fresh

News from AVRDC – The World Vegetable Center

February 11, 2011

www.avrdc.org

AVRDC Demonstration Garden under attack!

Page 5

New variety releases expand market options for Tanzania's farmers

Nine nutritious, high yielding, and good tasting vegetable varieties have the potential to extend harvests and increase incomes

After several years of development and two years of testing, nine new vegetable varieties, seven of which are indigenous vegetables, were released on 1 February 2011 in Tanzania. AVRDC breeders worked with local farmers, government researchers, and the public and private sector to select, test and evaluate breeding lines for release as stable varieties. Tanzania's Horticultural Research and Training Institute (HORTI-Tengeru) and Agricultural Seed Agency will now handle the maintenance of the varieties. *Read more...*

Tomatoes 'Duluti' and 'Tengeru 2010' -- two of nine new variety releases in Tanzania.

Duluti

Tengeru 2010

Top tomatoes

Two AVRDC **tomato** lines, LBR 6 and LBR 11, were released under new names **'Duluti'** and **'Tengeru 2010,'** respectively. These varieties have resistance to early and late blight diseases, which limit production of common varieties in cool wet weather; the new varieties have the potential to bridge the seasonality gap in tomato production by allowing farmers to grow tomato during the off-season. The yields are comparatively higher than 'Marglobe' and other traditionally grown varieties, especially under cool wet weather. The relatively firm fruit can be transported long distances; it is an excellent choice for the fresh market but can also be used for processing. Fruit is large and preferred in some neighboring countries, presenting opportunities for export. Heavy foliage covers the fruit, protecting it from sun-scald and bird damage.


Madiira 1

Favorite leafy greens

High in micronutrients such as carotene and vitamin C, calcium and iron, **amaranth** is an important vegetable in Tanzania and grows in all agroecological zones. It also contains lysine, an essential amino acid that is lacking in diets based on cereals and tubers. Compounds in amaranth enhance human growth and development, improve general health, and strengthen immune responses to combat diseases. If used by pregnant women, the folic acid in amaranth reduces the risk of neural defects in their newborns. Most amaranth farmers grow types that are harvested in 2-4 weeks. Two AVRDC amaranth lines, Ex-Zim and AM 38, were released under new names **'Madiira 1'** and **'Madiira 2,'** respectively. Both varieties have long harvesting periods due to late flowering and can be harvested by uprooting in 4-6 weeks and by repeated weekly or biweekly harvesting 4-6 times. These high yielders have a good taste and aroma.


Madiira 2

Olevolosi

There are many species of **African nightshade** found in Tanzania. The most common species is *Solanum villosum*. The other cultivated species is *S. scabrum* which is common in Hai, Moshi, Dar es Salaam and Mgeta-Morogoro. *S. villosum* has orange fruit and those of S. *scabrum* are purple. The nutritional value of nightshades depends on the species, time of growing (rainy or dry season) and soil fertility. Nightshade has appreciable amounts of methionine, which assists in the body's metabolic functions. Two AVRDC African nightshade lines, BG 16 and SS 49, were released under new names **'Nduruma'** and **'Olevolosi,'** respectively. The two varieties have been promoted in Tanzania and neighboring countries and the current demand for seed is much higher than the supply. This official variety release and subsequent commercialization will help ensure availability of quality seed through formal seed channels. Both varieties are late flowering, with broad leaves and vigorous sprouts after harvesting, contributing to higher leaf productivity compared with traditional *S. villosum* types. They also have high seed yields—an attribute favored by seed companies. Consumers can choose according to their taste preferences: 'Nduruma' has a mild


Nduruma

Nine new vegetable varieties extend harvests, increase incomes

sweet taste while 'Olevolosi' is slightly bitter.

Ethiopian mustards are common leafy vegetables cultivated in many parts of Tanzania. They perform best in cool environments; in warmer environments they flower very early and may not be good for repeated harvesting. For uprooting in 4-6 weeks, planting is done by broadcasting or drilling, and these methods require a lot of seed. Two AVRDC Ethiopian mustard lines, ML EM 1 and ST-3, were released under new names **'Rungwe'** and **'Arumeru,'** respectively. These new varieties are early maturing but late flowering; the harvest can start after 21-28 days and can continue for 4 -6 weeks on a weekly basis. The new varieties' broad leaves give them a yield advantage over the commonly grown landrace, 'Mbeya Purple.' 'Rungwe' is sweet tasting, while 'Arumeru' has a mild bitter taste with a very strong appealing aroma.

