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IPB recommends organic farming for vegetables

For the past years, the Institute of Plant Breeding (IPB) through funding support from the Bureau of Agricultural Research (BAR) has been conducting several varietal trials for organic vegetable production. The main purpose is to enable the Institute to recommend varieties of vegetables suited for organic farming.

What is organic vegetable production?

Organic vegetable production is a system based on the principle of taking care of nature and respecting all life forms. It is a progressing industry not only in the Philippines but mostly in America and Europe. This agricultural practice is health-wise and cost-effective since it does not use synthetic chemicals.

Some of the methods used in organic vegetable production include: organic fertilizer (using animal manure or compost as growing aids); intercropping (planting different types of plants); repellants (plants that release strong scents to fend off pests); attractants (plants that appeal to natural enemies); crop rotation (planting legumes after harvesting the main crops to enhance the soil with nitrogen); and mulching (using hay or plastic to retain soil moisture, minimize the growth of weeds, and to nurture the soil from extreme weathers).

IPB identified 11 kinds of vegetables suitable for organic vegetable production. These include eggplant, pepper, tomato, cauliflower, cabbage, lettuce, string beans, bush beans, cowpea, Baguio beans, and bunching onions.

Eggplant

Eggplant is one of the most planted and valuable among vegetable crops. It is the most consumed vegetable among Filipino households, particularly those belonging to the lower income bracket.

IPB recommended three eggplant varieties suited for organic production. These are: Concepcion (circular and greenish with white stripes); 455 (long and purple); 98-452 (long and purple); and Thep (long and greenish).

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CERDAF approves five addt'l national programs

DA Sec. Montemayor (extreme left) leads the oath taking of National Team Leaders during the CERDAF Meeting last May 28.

The Council for Extension, Research and Development for Agriculture and Fisheries (CERDAF) approved five National Research and Development/ Extension Agenda and Programs (NIRDEAPs) on May 28. These include NIRDEAPs of the networks on *Agricultural Engineering*, *Soil and Water Resources*, *Crop Protection*, *Irrigation and Drainage*, and *Grains Postharvest*. The NIRDEAPs embody the integrated thrusts and directions of each network for RDE, specifically containing programs and activities for specific commodities/discipline.

Prior to their approval by the Council, the NIRDEAPs underwent the regular review process by the Farmer/Fisherfolk-Industry Advisory Committee then by the Senior Scientist Advisory Committee.

Agricultural Engineering

The Agricultural Engineering Agenda and Programs are anchored on the National Agricultural Mechanization Plan to develop and promote appropriate agricultural engineering technologies. At present, the Philippines ranks lowest among Asian countries in terms of farm power utilization level resulting to high postharvest losses. With the Mechanization Plan, the network is now targeting to increase the current farm power level to 1.0 hp/ha in the short term, and 4.0 hp/ha in the long term.

Soil and Water Resources

The integrated RDE effort for the soil and water resources will revolve around two specific thrusts: soil conservation and management, and water conservation and management. The former will develop integrated management practices to conserve soil and improve its productive capacity, while the latter will focus on developing water conservation strategies by conducting water resources assessments, irrigation systems management, and water

See CERDAF, page 5

The growing Philippine vegetable industry: obstacles and opportunities

by Thea Kristina M. Pabuayon

With the enactment of the Agriculture and Fisheries Modernization Act (AFMA) in 1997, the Philippine agricultural sector has been modernizing rapidly, establishing itself as the center of the country's economy – with a 25% Gross Domestic Product (GDP) contribution and employing 50% of the labor force. However, the industry as a whole continues to exist as units of small, individually-functioning farms, most of which are producing fruits and vegetables for home consumption or as small-time alternative income source.

Vegetables as part of Filipino subsistence, be it as food or as source of livelihood cannot be undermined. All 43 kinds and 250 lesser-known species of Philippine vegetables are important sources of minerals, vitamins, fiber, and proteins. In the crop category, vegetable ranks second to ornamentals in terms of income generated per unit area and time. Moreover, it is widely used as an intercrop for coconut and fruit trees, and as a component of other cropping systems. Ironically, per capita consumption is quite low at 39 kilograms considering that the recommended intake is 69 kilograms.

Local Production

Vegetable production in the Philippines is highly seasonal, with the bulk of production coming from Ilocos (19.05%), CAR (19%), Southern Tagalog (12.74%), Central Luzon (9.28%), Western Visayas (6.88%) and Northern Mindanao (6.44%) from October to November.

In 1997, vegetables contributed 8% to the country's total agricultural output. From 1990 to 1997, it registered a 13.33% production growth, from 4.5 million metric tons (M MT) in 1990 to 5.1 M MT in 1997.

In the same year, with only 5% of the country's total agricultural area devoted to it, the vegetable industry contributed P26 billion to the economy and accounted for 9.4% of the total agricultural production.

Beyond rice and corn production, the Philippine agricultural industry is focused in meeting export commitments. This policy is supported by the government and is also the reason for the increased production of vegetable crops such as eggplant, onion, tomato, garlic, squash, and cabbage. Among these crops, eggplant leads in value of production with P1.8 M in 1999

See The Growing, page 3

Growing vegetables without soil

by Rita T. dela Cruz

Ever tried growing your own vegetable without soil…in a snap?

This is the enticing poser of the Institute of Plant Breeding (IPB), the country's national breeding center for all crops (except rice).

Yes, you can grow vegetables without soil.

What is SNAP hydroponics?

The idea of growing plants without soil is no longer new. Many small or big time farmers in Europe and the United States or even in our country are already practicing it.

