

ASIAN SEED

THE OFFICIAL PUBLICATION OF THE ASIA & PACIFIC SEED ASSOCIATION

China Vegetable Study Tour

APSA delegation tours veg basket of East Asia

Asian Seed Congress 2018

Review of the 25th edition of APSA's flagship event

Meet the EC

APSA gets new president, VP, welcomes four new members to the Executive Committee

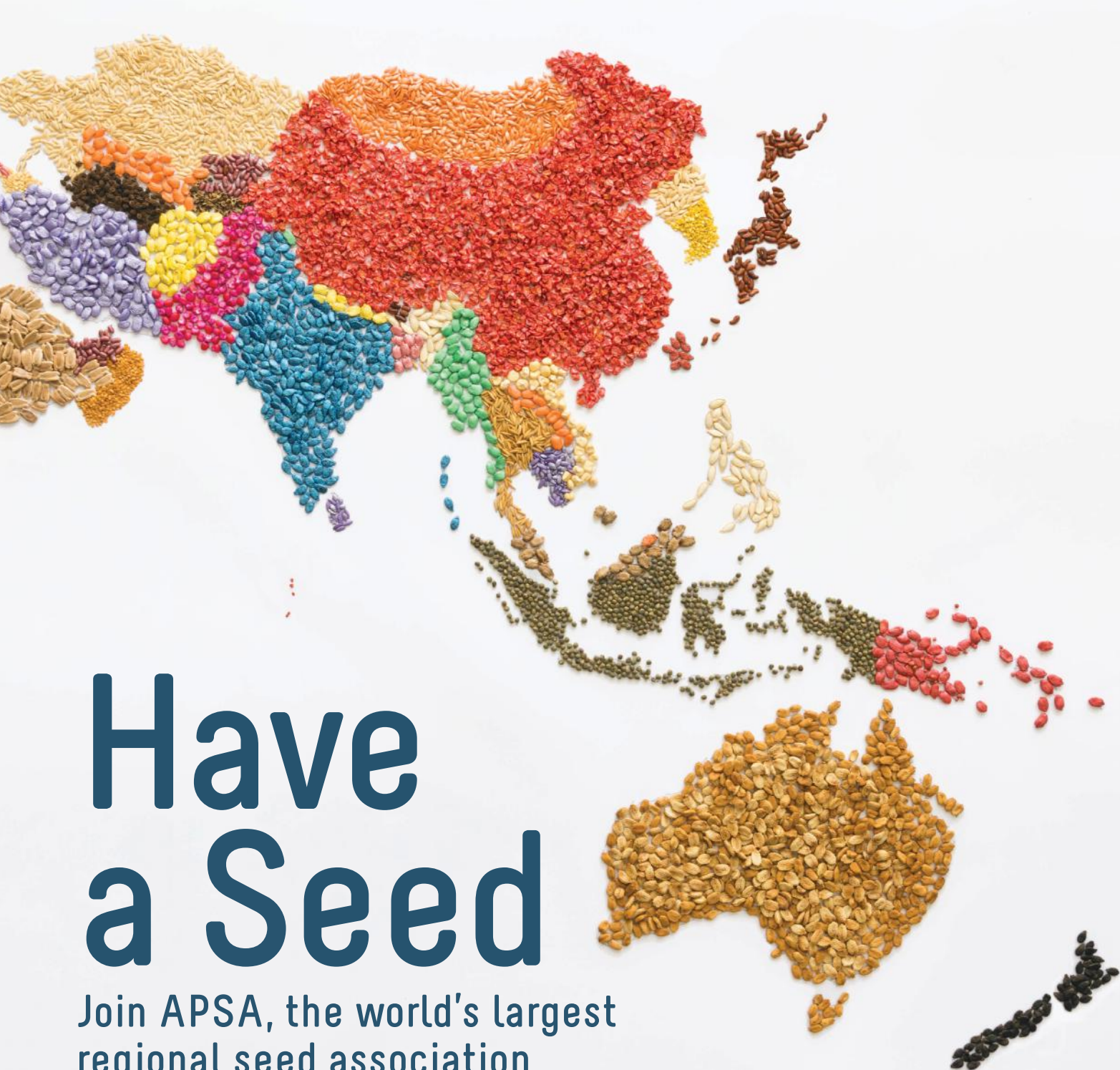
2019 in Seed

Calendar of Events reveals an exciting year ahead for the seed industry

VOL.24 NO.6
NOV/DEC 18
apsaseed.org



ASC 2018 REPORT



Have a Seed

Join APSA, the world's largest
regional seed association

Comprising seed-related enterprises from both the private and public sectors,
and from across the region and globe.