Fresh garden "eggs"

African eggplant is one of the most important and popular indigenous vegetables cultivated in Tanzania for home consumption and marketing. One AVRDC African eggplant line, DB3, was released under the name **'DB3.'** 'DB3' is sweet and has nearly replacing bitter-tasting old landraces such as 'Manyire Green' and 'Tengeru White.' 'DB3' was widely grown even before its official release, which is why the variety release committee decided to preserve its identity by retaining the line name. 'DB3' can be produced with fewer inputs (fertilizers, pesticides, fungicides, etc.) compared with tomato. It is highly productive and has long harvesting periods, which helps to stabilize supply and market prices.

-- Chris Ojiewo and Nadine Kwazi,
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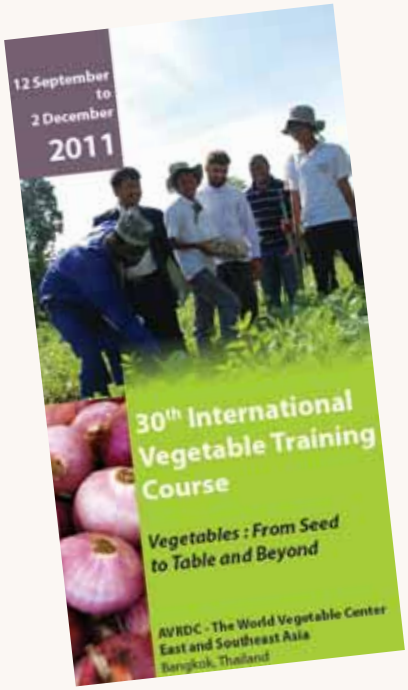
Intensive course in vegetable production



Registration is now open for AVRDC – The World Vegetable Center's 30th **International Vegetable Training Course**, to be held 12 September-2 December 2011 in our Bangkok office. The course aims to enhance technical, scientific and managerial skills of the participants to contribute to sustainable development of their countries through increased production and consumption of health-promoting vegetables.

Three course modules emphasize advanced and sustainable vegetable production and postharvest technologies, farmer education, marketing and human health and nutrition. In addition, the training will enhance awareness and understanding of emerging global development issues and technologies.

For a course brochure and registration forms, visit

http://www.avrdc.org/index.php?id=743

For more information, email:
info-eastasia@worldveg.org

Conference corner

Sixth International Workshop on Management of the Diamondback Moth and Other Crucifer Pests

21-25 March 2011

Kasetsart University

Nakhon Pathom, Thailand

http://www.avrdc.org/index.php?id=711

Fifth International Symposium on Vegetable Nutrition and Fertilization: Vegetable Farms Management Strategies for Eco-Sustainable Development

September 26-29 2011

Giza, Egypt

http://www.ishs.org/

Regional Symposium on High Value Vegetables in South-east Asia: Production, Supply and Demand