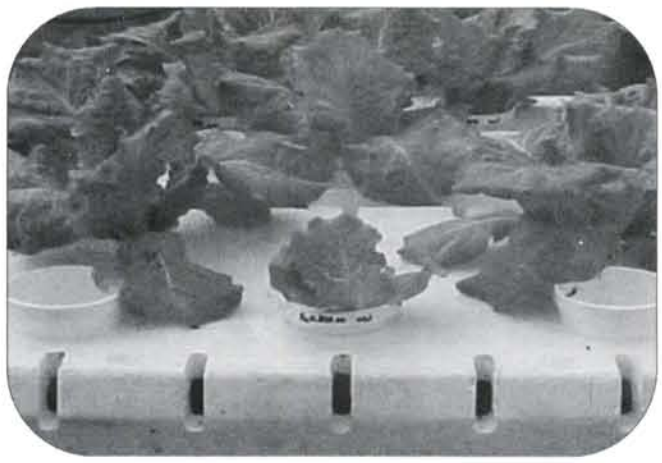
Hydroponics *per se* is the science of growing plants without soil while SNAP hydroponics is a low-cost, simple system developed primarily for household and vegetable growers. Researchers from IPB said that this technology is suited mainly for urban setting but it can be expanded to commercial scale for high-value and traditionally-grown vegetable crops.

SNAP hydroponics versus soil-grown vegetables

No soil means no weeds or soil borne pests and diseases. Plants maintain the best and most favorable nutrient and moisture levels in this type of hydroponics system. Healthier, fast-growing, and disease-free plants are being produced. The basic idea here is that the root systems stay smaller on hydroponically-grown plants, so the plant can concentrate its growth energy on producing plant mass, rather than roots. This can result in up to 30% faster growth. Likewise, it allows the vegetable grower to save garden space as he'll have more plants per square foot of the allotted space. Furthermore, hydroponically-grown plants never get root bound, so they do not need to be re-potted. The produce has a longer shelf life than soil-grown produce. Hydroponics is clean, so it adapts easily to indoor culture, but may also be used outdoors and in greenhouses.

What are the basic SNAP requirements?

The basic idea behind the SNAP hydroponics is simple and easy to follow. It is basically a beginner-friendly method of farming. It does not need electricity and other hard-to-acquire equipment or high system maintenance. To be able to set-up your very own SNAP hydroponics garden, basic requirements include: plenty of sunlight, clean water, snap fertilizer, growing container, and a growing area. All these for a simple, low-cost and yet high quality produce.



Starting a SNAP

The process involves seven stages: seedling production, holding cup preparation, seedling plugs production, growing container preparation, nutrient solution preparation, SNAP vegetable maintenance, and harvesting.

During seedling production, the seeds are sown in sterilized coconut coir-sand mixture until germinated. It is advised that nutrient solution be used instead of water 3 days after germination and ready for pricking. The seedlings are pricked and placed individually in a holding cup or plug, seven days after the seeds are sown.

Before pricking, the holding cup must first be well-placed. To do so, a one inch hole is needed at the bottom of each cups. Then it is patched from the inside with a garden net. The cup is filled with coir dust with 1-2 cm thick making it ready for the next stage.

During the third stage, seedling plugs are placed in plastic trays and watered with nutrient solution. This is maintained at least one-fourth inch deep for seven days to ensure that the bottom of the cup is always immersed. The root starts to grow from its netted bottom. If the roots are 2-3 cm, the plugs may now be transferred to growing containers.

The fourth stage includes preparing the growing container. This could be any of the following: discarded styropor fruit boxes, wide-mouthed jars, water buckets or pail, or any other container that can hold at least three liters of nutrient solution. The pots are then covered securely and dug with six holes which serve as hold of the seedling plugs.

The fifth stage is preparing the nutrient solution. The SNAP fertilizer is mixed with clean tap or rainwater and stored in a plastic drum. A pH of 6.0 is required before pouring the solution into the growing container.

The next stage is maintenance. This is done by making sure that the bottom of the plug touches the solution surface until the roots are long enough. The solution is replenished to a maintaining level once or twice a week. It is not advised to add solution a week before harvest.

The last stage is harvesting, which depends on the type of vegetables planted.

(For more information, please contact Dr. Rodel G. Maghirang, Vegetable RDE Network Team Leader, Vegetable Crops Division, Institute of Plant Breeding, College of Agriculture, UPLB, College 4031 Laguna, Tel. No. (049) 536 2298; 536-2697 or 536 3304 local 217 or Fax No. (049) 536-3438)

MMSU recommends off season tomato

Three new tomato hybrids developed by researchers from the Mariano Marcos State University (MMSU) offer excellent opportunities to Ilocos farmers to venture into profitable tomato production during the off-season.

The developed hybrids are high-yielding, early-maturing, and tolerant to the very humid conditions during wet seasons in the Ilocos Region. The fruits are juicy, sour, and have round and deep oblate shapes, qualities that are preferred by local consumers.

The three MMSU hybrids (Hybrids 1, 2, and 3) were developed in a five-year study by MMSU researchers—Marylis Nalundasan, Rolando C. Ruguian and Victor V. Alpuerto of Monsanto Philippines, Inc.

Hybrids 1, 2, and 3 were selected among 21 Fresh Market F1 tomato hybrids that were evaluated against eight open-pollinated varieties during the wet season for five years. In a follow-up two-year study, the economics of growing tomatoes and producing tomato seeds was also evaluated. Results showed the three hybrids out-yielded the open-pollinated varieties during the wet season. Hybrids 1, 2, and 3 provided a net income of P312,145 per hectare compared to P34,845 with the open-pollinated varieties. Tomato hybrid seed production was also profitable. For 1000 square meter area, 26,410 g of seed could be produced giving a net income of P65,435.

The MMSU tomato hybrids were developed from the native tomato cultivar. The native cultivar is tolerant to leaf diseases and excessive moisture. It could easily recover from typhoon damage provided the soil is not waterlogged. Local consumers prefer the native tomatoes because of their sour and succulent fruits. Thus, it is priced higher than the other varieties.

However, the native tomato has negative attributes---undesirable shape, susceptibility to cracking and short shelf-life of the fruits. Through hybridization of the native cultivar with other genotypes, the negative characteristics of the native cultivar were improved and the better characteristics were maintained in the new lines.

Most farmers plant tomatoes during the dry season after rice is harvested. They seldom grow tomatoes during the wet season because the native and open-pollinated varieties are low-yielding due to excessive flower drop and abortion caused by the hot-wet conditions during the wet season.

Planting time is November to December while the bulk of the produce is sold at the market from February to March. Abundant supply of tomatoes during these months results to a cheaper price at less than P5 per kilo. With the introduction of the new hybrids, farmers can now grow tomatoes during wet seasons and they can sell their produce at a much higher price—a lucrative business option for any Ilocos farmer. *(Junelyn S. de la Rosa)*

Halamanan...

be limited to the production of vegetables and popular cash crops for home consumption. With capital and technology, this could be a profitable business for budding entrepreneurs.

