PhilRice Magazine

A quarterly publication of the Philippine Rice Research Institute

REVISITING PUBLIC HYBRID RICE

ISSN 0117-0376

Vol.30 No. 2
Apr-Jun 2017

ABOUT THE COVER

While hybrid rice is not a new technology, this issue reintroduces it to the public to help them learn and unlearn the things that they know; provide explanations to their judgements; and consider it another option for them to be more competitive.

Same targets, only this time, we use different arrows and bullets.

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EDITOR'S NOTE

REVISITING PUBLIC HYBRID RICE

The Philippines began to recognize the potential of hybrid rice to boost production only in the late 1980s. Back then, public research institutions (PhilRice and IRRI) were more active than the private sector in breeding hybrid varieties. Our first hybrid (PSB Rc26H or Magat) was released in 1994, followed by Rc72H (Mestizo 1) in 1997. Lamentably, the difficulty in producing their ready-to-sow (F1) seeds slowed down their adoption at a wide scale.

The government took hybrid more seriously in 2002 when the Department of Agriculture (DA) was made to execute the centerpiece Hybrid Rice Commercialization Program. It subsidized mostly private F1 seeds, together with a few public hybrids, to make them more affordable and encourage continuing adoption among farmers. On-farm data showed that hybrids yielded higher than inbreds by a minimum of 15%.

A number of success stories occurred but farm-level adoption of the technology remained below expectations due to its relatively expensive seed and susceptibility to pests and diseases, chiefly bacterial leaf blight.

With waning government subsidies, the promotion of public hybrids nose-dived. Positively, the private sector took over; became more aggressive in breeding, seed-producing, and marketing their proprietary hybrids.

And public hybrid R&D persevered. PhilRice soon developed the two-line hybrids Mestiso 19 and 20, which require less complicated seed production compared with earlier generations of three-line hybrid varieties.

Reports now indicate that hybrid not only increases production but also entails lower cost. Hybrid rice farmers in Nueva Ecija, for instance, could produce 7.20 t/ha at a cost of P9.85/kg, while inbred yields 5.28 t/ha at P11.28/kg cost. Hybrid seeds, however, remain persistently expensive at P250-300/kg for private and P212/kg for public hybrids.

With more varieties to choose from and the growing evidence on its benefits, DA has revived its interest in hybrid rice technology. The government is to promote hybrid rice on a wider scale at a more affordable price to farmers. With policy reforms, public hybrid rice must complement private hybrids.

Hybrid seeds must be available. Hence, one of the government's major first steps is the production of parental seeds and to ensure their availability to seed growers across the country.

PhilRice plays a central role here, especially in promoting its own hybrids and their required crop management practices and technologies, and in providing technical assistance in the production of parental seeds. The latest public hybrids are not inferior, as they are not only high-yielding but also resistant to many pests and diseases.

This issue of the magazine features these public hybrids. Let's get to know them – their reliable agronomic traits, and how they benefit the farmers who grow them.

TV'S "PROBINSYANO" STARS FEATURED AT PHILRICE RICE PADDY ART

After featuring pop culture and political icons, PhilRice launched a new design of its rice paddy art baring two generations of *Ang Probinsyano* stars (Coco Martin and Fernando Poe Jr.), March 24.

The PhilRice FutureRice project uses the 3D anamorphosis principle (an art technique used for a distorted artwork that will only appear normal when viewed from a certain angle), aiming to increase awareness of netizens and 'millennials' on rice farming and agriculture.

The art team used a Korean variety purple rice to emphasize its distinction from the regular green-leafed rice variety.

Images of national hero Jose Rizal, the Al-Dub loveteam, President Rodrigo Duterte, and Vice President Leni Robredo were also featured during the 2015-2016 wet and dry cropping seasons. Since then, the photos have gone viral online and attracted visitors to the farm located in PhilRice Central Experiment Station.

On March 30-31, the FutureRice farm welcomed more than 1,000 farmers during the *Lakbay Palay* event. The 5-ha farm also showcases clean energy facilities, drone technology, advanced farm machines, and an experimental field that demonstrates hybrid, inbred, and traditional rice varieties. | **MARY GRACE M. NIDOY**

NEW MACHINES HELP REDUCE FUEL, LABOR COSTS

PhilRice, in partnership with the Bureau of Agricultural Research and IRRI, has developed new machines to help farmers cut on fuel and labor costs.

The Hydrous Bioethanol Fuel-Feeding Device, installed in a modified spark-ignition engine, uses hydrous bioethanol fuel (HBF) to power small agricultural machines.

"It can power microtillers, power tiller haulers, micromills, water pumps, pump boats, and other machines operated by gasoline engine," says Engr. Alexis Belonio, lead engineer of the device.

HBF can be extracted from sugar-rich crops such as nipa, sugarcane molasses, acacia fruit, and pineapple peels using a bioethanol fermentation and distillation facility.

"With our depleting supply of fossil fuel, the use of bioethanol technology is a cost-efficient system because our farmers can now produce and use clean alternative fuel from their farm resources at the least cost," Belonio adds.

Another machine is the Hand Tractor-Mounted Multi-Purpose Seeder (MP Seeder), attachable to local hand tractors with ride-on operator for mechanical dry direct seeding in rainfed areas.

"Aside from rice, it can also plant mungbeans and corn seeds in dry pulverized soil and later cover the seeds with another layer to protect them from birds and rodents," says Engr. Eden Gagelonia, lead engineer of the MP seeder.

The MP seeder can reduce farmer's labor cost by 20-30%, estimates Gagelonia.

Phoebe R. Castillo

Hydrous Bioethanol Fuel-Feeding Device

Jayson C. Berto

Hand Tractor-Mounted Multi-Purpose Seeder

"It also hastens the planting process. Normally, laborers finish the job in a day but with the MP seeder, they can finish planting in half a day or even 3 hours," she adds.

Both machines are to be commercialized in 2018. | **JOHN GLEN S. SAROL**

Nehemiah L. Caballong

PHILRICE REAPS MAJOR BINHI AWARDS

A prestigious award-giving body recognized PhilRice's communication initiatives and writers during the 2016 Binhi Awards, March 22.

