los Baños specified two methods of

propagating Ti plant, aside from sticking it in the soil and just letting it be.

For small-scale production of Ti plant, *kulob method* is practical. Instead of planting directly the cuttings on the ground, it is planted on the soil in polypropylene plastic bags. The plastic bag provides the plant with the right temperature to encourage root growth.

If you want to produce Ti plants in a large scale, you can use the plastic tent method. This method uses a soil bed made of polyvinyl plastic and a roof support or tent to maintain moisture and high humidity.

Ti plant can be grown from tip stem or nodal cuttings. For tip stem cuttings, place them in transparent 6 x 11 inches polypropylene bags, individually or in groups with two to three inches distance from each other. Equal mixture of sand, coirdust or burnt rice hull and sawdust is used as soil. Woody cane pieces from grown Ti plants can also be used for propagation. Cut the lower half of the cane into five to eight cm long nodal cuttings and immerse them in a fungicide solution before planting them in pots with sand and coconut coir dust as soil.

Ti plants grow roots after three to four weeks of planting. To hasten rooting by one week, treat the cuttings (tip or nodal) with any of the following

See King in, page 9

Cashing in with the 'Lucky Bamboo'

by Junelyn S. de la Rosa

There's more than just luck or feng shui when you own a lucky bamboo. A popular gift for almost any occasion, Lucky bamboo is selling like hotcakes in the market. Lucky bamboo is a very popular gift for all occasions. It is basically grown in water in a decorative glass container with colored stones or pebbles to keep the plant upright, no soil.

Selling Lucky bamboo is a very lucrative business, the cheapest is priced at P120 and the most expensive could reach up to more than a P1000. Lucky bamboo could grow for years indoors and virtually no care is needed. These plants are also used as accent plants in dish gardens or as fillers in bouquets.

Lucky bamboo is really a Dracaena, not a bamboo. Specifically, *Dracaena sanderiana* has two cultivars--Gold and Ivory which came from Congo, Africa.

Gold and Ivory plants are slender, succulent with unbranched stems. Gold or 'Yellow Corn' has dark green leaves with occasional faint lines of pale green. Ivory, also called 'striped corn plant' or 'white corn' has alternate glossy green leaves that taper to a point. It has broad white to yellow-green margins.

For ornamental growers who wish to expand their income and sell the Lucky bamboo as a hydroponic plant or as a foliage plant, there is a technology that has been packaged by the Institute of Plant Breeding of the University of the Philippines, Los Baños (IPB-UPLB). The mass production technology consists of three techniques: the 'exposed' method, the use of plastic tent, and the mist system.

Gathering and Preparation of Planting Materials

A. Tip Cuttings

- Secure healthy tip cuttings 10-15 cm long from vigorous plants.
- Place the cuttings in 6x6x11 polyethylene plastic bags then sprinkle with water to prevent from drying.

B. Nodal Cuttings

- Cut the plant 5 cm from the base. An erect plant can attain a height of 70 cm.
- Secure about five to eight cuttings with three nodes each. Retain at least two to three leaves per cutting to ensure faster growth of the plant.Place in a polyethylene plastic bag and sprinkle with water.

C. Hormone Application

- To hasten rooting, soak the cuttings in 100 ppm Indole Butyric Acid (IBA) solution for 30 minutes prior to planting. Cuttings soaked in IBA solution will have uniform roots a week earlier than untreated cuttings.

Mass Propagation

For the mass production of *D. sanderiana*, three techniques can be employed: the 'exposed' method, the use of plastic tent and the mist system.

A. Exposed Method

- Prepare rooting medium composed of 1:1 burnt rice hull and sawdust. Place the medium in a 6x6x11 polyethylene plastic bag.
- Water the medium thoroughly.
- Plant the cuttings about 5 cm deep in the medium. A maximum of five cuttings can be planted in 6x6x11 polyethylene plastic bag. For tip cuttings, remove the 3-4 lowermost leaves before inserting the base of the stems.
- Place the plants in an area with 60-70% shade.
- Water the plants daily.

B. Plastic Tent

The use of plastic tent is ideal for large-scale production. The structure, which measures 4 x 1 m bed can accommodate 60-80 plants depending on the size of the pots. It is fully enclosed with a plastic sheet and placed in a partially shaded area or inside a screenhouse. The roof is slightly inclined to ensure that no water will clog on top. The cuttings planted in polyethylene plastic bags are placed inside the plastic tent and are watered at least once a day, usually in the mornings to prevent drying.

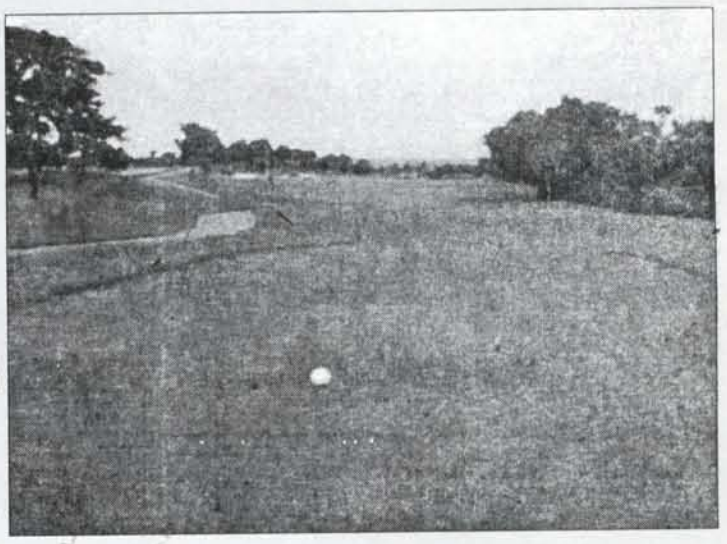
C. Mist System

The same procedure in the exposed method is followed in planting the cuttings for mist application. In this method, the plants are placed in a mist bed where they are subjected to continuous misting during the day

See Cashing in, page 9

Turfgrasses: the preferred ground cover

by Rita T. dela Cruz



They are not as popular as ornamental plants like orchids, bromeliads or hibiscus, nor do they enjoy as much importance as anthuriums or gladiolus. Turfgrasses act as vegetative ground cover for the purpose of preventing soil erosion as well as for aesthetics.

Since sod production is still a new idea in the Philippines, the popularity of the turfgrass industry is yet to be considered as an important aspect of the agricultural sector. Only few people know that this is one of the most used plants in landscaping.

The use of turfgrasses in the world started in the 17th century when lawn maintenance was more of an art than a science, and trimming grasses was merely relied on grazing animals. It was only when the lawn mower was invented by Edwin Budding of England in 1830 and the first motor-driven lawn mower was made in the 1900 that the industry of turfgrasses became known. In the US for instance, modern turf industry has grown rapidly and has contributed a lot to the country's economy.

In the Philippines, growing of turfgrasses started with the introduction of sports like golf and horse racing. It is used mainly for residential, commercial and recreational purposes.

Turfgrasses are angiosperms or flowering plants. Their growth is initiated thru their crown---the portion of the plant where the leaves, roots and stem join. They spread by growing stolons and rhizomes.

Generally, there are three types of turfgrasses that are used in landscaping, namely the bermuda grass (*Cynodon spp.*), the carabao grass (*Paspalum conjugatum*) and the various species of zoysia grass. The bermuda grass grows through its stolons and rhizomes. It has a fine to medium leaf and its shoot density is very high. It can grow in a wide range of soil especially fertile ones. Its very fast establishment rate and recuperative ability make it an excellent choice. The carabao grass grows only through its stolons. It has a coarse leaf texture and low shoot density. Like the bermuda it can practically grow in a wide range of soils. It is easy to establish and has an excellent recuperative ability. The zoysia grass, like the bermuda, grows through its stolons and rhizomes. It has also a fine to medium leaf texture and can grow in a wide range of soil. Its establishment rate is very slow while its recuperative ability is poor (it recovers but very slowly).

There are various reasons why turfgrasses are preferred as ground cover. They have extensive root systems and attractive green color and uniform appearance suited for landscaping purposes. They can tolerate improper maintenance practices and they have a tough and durable surface that provides outstanding ground cover for athletic fields and other recreation facilities. Moreover, they release significant amount of oxygen in the air, thus making golf courses the "lungs" of a city. They absorb harsh sounds as they act like rug and muffles and have cooling effects on the environment.

Growers of turfgrasses use two sets of criteria to determine their performance--visual and functional qualities. For the visual quality, growers have to consider the color (the greener the better), texture (width of the leaf blades), density (number of shoots in an area), and uniformity (combination of the three indicators). Functional quality depends on the rigidity (resistance of the leaves to compression), elasticity (tendency to spring back), resiliency (capacity to absorb shock), yield (measure of clippings removed), verdure (aerial shoots after mowed), rooting (root growth evident during growing season), and recuperative capacity (capacity to recover from damage).

Dr. Leonido R. Naranja, associate professor at the Department of Horticulture, University of the Philippines Los Baños, Laguna has conducted an intensive study on the turfgrasses' use in the Philippines. According to Dr. Naranja, bermuda grass, whether they are common or are of improved cultivars, is mainly selected for residential areas. As he emphasized, houses can hardly be called homes without lawns that often serve as an outdoor extension of the house where family activities are held. And usually, these lawns are covered with these grasses.

Meanwhile, carabao grass is used for cemeteries and industrial parks, while the improved bermuda cultivars are used for golf courses. As of now, golf courses are the major user of turfgrasses. According to Dr. Naranja, there are already 74 golf courses in the Philippines; 47 in Luzon, 14 in Visayas, and 13 in Mindanao.