24-26 January 2012

Chiang Mai, Thailand

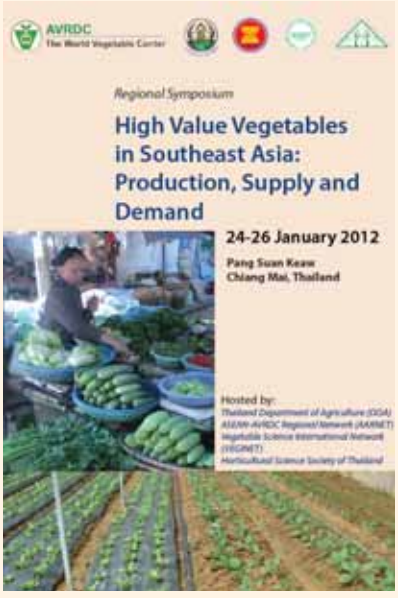
http://www.avrdc.org/index.php?id=449

Fifth Balkan Symposium on Vegetables and Potatoes

9-12 October 9-12 2011

Tirana, Albania

http://5bsvp.ubt.edu.al/



AVRDC peppers in *Proceedings*

Regional variety trials for sweet pepper in Kazakhstan facilitated by AVRDC pepper breeder **Paul Gniffke** and **Ravza Mavlyanova**, coordinator of the AVRDC office in Central Asia and the Caucasus, were recognized recently in the proceedings of the conference on "The Role of Agrarian Science and Scientific-Technical Information in the Innovation Development of Agriculture" held on 29 December 2010 at the **Research Institute of Potato and Vegetable Growing** in Tashkent, Uzbekistan.

Love that tomato!

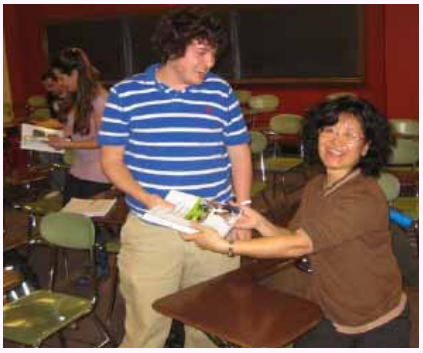
While they have not yet replaced red roses as the supreme expression of affection on Valentine's Day, **tomatoes** have long been associated with romance. The *xitomatl*, meaning "plump thing with a navel" in Aztec, originated in South America and was grown throughout Mesoamerica. When Spanish invaders returned to Europe with the tomato in the early 1500s, many were convinced the fruit was poisonous because it was classified alongside the mandrake or "love plant," a plant noted in the Bible as an aphrodisiac. In 1544, Italian herbalist Pietro Andrae Matthioli wrote about *pomi d'oro* or apples of gold; it's likely that the first tomatoes in Europe were yellow ones, hence the golden description. In 1553, Swiss naturalist Konrad Gessner depicted a small-fruited tomato in a watercolor, and identified it in Latin as *poma amoris*, "love apple." The French in turn called the tomato *pomme d'amour*, a mellifluous tag that has resonated throughout the ages. So skip the roses! A gift of tomatoes—rich in vitamins A and C, lycopene, and other vital micronutrients—is the perfect way to court a loved one, by placing their health and well-being above all.

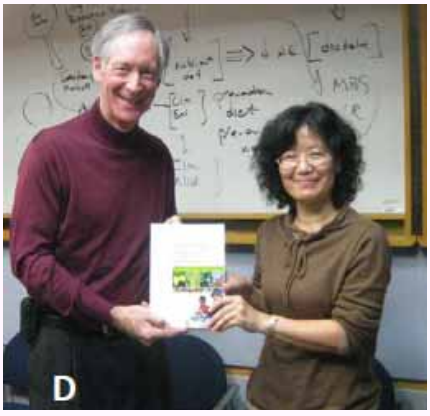
Winged perpetrator identified!

The tomatoes and lettuces growing in the **AVRDC Demonstration Garden** have been under attack recently, but not by a blight, virus, or insect. The perpetrator has been identified as *Pycnonotus sinensis*, a/k/a the Chinese Bulbul. These attractive but ravenous songbirds munch on the vegetables—and who can blame them? The crops, grown organically, are thriving and at their most appetizing. To curtail the birds' activities, garden manager **Deng-lin Wu** has erected netting over several rows of plants. The Demonstration Garden showcases more than 80 species of indigenous vegetables, AVRDC improved vegetable lines, and several production technologies including grafting, drip irrigation, starter solution, and nethouses.