The Binhi Awards is an annual competition organized by the Philippine Agricultural Journalists Inc. (PAJ) in cooperation with San Miguel Corporation to recognize the efforts of the country's agriculture and environment communicators.

Sonny P. Pasiona, a staff writer of this Magazine, was declared Agricultural Journalist of the Year.

John Glen S. Sarol, also a staff writer and layout artist of this Magazine, placed second in the same category, while multi-awarded photographer Jayson C. Berto was Agricultural Photojournalist of the Year.

The PhilRice Magasin also bagged the Agricultural Magazine of the Year Award. It features success stories of rice and rice-based farmers who have practiced various rice production technologies developed by the Institute. It also covers stories on agribusiness and relevant issues, such as climate change, and trade liberalization.

Meanwhile, the #BROWN4good Challenge, a social media campaign initiated by the Department of Agriculture and PhilRice, was named Best Agricultural Information and Media Campaign of the Year. The campaign resulted in more than a million pesos worth of brown rice distributed to chosen charities nationwide through the participation of netizens.

The Best Regional Agricultural Radio Program award went to *Maunlad na Agrikultura sa Nayon*, a PhilRice program in partnership with DA-RFO3. Experts from PhilRice served as resource speakers in the program who talked about technologies and relevant issues and developments on rice.

PhilRice's agri-journalists were among the 22 winners in 14 major and minor categories, who were chosen by a five-man board of judges chaired by former acting agriculture secretary Dr. William D. Dar, who now serves as founding president of Inang Lupa Movement Inc.

"More than 100 journalists and institutions joined the contest composed of reporters and correspondents covering the departments of agriculture, agrarian reform, and environment and natural resources beats, and writers and editors of major publications in Metro Manila, Central and Southern Luzon, Visayas and Mindanao, and government agencies," says Noel Reyes, Binhi Awards contest chair and PAJ vice president for internal affairs. | **MARY GRACE M. NIDOY**

AFRICANS LEARN PHILRICE-DEVELOPED FARMING SYSTEMS


Joselito J. Dela Cruz

Nineteen agriculture professionals from Sub-Saharan Africa completed the March 6 – April 28 training course on rice seed production and extension methods to help strengthen rice production toward food and livelihood security in their region.

The training course aimed to enhance the participants' knowledge and skills on rice production using the PalayCheck System as the platform focusing on the production of quality rice seeds. PhilRice developed the integrated crop management system for rice.

The participants were also exposed to different extension methods that can be applied in the promotion and use of quality rice seeds among farmers.

The Africans, composed of researchers, agricultural officers, extension workers, and seed inspectors, were from Ethiopia, Ghana, Kenya, Mozambique, Sierra Leone, Tanzania, and Uganda. They were joined by 10 agricultural extension workers from top rice-producing provinces in the Philippines.

"We are indebted to the instructors who invested significant amount of time, energy, and effort in giving us both theoretical and practical training on quality rice seed production through the PalayCheck System, agroecosystem analysis, and post-harvest management practices, just to mention a few," says Patience Maaldu, one of two participants from Ghana.

"We would implement all the knowledge and skills we gained during the training when we return to our respective countries," he adds.

Problems on food security in Africa led PhilRice, IRRI and the Japan International Cooperation Agency (JICA) into forging a partnership in implementing the 3-year project *Extension capacity development for rice food security in Africa* that includes the training.


oselito J. Dela Cruz


Joselito J. Dela Cruz


Joselito J. Dela Cruz


Joselito J. Dela Cruz

The three-batch course is the second phase of the project.

"We are pleased to share our expertise and experiences on rice seed production and extension methods with the Sub-Saharan countries through this training course to help boost their rice industry," says Ms. Lea Abaoag, head of PhilRice's technology management and services division and overall coordinator of the training.

The project is funded by JICA and managed by IRRI in collaboration with PhilRice and members of the Global Rice Science Partnership. | **ROBINSON B. VALENZONA**

WHAT'S NEW IN RICE RESEARCH?

ANNA MARIE F. BAUTISTA

1

Jayson C. Berto

KWEBO

2

Christian Paul M. Ariola

REDUCED-TILL PLANTER

3

Mel Anthony T. Talavera

HYBRIDS COMING

In a typhoon-prone country like the Philippines, farm investments are always at risk!

Dr. Ricardo Orge, a PhilRice engineer-scientist, has developed an innovation, called *kwebo*, to address this quandary.

Orge said *kwebo* is an easy-to-construct, typhoon-resistant structure, requiring minimal involvement of skilled workers.

The term *kwebo* is from two Filipino words, *kweba* (cave) and kubo (nipa hut) combined. It denotes a farm structure that has the strength of a cave, with the simple design of a nipa hut.

He thought about this innovation during his hometown visit in Leyte, six months after typhoon Yolanda in November 2013.

"There seemed to be a shortage of carpenters repairing damaged structures in the community. Even those capable of hiring dozens of carpenters had to use tarpaulins as temporary substitute for their blown down roofs. It even took another year before the people could actually repair their farm structures," Orge says.

With the development of *kwebo*, farmers can construct their own low-cost, typhoon-resistant multipurpose farm structure that can be used as a dwelling place for farm animals and safehouse for equipment.

Its construction is inspired by the Lego, a popular children's toy composed of building blocks, termed as Basic Construction Units (BCUs) for *kwebo*, according to the scientist.

BCUs are composed of pre-fabricated structural elements that function like hollow blocks to build roofs, floors, beams, and posts.

The first *kwebo* prototype can be found in the FutureRice Farm at PhilRice, with the shape of a dome or a tunnel, and a floor area of 20 sq m. It is currently utilized as seed storage and shelter for a dryer.

The project team is now evaluating the prototype to ensure its structural integrity, simplicity of construction, functionality, and cost effectiveness. Initial results yielded some optimized designs of BCUs using concrete and indigenous, recycled, and readily available materials like bamboos, with a system of assembling these.

This technology is expected to be adopted in rural farming communities where households can be trained to fabricate BCUs and assemble their own *kwebo*.

It directly sows rice and corn seeds in straight rows at a predetermined seeding rate, with an option to simultaneously apply basal fertilizer.