- Join the Asian Seed Congress at a 'members-only' discount
- Participate in study tours, workshops and training programmes
- Be part of private-public research projects
- Enjoy access to the APSA membership database
- Get up-to-date information with your free copy of Asian Seed magazine
- Promote your business by advertising in Asian Seed magazine, online and at the Asian Seed Congress

You can apply online for APSA membership by visiting our website at: www.apsaseed.org

For details please contact: apsa@apsaseed.org

Asian Seed & Planting Material
Volume 24, No. 6, Dec 2018

Official Publication
ISSN 0859-1776

APSA EXECUTIVE
COMMITTEE 2019

Office Bearers

President

Mr Tahir Saleemi

Immediate Past President

Ms Brenda Dossey

Vice President

Mr Wichai Laocharoenpornkul

Treasurer

Mr Daniel Gleeson

Executive Committee Members

Dr Tso-Chi Yang

Dr Mi-Hee Yang

Mr Tsukasa Kawakami

Casper van Kempen

Mr Muhammad Asim Butt

Mr Isao Iuchi

Mr John Mizicko

Dr Manish Patel

Dr Yan Shupeng

Mrs Zhu Xiaobo

Mr Jinman Lee

Acting Director

Dr Kanokwan Chodchoey

Membership Officer

Mr Komsak Kamjing

Public Relations Officer

Ms Suchada Yansarasrin

Liaison Officer (China)

Mrs Xiaofeng Li

Events Officer

Mr Mike Kingpayom

Membership Programs Officer

Mrs Kunaporn Phuntunil

Chief Accountant

Ms Narima Setapanich

Communications Officer

Mr Steven Layne

Research Officer

Mr Pot Phetlorlian

Administrative Officer

Ms Weeranuch Mhadhoo



P.O. Box 1030, Kasetsart, Bangkok 10903, Thailand
Tel: +66 (0) 2-940-5464 Fax: +66 (0) 2-940-5467
Email: apsa@apsaseed.org www.apsaseed.org

Asian Seed & Planting Material is published bi-monthly as the official publication of the Asia & Pacific Seed Association (APSA). APSA is a provident organisation dedicated to the promotion and improvement of the seed industry in Asia Pacific.

Asian Seed has a pass-on readership of 3,500 worldwide. Eighty per cent of our subscribers reside in the Asia-Pacific region and include senior executives in seed enterprises, government agencies, universities and national seed associations.

Subscriptions are available on the APSA website or from the Secretariat.

Editorial contributions and advertising enquiries should be sent to the Secretariat or by email to apsa@apsaseed.org. APSA holds the right to accept or reject contributions.

The contents of this magazine may only be reproduced with the written consent of APSA.

In this issue

13

Saving mom and the family farm

How one of Thailand's 'Young Smart Farmers' gave up a corporate career in the city for an organic farming future in the Thai countryside.



16

China veg seed Study Tour

APSA delegation tours seed and fresh-produce production and operation sites around Shanghai, Shouguang, Xingtai and Beijing.



22

25th Asian Seed Congress

Highlights and summaries from all the meetings, technical sessions and programs of APSA's annual meeting, held in Manila.



36

Meet the 2019 EC

Meet APSA's 15-member Executive Committee – where they are from and what they do.



History in the Making



Greetings from Pakistan. I am both honoured and humbled to assume my role as APSA's 23rd President. After serving as APSA's Vice President for 2 years, I begin my journey as the President with excitement and enthusiasm.

I hope you are all back home safely and all set to foster the new connections you built at the Asian Seed Congress in Manila, the Philippines.

I can't be more pleased about the ways in which APSA's flagship event has continued to expand in breadth, depth and scope, year-on-year.