Furthermore, Dr. Naranja mentioned that the turfgrass industry in the Philippines has a bright future provided that linkages and networking are properly established and nurtured.

See Turfgrasses, page 9

Catching the invisible enemy with ELISA

by Junelyn S. de la Rosa

Viruses cannot be seen with the naked eye. They are so minute that you will need a powerful microscope such as the electron microscope to be able to see them. Viruses are extremely simple organisms, consisting only of the genetic material necessary for multiplication (ribonucleic acid or deoxyribonucleic acid) and a protein coat for protection. The fact that they are basically life's building blocks place them among the smallest organisms known to science.

More than 25 viruses have been reported to infect orchids. The two most common orchid viruses are: Cymbidium mosaic potexvirus (CymMV) and Odontoglossum ringspot tobamovirus (ORSV). They vary in length and are between 450 and 300 nanometers long (one nanometer is one millionth of a millimeter).

Orchids that are infected with viruses often exhibit these symptoms: yellow, brownish line patterns on foliage, with discolored areas often sunken. Likewise, infected plants may be streaked or have discolored flowers.

However, each virus does not produce characteristic symptoms on orchids. It is impossible to make a precise diagnosis by looking at the symptoms alone. Ringspot symptoms or sunken brown spots may lead you to suspect that your orchid is infected with a virus, but it does not tell you what kind of virus it is. To make sure if your orchid is infected with a certain virus, you can use the enzyme-linked immunosorbent assay (ELISA). A recent study by two scientists from the Department of Plant Pathology of the University of the Philippines at Los Baños (UPLB)—Mr. Narceo Bajet and Ms. Priscilla Barcial developed a local antiserum of CymMV and ORSV for the ELISA kit.

The ELISA kit was used to test 623 orchid samples that were collected from commercial and university orchid nurseries around the Philippines. The orchid samples were either apparently healthy or exhibited virus-like symptoms. Most of the orchids belong to the genera Dendrobium, Cattleya, Mokara, Oncidium, and Vanda.

Results of the survey showed that almost half of the samples were infected by either CymMV or ORSV or by both. Some orchid samples (169) that did not exhibit any viral symptoms or looked healthy were also found infected. The researchers also tested micropagated orchids for the two viruses while they are still inside the flasks. They found that 4.2% and 6.4% were infected with CymMV and ORSV confirming that viruses can be transmitted through tissue culture. By developing the local antisera for the two viruses, it will be easier and cheaper for orchid growers to include the ELISA tests in their safety regimen.

(Source: ELISA kit: a local technology to counteract the threat of viruses to the Philippine orchid industry by Dr. Narceo Bajet and Ms. Priscilla Barcial of the Department of Plant Pathology, College of Agriculture, University of the Philippines Los Baños)

Grow *Dracaena godseffiana* the easy way

by Thea Kristina M. Pabuayon

More and more Filipinos have taken interest in foliage plants, both for their profit potential and their aesthetic value. One of the most in demand and also considered as the best indoor plant is the *Dracaena godseffiana*, a spreading and shrubby plant popularly used in flower arrangements and florist greens.

Dracaenas are made up of many varieties with sizes ranging from small tabletop varieties to plants 20 feet tall. They are known for their colorful leaves that often vary from emerald to gray green and sometimes with white or yellow stripes or yellow cream spots. In the local market, the *D. godseffiana* is sold in three varieties: the 'Gold dust' whose leaves are specked with small, cream colored spots; the 'Milky way' that has wide bands of white running at the middle of its leaves; and the yellow and green specked 'Florida beauty'.

To further promote the production of this plant, researchers from the Institute of Plant Breeding in UPLB and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)developed mass propagation techniques for the *D. godseffiana* under its Integrated Ornamental Horticulture R&D Program.

Easy growing with plastic

The *kulob* and plastic tent methods are two techniques recommended in growing *D. godseffiana*. These methods were proven effective in attaining extensive rooting even without the use of rooting hormones.

In the *kulob* method, a polypropylene plastic bag is used to enclose the plant. Initially, a rooting medium composed of pure coconut coir dust or an equal combination of sand and coir dust is placed in a 4x4 plastic pot. Stick the cuttings (four to five maximum) 2 cm deep in the medium; make sure that these are watered beforehand. The whole pot is then enclosed with the plastic bag and sealed with a rubber band to ensure that moisture is steadily maintained. The plastic tent method is a modification of the *kulob* method. It consists of a 4x1 m bed structure that is raised 2 ft above the ground and enclosed with six polyvinyl sheets. The tent is recommended for large-scale production.

Transplanting

The cuttings should have established their roots after three to four weeks and should be ready for transplanting. To use the cuttings as stock plants, transfer them individually or in groups of two to three to a 6x6x11 plastic bag containing any of these growing media: garden soil and coconut coir dust with 1:1ratio or garden soil, coconut coir dust and sand with 1:1:1 ratio. Avoid exposing the plants to full sunlight as this my damage the leaves. Complete fertilizer should be applied thrice a month, urea on the fourth week, and slow release fertilizer, such as

Multicoat, every quarter. Moderate and consistent watering must be done daily during the dry season and thrice a week during wet months.

As indoor plotted plants, the cuttings must be transferred individually or in groups of two or three to a 4x4 plastic pot containing any of these non-soil growing media: coconut coir dust; sand and coir dust with 1:1 ratio; or sawdust and burnt rice hull with 1:1 ratio. The plants must be kept in a partially shaded area for one week after which it should be transferred to a shaded area for another week. Like all plants, it requires sufficient natural light and water to keep it healthy. Unlike the stock plants though, indoor cuttings don't need as much fertilizer except for urea application twice a month to enhance leaf color.

(Source: PCARRD Information Bulletin No. 137a/2000: Mass propagation of Dracaena godseffiana 'Florida Beauty' by Dr. Simeona Siar and Mr. Herminio Jalotjot, Jr., IPB, UPLB. For more information, please contact: Dr. Joy Eusebio, Director, Crops Research Division, PCARRD, Los Baños, Laguna, Tel. No. (049)536-0014 to 0020.)

Bromeliads: The exotic plant

by Rita T. dela Cruz

In Sam Chism's personal reflection on bromeliads, he said, bromeliads are one of the best kept secrets in the plant world. They are diverse, fascinating, and relatively easy to grow.

Bromeliads are tropical plants native to the Americas. Its fleshy leaves form a funnel that holds water. They look quite different from traditional plants that is why a lot of people consider them exotic. They grow in diverse places like rain forests, deserts and coastal areas.

There are two types of bromeliads according to Dr. Ben Vergara, a bromeliad grower in the Philippines. These are the bromeliads with colorful foliage and the bromeliads with flowers. The foliage-type grows relatively slow but according to him, they have higher selling price compared to the flowering-type. Meanwhile, the flowering bromeliads grow faster and have wider use. The more flowers they have, the higher the selling price. Among the flowering bromeliads that are popular in the market are the guzmania, vriesea, tillandsia and aechmea.

Due to the peculiarity of bromeliads, a lot of people think they are difficult to grow. As a result, bromeliads have not caught the attention of plant collectors as much as other exotic plants.

Bromeliads are shade-and cool-loving plants. Shading them with fish net is recommended to minimize the intensity of the sun and to control the temperature. Low temperatures help the plant produce more colorful flowers and give it a waxy appearance. For potting purposes, growers may use a wide range of materials. Coir dust is a favorite among growers due to its

availability and low cost, and has been proven to inhibit weed growth.

To support plant growth, these bromeliads need to be nourished with fertilizers. The usual fertilizers are osmocote, multicote and nutricote, which are readily available in the market. These fertilizers are a bit more expensive than the complete fertilizer most growers use. The frequency of application depends on the fertilizer being applied and may be as frequent as once every three months or only once during the lifetime of the plant.

One of the advantages of growing bromeliads is that it has very few pests. The most serious are "mealy bugs" which can be easily eliminated by spraying Sevin. Other pests include plant hoppers, snails and caterpillars. Meanwhile, the most common disease is rotting, although maintaining the water level and removing infected plant parts can prevent this.

Just like any plant, scientists have extensively hybridized the bromeliads resulting to various cultivars with more colorful and improved traits. Newly discovered or hybrid plants often sell to collectors and plant enthusiasts for a big sum. Many of these new hybridized bromeliads resulted to more striking plants with both bloom and foliage. These new plants offer more colors and shades than any other plant. According to Dr. Vergara, orange and red and their combinations are the most common and most saleable hybrid of the bromeliads, although the yellow hybrid is also highly in demand. The whitish green hybrid is locally available while those with purple and maroon bracts are the least saleable variants.

(Source: "Growing bromeliads in Laguna and Quezon by Ben Vergara, a paper presented during the 6th Philippine Floriculture Congress, September 6-8, 2001 and http://www.ghg.net/beyer/bromeL.htm)

Wag that fish-tail fern

by Rita T. dela Cruz

The name wouldn't probably catch one's attention but the plant really attracts. The fish-tail fern (*Microsorium punctatum L.*) is a natural mutant of the species commonly called the "climbing bird's nest fern" and is common to countries like Africa, Asia and Polynesia. The fern was given the name because the leaves or fronds are crested or forked resembling the tail of a fish.

In the Philippines, fish-tail fern is commonly grown as pot plants for indoor use. The sturdy fronds (a large lead divided into many thin sections that is found on many flowerless plants especially ferns and palms) and long vase life of this plant make it a high potential for cut foliage. The popularity of the fish-tail fern has slowly flourished since its introduction to Europe through Netherlands. Thus, production of the fish-tail fern in a commercial-scale opens for both the local and foreign markets. It will not only meet the growing demand for this plant both local and foreign but also provides additional livelihood opportunities to growers.