It can be used under clay-loam soils and tilling is not needed. For hard clay soils, reduced tillage (one-pass rotavation) is recommended, project team lead Dr. Manuel Jose Regalado says.

Initial field trial has shown that the planter can be a better option to improve labor productivity, energy and cost efficiency while having good yield in rainfed lowland rice cultivation.

> With reduced tillage and dryseeding, farmers can conserve up to 50% of water because land soaking is not needed.
>
> **-Engr. Kristine Pascual-**

"With reduced tillage and dryseeding, farmers can conserve up to 50% of water because land soaking is not needed," PhilRice engineer Kristine Pascual figures out.

This technology is showing promise, and is currently being tested in farmers' fields. Field trial for corn is on-going at PhilRice CES.

PhilRice has bred two hybrid lines that are high-yielding and resistant to bacterial leaf blight (BLB).

Joanne D. Caguiat, PhilRice hybrid project leader, says most of the previously released hybrids are weak against BLB.

PR40640H is an improved version of Mestiso 3 (Rc116H) with Xa21, a gene that exhibits resistance to BLB. PR47216H averages 9.6 t/ha.

PR40640H will soon be entered in the National Cooperative Tests (NCT), while the other is in multi-location trials. NCT evaluates rice lines in terms of yield, pest and disease resistance, and grain quality across locations.

> PR40640H is an improved version of Mestiso 3 (Rc116H) with Xa21, a gene that exhibits resistance to BLB. PR47216H averages 9.6 t/ha.

RICE ACROSS THE COUNTRY

ALLAN C. BIWANG, JR.

Batac extends help to community

Highlighting its 18th anniversary celebration, the station conducted an extension activity in Cabuusan, Currimao, Ilocos Norte, March 24. The event aimed to build relationships with farmers, enhance their knowledge on rice farming, and help them boost their income. The Be RICEponsible campaign was also introduced to over 200 participants to motivate them to value every grain of rice. Seeds were also distributed to farmers.

Isabela's SOA reaches more audience

The station's School-On-the-Air (SOA) program widens its coverage as it reaches more provinces in Northern Luzon. The *Madiskarteng Pagsasaka* SOA program recently acquired a free-airing timeslot on DWDA 105.3mhz FM *Radyo Pangkaunlaran* of DA-RFO 2 in Tuguegarao City. This adds to its existing five radio station-partners that broadcast the program for free. The SOA is now heard in Nueva Vizcaya, Quirino, Isabela, Kalinga, Cagayan, and Abra. The program was conceptualized in 2014 to bring timely rice and rice-based farming technologies and information to rural farmers in Region 2 and elsewhere.

Los Baños seminar on women empowerment

With Women's Month in mind, the March 22 seminar challenged women to excel in their chosen fields and assert the importance of their role in rice farming. Themed *Women in Agriculture and in Science and Technology* (S&T), UPLB professor Dr. Amelia L. Bell and other women experts in these fields emphasized the need to empower and protect women in the workplace.

Negros field day

Organic farming as a safe and sustainable way of life was promoted among the more than 200 farmers who attended the April 21 event. A field tour showcased the station's existing organic projects, such as livestock farm, 6-ha organic rice production area, mushroom production facility, and vermicomposting. More than 90 kg of different promising rice lines were distributed. The field day was a feature of the Japan-ASEAN Cooperation and PhilRice project *Capacity Enhancement in Rice Production in Southeast Asia*.

Midsayap empowers religious leaders

The station trained 20 *Ulamas* (Muslim religious leaders) in the Autonomous Region in Muslim Mindanao (ARMM) to become rice advocates, April 3-7. Technical knowledge on integrated crop management systems, such as the *Palayamanan* Plus and *PalayCheck* System, was introduced to them. Aside from lectures, they also went through field demonstrations of various farming technologies, such as the agroecosystem analysis, alternate wetting and drying, leaf color chart, and minus-one element technique.

HYBRID 101

INBRED		HYBRID
5.31 t/ha	AVERAGE YIELD*	8.36 t/ha
6.19 t/ha	MAXIMUM YIELD*	10.20 t/ha
100 g/m^2	SEEDING DENSITY	50 g/m^2
1-3 Seedlings	TRANSPLANTING (SEEDLINGS PER HILL)	1-2 Seedlings

*NSIC-APPROVED INBRED AND HYBRID VARIETIES (1991-2016)

ADVANTAGES OF HYBRID RICE

- INCREASE IN YIELD
- STRONGER VIGOR AGAINST WEEDS
- LONGER-LASTING RESISTANCE TO ABIOTIC STRESSES
- HIGHER INPUT-USE EFFICIENCY

WHY HYBRID?

Hybrid boosts farm yields.

It yields 15-30% more than inbred, or some 6 t/ha instead of only 5 t/ha.

Hybrid makes full use of less land.

The higher hybrid yield per unit area indirectly saves 15% of the limited arable lands for other agricultural production purposes. Hybrid therefore leads to more diversified and efficient agricultural land-use.

Hybrid enriches farmers' income.

Bigger commercial production spells fatter income, not to mention the opportunity-laden hybrid rice seed production (AxR and SxP) venture. In both cases, more money can be made.

Hybrid employs more farm hands.

Both hybrid rice commercial and seed production systems contribute to the generation of more jobs, especially in rural areas. Every hectare of commercial seed production needs more workers, roughly 270 man-days of farm labor.

Data from PhilRice Hybrid Rice Seed Training Manual and Inbred and Hybrid Variety NSIC Data.
Reviewed by Ruben B. Miranda | Illustration by Jude Klarence C. Pangilinan | Infographics by John Glen S. Sarol.

DO's & DON'TS OF PRODUCING HYBRID RICE SEEDS

HANAH HAZEL MAVI B. MANALO
ILLUSTRATION BY JUDE KLARENCE C. PANGILINAN

Hybrid rice is a big hit to some seed growers. But others had been off-mark.

"Hybrid rice seed production technology is far different from inbred's. It may take time and experiences to achieve its maximum yield potential," says Susan R. Brena of the PhilRice program *Commercialization of Public Hybrids for Competitiveness.*

Brena adds that seed growers can choose between the cytoplasmic male-sterile (CMS) and the thermosensitive genic male-sterile (TGMS) systems in producing hybrid rice seeds.