With the enduring efforts of APSA's secretariat, and with valued support from all our sponsors, this year's Congress made a mark in APSA history for two major reasons: one, with participation from nearly 1,400 delegates, new records for attendance were set; and two, milestone decisions were made regarding APSA's future – with unanimous assent.

APSA was initially registered as a Thai seed association, which has worked very well for the

past two decades; but, keeping in view APSA's current structure and to meet future challenges, we needed to make some adjustments.

I want to thank you all for showing confidence in our proposed plan and giving unanimous approval, at the GAM, for registering APSA as an international organization.

With headquarters in Singapore and an operational office in Thailand, APSA has registered in Singapore as the Asia Pacific Seed Alliance.

I am excited about this new endeavor and I request your continued support to ensure a smooth transition.

Lastly, it gives me immense pleasure to write to you all the way from Pakistan – the 6th most populous country in the world and home to some of the world's tallest peaks. The country is mostly referred to as "land of the pure".

Accounting for over 25 percent of Pakistan's GDP, the agriculture sector plays a fundamental role in the

economy. With 47% of the land under cultivation, rich soil, and the world's largest canal system, agriculture engages more than 45% of the workforce.

Current focus of the agriculture sector is provision of food security and maximization of production.

Lack of awareness and education mean untapped opportunities for agriculture technology providers. Along with the China Pakistan Economic Corridor (CPEC), recent introduction of the new Seed Act, Intellectual Property Rights (IPR) and Plant Breeder's Rights (PBR) are directing new fortunes towards the private sector.

I take this opportunity to cordially invite all members to come experience the rich culture and incredible beauty of Pakistan.

Signing off, I congratulate and welcome the new executive committee members and office bearers. For myself, I will continue serving APSA to the best of my abilities. 🙏



Creating Tomorrow Today

TAKII SEED: HIGH QUALITY, RELIABLE, INNOVATIVE

TAKII & CO., LTD.
AMERICAN TAKII, INC.
TAKII EUROPE B.V.

<http://www.takiiseed.com/>
<http://www.takii.com>
<http://www.takii.eu>



TAKII SEED

Creating Tomorrow Today

Exciting Times Ahead for APSA



Welcome to the last issue of the year! Following a wonderful Congress in Manila in November, I would like to express my sincere gratitude to the Philippine Seed Industry Association, this year's national organizing committee, for their work as hosts. We were most impressed with the unlimited support they offered, and their dedication. Preparing for the Congress took up most of their day-to-day work during the past year.

The results were phenomenal – as was well-perceived by all delegates. I also would like to express appreciation to our sponsors this year, who contributed so much to our success.

At this year's General Assembly Meeting members overwhelmingly approved the financial statement reports for 2016 and 2017, the registration process for APSA, the 2019 budget, and the audits for 2018 and 2019. Moving forward, please look out for an announcement from the Secretariat with new details about membership renewals, which will be sent out soon.

Also, five new executive committee members were elected, and I take this opportunity to congratulate

them. Short introductions to each are on pages 36 and 37, along with a brief introduction to our new president, vice president, immediate past president, treasurer and other current Executive Committee members.

On behalf of all of us at the APSA secretariat, I want to express, for their contribution in the past, our deep appreciation to out-going EC members whose term finished this year: Mr Vaibhav Kashikar, Mr Zhipping Wang and Dr. Dehua Ma.

Looking back, aside from the Congress, APSA organized many activities last year to benefit members, starting with the new midterm meeting. There was also the APSA-World Veg Consortium's annual workshop; the first Asian Cucurbit Round Table with Kasetsart University; the 4th APSA Phytosanitary Expert Consultation with support from CropLife Asia, and the China Vegetable Seed Operations Study Tour (see pp 16–19).

Events in which APSA joined with other organizers included: the PVP Forum in China with CNSTA (see p 21), the 15th Solanaceae Conference with East-West Seed and Chiang Mai University, the Taiwan Agritech Expo and Vietnam Hortex.

Before concluding, I should add that credit for the success of our operations must be given to our stakeholders, who have supported all our activities, and also to our Standing Committees and Special Interest Groups – they initiate and contribute so much of importance to APSA.