How to grow one

Just like any regular plant, the fish-tail fern is not difficult to grow. While naturally this is an epiphyte (a plant that grows on top of or is supported by another plant) by nature, the cultivated form can be grown in plots or beds and containers in a variety of rooting media.

A recommended medium is the mixture of compost (can be humus, coconut coir dust, rotted or burnt rice hull or rotted ground corn cob) and garden soil to improve the drainage and nutrient composition. Some growers add course river sand. Other materials used are charcoal, saw dusts, wood shavings, coconut husks, fern roots and adobe.

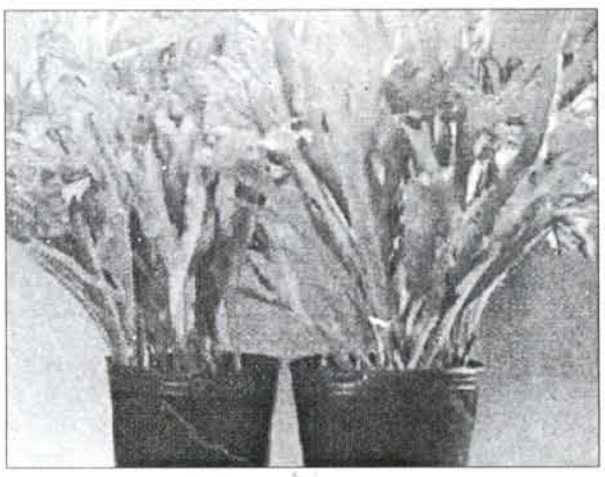
The fish-tail fern are shade-loving plants and do not require much space since they can be placed beneath hanging plants or under benches where other plants grow. In open areas, it is best that the plant be covered with layers of fish net to minimize the effect of sunlight. A 70% shade is ideal but it may vary depending on the climatic condition of an area and the age of the plant. Too much exposure to full sunlight damages the leaves causing scorching or sunscalding.

The fish-tail ferns need to be watered everyday. Sprinklers or water hoses are ideal for misting the ferns. This kind of irrigation leaves undissolved salts on the forked apex of the fern. During wet seasons, less watering is advised if the plant is infected with sclerotium (a fungal infection characterized by a compact hard mass that contains stored food) rot or other diseases.

How to propagate the fern

There are two ways of propagating the fish-tail fern: either by rhizome (a thick horizontal stem that produces roots and has shoots that develop into new plants) or spores (a small, usually one-cell reproductive structure produced by seedless plants like ferns). Traditionally, growers propagate the fish-tail fern by rhizome. The rhizomes are divided during replanting and re-potting when the fronds are already overcrowded. According to growers, a high percentage survival and fast growth is best achieved when the propagation is done during the rainy season.

Meanwhile, propagation by spores is employed after mature spore masses are collected from the healthy fronds and sowed on sterilized medium for germination. With a very high relative humidity, the young plant may take its form as early as 12 days after sowing but generally form only after 45 days.



How to sustain the plant

To ensure a healthy growth, fertilization is necessary. Growers can apply a diluted solution of complete fertilizer at least once a month. If foliar fertilizer is prepared as a weak solution, spraying on the fronds can also be done even on a weekly basis provided that it is applied early in the morning or late afternoon after watering the fronds.

Some growers use organic fertilizer as foliar spray. As top dressing or additive to the medium used, others use the well-decomposed animal manure or compost.

How to keep the fern disease- and pest-free

White louse scale and midrib borer are two of the major pests common in fish-tail fern. The white louse scale endangers the plants by producing light green to yellowish spots or specks that eventually turn brown on its fronds. This could be fatal to the plant especially with high infestation.

Meanwhile, the midrib borers produce a tunnel on the midrib of the fern that could result to wilting of affected fronds. Blackening of the midrib and accumulation of excreta (insect wastes) at the opening of the tunnel indicate the infestation. To control white louse scale, maintain a clean culture, and keep the plant free from weeds. Also, spraying the underside of the fronds with a mixture of dissolved detergent, dissolved lime and hot pepper can minimize the infestation. To control the midrib borer, apply systemic insecticides on the infected plant or leaves. Spraying must be done according to the manufacturer's recommendation and should be avoided during hot weather to prevent chemical burns.

Other pests include giant African snails, bush snails and slugs. They feed on the fronds, upper stem and soft rhizome, and roots. Most growers would just handpick these scumbugs as an economical way of controlling them, but these can be controlled more effectively by using metaldehyde baits or by placing deadly traps around the growing area.

As to diseases, leaf blight or leaf spot is a common disease of fish-tail fern. It is characterized by spots on the leaf and the rotting of the basal portion of the fronds that could spread easily if not prevented immediately. To avoid the spread of the disease, infected plants must be kept in a dry place and separated from the healthy plants. If the infected plant worsen, it must be disposed by burning. It is also recommended that sterilized potting medium be used to avoid further infection to other healthy plants.

(For more information, please contact Dr. Teresita L. Rosario and Mr. Fernando B. Aurigue of the Department of Horticulture, College of Agriculture, University of the Philippines Los BaÕos, College, Laguna with telephone numbers (049) 536-2227 or fax (049) 536-2478.)

Mass propagating the 'Doñas' through *Kulob* system

by Mary Charlotte C. Fresco

The Philippine Mussaenda or collectively known as Doñas which were named after the First Ladies of the Philippines, are considered one of the most significant contributions of the Philippines to the ornamental industry which have been gaining recognition here and abroad. Instead of petals, which most of the common flowers are distinguished for, Doñas are known for their splendid and colorful sepals or modified leaves and continuous blooming habit.

There are about 20 Mussaenda species to be found all over the country. Since scientists from UP Los Banos, Laguna successfully developed several hybrids of Doñas, Mussaenda propagation has become one of the most lucrative business opportunities among small and large-scale ornamental growers. For the past years, the demand for cutflowers and landscape plants has undoubtedly increased, yet due to lack of stable supply of quality planting materials and efficient propagation techniques, the country's market both domestic and international, is consequently decreasing.

In a joint undertaking, the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and Department of Science and Technology (DOST), developed and studied the *Kulob* mass propagation system and found that this could be a solution for these long-standing problems in the ornamental industry.

The *Kulob* system

Mussaendas are commonly propagated through marcotting which involves inducing roots to grow small plants while they are attached to the mother tree. However, this method cannot assure a continuous supply of planting materials because it takes 1-2 months to produce new plantlets.

In an effort to make an alternative efficient mass propagation technique that ensures uniform and saleable plants, the *Kulob* system was introduced. In the *Kulob* system, the cuttings, including the pot with the rooting medium are enclosed with polyethylene plastics bags in order to minimize transpiration, thus hastening rooting. The other known mass propagation technique is the Mist system which involves the spraying of water to the cuttings while placed in their rooting beds. But this technique is best suited to large-scale mass propagation operations.

The How tos

A. Shoot tip cuttings

1. Prune and fertilize (with 1 tbsp/gallon of urea) the stock plants weekly to facilitate new "flushes" or shoots.
2. After a month, collect healthy shoot tips with 3-5 nodes from the stock plants. The shoot tip cuttings should be at about 4-5 inches long.
3. Remove the older leaves leaving only one fully expanded pair.
4. Use only one of the following rooting medium:
   a.) pure coir dust
   b.) pure sand
   c.) decomposed rice hull and garden soil (1:1)
   d.) coir dust and garden soil (1:1)
   e.) coir dust, sand, and decomposed rice hull (1:1/2:1/2)
   f.) coir dust and sand (1:1/2)

To facilitate faster and easier rooting, the depth of sticking should be from 1.0 to 1.5 cm.

5. Prior to sticking, drench the rooting medium with water and allow it to drain. Immerse the

See Doñas, page 11

UPLB scientists...

Philip-Anthurium's new king

Anthurium is an herbaceous, hothouse plant. It has large highly colored leaves, a cylindrical cluster of flowers (spadix), and colored leafy sheaths (spathe). Growers of anthuriums in the Philippines cultivate mainly the old Hawaiian varieties, such as Kaumana and Nitta. Other varieties grown in the country are Baguio white and pink, Obake, Netarade, Miyana, and Tulip. Most companies get varieties intended for export mainly from Holland (www.da.gov.ph/agribiz/cutflowers.html). The elegant blooms of this tropical aroid (belonging to the Arum family of perennial plants) are produced and sold throughout the world. Although anthuriums are sensitive to low temperatures, they have a long vase life when properly handled. A newly developed hybrid of the anthurium foliage is King Philip. This is a clone of the selection from an inter-specific cross made by Mr. Fernando Aurigue of UPLB. It has elongated green leaves. The yellow-green spathe is lance-shaped, with darker veins and garish purple margin. Meanwhile, its spadix is black to purplish-brown turning to plum purple.

(For more information, please contact the following: for the aglaonemas, contact the Ornamental Crops Division, Department of Horticulture, UPLB, College, Laguna through telephone number (049) 536-2227 and the Exotica-Flowers and Plants, Inc., 48 Dinorado St., Sta Fe Subdivision, College, Laguna through telephone number (04) 536-0689 or e-mail: bvergara@laguna.net; for the orchids, contact the Puentespina Orchid Farm c/o of Mrs. Charita Puentespina, Malagos, Davao City through telephone number (082) 560-5128 or fax (082) 221-1395; for the anthurium, contact Ms. Clarita C. Pagulong, 27 Pilar St., Addition Hills, 1500 San Juan, Metro Manila through telephone numbers (02) 725-9645.)