Brena explains that TGMS is simpler than CMS because it doesn't need maintainer (B) and restorer (R) lines. Three lines or plants, specifically the A, B, and R-lines, are needed under CMS system. TGMS only needs a pair of S (seed parent) and P (pollen parent) plants. The S line serves as the mother plant bearing the hybrid rice seed while the P line is the father.

In CMS system, male sterility or the incapability of plants to produce functional pollen grains is controlled by the interaction of genetic factors. In TGMS, it is highly influenced by both genetic factors and temperature.

TGMS-based two-line hybrids include NSIC Rc202H or Mestiso 19 (M19) and NSIC Rc204H or Mestiso 20 (M20). The average seed yields of M19 and M20's SxP are 1-2 t/ha and 1.5-1.8 t/ha. This explains why seed growers prefer M20.

For producers of TGMS hybrid rice seeds, Brena advises the following do's and don'ts:

1. Do isolate

Isolation could be done with the combination of the following:

Geographical isolation: Select an area that can give natural protection against unwanted cross-pollination. This area may be surrounded by other crops such as banana and coconut, or an idle area. Trees can prevent unwanted cross-pollination.

Distance isolation: Plant 100 m away from other rice fields.

Time isolation: Adjust planting time so that the flowering period of the hybrid parents is at least 3 weeks earlier or later than the nearby fields.

2. Do consider the following in choosing a location for seed production

- Identify appropriate area and season for large-scale commercial production.
- The system has environmental limitations requiring strict adherence to proper timing that depends on season and location.
- Location may be identified based on analysis of 10 to 15 years of meteorological data. Optimum temperature should range 28-32°C. Four weeks of stable high temperature, >30 (day) and 24°C (night), must coincide with panicle development. Owing to these considerations, the best areas for SxP seed production are in the Visayas and Mindanao.
- Location must have fertile soil, adequate irrigation water and drainage, sufficient sunlight, and low incidence of pests and diseases.

3. Do handle the parent seeds with care

These are currently expensive owing to limited supply and high cost of production. Use the wetbed method to establish seedlings.

The wetbed method is a way of producing seedlings where pre-germinated seeds are directly sown in a well-puddled soil.

4. Do follow proper seeding interval

For beginners, the seeding interval from P_1 (Pollen Parent 1) to P_2, and P_2 to P_3, is 6 days. Interval between P_3 and S depends on the difference in maturity of S and P_3 which is influenced by season (sowing date), location, and characteristics of parentals.

P_2 and S should be planted at the same age, preferably 21 days. P_1, P_2, and P_3 are transplanted at the same day.

5. Do straight-row planting

This makes field operations, such as weeding, spraying, and roguing easier.

6. Do predict and adjust flowering dates

The mother and father plants must flower at the same time, hence seeding dates are adjusted based on the differences in their growth duration. However, weather fluctuations during the growing season and crop management practices may affect flowering synchronization.

It is important to learn and understand how the panicle develops to determine if flowering will synchronize between the mother and father plants. Needed corrective measures could then be done at the right time.

Start observing for panicle initiation at maximum tillering or about 65 days before expected maturity.

7. Do not ignore volunteer plants and off-types

Regularly remove volunteer plants and off-types, otherwise seed purity will be low. Roguing can be done any time in the father and mother plant rows when off-types are observed. The most important stages for roguing, however, are at maximum tillering and flowering (especially before pollination).

SEED GROWERS ON THE RiSE

We introduce two cooperatives – DOSEPCO and S2R – that help us promote local public hybrids. Let's hear their stories and pieces of advice to future seed growers who plan to tread the path they chose to take.

THE DOSEPCO CHRONICLE

JAIME A. MANALO IV

The hype on hybrid rice is being revived given that DA Secretary Emmanuel Piñol has announced government interest in hybrids to propel further yield increases in rice.

The book *Competitiveness of Philippine Rice in Asia* reveals that hybrids are behind the overly impressive yields in China.

Novo Ecijano farmers can vouch about this; during the 2016-2017 dry season, hybrid adoption here, a major rice-producing province, was 70%. This means 140,545 ha of its around 200,000 ha physical area for rice were planted to hybrid, according to DA-Regional Field Office 3.

M20 (NSIC Rc204H) is a public hybrid that can yield as high as 11.7 t/ha. It was bred by PhilRice and UP Los Baños.

According to Susan Brena, lead of hybrid parent line and F1 seed production under the *Commercialization of Public Hybrid rice Program* of PhilRice, the average SxP seed yield of M20 ranges from 1.5 to 1.8 t/ha. This makes it handsome to seed growers. M19's (Rc202H) SxP seed yield, which is another public hybrid, is only 1 to 1.2 t/ha.

The Davao Oriental Seed Producers Cooperative (DOSEPCO), among the country's most successful, is known for massively producing hybrid F1 seeds. The 30-year-old DOSEPCO, which comprises 30 members, has been producing M20 seeds since 2014 in 80-120 ha.

The cooperative can produce up to 180,000 kg of M20 F1 seeds worth more than P38M gross income (P212/kg is the mandated price).

Balbino Alingalan, chairperson of DOSEPCO and the Seed Growers Association in Region 11 says 25,000 ha were planted to M20 F1 seeds in regions 10-11 in 2015-2016. At 20 kg-seeding rate/ha , this would mean a gross revenue of around P106M from the 500,000-kg seeds that the said area needs. For DOSEPCO, therefore, the seed market is seamless thus far.

DOSEPCO seeds are partly exported to La Union, Pangasinan, Cagayan, Camarines Sur, Iloilo, and Bohol. It also used to massively produce Mestizo 1 (Rc72H), another public hybrid.

To ensure customer satisfaction, which translates to sustained income, quality control must be in place. At DOSEPCO, processing is centralized. Members deliver their produce to its warehouse and drying facilities. The Coop handles marketing. It calls buyers to check on quality. They call this "service after sales".

"We need to do this as our name is at stake," Alingalan says.