With their help, we aim to continue improving. I strongly believe we will achieve better results in the coming year by pulling together diverse views for ideas on our key foci: intellectual property rights; plant variety protection; movement of quality seed; and plant breeding innovation.

Finally, APSA now offers more educational material to members and stakeholders, relating to: plant breeding innovation; use of certified seeds; and plant variety protection. Please stay tuned to APSA via our social media and website. All members are valuable to us, and the APSA secretariat is more than happy to answer any queries you have. We welcome all suggestions for our activities moving forward.

To you and your family, we wish you a very happy new year in 2019 – may it bring you happiness every day! 🍀



The 2018 Executive Committee, posing here on stage at this year's General Assembly Meeting, includes four new members See page 36 for bios.



Since 1917

VEGETABLE SEED BREEDERS AND GROWERS

We are specialized in Hybrid Cabbage, Broccoli, Cauliflower, Chinese Cabbage, Tomato, Eggplant, Chilli Pepper, Cucumber, Watermelon, Squash, Okra, Carrot, Bunching Onion, Spinach, Radish and Oriental Vegetables.



TOKITA SEED CO., LTD

(HOME PAGE) <http://www.tokitaseed.co.jp>

TOKITA SEED CO., LTD.
1069, Nakagawa, Minuma-ku, Saitama-shi,
Saitama-ken, Japan 337-8532
Tel: 81-48-686-7235 Fax: 81-48-688-1167

TOKITA SEED INDIA (P) LTD.
360, 13th A Main, Sector-A, Yelahanka New Town,
Bangalore, KA, India 560046
Tel: 91-80-2846-0254 Fax: 91-80-2846-0749

Implications of US, China Tariff Tussle on Asian Seed Industry



By Michelle Klieger
Founder of Stratagerm Consulting

michelle@stratagerm.com

The United States and China trade dispute is changing the global supply chain as the world's largest economies aim at overcoming perceived or alleged inequities by imposition of tariffs. The seed industry will not escape unscathed.

Rather, it will be greatly impacted by this situation, which could result in long-term changes to the seed supply chain.

Earlier this year the United States imposed tariffs on China, citing Chinese trade practices related to intellectual property rights and technology transfers. The United States has imposed three tranches of tariffs on Chinese goods for a total of US\$250 billion in affected products.

The last and largest tranche went into effect on September 24th, applying a 10% tariff on \$200 billion worth of Chinese goods. It includes all planting seeds from China. Unless the situation de-escalates, the 10% tariff that planting seeds face will increase to 25% on March 1, 2019. China has levied \$110 billion of counter-tariffs on U.S. products, but to date none of them are on planting seeds.

In 2017, the UN Comtrade Database reported that the United States imported over \$135 million in planting seeds from China, primarily pre-commercial seed which Americans now have to pay a 10% tax (US\$13.5 million) to import. That cost will grow to almost \$34 million in 2019. Seed companies

located in the United States are investigating other places to produce seed as one way to avoid the tax. In 2017, the United States was the biggest purchaser of Chinese seeds, accounting for 20% of the seed exports from China. A decrease in sales could have a major impact on Chinese seed companies.

Over half of the seed exported by China is vegetable seed (\$379 million). American and European vegetable seed companies have been looking into other seed production markets for years because of intellectual property concerns and increasing labor costs. Up until now this transition has been slow, because the experience and relationships inside China cannot easily be transferred. However, the tariffs will accelerate the shift to other regions.

World Bank economist Massimiliano Cali looked at third-party countries, particularly in East Asia, that are economically tied to the United States and China. His theory is that many East Asian countries already produce many of the goods that the United States purchases from China. Therefore production could easily shift from China to those countries. His work does not directly cover seed,



US Officials, led by President Donald Trump (left) negotiate with their counterparts in China, led by President Xi Jinping (right).