Ray-yu at Rutgers

Ray-yu Yang, who leads AVRDC's Nutrition Group, visited the **Rutgers University** School of Environmental and Biological Sciences from 13-17 November 2010. She met faculty and students and discussed the Agriculture, Education and Research Opportunities in Asia (AERO-Asia) initiative. Her visit was sponsored by the school's Office of International Programs, the official funder of the AERO-Asia initiative, and the United States Department of Agriculture National Institute of Food and Agriculture-supported International Science and Education program. **Michael Lawton** and **Albert Ayeni**, co-directors of the AERO-Asia initiative, hosted Yang during her visit. On November 15, Ray-yu presented a seminar on "Indigenous Vegetables in Tropical Africa and Asia for Nutrition Security, Food Diversity and Value Addition." Approximately 40 members of the Rutgers' community were in attendance, including faculty, students, and staff. On the 16th, she gave a lecture on "Nutritional Properties of Asian Vegetables" to the International Agriculture: New Crops and New Uses class. Her comprehensive lecture helped enrich the students' understanding of the role of vegetables in nutrition and health around the world. On behalf of AVRDC, Ray-yu donated a copy of the Center's 319-page book, "*Discovering Indigenous Treasures: Promising Indigenous Vegetables from Around the World*," to six students in the class.





During her visit to Rutgers University, Ray-yu Yang shared copies of *Discovering Indigenous Treasures* with **David Wallace** (*left*), a student in the Environmental Policy, Institutions, and Behavior program, and **Peter Gillies** (*above*), founding director, Institute for Food, Nutrition, and Health.

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

Kids on camera

***I to r**: Yung-kang Huang, Assistant Specialist, AVRDC GRSU, explains the seed collection to the two young hosts of "Calling for Dr. Miao," Wei-An and Sin-Jou.*

The film was rolling when a camera crew from **Tzu chi/Da Ai-TV** came to Center headquarters in Taiwan to begin production on a program for children about the benefits of eating and growing vegetables. **Wei-An** and **Sin-Jou**, the two young stars of "Calling for Dr. Miao," toured the Demonstration Garden and learned about tomato breeding and seed collection from **Yung-kang Huang, Chee-wee Tan, Shu-fen Lu, Jessica Chang**, and **Sophie Chou**.

To benefit from greens, don't gargle!

Nitrates, which are abundant in green, leafy vegetables of all kinds, boost the powerhouses in cells that provide energy. A single helping of spinach is enough to increase the efficiency of mitochondria, small bean-shaped bodies which fuel cell activity and growth. Originally it was thought that the iron content of spinach made it a power food. Now scientists have learned that nitrates are the true energy-boosting ingredient in the vegetable. Lead researcher Eddie Weitzberg, from the Karolinska Institute in Stockholm, said: "We're talking about an amount of nitrate equivalent to what is found in two or three beets or a plate of spinach. We know that diets rich in fruit and vegetables can help prevent cardiovascular disease and diabetes, but the active nutrients haven't been clear. This shows inorganic nitrate as a candidate to explain those benefits." Previously, Weitzberg and colleague Jon Lundberg showed that with the help of bacteria, dietary nitrate increases levels of nitric oxide in the body. Nitric oxide is a molecule that opens up blood vessels, lowers blood pressure, and improves circulation.

-- excerpt from the Daily Mail Reporter

The study also found that mouthwash may reduce the benefits of nitrates by killing bacteria in the mouth which are needed to generate nitric oxide.

Larsen FJ, Schiffer TA, Borniquel S, Sahlin K, Ekblom B, Lundberg JO, Weitzberg E. 2011. Dietary Inorganic Nitrate Improves Mitochondrial Efficiency in Humans. *Cell Metabolism*, Volume 13, Issue 2, 149-159.

East and Southeast Asia update

Field celebration

On the occasion of its 90th anniversary **Chia Tai Seeds Company** hosted a Fair & Field Day at its research station in Kanchanaburi, Thailand from 15-23 January 2011. AVRDC's Cucurbit Breeder **Narinder Dhillon** and **Supunsa Phethin**, Research Assistant, visited the company's bitter gourd and pumpkin field trials on 20 January, and discussed cucurbit breeding issues ranging from constraints of production to market demand and future directions with the company's cucurbit breeding team, led by Supat Maekiyanon. Chia Tai has expressed interest in a joint project with the Center to screen bitter gourd for high temperature tolerance. To sweeten the discussion, Dhillon and Supunsa enjoyed delicious pumpkin, melon, and tomato ice cream prepared by Chia Tai staff.

Narinder Dhillon (second from left) and Supunsa Phethin (third from left) flanked by Chia Tai cucurbit breeders.