A date...

so that buyers are assured of uniform-sized plants. He added that during November to December, the peak season for ornamental plants, two to three large trucks go down to Manila everyday to deliver the plants.

In King Louis Farm, quality and strategy is the name of the game. "Quality flowers come from quality planting materials," he emphasized.

Mr. Chatto admitted that most of their planting materials especially for poinsettias and liliums are imported from countries such as the Netherlands, and America because our country lacks the facilities for storing bulbs for a long time to maintain their quality and viability. In order to assure uniform and quality flowers throughout the seasons, old planting materials are discarded. Selecting a strategic place for growing cutflower is also a major consideration according to Mr. Chatto.

"We try to locate our farms in areas *na maganda ang* gravity to ensure a stable water supply. Water is abundant during the rainy season, but we have a hard time during summer and we tend to rely on deep well which consumes a lot of energy and effort," he explained. Though King Louis Farm is concentrating its

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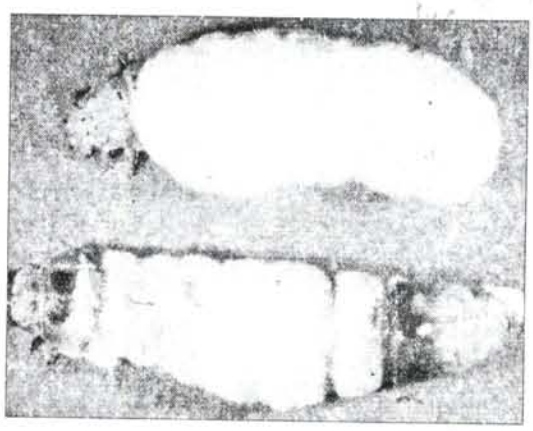
Beauveria mold bioinsecticide: safer control against orchid pests

by Junelyn S. de la Rosa

Since the early eighties, the orchid industry has been a lucrative and competitive business. Today, there is a big market for orchids. But the big market for orchids is also a stringent market. Orchid buyers all over the world want healthy and disease-free orchids. To make sure that their orchids are safe from various pests, orchid growers are using more and more commercial insecticides that are expensive. Some growers even spray insecticides weekly at the first sign of a pest. Lately, however, heavy pesticide usage has been constantly attacked on all sides. Environment and health experts have been active in advocating minimal use of pesticides. This resulted to an increasing demand for environment-friendly and people-friendly technologies that can effectively control the pests attacking orchids.

Meeting the challenge for safer technologies, Dr. Dante Santiago of the National Crop Protection Center, University of the Philippines at Los Baños (UPLB) developed a bioinsecticide using the spores of a mold- *Beauveria bassiana* (Bals.) to control two common orchid pests—the yellow orchid



Soybean loopers killed by fungus Beauveria bassiana.

beetle or orchid lema (*Lema pectoralis*) and vanda thrips (*Dichromothrips corbetti Priesner*). This project is one of the ongoing high impact projects of the National RDE Ornamental Network funded by the Bureau of Agricultural Research (BAR).

The bioinsectide is prepared by mixing Beauveria spores in a weak (0.01%) detergent solution. The solution was applied on the yellow orchid beetles and sprayed on Vanda flowers that are attacked by thrips. The researchers found that the Beauveria mold is very effective in controlling the beetles and the thrips. All grubs and adult beetles that were treated with the solution containing 10,000 mold spores died. Most of the Vanda thrips (94%) sprayed with the solution were also killed. The bodies of the dead insects were covered with the molds.

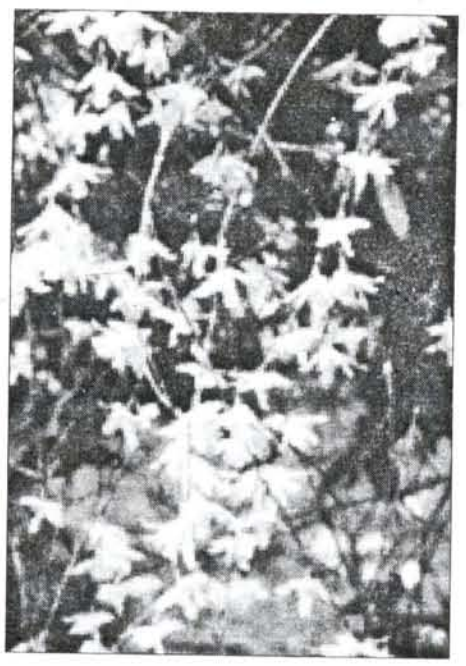
Male beetles that were contaminated with the spores infected the healthy female beetles with mortalities ranging from 87% to 93%. Most female beetles contracted the molds at least two days after the male beetles got infected. Each contaminated male beetle was able to transmit the infection to five female beetles at a time. Most of the infected female beetles died (96% to 100%). These findings imply that even a few contaminated male beetles can spread the infection to other beetles in the field.

The study also found that the male beetles are attracted to derivatives of cinnamyl alcohol.

See Beauveria, page

Orchids and mycorrhiza: a lesson from the wild

by Junelyn S. de la Rosa



In the wild, orchids rely on a symbiotic fungus to get water and nutrients from the soil. The fungus and the specialized roots on which the orchids grow are together known as mycorrhiza, or "fungal roots".

The symbiosis between mycorrhiza and orchids is one good example of a natural give-and-take relationship. Mycorrhizae soak up water and nutrients over a large area and provide them to the plant. In return, the orchid provides food in the form of carbohydrates to its fungal partner.

In some cases, some orchids cannot survive without a fungal partner throughout its entire life. Moreover, mycorrhizas produce healthier plants by protecting them from disease and other pathogens.

In developed countries, the commercial use of mycorrhizas for other crops has already taken off. Scientists believe that it will become more popular as demand for organic food increases in a year or so. Mycorrhizas are considered a better and more practical option than applying expensive fertilizers, pesticides and fungicides. To explore the potential of Mycorrhiza, five scientists from the National Institute of Molecular Biology and Biotechnology (BIOTECH)-Mesdames Marilyn Brown, Estrella Lales, Elsa Luis, Adora de Castro and Mr. Arnel Perez, tested six fungal isolates on a common orchid-Dendrobium sp.

The scientists found that Dendrobiums grow better when they are inoculated with the orchid mycorrhizal fungi (OMF). These fungal isolates were cultured in the laboratory and chosen from among 75 fungal isolates that were collected from Luzon and Negros. The isolates were either placed just below the roots of the Dendrobium or mixed in the potting medium made of charcoal and chopped fern chips.

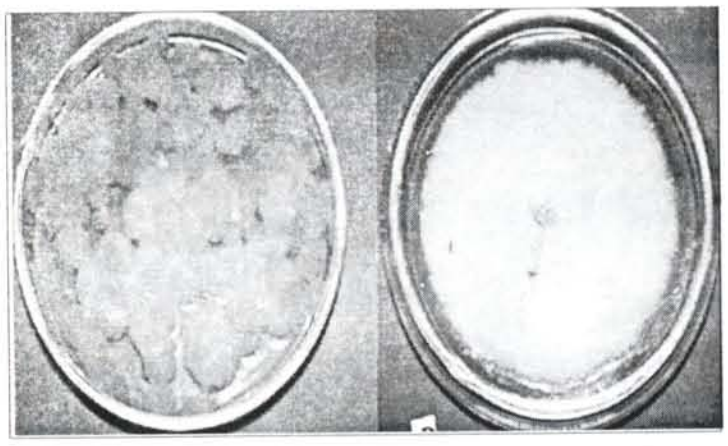
After three months, the inoculated Dendrobiums were bigger and looked more robust than the uninoculated orchids. After one year, the inoculated orchids were 3-5 times bigger, flowered earlier and produced more spikes than its counterparts. According to the experts, some orchid seedlings do not grow well without mycorrhizal inoculation. Thus, orchid growers who wish to propagate certain species for this lucrative industry must consider this new option. The researchers said that there is much promise in making OMF commercially available to ornamental growers.

While some orchid seedlings can grow without mycorrhizas when supplied with the necessary nutrients in culture, these plants tend to be more susceptible to fungal disease when mature, and often die. The key, therefore, to producing healthy, mature plants or orchids is to inoculate seedlings with mycorrhizas, following the symbiotic relationship in the wild.

(Source: Growth Response of Dendrobium sp. to Orchid Mycorrhizae Inoculation by Marilyn Brown, Estrella Lales, Arnel Perez, Elsa Luis and Adora de Castro of the National Institute of Molecular Biology and Biotechnology (BIOTECH) UP Los Baños, College Laguna, Won the AFMA R&D Paper Award 2001, Unpublished Category)

Controlling white rust in chrysanthemums

by Junelyn S. de la Rosa



Pure cultures of (a) Paecilomyces sp., (b) Verticillium sp.

Chrysanthemums in the highlands of Baguio, Benguet, some parts of Tagaytay and Davao are sick with white rust caused by the fungus-*Puccinia horiana Henn.*

Chrysanthemum rust was first discovered in the Philippines in 1961 by Teodoro et al., 66 years after it was first reported in China and Japan in 1895. Today, white rust has become more destructive than it was four decades ago. Some chrysanthemum varieties that were resistant before are now susceptible to the disease. Yield losses could be as high as 80% especially when the plants are infected at a very young age. A research team from Benguet State University (BSU) composed of Dr. Luciana M. Villanueva (project leader), Ms. Teresita Masangcay and Ms. Nordalyn Pedroche studied the alternate hosts and disease cycle of *P. Horiana* and verified the effectiveness of two fungal hyperparasites and bacteria for its control. The study entitled: "Fungal hyperparasites and bacterial antagonists as component of integrated disease management program for chrysanthemum white rust" is a high impact project funded by the Bureau of Agricultural Research of the Department of Agriculture (DA-BAR).