Country	2017 Vegetable Seed Exports
China	\$377,957,924
Japan	\$170,148,567
Rep. of Korea	\$101,624,413
Australia	\$100,483,461
India	\$71,716,898
Pakistan	\$44,853,475
New Zealand	\$29,248,235
Thailand	\$27,787,100
Viet Nam	\$18,666,714
Indonesia	\$14,048,833
Malaysia	\$12,381,555
Philippines	\$9,941,405

Country	2017 Vegetable Seed Exports to United States
China	\$132,232,807
Japan	\$48,210,499
Rep. of Korea	\$44,325,028
Australia	\$19,111,992
India	\$5,693,549
Pakistan	\$5,082,760
New Zealand	\$4,956,703
Thailand	\$3,732,959
Philippines	\$1,576,547
Viet Nam	\$962,059
Malaysia	\$50,700

Since China and the US are top trading partners for vegetable seed, many APSA countries stand to be impacted by seed movement disruptions linked to impending tariffs on agriculture products.

but using his method and data from the United Nations, here are some inferences that Stratagerm has made.

The table above left shows the amount of vegetable seed that APSA countries exported in 2017. The table on the right shows how much vegetable seed these countries are already selling to the United States. The values of seed in these tables capture both commercial and pre-commercial seed. Datasets do not distinguish between the two types of seed. Cali's premise is that the countries that already produce seed and sell it to the United States are best positioned to absorb the excess demand as companies look to buy from non-Chinese sources, and increase the size of their seed industries.

Most seed production contracts are signed in the first quarter of the year. Stratagerm advises American clients to consider the impact the tariffs will have on their firms and look for ways to mitigate those costs. That might include looking for new production partners. Companies in other locations that want to increase their seed production should be actively engaging with possible overseas partners right

now. Even if the tariffs are removed, companies with contracts in place may not return to China for future seed production needs.

This situation remains fluid. There has been limited communication between Washington and Beijing; during a meeting at the recent G-20 event in Argentina, President Trump and President Xi agreed to a temporary trade truce, effectively postponing tariff increases (to 25%) from January 1 to March 1, 2019 – unless, of course, a resolution is made before then.

Many American and Chinese companies are scrambling to adjust to this new trade environment. They are trying to limit the damage caused by the trade dispute. However, for other countries in the Asia and Pacific region this situation could be an opportunity to expand their businesses.

Sources: Data from the UN Comtrade Database & Cali's work: voxeu.org/article/impact-us-china-trade-war-east-asia

Disclaimer. The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of APSA.

‘Big Four’ Cues from the Windy City

By Mr. Johan van Asbrouk,
Chair of APSA's Standing
Committee for Seed Technology

johan.rhino@gmail.com

Earlier in December, I attended the American Seed Trade Association's conference for Corn, Sorghum and Soy Seed Research Conference in Chicago, where I had the chance to explore the Seed Expo, and talk to different company representatives concerning their latest developments and technologies. Different presentations offered good insight into the future for the agro seed industry in the US and worldwide.

Chicago is always extremely cold, but the venue allowed everyone to use the tunnel systems that are connecting three major hotels.

Representatives from major seed companies Bayer, Syngenta, BASF and the newly formed (official date is around



June 2019, I believe) company Corteva (official merger of DowDupont and Pioneer) gave their thoughts on what they found key for the future.

Following are a few take-home points from my notes during this panel discussion with these "big four":

- Optical technologies are already and will continue to be the major driver in the transformation of seed technology.
- We do need diversity in diversity.
- The future will rely on partnerships and innovation.

- China is investing very heavily on research and innovation, and this in a fast pace.
- Key will be the public private partnerships, especially in Africa and Asia

In conclusion, I strongly believe that this were three days well spent and definitely worthwhile. As Chair of SC Seed Technology, I look forward to discussing, planning and collaborating on worthy projects and developments in the APSA region, and encourage key stakeholders to get involved, starting with reading the summary from the Congress technical session on page 31.

Access to, for Africa

Seeds2B Africa helps seed companies build new business

African farmers need access to better seeds of improved varieties. Companies connected to APSA are excellently placed to satisfy that need. Seeds2B Africa is here to help.

Syngenta Foundation for Sustainable Agriculture (SFSA) is a non-profit organization based in Basel, Switzerland whose mission is to create value for resource-poor smallholder farmers in developing countries by supporting innovation in sustainable agriculture and activation of value chains.