Carlo G. Dacumos


BINHI
S2R

John Glen S. Sarol

THE S2R REPUTATION

MARY GRACE M. NIDOY

The Seed to Rice (S2R) Cooperative in Lupon, Banaybanay, Davao Oriental is relatively new, having registered only in June 2011. Yet, its members have successfully promoted and supported local public hybrids.

> "As long as quality parentals are always ready and the government supports us in marketing public hybrid, there is no reason for farmers to be hesitant in venturing into hybrid seed production.
>
> -Ruben Batino-

The 15-member cooperative started by producing seeds of M1, M3 (NSIC Rc116H), and M7 (NSIC Rc136H). Today, they allot 17 ha for M20 and 24 ha for M1. Their seeds reach regions 1, 2, 4B, 5, 7, and 9.

In the market, each bag of seeds that weighs 18 kg costs P3,816. In 2013 alone, S2R produced 12,000 bags of seeds in 100 ha and 11,000 bags in 2014 dry season.

Aside from their own warehouse and drying facilities, they have put up their own rice mill for additional income.

According to Nemia Yee, S2R manager, the quality of parentals is crucial in hybrid seed production.

"Future seed growers also need to bear in mind that hybrid is location-specific. You won't be able to produce seeds in windy areas so climate is another factor," she adds.

Banaybanay is home to public and private hybrid seed companies as its location and climate are conducive and ideal for seed production.

Despite the risks in producing seeds, S2R members vouch that hybrid is more profitable than inbred seed production. The standard price in the market of inbred seeds for 40 kg/bag is only P1,360.

"As long as quality parentals are always ready and the government supports us in marketing public hybrid, there is no reason for farmers to be hesitant in venturing into hybrid seed production," S2R member Ruben Batino says.

The members agree that the campaign on hybrid seed production must be intensified, and educating farmers should start from the local government unit. Indeed, with more seed growers inevitably come more hybrid users.•

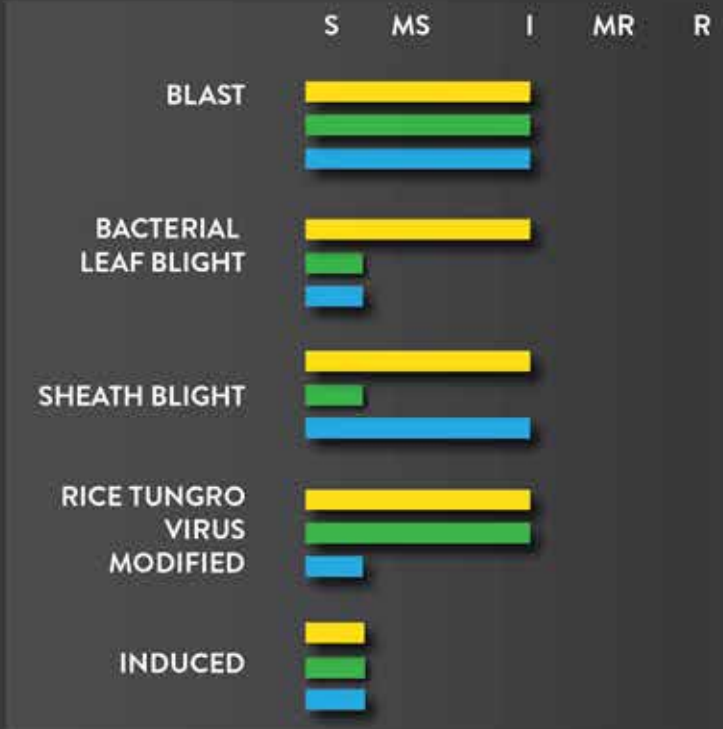
GETTING TO KNOW
M1 & M20 HYBRIDS

ANDREI B. LANUZA

The Department of Agriculture (DA), under its *Masaganang Ani* scheme, is to plant at least a million hectares of irrigated areas to hybrid rice. The technology is seen as one of the answers to the country's persistent challenge of growing enough rice to feed more than 100 million Filipinos. PhilRice has committed to provide seeds of public hybrids Mestizo 1 (PSB Rc72H) and Mestiso 20 (NSIC Rc204H).

The graphics compares the characteristics of M1 and M20.

REACTIONS TO DISEASES



REACTIONS TO PESTS

PSB Rc72H (M1)
NSIC Rc202H (M19)
NSIC Rc204H (M20)

S - Susceptible
MS - Mildly Susceptible
I - Intermediate
MR - Mildly Resistant
R - Resistant

M1

Co-developed by IRRI and PhilRice, M1 was the cornerstone of the Arroyo administration's (2001-2010) hybrid rice program and was heavily promoted by the DA. It is medium-maturing (123 days) and has a maximum yield of 9.9 t/ha. This variety was popular among consumers for its desirable eating quality and aroma. It has intermediate reaction to blast, bacterial leaf blight, tungro, and green leafhoppers (GLH) but is susceptible to brown planthoppers (BPH) and stem borers.

M20

Mestiso 20 is early-maturing (111 days) co-developed by PhilRice and UP Los Baños. It yielded more than PSB Rc82 and M1 in field tests. It showed moderate resistance to yellow stem borer, GLH, and BPH and intermediate reaction to blast, sheath blight, and whiteheads caused by white stem borers. It is more adaptable and yields higher than M1 (11.7 t/ha).

SOURCE: PLANT BREEDING AND BIOTECHNOLOGY DIVISION

> M20 is more resistant to pests and diseases, and is strong-stemmed so it's less prone to lodging.
>
> -Lilio Olfato-

M20 ASSURES BETTER HARVEST IN A TYPHOON-PRONE AREA

SONNY P. PASIONA

Samar province boasts of the long San Juanico Bridge and its splendid mountains, historical churches, and beautiful beaches that attract tourists. Yet, it is one of the poorest provinces in the country. In 2013, super typhoon Yolanda debilitated Samar, stealing lives and agriculture livelihood.

Rice farming, particularly in a highly vulnerable area like Samar, may be considered a gamble. Despite everything, Lilio Olfato of Basey town proved that the use of hybrid rice could turn things around.

GOD HEARD HIM

Olfato, 48, has been tilling the land for over 15 years struggling with typhoons, pest infestations, and drought, among other forms of pestilence.