The researchers found that the pathogen does not infect other weed species in the area. Unlike other rust fungi, white rust only stays in one plant or host for its entire life. *P. horiana* produces two kinds of spores: bicellular teliospores and unicellular basidiospores. Mature teliospores germinate while still attached to the sori (a compact mass of spores) while basidiospores are usually discharged and spread by air, water, clothing, pruning tools, stakes, pots, or strings.

Basidiospores are generally short-lived while teliospores that grow on detached chrysanthemum leaves could live up to two months. Both spores thrive in humid and moist places and thus, white rust is a primary problem in the highlands.

P. horiana attacks the leaves of chrysanthemum causing spotting and in severe cases, twisting and finally, drooping of the leaves. Small, raised and discolored areas called pustules appear on the lower surface of the leaves and are beige to pink. These pustules produce the spores and turn white when they mature. Under severe infection, the flowers and stem can also be infected. Plants that are infected are usually stunted and defoliated thus affecting the quality of the cutflower yield.

The scientists recommend the use of two fungal hyperparasites-- (*Verticillium sp.* and *Paecilomyces sp.*) and bacteria (*Pseudomonas sp.* and *Flavobacterium sp.*) in combination with compatible fungicides to effectively control white rust. It has been observed that the pathogen has already developed minor tolerance to some fungicides commonly used to control the disease.

To effectively control the disease, they also recommend that growers spray right after the plants recover from transplanting. Spraying should be done every seven to ten days with a fungicide and to make sure that the lower leaf surfaces are thoroughly sprayed. This should be done until the plants are about 30-38 cm tall. Spraying along the aisles occasionally is also necessary to protect the late developing side shoots.

Other practices that could help control the disease are the following cultural management techniques: 1) Keeping the foliage dry at all times; 2) Removing infected leaves from the plants and burning them immediately; 3) Avoid watering plants late in the afternoon; 4) Using disease-free planting materials; and 5) Removing old plants and burning debris from the beds immediately as soon as the crop is cut off. By integrating the hyperparasites and the bacteria with fungicides and cultural management techniques, the scientists are confident that the farmers and other ornamental growers could stop white rust from being the much-dreaded nemesis of chrysanthemums in the highlands.

(Source: White rust: The nemesis of chrysanthemum in the highlands by Dr. Luciana M. Villanueva of Benguet State University, La Trinidad, Benguet; Tel No. 074-422-6504.)

Ways to enhance palm seed germination

by Laarni C. Anenias

One who is fond of collecting ornamentals simply won't miss out taking palms in his/her collection. Either for indoor or outdoor decoration, palms are a common choice among landscapers, interior decorators, and housekeepers.

For these reasons, demand for palms has significantly increased through the years. However, growers have not been able to meet this growing demand because of the lack of planting materials due to long and irregular germination of palm species.

To counter this problem, researchers from the Institute of Plant Breeding and Department of Horticulture in UP Los Banos recommend several techniques to induce uniform germination of palm seeds. The group, composed of Dr. Simeona Siar, Dr. Calixto Protacio, and Ms. Lilibeth Obmerga, recommend pre-treating the seeds prior to sowing. According to them, any of the following techniques could be used: soaking, hot water treatment (HWT), stratification, newspaper/paper towel technique (NP), or kulob (K) and exposed (E) techniques.

Soaking is done to soften the seed husks. Seeds are soaked in water from 2 days to 2 weeks. The researchers recommend daily changing of water to promote better aeration. HWT, on the other hand, involves soaking seeds in water at 50^{0}C for 15 minutes.

Stratification involves removing seed covering by soaking it in water, then air drying it for 24 hours. These are then placed in polyethylene bags and kept in a refrigerator at approximately 5-80^{0}C for 1 week.

Moreover, NP technique involves putting seeds in a fungicide solution (Dithane-M45), at 1 tsp/4L, for 10 minutes. Seeds are then airdried overnight, then wrapped in newspaper/paper towel, and sprinkled with water. These are then covered and sealed in plastic bags.

Furthermore, K and E techniques are done after sowing the seeds in containers. In K, containers are wrapped with polyethylene bags, then sealed. This retains moisture within the system and promotes seed germination. As the name implies, E technique involves exposing the seeds to the environment, but not in direct sunlight. Seeds should only be placed in shaded areas or in a screenhouse protected with three layers of net roofing. The researchers recommend the following media in sowing seeds: pure coconut coir dust (CD), pure garden soil (GS), and combination of CD and GS (1:1), and a combination of sand and CD (1:1).

These techniques were tried on local palms with anahaw (*Livistona sp.*) and *bunga* or *nga-nga* (*Areca cathechu*) having the highest germination percentages. Anahaw seeds had 100% germination rate, 6-8 weeks after sowing. Its seeds were soaked in tap water two weeks, sowed in GS media, and placed in exposed conditions. Bunga seeds, on the other hand, germinated 4-6 weeks after sowing, with a 96% rate. This rate could be achieved by pre-treating the seeds either in HWT or by soaking it for 2-3 days then sowed in a combination of sand and CD. After pre-treatment, seeds could either be placed in an enclosed or exposed condition.

With these techniques, we could now expect a more prolific palm production in the country.

(Source: Mass propagation techniques for selected palms, provided by the Integrated Ornamental Horticulture R&D Program, funded by the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD). For more information, write to The Executive Director, PCARRD, Los Banos, Laguna, Tel. No.: 049-536-0014-15.)

Prospects...

support large scale production of wide plant varieties, has typhoon-free areas, and improved facilities and communication systems. Like Japan, Hongkong is also a potential market since its ornamental imports have increased drastically from a mere HK$115 million in 1989 to HK$282.4 million in 2000. Dried cutflowers are mainly exported to the Netherlands. In 1999, our total export to this country was 26 metric tons valued at $192,280. The Netherlands took about 41% of our total ornamental exports from 1995-1999. In the same period, USA became a major importer of our fresh foliage, taking in 69% of our exports, and in 1999 earned for the country $492,593.

"Flowers are not made by singing 'Oh how beautiful,' and sitting in the shade."
-Rudyard Kipling-

To reap something beautiful and beneficial, one must be prepared to work hard and invest on something like the beautiful orchid that blooms after months of delicate rearing.

To truly break into the world market, the industry must improve its capability to meet the world's terms of quality, variety, quantity, consistency of supply, price, and

See Prospects, page 10

Prolonging the vase life of cut flowers with ethylene adsorbent and Florafresh

by Mary Charlotte O. Fresco

Flowers are exquisitely beautiful especially when they haven't been cut from their mother plants. But as soon as these flowers are cut and brought indoors, wilting reduces their beauty and quality. When a flower starts to wilt, its vase life is shortened; consequently, its market value falls. With these impinging factors coupled with improper post harvest handling and practices, one can hardly see a "blooming" cut flower industry.

To address this problem in cutflower production, scientists and experts from Postharvest Horticulture Training and Research Center (PHTRC) at UP Los Banos, Laguna, developed and introduced ethylene adsorbent and Florafresh to give cut flowers their maximum potential vase life.

Florafresh

Florafresh is a liquid mixture of biocide, sugar, buffer, and water applied to maintain the freshness of some cutflowers while prolonging their vase life. It is best applied to mums, gladioli, roses, carnations, and orchids.

One can easily apply Florafresh by following these simple steps:

1. Mix one part of Florafresh to 10 parts of water.
2. Use a clean sharp knife or shear in cutting the stems. This is necessary to prevent crushing the stem and to facilitate water/solution absorption in the cells. Remove leaves that are submerged in the solutions. Dead leaves trigger the growth of fungi and bacteria.
3. Soak the cut flowers in about 1-inch deep solution. Florafresh is guaranteed as more effective compared to using plain water or other holding solutions because it lengthens the vase life of flowers two-folds or more. One can expect normal opening of flowers and better color retention of petals even if the flowers are harvested immaturely.

Aside from being easy to use, Florafresh is affordable. Growers need only to spend P2.50 to treat a dozen of cutflowers.

Ethylene adsorbent

Ethylene is a gas emitted by any harvested commodity. It causes ripening and deterioration in fruits, vegetables, and ornamentals. In cut flowers, when ethylene gas concentration is high, the petals start to fade and fall.

Ethylene adsorbent (EA) in sachet form is made up of indigenous waste materials that directly absorb ethylene gas from a storage space, transport container, or pack of various horticultural produce. One can experience its optimum results when used with modified atmosphere packaging and storage (MAP).

EA is effective in delaying the deterioration of important cutflowers such as chrysanthemum, gladioli, and white dendrobium. EA is so easy to use and is applicable both in treating small or large bulks of postharvest produce.

When used with MAP, one should use the specified numbers of EA depending on MAP requirement. When dealing with large bulk loads, EA sachets should be evenly distributed within the shipment.

To maintain the effectiveness of EA sachets, it is important to store and pack unused sachets in a cool place, preferably inside a refrigerator. Stored absorbents that have turned brown or lost their violet hue are no longer effective to use.

EA was designed to cater to a wide range of users, which include farmers, housewives, retailers, shippers, exporters, and tissue culture practitioners.

It is safe to use, environment-friendly, affordable, and cheap costing only P2 per sachet.