Rajesh Dhungal (left) chats with Dhillon and Supunsa about the upcoming 30th International Vegetable Training Course, which will open on 12 September 2011.

A visitor from Nepal

Rajesh Dhungal, Program officer, Oxfam GB, Nepal, visited AVRDC East and Southeast Asia at Kasetsart University, Kamphaeng Saen, Thailand on 24 January 2011 to learn more about the Center's 30th International Vegetable Training Course and explore its utility for extension workers of various NGOs in Nepal. **Narinder Dhillon**, AVRDC's Cucurbit Breeder, and **Supunsa Phethin**, Research Assistant, explained the content of the three-module training course in detail and its past impact in Asia. Rajesh visited AVRDC's cucurbit trials and discussed horticultural traits of bitter gourd landraces in Nepal. The two men have a history: Rajesh was under Dhillon's tutelage while earning his master's at Punjab Agricultural University, where Dhillon held a professor's position before joining AVRDC last year.

Ag Fair in Ebolowa

Left: AVRDC demonstration plot.

Bottom (clockwise):

Ashu Tambe *(r)* from Centre for Assistance to Sustainable Development (CASD) and Takemore Chagomoka, AVRDC Seed Marketing Specialist in front of AVRDC demonstration plot.

Robert Jackson, Ambassador of United States of America in Cameroon (center) visits AVRDC plots accompanied by Takemore Chagomoka *(r)* and Njoh Wanduku *(l)*.

Catherine Akom Anjeh *(r)*, FFP/FFE Projects Assistant at the US Embassy, signing the visitors' attendance book.

Njoh Wanduku and secretary general, **Ebelle Etame** *(l)* of the Ministry of Scientific Research and Innovation at the AVRDC booth.

Cameroon's **National Agricultural Fair** was held in Ebolowa from 17-22 January 2011, and **AVRDC – The World Vegetable Center** was there to promote sustainable vegetable production for food security, health, and income. The last fair of this kind took place 25 years ago; previously, Cameroon had these fairs every five years in different regions of the country. AVRDC took the opportunity to display new lines selected for their good adaptability to the humid tropics of Cameroon, and has proposed to the **Institute for Agricultural Research and Development** that the lines be listed in the national variety catalog for commercialization. The vegetable crops on display in the demonstration plot during the fair were 2 varieties of okra (TOT 7940, PI496946) , 3 varieties of chili pepper (PP 9852-173, PP0237-7508, PP 97-9195-1), 3 varieties of tomato (CLN 1464A, CLN 1462A, CLN 1464B), 3 varieties of African eggplant (AB2, N13, Oforiwa), 3 varieties of jute mallow (Aziga, Bafia, UG), 3 varieties of amaranth (IP5, AM-NKGN, AM-ZIM) and 3 varieties of African nightshade (SS52, BG24, TZSMN 55-3). These high yielding lines with disease resistance, good marketability, high mineral content, and good shelf life attracted many to the AVRDC booth; more than 300 people

L: AVRDC's Takemore Chagomoka *(l)* and Njoh Wanduku *(r)* in front of AVRDC booth.

R: **Guy Blaise** (center), General Manager of Semagri-Sarl, taking a picture of AVRDC African eggplant.

signed the visitors' book, including Robert Jackson, Ambassador of United States of America in Cameroon, and Catherine Akom Anjeh, FFP/FFE Projects Assistant at the US Embassy. The Minister of Scientific Research and Innovation, Madeleine Tchuinte, and her secretary general, Ebelle Etame, also visited the booth. Private seed sector company partners and coordinators of CGIAR centers toured the AVRDC demonstration plot, including Guy Blaise, General Manager of Semagri–Sarl, who expressed interest in African eggplant, and Zac Tchoundjeu, Regional Director West and Central Africa, International Centre for Research in Agroforestry (ICRAF).

Brochures in French and English promoting amaranth, nightshade, jute mallow, okra, cowpea, and eggplant were distributed.