Plastic bags and plastic sacks are used as pots to grow vegetables.

The government may prove very helpful in this endeavor by providing interested families with the basic know-how of urban farming. Moreover, planting materials and training on proper production, harvest, postharvest and marketing can greatly improve the urban farmers' chances of success. There are already documented successful urban farm stories that the government can bank on. Examples are the urban agriculture project at the Central Luzon State University headed by Dr. Pedrito Natural and gas station operator Pete Magsuci's *lakatan* backyard farm. Undoubtedly, urban agriculture can present many benefits for city dwellers: increased food security for the urban poor; easy access to nutrient rich foods; reduced poverty in low-income areas; creation of jobs and small-scale businesses; and enhanced city environment. The list could go on.

With proper motivation and a vigilant effort to develop this promising enterprise, rural and urban dwellers alike can look to a brighter and promising future. ■

DA to launch...

establishment of micro agri-fishery projects in the pilot areas, facilitate access to basic food commodities in pilot camps, provide available production and post-production inputs to encourage them to venture into agribusiness and establish linkages and networking with other agencies, private groups and state colleges and universities to enhance economic activities in the identified pilot areas.

On the other hand, the DND through the AFP shall provide the DA with a list of the pilot areas and names of AFP personnel and the required assistance and livelihood projects to be undertaken, provide the venue and other facilities needed for the agri-fishery livelihood training program, provide available equipment for the construction of farm to market roads and other agri-fishery related infrastructure projects, and provide other necessary assistance to the DA and its attached agencies. *(Junelyn S. de la Rosa)*

Halamanan sa BPI: Farming the City

by Thea Kristina M. Pabuayon

For years, people have considered agriculture or farming as a rural activity. It was almost unthinkable then that one can engage in farming activities when one lives in the city.

Today, with the looming uncertainty of the Philippine economy, a big portion of the people who are hit by problems of malnutrition and poverty continuously set out to find alternative means of livelihood and ways to survive.

With this scenario, the government has launched an initiative to improve the plight of urban people by planting vegetable and other crops on vacant residential spaces, backyards, and vacant lots.

***Halamanan sa BPI*: a model urban garden**

In June 2000, the Bureau of Plant Industry (BPI) launched its own techno-demo model urban garden at the BPI Central Office in San Andres, Manila. The *Halamanan sa BPI* is a 4,405 square meter experimental area, which was converted into a mini-park complete with a *bahay kubo*. It showcases a variety of pesticide-free vegetables planted side by side, including leafy, green, fruit, root, and vine vegetable crops. Mushrooms, ornamentals, medicinal plants, herbs, spices, and selected fruits grown alone or intercropped with other vegetables are also planted. Some selected vegetable crops are grown on common junk such as old rubber tires, tin cans, recycled plastic bags/containers, earthen pots, plastic and jute sacks, styropor fruit boxes, old gutters, and bamboo poles.

For six months, from August 2000 to January 2001, a total of 574.64 kg of assorted vegetables was harvested. Originally conceptualized by BPI Director Blo Umpar Adiong, the *Halamanan sa BPI* was duplicated from a Model Socio Economic Enhancement Development (S.E.E.D) farm established in Marawi City at Lanao del Sur. Established by experts from the Central Office and the Baguio Experiment Station, this seven-hectare farm was planted with various cash crops including leafy, green, fruit, root, and vine vegetables to serve as a showcase for the Mindanao people. The Marawi farm proved to be a success, pioneering the establishment of other model S.E.E.D. farms in Talagak, Bukidnon and Baler, Aurora.

Urban Farms: a promising industry

Urban agriculture need not

See Halamanan, page 2

The growing..

from just P0.6 M in 1990. The remaining four ranks in this order: onion (P1.1 M), tomato (P1.03 M), garlic (P0.9 M), cabbage (P0.6 M), and squash (P0.5 M).

In terms of volume, eggplant still ranks first (28%), followed by tomato (22%), squash (18%), onion (15%), cabbage (14%), and garlic (3%).

Compared to Asian and world production, local vegetable production is relatively low. Eggplant averaged a yield of 9.95 t/ha in 1997 which is only half of Asia's average yield of 15.91 t/ha and the world's 16.17 t/ha. However, our local eggplant yield fared better than Thailand (6.19 t/ha), Indonesia (3.48 t/ha), and North Korea (1.67 t/ha). The same trend goes for tomato which registered an average yield of 9.73 t/ha in 1999, onion (7.18 t/ha), and garlic (2.6 t/ha).

Export Opportunities

As mentioned earlier, the Philippines is well into exporting. Vegetables in fresh/chilled, dried and processed forms are exported. From 1993 to 1996, the value of vegetable exports rose considerably from $25 M in 1994 to $45 M in 1996, only to drop at $31 M in 1997.

In 1997, onion was the number one export in terms of value at $10.5 M followed by shallot at $7 M. Main importers included Indonesia (55%), Malaysia (22%), and Singapore (21%). Another major export was asparagus at 5, 660 MT. This was exported to Japan in 1996 and registered a profit or value of $13.7 M. Other exports included garlic, beans, peas, tomato, and vegetable seeds.

A large amount of tomato, pepper, eggplant, melons, and watermelons are also exported. Aside from these, the country can also capitalize on the export of squash, sword bean, white gourd, sitao, and radish which are also gaining ground internationally. However, the country also imports a lot of vegetables, oftentimes cancelling its gains in export. In 1996, total vegetable import exceeded exports at $79. 8 M. The bulk of these imports consisted of preserved and processed vegetables, dried, fresh, and chilled products. Moreover, the country's vegetable seed requirement, specifically onion seeds, crucifers, and other semi-temperate crops are also imported from USA, Japan, the Netherlands, Thailand, and Vietnam.

Improving overall industry status

Although vegetables have a high potential of contributing to our farmers' income, the government has given little priority to this industry. This, coupled with existing problems such as the erratic supply and low quality of produce, poor farm-to-market roads, inadequate storage facilities, limited access to reliable market information, and lack of entrepreneurial skills among growers and cooperatives obstruct the industry's potential in the world market.