SFSA has developed a business model to connect Public and Private Breeders in Africa called Seed To Business (S2B) and is now expanding this program in Asia. The potential is significant. The commercial seed sector in Sub-Saharan Africa (excluding

South Africa) is currently worth only US\$ 400 million. In India, with a similar size of population, the market is five times as large. As Africa's population is growing rapidly so will demand for more and better crops.

However, entering a new market or segment, particularly without a local presence, can be tricky. "Cultural, language and logistical barriers can all hinder a company from seizing the opportunities", says Camille Renou, Seeds2B Lead for Africa.

Seeds2B Africa is a for-profit social enterprise. It currently operates in Kenya, Mali and Senegal. "We're technology- and results-driven", comments Renou. "We aim to provide more choice and better access to new, improved varieties of a wider range of crops for smallholders in Sub-Saharan

Africa. We believe that great varieties deserve promotion in new markets."

Seeds2B Africa offers a range of services. These include scouting for new varieties and running appropriate trials. These studies examine how well varieties meet market demands such as performance and acceptance. All trials are coded to protect confidentiality. In addition, Seeds2B Africa supports variety registration applications, and licensing to local companies.

"Importantly, we also help build business-to-business links, and work with companies to develop their sales propositions. Everything we do is about linking existing capacities in local markets. This extends from working with national agricultural research services (NARS) and regulatory



authorities to promotion to local seed companies and distributors. We can't promise seed sales. But we are always very pleased to hear about successes achieved after collaboration with Seeds2B Africa. Every new variety available to smallholders reinforces our mission as a social enterprise," Renou concludes.

Have you already been thinking about moving into a new market? If not, perhaps this article ignites an interest to learn more! Please email: info@seeds2b.org

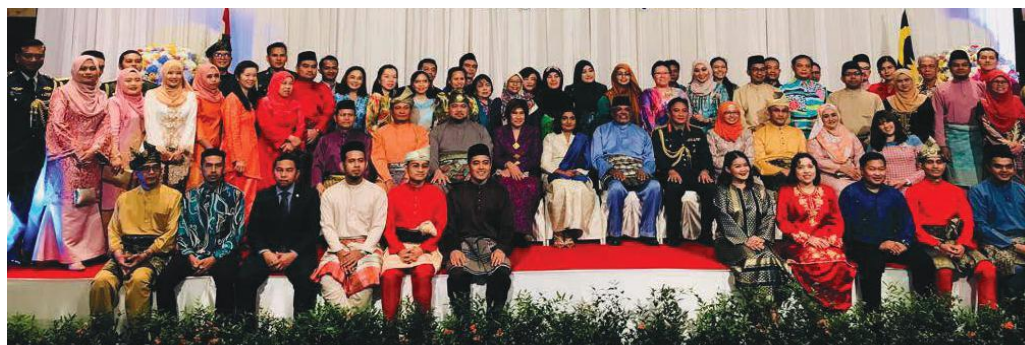
Malaysian food, relations and trade in bloom

APSA looks forward to increasing collaboration with our Malaysian friends and associates ahead of the 26th Asian Seed Congress, which is scheduled to be held in Kuala Lumpur 25 to 29 November, 2019.

The Malaysian government in recent years has made strides in bolstering its agriculture and food industries, and especially in strengthening ties with its neighbor Thailand, where APSA's operations are based. Attesting to the growing strength of these industries, APSA this year has had the pleasure to attend some notable events hosted by the Embassy of Malaysia in Thailand.

On June 1, we attended the Durian Fiesta to celebrate increased trade of fresh fruit between the two countries. Then, on September 17 we joined distinguished guests from Thailand and Malaysia, as well as other countries in celebrations to commemorate Malaysia's National Day at the Embassy of Malaysia in Thailand.

Most recently, on December



The Malaysian Embassy in Bangkok in 2018 commemorated 61 years of diplomatic relations with Thailand.

1, we attended the annual Malaysia Food Festival at the Anantara Siam Bangkok Hotel, where we saw first hand why Malaysia stands to be a major downstream player in the regional and global food chains. In the coming year as we get closer to our annual event, we look forward to learning more about progress taking place upstream.