"We have high yielding vegetable varieties"


Scientific Research: Job Well Done

Pluvial Rice

So proclaimed AVRDC's **Njoh Wanduku** to a reporter from the Cameroon Tribune, who interviewed participants in Cameroon's Ebolowa 2011 Agro-pastoral Show. Njoh was on hand at the show to introduce local farmers to the Center's high yielding, disease-resistant vegetable lines, including okra, chili pepper, eggplant, tomato, and leafy greens.

The early onion catches the market

Farmers in Mali take up the challenge of producing onions in the rainy season

Albert Rouamba *explains how to produce early onion to farmers attending the field day.*

Early onion production (November to January) constitutes a big challenge for most onion growers in West Africa, especially in Mali. **AVRDC – The World Vegetable Center** and the **West Africa Seed Alliance** (WASA) have combined their strengths to conduct research on new onion varieties adapted for early production.

Onion production is generally conducted from October to March. Local onions arrive on the market at the same time of year (March and April), and at harvest, prices plummet. Because onions are perishable, much of the harvest is lost.

From July to January, the opposite situation prevails. There is a shortage of onions, and consumer demand during this period is met almost exclusively by onions imported from Holland and Egypt.

To help extend onion production, AVRDC and WASA put their best varieties recommended for early season production on trial in Kirina, a village in southern Mali about 45 km from Bamako, the capital city. At a **Field Day** on 6 January 2011, onion growers from

l: *Female farmers actively participated in the field day;* ***r:*** *Onion growers take a closer look at the field trials.*

Kirina, Dalakana, and other neighboring villages learned something contrary to popular belief: that it is indeed possible to cultivate onion during the rainy season so that harvests can reach local markets early in the season and provide good returns and profits.

AVRDC and WASA established the field trial in early August through sowings of selected early season onion varieties. Field trial plants were transplanted in mid-September and harvesting occurred by mid-December. A variety selected by AVRDC and an Indian variety introduced by WASA were compared with the control, local variety 'Violet de Galmi' widely cultivated in the region. Despite the rains, the two varieties brought by WASA and AVRDC were healthy and produced good bulbs, while more than 80% of the 'Violet de Galmi' control plants did not survive the trial period.

The 78 Field Day participants (66 men and 12 women) were impressed by the productivity of the two new improved varieties. They were pleased to learn of a new strategy to earn more profit by engaging in early onion production, and nearly all expressed their willingness to engage in early onion production in 2011.

Before that can happen, another challenge must be met: ensuring seed availability at an affordable cost. To build seed stocks, AVRDC will reinforce the production of foundation seed to supply seed companies for certified seed production. To improve access to quality seed, WASA will link farmers with seed dealers.

At the end of the Field Day, farmers expressed their thanks to AVRDC and WASA for having conducted field trials of onion varieties whose adoption will certainly contribute to reducing local poverty.

-- Albert Rouamba, Onion Breeder, Mali
albert.rouamba@worldveg.org

Top: *How about these onions? AVRDC onion breeder Albert Rouamba (l to r), AVRDC research assistant Moussa Kanoute, and Edo Lin, WASA seed specialist.*

Bottom: *About 80% of onion growers in Kirina are ready to start early production in 2011.*

Linking farmers to the vegetable processing industry in Tanzania

***Chris Ojiewo**, AVRDC Vegetable Breeder, explains the growth and yield characteristics of AVRDC pepper and tomato lines to participants during the workshop. (photos: Victor Afari-Sefa)*

In recent years, AVRDC's **Regional Center for Africa** has sought to link vegetable farmers in sub-Saharan Africa to different direct marketing outlets, such as supermarket chains and processing industries. **M/S Darsh Industries Ltd**., a Tanzanian company involved in the processing of fruit and vegetables, notably tomatoes and hot pepper, is a member of AVRDC's Innovation Platform, established in part to connect private sector companies to vegetable producers.

Since its founding in 2000, Darsh Industries has been acquiring raw materials for processing partly through arrangements with local contract farmers and partly via spot market purchases. The company also leases land for its production needs and recently purchased 25 hectares of land (known as *Nduruma* Farm*)* in Arumeru district of Arusha, Tanzania for this purpose.