(For more information, please contact Postharvest Training Research Center (PHTRC), UP Los Banos, College, Laguna at Tel. No. (049) –536-3259, 536-2444.)

Turfgrasses...

Likewise, he recommends further research to boost the industry's development. And since the turfgrass industry is not a priority, the government does not yet have the capability to fund this kind of projects. Dr. Naranja is enticing private stakeholders to invest in supporting and financing the breeding selection of these grasses to further boost the industry.

(Source: Turfgrass Use in the Philippines: An Overview, a Philippine National Bank Inaugural Professional Chair Lecture of Dr. Leonido R. Naranja, associate professor, Department of Horticulture, University of the Philippines, Los Baños, Laguna, Philippines: For more information, you may contact him at telephone number (049) 536-2227 or 536-2478.)

Cashing in...

from 7 am to 4 pm. The bags or pots used have at least four holes at the bottom to prevent water lodging that may result to stem rot.

Transplanting

Rooted cuttings are ready for transplanting when roots are already established, usually 3-4 weeks for tip cuttings and 4-5 weeks for nodal cuttings.

- Transplant individually in a 6x6x11 polyethylene plastic bag containing an equal mixture of burnt rice hull and sawdust.
- Keep the plants under partially shaded areas (60-70% shade) for a week before gradually transferring outside. Do not expose the plants to full sunlight during the dry season to prevent leaf burn.
- Avoid crowding the plants to minimize competition for space which might result to plants producing longer leaves. Shorter and more compact leaves are preferred in the market.
- One week after transplanting, apply complete fertilizer (14-14-14) at the rate of 1 tbsp/4 L of water thrice a month and once a month with urea (46-0-0), 1 tbsp/4 L of water. If slow release fertilizer (17-17-17) will be used, apply only once in every three months.
- Water the plants regularly during the dry season and minimally during the rainy season.
- Handweed as often as needed.

(For more information, please contact: Dr. Joy Eusebio of the Crops Research Division, PCARRD Los Baños , Laguna at tel no. 049 536-0014 to 536-0020.)

King in...

concentrations before they are planted on the soil: 100 ppm indole butyric acid (IBA); 100 ppm alpha napthalene acetic acid (ANAA); or 100 ppm Hormex or quick root powder.

Since moisture is crucial to the growth of Ti plants, they should be watered everyday to keep the soil and leaves moist. The plant should not be exposed to full sunlight since this might damage the leaves and alter its distinct color and form.

You may apply fertilizer (14-14-14) two weeks after transplanting. Apply at least one tablespoon of fertilizer for every four liters of water twice a month. As the plants grow older, apply fertilizer weekly. Urea (46-0-0) maybe applied once a month at one tablespoon per four liters of water.

This is practical for those producing Ti plants in a large scale. Otherwise, with the sun, the rain and soil nutrient, Ti plants can also grow healthily. ■

DOA...

plant diagnostics, and information technology in relation to agriculture.

Department of Agriculture (DA) Usec. Ernesto Ordoñez who represented DA Sec. Leonardo Montemayor as guest of honor said that the fields of knowledge to be discussed in the symposium are promising tools in agricultural science for poverty alleviation and enhancement of global competitiveness. We have to know how we are going to fully utilize them because " we do not have the luxury of time. Global competitiveness is the only key to our survival," he said.

With the onset of globalization, Thailand and the Philippines have recognized that cooperation is vital. "It is important that we share technologies so that we can jumpstart all those things we could do so as not to be left behind, Usec. Ordoñez further pointed out. BAR Dir. Eliseo Ponce added that "we will achieve more through this cooperation as we have common problems, interests and needs." Meanwhile, DOA Deputy Director Pitakpaivan expressed her appreciation for the collaboration, saying, "this gathering of Filipino and Thai scientists is a great opportunity to share solutions and opportunities. We value this research collaboration because this is a good channel for scientists and policy makers to exchange expertise and experiences that we can learn from each other and from there we can draw future activities complementing the policy of our government."

Moreover, she disclosed that for the coming years, Thailand will base its agricultural outputs on the demands of the local and international market. Consequently, its priority crops are rice, rubber, cassava, sugarcane, pineapple, coffee, palm oil, corn and what they call as " high potential crops" which include mangosteen, pomelo, peanut, baby corn, and sunflower. They also plan to increase their soybean and cotton production. To enhance production efficiency, DOA will promote sustainable production, decentralize their functions, and develop farmers' organization in the countryside.

BAR envisions a food-secure Philippines. Recognizing the crucial role research plays in the achievement of this vision, researches will be geared on developing novel agricultural production techniques and postharvest technologies to improve productivity and profitability of agricultural commodities and promote sustainable agriculture.

BAR and DOA will start drafting protocols of exchange for germplasm to expedite exchange of varieties between the two countries. However, Mrs. Pitakpaivan disclosed that Thailand must wait for the Mutual Trade Agreement endorsement from their DOA. For the meantime, requests for exchange visits of scientists and researchers will be facilitated to encourage exchange of scientific and technical information.

The activities and impacts of the BAR- DOA cooperation will soon be posted on the BAR website and linked to the DOA website as

See DOA, page 2

Mass producing the fragrant *Kamuning*

by Junelyn S. de la Rosa

Kamuning or *Murraya paniculata* is a small tree that is famous for its fragrant white flowers that smell like jasmine. Native to Southeast Asia, China and the Malay peninsula, *kamuning* or Orange Jasmine has pear-shaped leaflets that are dark green and glossy. After each blooming period, its white blossoms turn into orange and scarlet fruits.

Before, *kamuning* was usually planted as a hedge or accent shrub for landscaping purposes. Today, its glossy evergreen foliage is more popular as fillers in flower arrangements. Recent surveys show that fillers now occupy a substantial share in the cutflower business. A recent survey says that cut foliage or fillers make up almost a third of bouquets compared to 5% 10 years ago. To meet the increasing demand for foliage plants, the Institute of Plant Breeding of the University of the Philippines at Los Baños (IPB-UPLB) has identified techniques to mass produce *kamuning* successfully. There are two ways to mass propagate k*amuning*, either through stem cuttings or seeds.

Propagation by stem cuttings

A. Preparation of stem cuttings

- Secure healthy and woody 13-20 cm long stem cuttings. Remove 5-8 cm of the terminal stem to allow faster rooting. Choose cuttings with mature leaves.
- Place the newly harvested cuttings in polyethylene plastic bags then sprinkle with water to prevent from drying. Seal the bags with rubber bands.

B. The *kulob* method

Kamuning stem cuttings root faster in the *kulob* method wherein the whole system is enclosed in a polypropylene plastic bag. This method helps to maintain the humidity needed to initiate rooting. For extensive rooting, use appropriate media and rooting hormones. The steps involved in this method are as follows:

- Prepare rooting medium composed of an equal mixture combination of sand and coirdust. Drench with 1 tbsp fungicide dissolved in 4 liters of water.
- Dip cuttings either in "quick root powder" or in 50 ppm alpha napthalene acetic acid (ANAA) or Hormex for 30 minutes.
- Stick the cuttings, 4 cm deep, in a 6x6x11 plastic bag containing the medium. Use bigger pots if more cuttings will be planted. A maximum of 4-6 cuttings can be planted in a 6x6x11 plastic pot.
- Enclose the whole system with a polypropylene plastic bag and seal with rubber bands.
- Place the *kulob* plants under shade.

C. Transplanting

After 6-8 weeks, roots are already established. Transplant rooted cuttings as follows:

- Transplant individually in 6x6x11 plastic bags containing either an equal mixture of sand and coir dust or soil and coir dust.
- Acclimatize transplanted plants under partial shade for one week before exposing them to full sunlight. Well-established kamuning plants can tolerate both partial shade and full sunlight conditions.
- After one week, apply complete fertilizer (14-14-14) at 2 tbsp in 4 liters of water. Repeat every other week. Apply urea (46-0-0) at 1 tbsp. dissolved in 4 liters of water once a month. Slow release fertilizer (17-17-17) could be applied once in every three months. Plants that are transplanted should not be fertilized too often.
- Water the plants daily during the dry season and minimally during the rainy season.

Propagation by seeds

A. Preparation of seeds

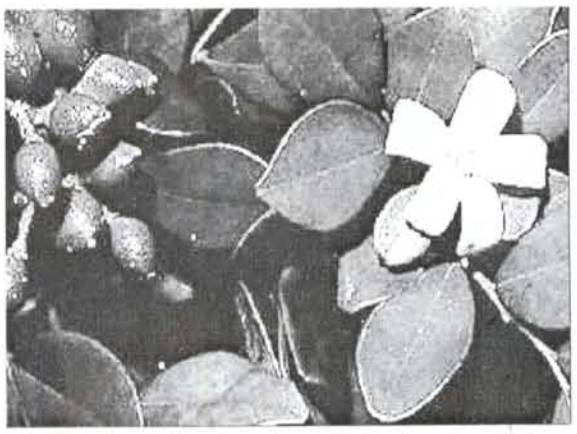
- Harvest ripened seeds from the mother plant. Ripe seeds may be orange/red orange to deep red depending on the variety or strain of the plant.
- Soak the seeds in water for 3 days . After 3 days, remove the pulp of the seeds and wash with clean water.
- Air-dry the seeds for a few hours before sowing.

B. Germination

- Sow the seeds by spreading them evenly in a polyethylene bag containing an equal combination of either the following mixture: sand + coconut coirdust or burnt ricehull+ sawdust.
- Cover the seeds with 1 cm layer of the medium and place in a shaded area.
- Water the seeds only when the surface of the medium appears dry.