The Southeast Asian country is a top importer of sowing seed. From 2013 to 2016, Malaysia was consistently the region's leading importer of sowing seed – importing between US\$500 and US\$800mn worth of seed annually. Most seed the Southeast Asian country imported was maize and soybean, consistent with

the government's policy of strengthening food security through cropping extension programs.

Malaysia is now inhabited by more than 32 million people, with hundreds of ethnic communities, namely, Malays, Chinese, Indians, Iban, Orang Ulu, Melanau, Kadazan, Murut, Dusun, Orang Asli, Malaysians of Siamese descent, Sikhs, Eurasians and others.

2018 also marked the 61st anniversary of the establishment of diplomatic relations between Malaysia and Thailand, and enhancing the existing close bilateral relations and strong economic ties with Thailand will remain Malaysia's top priority.

Presiding over the commemoration of the 2018 National Day celebrations in Thailand, H.E. Dato' Jojie Samuel, Ambassador of Malaysia to Thailand, said: "I strongly believe that our mutual partnership in all dimensions will grow even stronger and higher over time."

Thailand is Malaysia's 5th largest trading partner globally, and 2nd within the ASEAN trade bloc; total bilateral trade in 2017 recorded 8.27% year-on-year growth to USD 22.10 billion. Thailand also ranked 4th in tourist arrivals to Malaysia, recording an increase of 3.1% visitors to 1.84 million. 🇹🇭

HM.CLAUSE India Holds Open-Day at Hyderabad Station

HM.CLAUSE India on November 21 held its first-ever open-day at one of its ten local experimental stations in India, near Hyderabad.

Nearly 200 customers from all over India, Bangladesh and Sri Lanka came to discover nearly 90 varieties of more than 20 different vegetable species. The visit of the area was followed by a visit of the head office facilities in Hyderabad.

Throughout the day, HM.CLAUSE India's sales and technical teams, plant breeders, factory workers, and quality control laboratory staff discussed and shared with their customers about the vegetable varieties that the company works with.

They also discussed the ways in which HM.CLAUSE India is



Nearly 200 customers attended the open-day. Photo: HM.CLAUSE

meeting the expectations of the local market, which has very specific characteristics and needs, and to which the company now offers high-performance varieties, particularly in terms of okra, gourds and chilli peppers.

One of the leading okra varieties is the CHIRANJEEVI F1. Easy to harvest, its pods have an attractive dark green.

In terms of ridge gourds, the VINAYAK F1 variety produces

a uniform dark green fruit with highly visible ridges and a very good fruit set. As for bitter gourds, the ANUSHKA F1 variety has a good yield and generally early fruit maturity.

Among chilli pepper varieties, two are particularly noteworthy: the RED ROSE F1 variety has good yield potential, is resistant to mildew, and produces a very attractive red fruit; and the PES-310 F variety, with its very upright habit and short internodes,

is highly suited to the fresh produce market.

According to Jean-François Boscher, Managing Director of HM.CLAUSE India, "our ambition is to become India's leading seed company. ... This event is a key part of our strategy and another key milestone in our endeavors to bring the best products and technical information to the Indian market as well as expanding into Asian markets," said Daniel Gleeson, Director of HM.CLAUSE's ASIA region.

A subsidiary of HM.CLAUSE, HM.CLAUSE India is headquartered in Hyderabad, Telangana state. Present on the Indian market for more than 20 years, it has more than 300 permanent employees and as many temporary employees across four sites.

Next Generation Cucurbit Breeding

Unisexual flower development and parthenocarpy to increase yields (Part Two)

By Manash Chatterjee, BenchBio Pvt Ltd., Vapi, Gujarat, India;

Abdel Bendahmane, Institute of Plant Sciences (IPS2), Paris, France

In Part One (Gynoecy Gender Genius), published last issue, we looked at using the sexual morphology fundamentals of cucurbit flowers as a basis for increasing production. Now, we will look at several promising techniques in the field.

Higher-yielding F1 hybrid cultivars of various types of crops have made a significant contribution to the world's food supply: one of the continuing challenges of plant breeding is to master production of F1 hybrid seeds. Sex determination systems leading to unisexual flowers are attractive tools for improving production of F1 hybrid seeds, especially with cucurbits.