Through BAR, a network solely dedicated to improving the vegetable industry was created. The vegetable network, which is composed of experts from UP Los Baños (UPLB), Benguet State University (BSU), Visayas State College of Agriculture (ViSCA), and Central Luzon State University (CLSU), coordinates all research, development, and extension efforts pertaining to vegetables. Likewise, a National Integrated RDE Agenda and Program (NIRDEAP) was drafted to state specific projects for the network.

Through the NIRDEAP, several industry goals were set to guide the network in improving present vegetable situation such as: a stable vegetable supply to minimize fluctuations in market prices through increased off-season production; reduced postharvest losses by 20%; increased export by 20%; and increased per capita vegetable consumption to 60 kg. Granting these are achieved, the country is assured of a competitive edge in the world market.

(Sources: Vegetable NIRDEAP; The Fresh Fruit and Vegetable Market in the Philippines by the Team Canada Market Research Center and the Canadian Trade Commissioner Service)

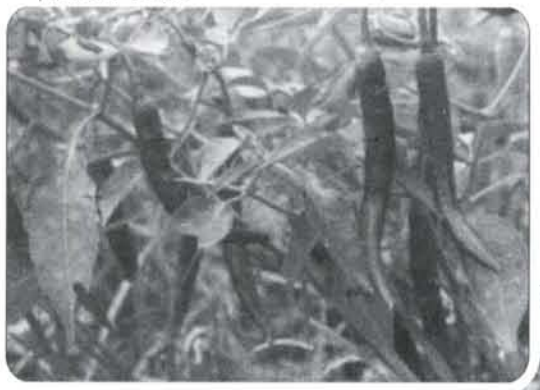
IPB...

Pepper

Pepper has a high demand and potential in the local market.

Among its recommended varieties for organic production are: C1550 (greenish, slightly-spiced); Inokra (greenish, non-spiced); 99-232 (green; spicy) and; Hp 21(green, slender, non-spiced).

Pepper varieties (top) 99-232 and (bottom) C1550



Tomato

This crop is third in terms of value of production. Tomato is the top major export crop of the country.

Among the recommended varieties are: Prestige (Del Monte type, reddish, thick and plump); Tropic boy (salad type, circular, the side part is greenish) and; 99-234 (Del Monte type, plump).

Cauliflower

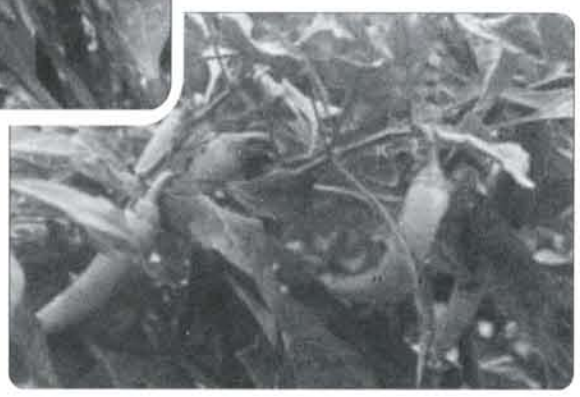
This is a popular crucifer grown mainly in cooler areas. Among the recommended varieties include: 98-323 (whitish, narrow) and; Tsx-97501 (yellowish, broad).

Cabbage

In terms of value of vegetable production, cabbage ranked eighth with 8.2% average annual growth. Varieties recommended for organic production are: Alex (green, flat-round) and; Tropical King (green, flat-round).

Lettuce

This is a semi-temperate vegetable which is popularly used in vegetable salad. Local varieties common in the country are the crisphead types that include the green and the red iceberg varieties. Other recommended varieties are: President (green, heading) and Kaiser (green, heading).



String bean

This crop is very popular in backyard farming. Recommended varieties include: 228-1(green, long); CSL-19 (greenish, long); and UPL PS1 (green, long).

Bush bean

Recommended varieties are: CBD 53-2 (green) and UPLB S3 (slightly greenish).

Cowpea

Varieties for organic production include: CES 26-1 (green) and; CCD 10-1 (green).

Baguio beans

The only variety that IPB recommends for organic production is the B-21.

Bunching onions

Bunching onions may be produced from immature, thickly planted white onion varieties and from commonly known Japanese bunching types. Green bunching onions are known by several names depending on the region of the country. Some of the names used are "scallions," "green onions," and "spring onions."

All these terms can be used for immature onions. However, the "green bunching onion" sold in stores today is most likely a different species from the bulb onion. On the other hand, the most common green onions at present are *Allium fistulosum*.

The only variety of the bunching onion that is recommended for organic production is the aqua green. *(Rita T. dela Cruz)*

(For more information, please contact Dr. Rodel G. Maghirang, Vegetable RDE Network Team Leader, Vegetable Crops Division, Institute of Plant Breeding, College of Agriculture, UPLB, College 4031 Laguna or call at Tel. No. (049) 536 2298; 536-2697 or 536 3304 local 217 or Fax No. (049) 536-3438)

Dump that damping-off diseases

by Mary Charlotte O. Fresco

Best agricultural produce are often derived from good production inputs which include high quality and disease-free planting materials.

But the indiscriminate use of chemical pesticides to minimize disease infestation especially during seed germination stage remains to be a formidable challenge for our local farmers today. To address this long-standing problem, a study on the use of *Trichoderma* as a control agent of damping-off disease in vegetables was conducted by a research group headed by Dr. Virginia C. Cuevas at UP Los Baños. The project, which was supported by the Bureau of Agricultural Research (BAR), determined the efficacy of *Trichoderma* as a biological control agent against the pre-emergent and post-emergent damping off diseases in lowland vegetables. The damping-off diseases, usually caused by fungal pathogens under moist or damp conditions, are fatal to seedlings.