C. Transplanting

- Kamuning seeds usually germinate 2-8 weeks after sowing. Transplant seedlings one week after germination or when the first pair of leaves emerges.
- Transplant individually in a 2.5x 2.5x5 plastic bag containing an equal combination of any of the following medium:
  - garden soil + coirdust
  - sand + coirdust
  - burnt ricehull + coirdust.
- Keep the newly transplanted plants in the shade for at least one month. Kamuning seedlings grow best under partial shade. Direct sunlight causes yellowing and scorching of the leaves.
- Apply complete fertilizer (14-14-14) two weeks after germination at 1 tbsp/4 L of water. Repeat every other week. Urea (46-0-0) at 1 tbsp/4 L of water should also be applied once a month.
- Water the plants daily during the dry season and minimally during the rainy season.



(For more information, please contact: Dr. Joy Eusebio of the Crops Research Division, PCCARD Los Baños , Laguna at tel no. 049 536-0014 to 536-0020.)

Beauveria...

These attractants were as effective as the females beetles in luring the males. The researchers are positive that these attractants can be used in making baits that will contain Beauveria spores. At present, the researchers are developing and mass producing the new bioinsecticide. They believe that it is high time that orchid growers switch from using harmful chemicals to a much better and safer option- the Beauveria bioinsecticide.

(For more information, please contact: Dr. Dante Santiago of the National Crop Protection Center of the University of the Philippines at Los Baños at tel no: 049-536-2409.)

Prospects...

service reliability.

However, our local producers are hindered from improving their merchandise because of high production costs, shortage of quality planting materials, insufficient production technology, and unavailability of appropriate agricultural chemicals. These issues cause a chain of other problems for exporters as well since there are insufficient quality products to sell.

The Bureau of Agricultural Research (BAR) has created the National Ornamentals Research Development and Extension network which spearheads all development activities to improve the industry and has taken moves to continue the first Integrated Research Program on Ornamentals initiated by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD). The network has also formulated a national RDE agenda which contain specific programs and projects geared towards developing new technologies for the ornamentals sector.

It is true that we cannot expect great products by just desiring it, but by working toward it.

(Sources: National RDE Agenda and Program for Ornamental Crops; Japan and Hongkong Markets on Cutflowers by Cecilio Costales; Cutflower Industry Situationer report from www.da.gov.ph/agribiz/cutflower.html; Ornamentals and Medicinals from www.pcarrd.dost.gov.ph/commodities/crd/ornamentals/ornamentals_soa&soi.html.)

Aglaonema...

other day and transplant the rooted cuttings after four or five weeks.

For large-scale propagation, the researchers recommend nodal cutting which makes use of the plant's two-node or half-stem (with one bud) as propagules. Before planting, growers must soak the nodal cuttings as well as its rooting medium in fungicide solution. Basal ends of half-stem cuttings need to be treated with 50 ppm of indole butyric acid (IBA) or napthalyne acetic acid (NAA) for 15 minutes. Insert the cuttings partially in the medium and place under shade. Daily but moderate watering is recommended. After eight to ten weeks, pot the cuttings individually in size 3 or 4 pots in the following non-soil mixes: mixture of one part sand and one part coconut coir dust or an equal combination of sand, coconut coir dust and rice hull. After two weeks, fertilize the plants every week thereafter, alternating urea or complete fertilizer at 1/2 tsp/4 l of water. In addition, slow release fertilizer, such as Multicoat, must be supplemented every quarter. The plants should be ready for marketing in five to eight months.

(Source: PCARRD Information Bulletin no. 138a/2000: Mass Propagation of Aglaonemas by Dr. Calixto Protacio and Ms. Lilibeth Obmerga, Dept. of Horticulture, College of Agriculture, UPLB. For more information, contact Dr. Joy Eusebio, Director, Crops Research Division, PCARRD, UPLB, Tel no. (049)536-0014 to 15; and 536-0017 to 20.)

GMA presents...

medallion.

The Gawad Saka Awards is an annual search for outstanding achievers in agriculture and fisheries that represent the various stakeholders of the community—farmers, fisherfolk, farm communities, scientists and organizations as well as DA and local government employees. *(Junelyn S. de la Rosa)*

The national...

consists of fresh leaves, twigs, and branches that often go with cutflowers in floral arrangements and foliage plants grown in containers.

Flowering annuals, shrubs, herbaceous perennials grown in containers, evergreens, and turfgrass compose the group on flowering pot plants and landscaping materials. Processed ornamentals, on the other hand, are those that have been slightly altered through drying, dyeing, and other processing methods.

For each commodity line, there are six disciplines where research activities are aligned: production, postharvest, crop protection, socioeconomics and marketing, crop improvement and conservation, and policy and advocacy.

UPLB is the lead agency in the program's implementation, monitoring, and evaluation. Institutional members of the network are as follows:

- Benguet State University
- Cavite State University
- Leyte State University
- Central Mindanao University
- Bureau of Plant Industry – Los Banos National Crop Research and Development Center ■

Outstanding...

Laguna, Bago Oshiro, Baybay, and Tagnana – all local tall varieties; and West African and Rennel – both foreign tall varieties. The Philippine Coconut Authority's research initiatives on this variety started in 1977. It was only last year when the initial distribution of its seeds was made. Results of this 13-year research are worth the wait. This new variety yields medium to large nuts (1,529-2,848 grams) and starts to bear flowers at 2.5 years.

Pres. Arroyo receives a seedling of the GMA farmer's coconut variety from Philippine Coconut Authority Administrator Carlos Carpio.

Moreover, this new variety bears 52-88 nuts per palm, unlike old varieties which yield only 38 nuts per palm. It produces approximately 7,638-11,813 nuts per hectare, compared to the old varieties at 4,000 nuts per hectare.

SNAP hydroponics, is simply "planting without soil." The Institute of Plant Breeding, also in UPLB, introduced the SNAP hydroponics technology. This technology is a simple and cheap method of producing vegetables such as tomato, lettuce, cucumber, watermelon, cauliflower, broccoli, and celery; and can be done in a small space. Researchers stated that plants in hydroponics are healthier, fast-growing, and disease-free since vegetables are free from weeds and other soil-borne pests and diseases.

The CD ROM on "Knowledge-based systems for sustainable fisheries management," generated by the National Fisheries RDE Network, contains information that are relevant to fisheries management. Among the features of this CD-ROM are the Fisheries Code, National Integrated Protected Areas System (NIPAS) Act, and other relevant fisheries laws.

Other highlights of the R&D Week

Aside from the presentation of technologies, the launching of the Agriculture and Fisheries R&D Information System (AFRDIS) was held. AFRDIS is BAR's information technology venture connecting all RDE networks, SCUs, and the regions to a central information system to enhance their information-sharing capacity. The AFRDIS' launching featured a videoconference between President Arroyo and selected farmers in Central Luzon.

Other main events during the week-long celebration are the National Research Symposium, where BAR awarded outstanding papers generated by local scientists. In the Unpublished Category, three major awards were given out: the AFMA Outstanding R&D Paper, AFMA Best R&D Paper, and AFMA R&D Paper. Under the Published Category were the DA Secretary's Award and the BAR Director's Award.

A day was also devoted to provide a forum for international research agencies to meet and discuss issues along this year's theme, "New Science and Tools for Food Security and Poverty Alleviation". Representing the various agencies during this year's International Agriculture Research Day were: International Rice Research Institute, Asian Vegetables Research and Development Center, International Center for Living and Aquatic Resources Management, International Maize and Wheat Improvement Center, International Livestock Research Institute, Center for Agriculture and Biosciences International, and International Plant Genetic Resources Institute/International Network for the Improvement of Banana and Plant.

A Recognition Day was held to give due credit to the people who performed outstanding work in helping the Bureau advance R&D in the country. BAR staff and scholars, DA scientists, network team leaders, and members of the Senior Scientist Advisory Committee were all recognized for their invaluable support and contribution to the Bureau, and consequently, to the agriculture and fisheries sector.

BAR likewise gave Congressman Florencio Abad, from the lone district of Batanes, this year's *Gintong Butil* Award for his "strong support to the goals of BAR and concern for the development of agriculture and fisheries in the country while he was chair of the Appropriations Committee, House of Representatives."

National leaders such as Vice President Teofisto Guingona, Senator Manuel Villar, and Department of Agriculture (DA) Secretary Leonardo Montemayor, likewise, graced the week-long activities.

BAR plays a pivotal role in the development of the country's agricultural sector through its endeavors in national research and development. The Agriculture and Fisheries Modernization Act, more popularly known as AFMA, mandated it for this important task. *(Laarni C. Anenias)*

UPLB scientists...

oryoforchids.html). And so began the plants' popularity in the Philippines. Orchids belong to the *Orchidaceae* family and has four types: a.) epiphytes (air plants which grow chiefly on trees); b.) lithophytes (clings to the surfaces of rocks); c.) saccophytes (grow in decaying vegetation on the forest floor); and d.) terrestrials (roots in soil or sand). In the Philippines, the most popular varieties of orchids are *Vanda* and *Dendrobium*. Other varieties are *Cattleya*, *Cybidium* and *Phalaenopsis*.

Orchids are identified in terms of genera and species, and mostly their names are derived from scientific and Latin words. Many orchids are named after famous collectors and plant hunters. An example is *Vanda sanderiana* which is named after the 'Orchids King' Frederick Sander who collected it from Mindanao, Philippines in 1880.