But he found himself farming with gusto anew when he started using hybrid rice varieties that are resistant, resilient, and high-yielding. One of them is Mestiso 20 (M20), a public hybrid jointly developed by PhilRice and UPLB.

Carlo G. Dacumos

As a member of a farmers' association, Olfato gained access to seed subsidy programs of the government. In November 2016, the local government of Basey distributed M20 seeds at 18 kilograms per bag, an initiative from the *High-Yielding Technology Adoption* Program of the DA in Eastern Visayas.

Olfato hoped that M20 would sprout with resilience and exude hope for a bountiful harvest.

Days before Christmas of 2016, he sowed and prayed for a gift from above. Upon field monitoring, he saw signs that God heard him loud and clear.

"Compared to previous commercial seeds that I used, M20 had longer panicles and greater seed count," he says.

Although stem borer inflicted a minor infestation, Olfato observed that M20 showed decent resistance to it.

A little over three months after he planted, he finally reaped what he has sown – a record-breaking yield of 5.33 t/ha. That spelled a handsome gross income of P64,000.

TRANSITIONING TO HYBRID

"Initially, farmers in our municipality were ignorant about hybrid varieties. We were used to cultivating native varieties like *kabangkalan*," Olfato recalls.

Eventually, hybrid rice penetrated the Eastern Visayas region through field demonstrations of various government programs. Farmers then slowly adopted.

Olfato's farm would normally yield 4 t/ha using commercial hybrid seeds. However, if conditions are unfavorable, like drought, it could dwindle to as low as 1.85 t/ha — once an unfortunate harvest that Olfato doesn't even want to remember.

"In my experience with M20, I felt an assurance that it wouldn't happen again," he says.

Lina Gayon, officer-in-charge of Basey's Municipal Agriculture Office, further attests to M20's exemplary performance.

"During our field monitoring, M20 truly looked better than commercial seeds that are normally grown by our farmers. It's more resistant to pests and diseases, and is strong-stemmed so it's less prone to lodging," Gayon says.

In spite of the positive results, Gayon calls for further promotion of public hybrids including M20.

"Compared with inbred, hybrid rice has a 15-20% increase in yield. That is a significant figure for our farmers," she adds.

Other than seed subsidy, Olfato also calls for postharvest support, such as mechanical dryers and storage facilities. He hopes that through hybrid utilization strengthened with infrastructure development and capacity-building activities, farmers in Samar would rise above the poverty threshold. Someday, their province may no longer be tagged as one of the poorest. •

MESTIZO 1: A HYBRID WITH GOOD YIELD AND GREAT TASTE

CHRISTINA A. FREDILES

Mestizo 1 (PSB Rc72H) lingers on Dumon Mabborang's mind – irreplaceable and undeniably better than the others.

Mabborang, 63, of Buan West, Solana, Cagayan first planted it in 2003. A technician from DA convinced him to try the variety. Until now, he is still an avid fan of Mestizo 1.

MESTIZO 1 STILL

Mabborang asserts the variety has better eating quality than most inbreds.

"When cooked, it is soft, aromatic, and tastier," he describes.

He recalls that some farmers who agreed to sell their produce before harvest changed their mind after tasting Mestizo 1. They say it is comparable to fancy rice owing to its aroma and softness.

The variety also stirred curiosity among consumers in their community.

"They asked me where they could buy the seeds and the milled version of the variety," he says.

Mestizo 1 can also be sold at a higher price than other hybrids. Its being not prone to leaf blight and hopperburn encouraged Mabborang to continue planting Mestizo 1.

PRODUCING MESTIZO 1 WITH A TWIST

He followed the usual recommendations in planting hybrid rice – 20 kg seeds for a hectare at 1 seedling/hill.

"A seedling is enough as it produces many tillers," he says.

But for fertilizer management, he included bat manure to nourish his rice. He used 20 bags of it for a hectare, each costing P150 and weighing 20 kg.

Mabborang says that the bat manure made his rice resistant to pests and diseases. Grains are also heavier and with less unfilled grains.

He would dissolve a bag of bat manure into 160L of water and soak it overnight. Through a laboratory test, he found out that the manure has 6% nitrogen, 7% phosphorus, and 5% potassium.

Nitrogen or urea is responsible for faster growth development of rice; roots and flower develop through P; K makes the plant resistant to pests and diseases.

The manure also serves as soil conditioner that improves drainage and texture.

FAITHFUL TO MESTIZO 1

After following all the recommendations for planting Mestizo 1, Mabborang harvested an average of 8 t/ha. For him, the variety provides good yield and better income.

But to achieve higher yield and income, he advises farmers to be open to new ideas such as planting hybrid varieties. He used to buy seeds from the government but today, he himself produces them.

"Farming is a profession with constant challenges as the need for food continues to rise. So we need to try new technologies for us to keep up. One of them is hybrid," Mabborang concludes. •

John Glen S. Sarol

COMPILED BY
ASHLEE P. CANILANG

There is no hybrid seed center in our area. I am willing to try hybrid should there be one where we can buy seeds.

Richard Manlincon,
Zamboanga del Norte

Seeds are expensive. The government should have subsidy programs for hybrid seeds so that more farmers will be convinced.

Recto Purisima,
Leyte

I will plant hybrid if I will be taught how to manage it properly.

Elias Jungco,
Negros Occidental

The government should offer hybrid seed loans just like the private seed companies. Only then can our farmers shift from inbred to hybrid.

Joselito Guya,
Cagayan

We asked farmers what will convince them to plant hybrid rice, and they say:

We should be made aware of the characteristics and benefits of planting hybrid rice: yield advantage, milling recovery, pest and disease resistance.

Joe Marie Gozon,
Leyte

We should breed more hybrid varieties with higher resistance to pests and diseases. Only then can we be able to convince our fellow farmers to plant it.

Jerimar Turingan,
Cagayan

Demo farms should be established nationwide showcasing the advantages of hybrid over inbred varieties. Most of our fellow farmers need to see things first before believing.

Wilfredo Tiu,
Surigao del Norte

Its price is the main constraint that's why we can't afford to plant hybrid rice in our farms. Should its price be lowered, most of us will shift to hybrid rice.