Results of the study revealed that *Trichoderma*, when applied to pechay and tomato, effectively controlled the three identified damping-off diseases namely: *Pythium*, *Sclerotium*, and R*hizoctona*. Application of *Trichoderma* showed comparative advantages over the use of chemical fungicide Dithane in terms of effectiveness, 155 % and 67 %, respectively. It was also noted that the percentage of seed germination in *Trichoderma*-treated plots was higher (82%) compared to those plots treated with chemical fungicide (76%). As to the growth enhancement property of *Trichoderma* on pechay and tomato seedlings, these were taller and heavier compared to control and chemically-treated seedlings.

In terms of economics, farmers can save more with the use of *Trichoderma*. Rough estimate of application cost showed that farmers spend P4.00/m^2 using *Trichoderma* pellets and P6.00/m^2 using Dithane. As for the frequency of application, *Trichoderma* pellets are applied only once per season while Dithane requires repeated foliar spraying every 7-10 days after the first drench application.

Trichoderma is a known worldwide fungus with high antagonistic properties against fungal pathogens and wide range of soil-borne and airborne pathogenic diseases. Scientists confirmed that species of *Trichoderma* has desirable inherent characteristics over other soil microorganisms since they grow very fast. They have the ability to produce polysaccharide (complex carbohydrate or sugar)–degrading enzymes that enable them to colonize substrate that are also utilized by pathogens during their survival phase.

Several studies conducted in different countries have proven the effectiveness of *Trichoderma* in attacking the hyphae or larvae of the pathogenic fungus. According to Dr. Cuevas, the success of *Trichoderma* products in the market attests that there is solid basis for its use as biological control agent.

(For more information, please contact: Dr. Virginia C. Cuevas, Dr. Alfredo M. Sinohin, and Mr. Joey I. Orajay, Department of Plant Pathology, College of Agriculture, UPLB.)

Grafting effective in producing off- season tomato

Tomato is an important vegetable known for the versatility of its uses both in fresh and processed food preparations. In the Philippines, it is considered as one of the major cash crops due to the great demand in the local market. However, production of tomato during off-season (rainy months from June to October) is hampered by many production constraints such as pest and diseases, unfavorable environmental factors, and lack of suitable varieties for planting. Thus, tomato produced during off-season commands a very high price.

In a study conducted by Dr. Lun G. Mateo and his group at the Central Luzon State University (CLSU), they found that grafting is an effective strategy to produce varieties of tomato that can withstand off-season production constraints. Two tomato hybrids, Apollo and CLN5915, were grafted to two different rootstocks, EG 203 (an eggplant) and H7996 (a tomato variety). Both rootstocks are known to be resistant to bacterial wilt, a highly devastating disease caused by *Ralstonia solanacearum*.

The researchers placed the grafted Apollo and CLN5915 seedlings in a compartment with a relative humidity (amount of water vapor in the air) approximately at 85-90% for a week. The newly grafted seedlings were then transferred into another chamber prior to transplanting. The planting beds were raised to 30 cm high and provided with rainshelter using 32-mesh plastic net. This was done to protect the seedlings from heavy rainfall and damage caused by waterlogged soil. Significant results from the two-year experiment revealed that the two grafted tomato seedlings showed higher percentage of survival compared to non-grafted plant. Grafted Apollo and H7996 had 97.2 and 77.8 survival percentage, respectively. On the other hand, non-grafted Apollo plant had zero percent survival. As to the ability to resist bacterial wilt, grafted varieties showed high percentage of survival (97.2%), while non-grafted plants had 70.8 survival percentage.

In terms of yield performance, grafted Apollo to EG 203 yielded an approximate of 13.1 tons/hectare, while Apollo seedlings grafted to H7996 yielded 11.7 tons/hectare, and the non-grafted plants yielded only 1.3 tons/hectare.

In an effort to integrate advances in grafting technology, a similar study was conducted by James R. Burleign at the Asian Vegetable Research and Development Center in Taiwan and Christian Ulrichs at the Technical University of Munich in Germany. The results of their studies can be very useful to determine the limitations and advantages of grafting technology when used under different environmental conditions. *(Mary Charlotte O. Fresco)*

For more information, please contact: Dr. Lun G. Mateo, Dennis R. Cacho, Anacleto F. Bala, Central Luzon State University, Muñoz, Nueva Ecija. Tel. No. (044)-456-0704

'It's time you put some spice into your life'

by Maria Rowena Briones

This could well be the slogan for encouraging farmers to grow spices and consumers to promote the use of spices in their cooking. Local market base is needed to enable our spice industry to gain a share of the world market for spices. By increasing our spice production, we can also lessen the amount of spices that we import.

Spices are any vegetable product or mixture, in whole or ground form whose significant function is to flavor, season and preserve or impart color and aroma to foods.

The Philippines is a net importer of spices. From 1991-1996, the country imported an annual average of 1,400 tons of spices, reaching almost 2,000 tons in 1996 and valued at $3.4 million while exports had an annual average of 150 tons at $0.2 million. The bulk of these exports are pepper. The feasibility of producing locally some of the imported spices such as sweet basil (*Ocimum basilicum L.*) have not been looked into.

Sweet basil is a popular savory herb used to impart a fragrant, warm, and sweet flavor with pungent and clove-like notes to dishes and drinks. The leaves complement many soups, salads, and vegetable dishes. Sweet basil is also often used along with tomatoes. In Italian cooking, the leaves are used in pizzas, pasta, chicken and cheese dishes; in France, in omelettes and soups. The leaves are a source of essential oil and oleoresin mainly applied in industry to flavor baked goods, sauces, pickles, vinegar, and meat products, and to modify flavor of some liquors.

Sweet Basil

Sweet basil is adaptable to wide range of conditions favorable for vegetable production and grows spontaneously. It is propagated through seeds or cuttings. It is sown evenly at a depth of 2-10 millimeters in germination boxes on a previously moistened medium consisting of equal parts of compost or farm manure, garden soil, and river sand. Watering is done gently using a hand sprayer. It needs at least five hours of daily direct sunlight and 12 hours of artificial light if grown indoors and grows best on fertile, light and well-drained soils since it has a relatively high nitrogen and water requirement. Once established, sweet basil seedlings grow rapidly. When plants have reached a height of 50-70 cm, branching starts. Pinching out its tip encourages vegetative growth. It is best harvested prior to the start of its flowering or 3-4 months after planting.