To meet its target production volume, Darsh Industries imports the bulk of its raw materials from China, especially tomato concentrate for tomato processing, said **Ravikant Bhalerao**, Darsh General Manager. In 2009 for example, 3,800 metric tonnes of tomato concentrate were imported from China while 2,200 metric tonnes of tomato were bought from local farmers over a 4-month period—approximately 60% imports/40% local production. The company intends to flip this mix in the future, targeting levels of 60% local production/40% imports.

All the produce processed by Darsh Industries is wholesaled locally in Tanzania a few days after processing (the company has no provisions for long-term storage), but regional demand is growing and there are plans to export to Uganda, Kenya and other African countries. This presents a great opportunity for Tanzanian farmers to increase tomato production to meet the 2011 projected demand of 10,000 metric tonnes of tomato.

To source raw materials from local tomato and pepper farmers rather than rely on paste imports, Darsh Industries and several development partners planned a series of outreach programs for smallholder farmers in Tanzania. In collaboration with the **Tanzanian Agricultural Productivity Program** (TAPP), a 5-year USAID-sponsored initiative that works with the Tanzanian government to increase rural incomes and transform Tanzania's agricultural sector, Darsh hosted a one-day workshop in Swahili for more than 100 farmers from various regions of Tanzania, seed company representatives, and government staff on 19 January 2011. Richard Pluke, TAPP's Environmental and IPM Manager, said the workshop was held to encourage farmers, especially those operating around the *Nduruma* nucleus farm, to supply Darsh with fresh produce. AVRDC is recognised as a valued partner able to link smallholders with private sector businesses, and **Chris Ojiewo**, **Victor Afari-Sefa**, and **Ronia Tanyongana** ably represented the Center at the workshop.

Chris gave presentations on the Center's tomato and pepper lines with good processing attributes. His first presentation highlighted growth and yield characteristics and agroecological adaptation of various AVRDC tomato lines,

Workers at M/S Darsh Industries Ltd., Arusha, Tanzania putting labels on filled tomato sauce bottles in the production line. (photo: Takemore Chagomoka)

including two that have already been released and commercialized in Tanzania: 'Tanya' and 'Tengeru 97'. These two varieties are much sought-after by farmers and consumers, and also provide good quantities of paste for processing. Chris introduced newly released late blight resistant varieties 'Meru' and 'Kiboko,' and also lines LBR 6 and LBR 11, which recently received approval for release in Tanzania as 'Duluti' and 'Tengeru 2010.'

AVRDC peppers, including cayenne types, were promoted in the second presentation. The majority of Darsh Industries' locally bought peppers are *pili pili mbuzi* (bell peppers), but the company is also considering African bird's eye chili and cayenne types. Smallholder farmers in Kenya have found good markets growing the tiny chillies for processing companies, and Tanzania hopes its farmers will as well. Chris provided information about growing cayenne peppers for processing, prompting discussion among the farmers about the possibility of increasing their income sources and diversifying their farm portfolios. Representatives from the Tanzanian Horticultural Association, Alpha Seeds and East African Seeds and **Janine Rüst**, a graduate student from the Swiss Federal Institute of Technology, Zurich, Switzerland who is being hosted by AVRDC's Regional Center for Africa for field work, also gave presentations. The workshop closed with a tour of Darsh Industries' processing facilities, to give farmers a closer look at the secondary production environment.

-- Takemore Chagomoka
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Success: Thesis defended!

Congratulations to **Kengne Naoussi Merlin**, AVRDC intern, for defending her thesis on 12 January 2011 at the Agricultural Faculty of the University of Dschang, Cameroon. She was awarded the *Ingénieur Agronome* degree in Economics and Rural Sociology. Merlin worked on the topic "The socioeconomic analysis of tomato, pepper and okra sector in Yaoundé and its periphery." She was supervised at AVRDC by Christophe Kouamé and Njoh Wanduku.

-- Njoh Wanduku
AVRDC Liaison Office, Cameroon
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***Kengne Naoussi Merlin**, AVRDC intern received a first class grade for her thesis from the jury: (1 to r) Nkodo Fidèle, Kamajou, Ajaga Nji, Kengne Naoussi Merlin and Njoh Wanduku.*