Today, our local scientists have developed two more hybrids of orchids—the Spathoglottis Sunrise and the Dendrobium Ingrid Fancy. The Sunrise was developed by two women scientists, Dr. Teresita Rosario and Ms. Anilyn Maningas of UPLB. A very beautiful cross, its yellow flowers are spotted with numerous brick red dots starting at the base of petals vanishing towards the tip. Its lateral lobes are also brick red. Meanwhile, the Ingrid Fancy is white with bluish purple petal tips. Its lip has a yellowish midlobe with bluish purple tip. The lateral lobes are whitish green. Considered as one of the best cloned pastel hybrids of Davao City's Ms. Charita Puentespina, the Ingrid Fancy was also developed with the help of Rosario and Maningas.

See UPLB scientists, page 7

A date...

production for the local market, the farm is also engaged in producing Calla lily bulbs, particularly the colored varieties for export to Holland. Being an economist by profession and at one time bank manager for some years, Mr. Chatto claimed that management per se is not a major problem. "*Mahirap kapag* rainy season, it is too humid, *kaya* fungus *ang karaniwang sakit ng halaman, yun ang* major problem *sa lahat ng halaman dito*" he claimed. "What we do is we link with other big cutflower growers, at least they know the appropriate strategy to adopt. In return, we help them on technical aspects where they are not quite familiar with. *Ganyan dapat talaga sa* business, give and take *minsan ng* knowledge," Mr. Chatto wittingly expressed.

Mr. Chatto believes that King Louis Farm as a company has come a long way. At present, they are not only catering to the cutflower needs of Metro Manila and several points in Luzon, but are also supplying big flower shops in Bacolod and Cebu. For whatever strategies are behind this success, Mr. Chatto would not hesitate to share them with those who are willing to venture into the cutflower business. ■

Donas...

shoot tip cuttings in fungicide solution (5-10 minutes). It is also recommended that the rooting medium be drenched with fungicide solution to avoid any fungal contamination. One may use a 5x5x7 black plastic bag for planting 20-25 shoot tip cuttings. 6. Enclose the entire system (cuttings, pot, rooting media and wire) with a polypropylene plastic and seal with a rubber band or string. Place it under partial shade. 7. Open the plastic bag at least once a week and gently pull the cuttings to check if they have rooted. 8. Start transplanting the cuttings after 1 to 2 weeks or when they have developed firm roots.

(For more information please contact: Dr. Calixto M. Protacio or Ms Lilibeth R. Obmerga, Department of Horticulture, College of Agriculture, UP Los Banos, Laguna at Tel. No. (049) 536-2448.)

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Region 6
Ms. Corazon Arroyo, WESVIARC
Region 7
Ms. Nenita Montecillo, CEVIARC
Region 8
Dr. Elizabeth Briones, LSU
Region 9
Mr. Dennis Palabrica, Western Mindanao IARC
Region 10
Ms. Cora Dumayaca, Northern Mindanao IARC
Region 11
Dr. Lourdes Generalao, Davao City
Ms. Rosita Rodriguez, Davao City
Ms. Myrna Cantila, Davao City
Region 12
Ms. Angelita Abrazado, CEMIARC

Farmer/Fisherfolk-Industry Advisory Committee (FIAC)
Chair: Mr. Efren Chatto
Members:
Mr. Rex Puentespina
Mr. Ramon Yan
Dr. Benito Vergara
Mr. Art Lopez

The national RDE program for ornamental crops

by Laarni C. Anenias

A few years ago, experts in the ornamental industry identified R&D activities and lack of government support as two areas where the Philippines has rated poorly. Thus, with the combined efforts of the Bureau of Agricultural Research (BAR), University of the Philippines Los Banos (UPLB), and Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD), the national RDE program for ornamental crops was developed.

Guided by a vision of improving the ornamentals R&D, this network pursues its mission of shaping the country's policies and directions to create a more conducive industry scenario in generating and promoting relevant technologies.

Program themes

The program works along themes that are aimed to help the local industry become more globally competitive. These are as follows:

- Sustained productivity and increased profitability through cost-efficient production system
- Quality enhancement through post-production systems improvement
- Human- and environment-friendly pest management systems
- Biodiversity conservation, development, and utilization
- Investment strategies, advocacy, and policy reforms for global competitiveness
- Promotion of appropriate and sustainable technologies

Products

The program covers four groups of commodity lines: cutflowers, cut and containerised foliage plants, flowering pot plants and landscaping materials, and processed ornamentals (e.g. flowers, leaves, branches that are dyed or dried).

Cutflowers, as the name suggests, are flowers cut from their stems. Used as centerpiece in any floral arrangement, cutflowers are indeed the most common ornamental commodity. The cut and containerised foliage plant group

See The national, page 10

GMA presents 2001 Gawad Saka awards

As the Department of Agriculture (DA) celebrates its 103rd anniversary, 38 Gawad Saka winners were honored by her Excellency President Gloria Macapagal-Arroyo on October 25 at the Heroes Hall in Malacañang. She was assisted by DA Secretary Leonardo Q. Montemayor in giving the awards.

Individual winners for the outstanding farmers and fisherfolk category received P25,000 cash each. They were: Luz Lozada (Outstanding Rice Farmer), Jose Lorenzo (Oustanding Corn Farmer), Joel Laxamana (Outstanding Coconut Farmer), Andres Berongoy (Special Citation), Pablito Sandoval (Outstanding Sugarcane Farmer), Cirila Sanchez (Outstanding HVCC Farmer), Cosme Gunnawa (Outstanding Large Animal Raiser), Albino Antipolo (Outstanding Small Animal Raiser), Domingo La Torre (Outstanding Fisherfolk), Guillermo Amploquio (Special Citation), Erlindo Alcantara (Special Citation), Victor Hortiz (Special Citation), Alberto Tabangay (Outstanding Fishfarmer), Samuel Corpuz (Outstanding Young Farmer/Fisherfolk), Joseph Fernando (Outstanding Young Farmer/Fisherfolk), Ernesto Dongbo (Outstanding Young Farmer/Fisherfolk).

DA Sec. Leonardo Montemayor (center) poses with the GAWAD Saka winners.

Outstanding farm organizations received project grants from P150,000 to P250,000 pesos. The winners were: Shelmed Cottage Treasures (Outstanding HVCC Processor), Sirawan Foods Corporation (Outstanding HVCC Processor), TUGA 4-H Club (Outstanding Young Farmers' Organization), Saints Peter and Paul Multi-purpose Cooperative (Outstanding Small Farmers'/Fisherfolk's Organization), Candelaria Rural Improvement Club (Outstanding Rural Improvement Club), MAFC of San Francisco, Surigao del Norte (Outstanding Municipal and Fishery Council), PAFC of Baligatan, Ilagan, Isabela (Outstanding Provincial Agricultural and Fishery Council) .

Dr. Mercedes Umali-Garcia of the National Institute of Biotechnology and Applied Microbiology of the University of the Philippines at Los Baños (UPLB) garnered the Outstanding Agricultural Scientist Award for developing the BIO-N and the Biotab fertilizers. The Bureau of Agricultural Research (DA-BAR) will provide her a research grant of up to P1 million pesos. Dr. Garcia also received the Rizal-Pro Patria

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were live plants, cuttings and slips (35%) mainly from Israel (35%), fresh cutflower and flower buds (28%) and orchids (14%) mainly from Thailand, and bulbs and tubers (7%) mainly from the Netherlands.

The fall in the country's cutflower supply was particularly evident from 1995-1999 when a negative growth rate of 11% per year was recorded. Only 56,964 metric tons was produced for the whole period, with a yearly average of only 14,241 metric tons. Although cutflower production does not require huge areas of land, the drop in production from 1995-1999 can be partially attributed to the decreasing area planted to it. From1995, land cultivated to cutflowers dipped from 1,284 ha to only 1,056 ha in 1999. With 34% of the area devoted to it, gladioli was the highest yielding cutflower for that period at 205.12 mt per hectare per year followed by orchids at 178.54 mt/ha, and baby's breath at 137.63 mt/ha.

Except for cut foliage, the demand for the remaining two product lines is not comparable with the cutflowers'. The demand for foliage is actually dependent on the demand for cutflowers since both are used for flower arrangements and bouquets. Most popular among cut foliage plants are various dracaenas, cordylines, ferns, palm fronds, and murraya. Meanwhile, landscaping materials usually cater to the needs of newly constructed or refurbished subdivisions, shopping malls, golf courses, parks and public/private buildings.

International demand for ornamental products is growing which local producers still have to take advantage of, particularly the cutflower and cut foliage markets. Although we have penetrated some Asian markets, exports have been irregular in the last five years

wherein we traded only1,291 mt valued at $1.8 million. In 1999, the country earned $2.01 million in exports. The most in demand are fresh foliage which contributed 31% of the total export earnings, followed by live plants/cuttings and slips with 29%, cutflowers with 19%, and flower buds with 11%. In 2000, however, export earnings slipped at $1.98 million which pales in comparison to ornamental market earnings of Thailand, Malaysia, Singapore, and most Asian countries.

Studies have shown that the biggest market for Philippine exports of live plants, cuttings, and slips is Korea. In the last five years, they have absorbed 65% of the total volume of this product line, and earned us $230,000 in 1999 alone. Meanwhile, Japan is the biggest importer of our cutflowers and flower buds, taking in 88% of the country's production from 1995-1999, and earned us $313,426 in 1999 alone. In a paper by Cecilio Costales entitled "Japan and Hongkong Market on Cutflowers," he described the vast opportunities awaiting our export producers, particularly Davao which has enough resources that can

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