In harvesting, sweet basil is cut 10-15 cm above the ground to ensure regrowth and subsequent harvests after 15-20 days. Yield is estimated at seven tons per hectare of fresh leaves per harvest. Before processing, Sweet basil leaves and branches are washed and dried at temperatures not exceeding 35°C and are chopped to specific sizes and graded.

Sweet basil is produced in small quantities in Cavite and its market is limited to first-class hotels and specialty-food restaurants. But its popularity is growing as health food, including its use for pastas and Italian foods. These are the in thing nowadays thus offering new opportunities for farmers who want to diversify their agricultural produce.

(Source: de Guzman, C.C and J.S Siemons (ed.). Plant Resources of South East Asia. Leiden The Netherlands: Backhuys Publishers, 1999.)

Gulayan...

cabbage, sweet pepper, hot pepper, bush sitao, okra, cucumber, squash, ampalaya, upo, and kangkong.

Sampaguita cuttings were initially distributed to the participants. Planting materials are given free during the first planting. For succeeding plantings, however, participants had to produce their own planting materials.

All Metro Manila cities and municipalities are included in the project with Quezon City having many sites. Selected areas in nearby provinces Quezon, Cavite, and Batangas were likewise included.

A GBP monitoring and evaluation team regularly conducts monitoring and evaluation to ensure the project's sustainability.

As of December 2000, GBP has launched 30 vegetable gardens, with a cumulative total area of 230,000 sqm, and has made lives better for its 2,500 beneficiaries.

Hopefully, through its vision and initiatives, GBP will continually make greener pastures out of our urban cities, literally and figuratively.

(Source: Dr. Virginia A. Duldulao, in her paper titled Gulayan at Bulaklakan: A Component of the Government's Urban Agriculture Program, presented during the National Conference-Workshop on Urban Agricultural Systems in the Philippines, Bureau of Soils and Water Management, Quezon City, 15-17 January 2001. Dr. Duldulao is a former Director IV at the Office of the Presidential Assistant on Food Security in Malacanang, Manila. She is currently a Communication Specialist at the Bureau of Agricultural Research.)

A commodity feature

Cultivating the Aromatic Garlic

by Mary Charlotte O. Fresco

Garlic (*Allium sativum)* has long been used as a culinary spice and medicinal herb. It is believed to have originated in Central Asia for over 5,000 years ago. Its fine aroma and distinct taste make garlic an export winner crop. There are about 300 varieties of garlic all over the world. Garlic is classified based on its origin and morphological features. Several types of garlic include: true garlic (predominantly from China), hard neck varieties (Asiatic types) and soft neck varieties. In the Philippines, the varieties of garlic being planted fall under the soft neck varieties that are often cultivated in the provinces of Ilocos, Batanes, Mindoro, and Batangas. Aside from its versatility as a culinary bulb, garlic production provides a wide range of livelihood and economic opportunities for the Filipino farmers.

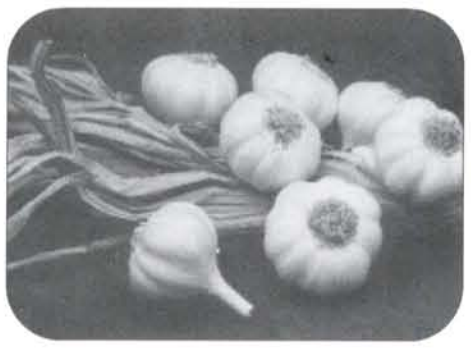
Land Preparation and Planting

Garlic can be grown on a wide range of soil types. The soil should be harrowed thoroughly to break large soil clods and eliminate the growth of perennial weeds. Heavy soil types may hinder bulb expansion that would result to rough and irregular shaped bulbs. Soil pH should range from 6.0-7.5. Apply organic matter such as animal and green manure to the soil prior to planting.

Garlic seed stock should be stored as whole bulbs prior to planting. It should not be stored long, since cloves separate from the parent bulb deteriorate rapidly. The amount of planting material may vary from 700-1,000 kg/ha, depending upon the weight of individual cloves to be planted and planting space. The distance of the planting holes ranges from 7 – 12 cm apart. Cloves of small-bulbed strains may be planted as close as 7 cm apart. Single or multiple rows are commonly used. Spacing between rows is generally not less than 20 cm.

Fertilizer Application

Garlic grows well on fertile soil. The amount of nitrogen fertilizer required varies depending on soil type. Garlic generally requires 70-125 kg/ha of nitrogen. A small amount of nitrogen can be applied as soon as the primary leaves sprout from the bulb. The application of nitrogen



fertilizer should be completed within 4-6 weeks before harvest. Optimum care must be taken when applying the fertilizer to avoid foliar burn. Applications of urea should be avoided for it may cause plant injury.

Irrigation

Garlic is sensitive to moisture stress throughout the growing season. For most soils, 2.5 cm of water is required per week during growing season. Morning to mid-afternoon is the best time of irrigation. This allows sufficient time for the foliage to dry before nightfall. As the garlic matures, watering is minimized to avoid bulb deterioration.

Garlic diseases

The major disease problems that infest garlic are fusarium basal rot and penicillium mold. Fusarium basal rot is a disease that attacks the basal plate region and the roots. Warm soil temperature and high moisture content in the soil trigger the growth and development of the soil-borne pathogens. Crop rotation is found helpful in preventing the fusarium basal rot.

Penicillium mold is the main cause of garlic decay while in storage. The disease appears as masses of blue-green spores and usually attacks the base of the bulb. The planting of garlic during the later part of summer when temperature is quite high should be avoided. This favors the development of pathogens that cause clove rot. Irrigation may help during the early stage of planting, since soil moisture content appears to suppress clove rot.

Harvesting and Curing

It is easy to detect when garlic cloves are ready for harvest. Matured leaves begin to dry, discolor and bend towards the ground. Another indication of bulb maturity is the reduced thickness of leaf sheath surrounding the bulb. Garlic may be harvested by hand pulling. Using a fork helps loosen the soil thus facilitate lifting. Harvested garlic must be cured properly to ensure a long storage life. Open field curing may be done by placing the garlic in vegetable bins with cover but this should allow natural air to dry the cloves. In indoor curing, garlic gloves are placed in wired racks or open trays. The storage house should be well ventilated.