Jose Garlejo,
Cagayan

Hybrid seed promotion should have information about the varieties' location-specific adaptability so that we will not waste our money on varieties that aren't suitable in our areas.

Francisco Ojed,
Leyte

I will be convinced to plant a hybrid variety if the seeds can be replanted just like inbred. Since the price of hybrid seeds is higher, farmers like me cannot afford to buy seeds every planting season.

Merto Orpilla,
Cagayan

*Crowd sourced via PhilRice Text Center

A TRUE BELIEVER IS A GOOD PROMOTER

PERRY IRISH H. DURAN

What does it take to be an effective partner in development?

In Danilo B. Tumamao's case, you have to be a believer of the technology before you can promote it to the farmers. The 62-year-old provincial agriculturist of Isabela has been an advocate of hybrid rice technology since 2002.

As recipient of the Dr. Sant S. Virmani Award in hybrid rice development and dissemination in the Philippines in 2004, Tumamao was recognized for the following accomplishments: area planted to hybrid rice in Isabela grew five times from 2,200 ha in 2001-2002 to 11,000 ha in 2003-2004, which was the highest in the country; hybrid yield was 5-7 t/ha or 1-3 t/ha better than inbred; and Isabela accomplished 70% of the hybrid production target in Cagayan Valley.

PROMOTION

Tumamao became involved in the hybrid rice promotion and commercialization project when it was piloted in 2002. With seed subsidy from the government, farmer adoption of hybrid rice in Isabela increased.

Mestizo 1 hybrid became popular among Isabela farmers, and was preferred by millers and consumers because of its good milling recovery and eating quality.

"Practically, all the attributes of a 'super rice' are present in hybrid rice," Tumamao says.

By attributes, Tumamao means high-yielding, high milling recovery, good eating quality, and pest and diseases-resistant.

But soon enough, the adoption of hybrid rice wavered due to its expensive seeds and location-specificity.

For Tumamao, promoting hybrid requires support from public and private institutions to find a way of reducing seed cost and ensuring enough supply for farmers. Availability of farming machines is crucial and cooperatives also play a big role in organizing farmers to make sure that they can access these technologies.

CATALYST OF ADOPTION

"Institutions should continue on their efforts to develop the knowledge base of farmers aside from the research that farmers themselves do to acquire knowledge," Tumamao explains.

Extension workers and the local government units (LGU) are mandated to promote agricultural technologies. This work requires collaborative undertakings with DA and initiatives from the local leaderships.

"During project implementation, we were active in working with farmers, especially in field demonstrations that became an avenue for them to learn and unlearn. They saw the difference between hybrid and inbred in terms of stand, yield, and cape. Because of the frequency of these demos, farmers' interest in hybrid rice increased," he recounts.

Tumamao describes his method of promoting hybrid rice as if he were painting an image.

> Institutions should continue on their efforts to develop the knowledge base of farmers aside from the research that farmers themselves do to acquire knowledge.
>
> -Danilo B. Tumamao-

"For example, if one harvests 100 cavans of hybrid rice compared to 50 cavans of inbred, it's like practically widening the farm area because of high production," he says.

"The challenge is to always ensure that hybrid seeds are 20% better than the best inbred variety," he adds.

Tumamao recalls that when hybrid rice promotion and commercialization started, PhilRice was at the forefront.

"One must not assume that one can do everything. Roles must be well-defined. For example, DA or PhilRice can provide training programs on seed and hybrid rice production to equip the LGU to do the ground work in the target areas," he says.

He cites that farmers' field days are effective activities in promoting hybrid rice and in providing new information for the farmers' final decision-making.

"Our role must be to become a partner, doing our responsibility. Promotion is always a collaborative effort."

Jayson C. Berto

Rice C

Puto Pao

INGREDIENTS

Puto base:
500 g rice flour
2 water
1 ½ sugar
4 pcs egg white
¼ bar cheese

Asado filling:
¼ kg chicken breast
1 chicken stock
2 tbsp soy sauce
2 tbsp brown sugar
garlic and onion (pepper to taste)

PROCEDURES

1. Sauté garlic, onion, and shredded chicken breast. Add sugar, soy sauce, pepper, and chicken stock. Simmer until dry. Set aside.
2. Combine rice flour, white sugar, and water in a bowl. Mix until it has a condensed-milk consistency. Set aside.
3. In a large bowl, beat egg white until soft peaks form. Add 1 cup sugar gradually. Continue beating egg white until stiff but not dry.
4. Fold in the flour mixture into beaten egg white until thoroughly blended.
5. Spoon a small amount of mixture into molders, add *asado* filling, then fill with flour mixture. Top with cheese.
6. Steam over medium heat for 15 min or until cooked.

Blends

COMPILED BY JAYVEE P. MASILANG

Brownies

INGREDIENTS

1 ½ rice flour
2 brown sugar
1 margarine
½ tsp salt
½ Karo syrup
60 g unsweetened chocolate
6 eggs
½ chopped nuts
2 tsp vanilla
¼ tsp baking powder

PROCEDURES

1. Preheat oven at 350°F and line a 6x6x2" pan with wax paper.
2. Melt margarine in a double boiler. Add unsweetened chocolate, sugar, and vanilla. Mix thoroughly and cool.
3. Pour and blend melted mixture into beaten eggs.
4. Combine rice flour, baking powder, and salt. Gradually add to chocolate mixture.
5. Pour into the baking pan. Top with chopped nuts and bake for 25 min.
6. Take the pan out of the oven when almost done. Brush the top with Karo syrup and bake again to dry.
7. Cool slightly and slice into squares.

SOURCE: RICE CHEMISTRY AND FOOD SCIENCE DIVISION

STA
EXTRAOR

Getting to know other

Carlo G. Dacumos

SAILILA E. ABDULA

Hometown:
Matalam, North Cotabato

Academic Profile:
Master in Development Management
(Development Academy of the Philippines [DAP])

PhD in Agriculture
(Major in Functional Genomics, Chungbuk National University in South Korea)

MS in Plant Breeding (UPLB)

BS in Agriculture (cum laude) major in Plant Breeding and Genetics
(Minor in Plant Pathology, University of Southern Mindanao)

He leads the project titled *Identification and selection of transgressive segregants in Philippine-released hybrid rice varieties* as well as the collection and evaluation of farmers' rice lines in irrigated and rainfed lowland areas. His interests extend to efficient and sustainable technology transfer strategies as he pioneered working with Muslim religious leaders as rice technology intermediaries. His most recent project is called the *Cotabato Special Rice*, a participatory approach in building a rice-based community enterprise.