(Source: Veggies Today, National Vegetable RDE Network, Institute of Plant Breeding, UPLB College, Laguna, Tel no. (049)536-2512 local 217; Ontario FactSheet, Ministry of Agriculture, Ontario, Canada)

Vegetable gardening at the rooftop?

by Virginia A Duldulao

You can raise vegetables on your rooftop. That is, if you do not have any space on the ground anymore like Leonila Griarte who used about 26 sq m of her rooftop for her garden.

This rooftop garden is located at 781 Coronado St., Mandaluyong City, overlooking the Pasig River. She planted different crops at different periods of the year. These include *pechay*, mustard, okra, *patola*, pepper, ginger, *malunggay*, *ampalaya*, squash, and *camote*. For the whole year, her garden supplies her family's vegetable needs. In addition, she raises orchids and bromeliads aside from ordinary ornamental plants that serve as giveaways to her friends and officemates.

Leony owns a place whose façade looks small but the inside portion extendes to two houses. It is in the front portion that a third floor is constructed and the back portion with a second floor. The third floor is divided into two: a bedroom with toilet and bath with a small balcony while the other part is the garden, an open space that is directly under sunlight the whole day. The balcony has an overhang where she places potted orchids of different kinds.

The garden is divided into two parts. The front portion, about 4 m and 1 m wide, is the nursery for orchids and other ornamentals using recycled materials as containers. The remaining portion is the vegetable garden. Two plots, one at both sides, were made. Hollow blocks were used to enclose the plots measuring 2.75 by 1.5 m each leaving a footpath of .50 m between the plots. The plots were filled with soil brought in from Cavite and Batangas. The height of the hollow blocks when set horizontally is the depth of the plots. The blocks were cemented together to prevent soil from eroding through the gaps in between. One of the plots does not extend until the wall. Instead, a platform made of steel bars occupies the space. This holds small pots of ornamentals, bromeliads, Thai kalachuchi, and orchids.

The plot at the left portion contains the cucurbits. According to Leony, her regular plants include eggplant, pepper, tomato, and *okra*. At the sides are *oregano* and *luyang dilaw*. Also at this part of the garden is a tall wrought-iron chicken cage that is really for raising four to five chickens at one time. They provide eggs for the family and manure for the plants. The cage also serves as trellis for the *patola* and *ampalaya* vines.

The second floor which serves as kitchen and dining room has a balcony. In it are two very large containers made from vehicle tires, one planted to *pandan* and the other to *malunggay* tree. There are also driftwoods at both sides with orchids. The *pandan* leaves are used by her daughter in the making of a native delicacy that she sells commercially.

To water her plants, a faucet is installed at the entrance of the garden. She uses organic fertilizer and no pesticide.

Benefits of gardening

Since 1983, Leony had been gardening as a pastime in between mothering and a job at Vonnel. She soon realized that she could produce food for her family's consumption. When she was able to buy a larger area for her house, her pastime became a preoccupation to produce her family's vegetable needs. She could also share her produce with her neighbors and officemates at the City Hall of Mandaluyong where she works. Moreover, she propagates plant materials and grow seedlings as well as produce seeds from her plants which she distributes to her neighbors to encourage them also to plant vegetables.

She estimates that her family of five daily consumption of vegetables amounts to P80.00. Since she rarely buys vegetables, then this amount is already a saving on her family budget. Moreover, her grandchildren have even become vegetarian which is rare for children these days.

Innovative ways of gardening

Families can be innovative in their ways of food production especially when space is a constraint. In flood-prone Valenzuela and Malabon, some families plant *camote* and *kangkong* in discarded containers and when the flood comes they bring these to upper portions of their house to hang. This assures them of vegetables even at a time when these are in short supply. Others plant *kalamansi, saluyot, pechay*, pepper, eggplant, and others in their veranda.

How about you?

Want to try? ■

CERDAF...

quality/groundwater management through watershed approach.

Crop Protection

To ensure effective pest management for a sustainable agriculture, the crop protection network will focus on these specific program areas: pest surveillance, monitoring and forecasting, management of pest outbreaks, management of quarantine pests, genetics and biotechnology in crop protection, socio-economic and environmental impact of crop protection, policy studies, alternative pesticide application systems, information and communication systems, extension approaches, and technology service delivery systems and linkages with the private sector.

Irrigation and Drainage

Studies on the status of irrigation development in the country revealed that only 29% (1.34 million ha) of the estimated potential irrigable area is irrigated. The challenge therefore is to irrigate the remaining 3.32 million ha of land. With the NIRDEAP in place, this is now possible. Specifically, the network will focus its efforts on 10 programs: aquifer characterization, surface water resources assessment and climatological characterization, identification of potentially irrigable areas, improving the performance of irrigation and drainage systems, field assessment and packaging of appropriate technologies, development of improved irrigation and drainage design criteria, water resources protection, operationalization of irrigation and drainage sub-sector monitoring and evaluation system, enhancement of institutional capability and strengthening institutional mechanisms for sustainable irrigation development, and policy issues in irrigation development.

DA Sec. Leonardo Q. Montemayor asked members of the network to schedule a meeting with UP Los Baños (UPLB) experts to discuss further the problem of high irrigation costs, and review of the current Irrigation Service Fee (ISF) and sustainability.

Grains Postharvest

For the next five years, the Grains Postharvest Agenda and Program shall prioritize the following: improved postharvest technologies and mechanization, food and feed safety and quality, food and feed protection, and emerging technologies on grain products and by-product processes. According to CERDAF members, the biggest disincentive to farmers' access to new technologies are high production cost and high interest rates of bank loans used to procure the inputs. CERDAF members therefore recommended the establishment of the Agriculture Machinery Development Program to aid farmers in accessing funds to buy various agricultural machinery.

Bureau of Agricultural Research Director Eliseo R. Ponce reiterated this and added that, government can also provide farmers with soft credit through a financing program that will allow farmers to personally purchase the equipment and machinery they need. *(Thea Kristina M. Pabuayon)*

National Integrated RDE Agenda and Program for Vegetable

Vegetable is a high-value agricultural produce. In 1997 alone, it comprised eight percent of the total agricultural output of the country although utilizing only five percent of the total agricultural area. It grows 10.7 percent every year, in terms of value and two percent in terms of production. However, its potentials have not been fully optimized.

Export market offers a lot of opportunities for vegetable growers because we produce our best products when production of these are low in temperate countries. On the other hand, vegetable farming is highly dependent on the prevailing climate making its production erratic. The vegetable industry in the country merits attention in its RDE to equip vegetable growers and traders with necessary know-how so they can become more competitive players in local and global market.

The National Integrated Research Development and Extension Agenda and Program (NIRDEAP) aims to make the vegetable industry capable of supplying the needs of the local and export market through equitable, sustainable, globally competitive and environment- friendly systems of production, post production and marketing technologies.

Its agenda aims to

- Provide profitable and sustainable production technologies to vegetable growers to increase their yield, improve their production even during off-season and reduce pesticide usage by 20-50 percent in five years
- Improve the post harvest handling and quality assurance systems to reduce post harvest losses by 20 percent
- Enhance competitiveness in the world market to increase export by 20 percent.

These will be achieved through the following strategies:

For profitable and sustainable production technologies, efforts will be undertaken to:

- Develop varieties that are pest resistant
- Promote integrated pest management on major pests and diseases
- Encourage cultural management of some vegetables for off-season production
- Develop and encourage farmers to use organic vegetable production technologies

For improvement of post harvest handling practices:

- Partnership with growers and traders will be forged to come up with better handling, to packaging and storage practices
- Dissemination of better handling practices of vegetables

For enhancement of competitiveness of the vegetable industry:

- Establish a quality assurance system for the vegetable produce
- Produce multimedia materials to encourage Filipinos to include vegetables, being major sources of minerals, vitamin, protein and fibers, in their daily diet
- Develop new and better fresh and processed products for export
- Install market and production database (by commodity and by region) and information system for a more efficient flow of data and technologies relevant to programs and the policies helpful to the vegetable industry.

Priority National R&D Programs

These will focus on the production system of eggplant, squash, tomato, garlic, onions and shallots. These include development of pest resistant and heat tolerant varieties of squash, eggplant, and tomato, and improvement of seedling production methods of onions and shallots so that growers can take advantage of the global market demand for these produce. To reduce use of pesticides on crucifers, growers will be encouraged to favor integrated pest management and organic vegetable production.

For the research outputs on the national level to be applied from regional to the farmer level, part of the agenda is to insure that regional RDE priorities mirror the national RDE. In this way, NIRDEAP can produce vegetables for both local and foreign markets. *(Maria Rowena Briones).*

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Louis Guingona (Vava-Veggie)
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Abner Villahermosa (San Miguel Packaging Products)

DA launches AFP livelihood program

To augment the meager income of civilian and military personnel of the Armed Forces of the Philippines (AFP), the Department of Agriculture (DA) signed a Memorandum of Agreement (MOA) on "Income and Livelihood Program for AFP Personnel" with the Department of National Defense (DND) on 28 March 2001 at Camp Aguinaldo, Quezon City.

A national task force was created to provide efficient and effective management of the livelihood program (SO No. 166, Series of 2001). It is composed of: Chairman—Usec. Ernesto Ordoñez, Vice-Chairman—Asst. Sec. Edmund J. Sana, National Program Coordinator—Asst. Dir. Alberto B. Maningding, Co-Program Coordinator—Asst. Dir. Asterio Saliot and members from other DA-attached agencies. Based on the provisions of the MOA, a set of implementing guidelines was formulated by the two parties. It consists of the objectives of the program, target beneficiaries, joint implementing task force, program components and mechanics of implementation.

The program components are: 1) Production and Enterprise Development, 2) Basic Food Commodities, 3) Capacity-Enhancement, 4) Linkages and Networking.

For production and enterprise development, the DA shall extend technical assistance for micro agri-fishery projects through feasibility studies on diversified crop, livestock and poultry, and aqua-culture production, demonstration projects on the establishment of nurseries and orchards, enterprise development plans for processing of various products, technical assistance in the operation of micro agri-fishery projects and initial inputs needed for crops, fishery, poultry and livestock production. On Basic Food Commodities, the DA shall facilitate access to basic food commodities for AFP personnel and their dependents through various National Food Authority (NFA) projects. These are: supply of commissaries, Greater Market Access (GMA) stores inside the campus, GMA rolling stores and other stores outside the campus.

The DA shall also organize seminars and hands-on training courses on production and processing of agri-fishery products, fiber-based handicraft and other livelihood enterprises, creation of cooperatives and facilitation for access to credit, capital and credit guarantees from the Quedan and Rural Credit Guarantee Corporation (QUEDANCOR) or other formal lending institutions.

In the course of the project, the DA shall provide technical assistance to AFP personnel and their dependents in the

See DA to Launch, page 2

The Gulayan at Bulaklakan Project: creating greener pastures for urban dwellers

by Laarni C. Anenias

Picture yourself going to the poorer areas of Metro Manila, and instead of seeing garbage scattered around, you see spans of lots planted with vegetables, the area glowing with flowers. Imagine going there, and instead of seeing children and adult alike scavenging through piles of garbage, seeing them cultivating a robust garden. This is the vision of the Gulayan at Bulaklakan Project (GBP): a component of the government's Urban Agriculture Program.

GBP started in 1998 through the initiatives of the Office of then First Lady Loi Ejercito. The project aims to provide food and livelihood, and promote environmental well-being and good health among the marginalized sector of urban society. An interactive participation among schools, communities, government units, and non-government organizations (NGOs), the project is an excellent example of a comprehensive development program.

The Office of the Presidential Assistant on Food Security spearheaded the implementation of GBP. The Metropolitan Manila Development Authority, Office of the First Lady, the local government units, and several NGOs likewise help in implementing this project.

The GBP organizers use the community-based approach such that urban communities are informed and organized to cultivate vacant public lots, transforming these into community gardens. Communities are encouraged to plant vegetables, ornamental plants, and other food crops that could help augment their income. Schools with vacant plots, associations, cooperatives, and parishes are likewise encouraged to join GBP.

Participants are encouraged to plant short season vegetables such as tomato, eggplant, pechay,

See Gulayan, page 4

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