Abdula was the national 2016 Gawad Saka Outstanding Agricultural Researcher, for his significant contributions in the R&D of NSIC Rc120 (Matatag 6) and Rc226 (Tubigan 20). These varieties were developed and released to contain the tungro rice disease infestation in Southern Mindanao.

Abdula was designated as the Institute's executive director in July 2016.

Carlo G. Dacumos

MARISSA V. ROMERO

Hometown:
San Pablo City, Laguna

Academic Profile:
PhD in Food Science, major in Food Chemistry
(Rutgers, The State University of New Jersey)

MS in Food Science, major in Food Chemistry and Biochemistry
(University of California, Davis)

BS in Food Technology, major in Food Processing (UPLB)

Romero leads R&D work on healthier rice such as brown rice, germinated brown rice, pigmented rice, micronutrient-dense rice, low-protein rice, and rice blends. She also serves as the key technical person for the consumption aspect of the Be RICEponsible Campaign.

She headed the Rice Chemistry and Food Science Division and led the Natural Products and Value-Adding Systems that evolved into High-Value Products from Rice and Its Environment Program. Nutri Rice Milk, rice mélange, and rice wine are some of the products she helped develop.

Romero pioneered research on nutraceuticals and antioxidants of rice. Some of her current projects focus on grain quality evaluation and/or characterization of phytochemical content of traditional/heirloom rice, specialty rice, unclassified farmers' rice lines, and Korean rice cultivars.

Romero's major awards include 2017 Region 3 Gawad Saka Outstanding Agricultural Scientist, 2015 PhilRice Outstanding Senior R&D Staffer, and 2010 Outstanding Women in the Nation's Service for Science and Technology.

John Glen S. Sarol

RHEMILYN Z. RELADO

Hometown:
Balingasag, Misamis Oriental

Academic Profile:
Master in Development Management
(DAP, with highest honors)

MS in Agricultural and Extension Education
(Pennsylvania State University)

AB in Sociology
(UPLB, cum laude)

In the past 5 years, Relado has been involved in research that looked into the competitiveness of the Philippine rice industry relative to other Asian countries; socioeconomic and technological profiles of rice-based farm households in 42 major rice-producing provinces of the country; and information sources of rice farmers. As her re-entry project for her Master in Development Management program, she endeavored to enhance the delivery and farmers' access to high-quality rice seeds. Her project's *Lakbay Binhi*, a mobile seed center that aims to deliver high-quality and location-specific rice seeds to hard-to-reach areas is in its pilot-testing phase.

She is the head of the Socioeconomics Division.

AFF
RDINAIRE

PhilRice R&D brains

John Glen S. Sarol

FREZZEL PRAISE J. TADLE

Hometown:
Kabacan, North Cotabato

Academic Profile:
PhD degree in Biological and Chemical Sciences (The University of Queensland, Australia)

MS degree in Crop Protection (with minor in Agronomy specializing in Plant Breeding) (University of Southern Mindanao, USM)

BS in Agriculture major in Entomology (USM)

Prior to her graduate studies, Tadle was involved in researches on crop protection, particularly rice black bug (RBB) and white stem borer to help farmers manage pests and diseases. She studied the efficiency of *Telenomus* as a biocon agent for RBB under Midsayap conditions, and saw that this parasitoid is essential.

Tadle is currently R&D coordinator of PhilRice Midsayap. She leads and monitors projects on evaluation of rice cultivars for insect pest resistance and yield trials, intensified rice-based farming systems, PRISM, and others.

Jayson C. Berto

MYRIAM G. LAYAOEN

Hometown:
Cabiao, Nueva Ecija

Academic Profile:
Master in Development Management (Third Honors, DAP)

MA in Communication, major in Communication Research (UP Diliman)

AB in Mass Communication (Major in Journalism, minor in Broadcasting, UP Baguio)

As now director of Be RICEponsible, she leads the national implementation of the campaign on responsible rice consumption. It is aimed at helping achieve rice self-sufficiency by reducing rice wastage, promoting healthier rice options, and showing appreciation for rice farmers.

She also works as a knowledge product specialist cum communication researcher. Her exposure to development work enables her to explore the communication needs of farmers and other stakeholders in the agriculture sector. Aside from her involvement in various knowledge management activities, she also specializes in development researches to explore the potentials of various communication modalities particularly on rice science for development.

Her MA thesis focused on farmers' communication patterns and trends in facing the challenges of climate change to rice farming. She also studied the improvement of printed knowledge products through participatory evaluation.

She was the head of the Development Communication Division in 2016.

John Glen S. Sarol

EDUARDO JIMMY P. QUILANG

Hometown:
Ilagan City, Isabela

Academic Profile:
Diploma in Public/Development Management (The National Government's Career Executive Service Development Program, DAP)

PhD in Agricultural Sciences, specialized in Bioproduction Environmental Sciences (Kyushu University, Japan)

MS in Agricultural Meteorology, minor in Agronomy (UPLB)

BS in Agricultural Engineering, major in land and water resources engineering and technology (UPLB)

Quilang was PhilRice's acting DED for Development from 2011 to 2015. Under his watch, several campaigns and special projects were launched such as the Palayabangan: The 10-5 Challenge, PalaYamaNayon: The Rural Transformation Movement, Be RICEponsible Campaign, Best Station Contest, and Rice Science Museum.

He is involved in various researches on geographical information systems and remote-sensing applications in agriculture; adaptation and mitigation options for climate change; ICT for agriculture; water-saving technologies; greenhouse gases inventory; climate change impacts, risks, vulnerability, monitoring and evaluation and adaptation assessment; and disaster risk reduction and management.

He is now the acting DED for research.

Hybrid vigor

(noun)

When the best of both worlds complement each other, their offsprings carry their traits.

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