For instance, in *Cucumis melo* (melon), seed companies have exploited monoecious cultivars for F1 hybrid production. Treatment of monoecious melon plants with Ethrel, an ethylene precursor, leads transiently to plants having only female flowers.

In *Cucumis sativus* (cucumber), the exploitation of gynoecy to produce F1 hybrids is also an attractive system for two reasons: first, the gynoecious plants carry only female flowers, which eases tracking of the crossing and gives pure hybrid seeds; second, treatment of gynoecious plants with ethylene perception inhibitors, like silver nitrate/silver thiosulphate, induces male/hermaphrodite flower and, thus, the gynoecious lines can be maintained.

In crops that develop a low number of pistillated flowers, such as many orphan crops of the Cucurbitaceae family, gynoecy could be a practical tool for increasing yield.

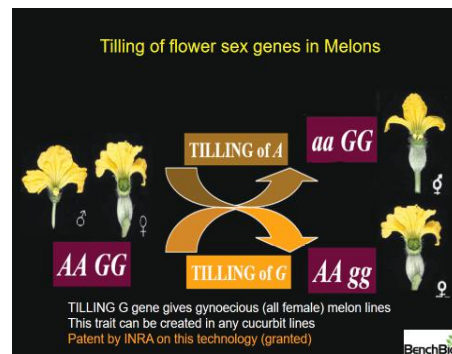
In cucumber, for instance,

introduction of gynoecy in breeding lines positively correlates with higher yield. In monoecious species such as *Luffa cylindrica* (Sponge gourd) and *Lagenaria siceraria* (bottle gourd) and others that show non-optimal synchronization between anther anthesis, pollen viability and pistil receptivity, fertilization is a limiting factor for yield.

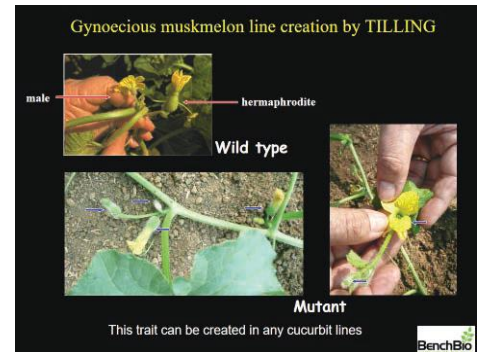
In such species one would expect the co-cultivation of androecious plants with gynoecious plants to serve as a reservoir for continuous production of pollen and/or creation of andromonoecious (hermaphrodite) plant types. In other circumstances the combination of stable gynoecy with parthenocarpy is also a promising means to improve productivity.

Parthenocarpy can bypass poor fruit setting due to pollinator decline or unfavorable growth or developmental conditions (such as high temperature and drought). Combining parthenocarpy and gynoecy in cucumber has enabled large scale glasshouse production of cucumbers in countries such as the Netherlands – which is a major producer of EU cucumbers. In this case, fruit set occurs without fertilization, leading to seedless straight cucumbers, and, in the absence of bees, resulting in significantly higher yields – about 100 tonnes/ha, compared to a global average of 15t/ha.

Recently it was shown by



TILLING of the A and the G gene to modify flower sex type in cucurbits. Above graphics demonstrate proof-of-concept regarding creation of gynoecious lines by mutating the CmWIP1(G) gene in melons. We can use this strategy in other cucurbits for hybrid development. This trait can be stacked with the parthenocarpic (seedless) trait for higher yields – without pollination – in cucumbers.



Dr Bendahmane's lab* that in melon, sex determination is genetically governed by the interplay of alleles of the andromonoecious (M), androecious gene (A) and gynoecious (G) genes. The cloning and characterization of M, G and A genes have shown that the gynoecious (G) gene encodes a zinc finger transcription factor, the andromonoecious (M) gene encodes an ethylene biosynthesis enzyme, CmACS-7 and the androecious gene (A) encodes CmACS11. Therefore, genes controlling flower sex forms are now available.

Screening for induced mutations in CmWIP1 (G) in monoecious melon or cucumber, using the TILLING concept, demonstrably leads to gynodioecy (100% female flowers) thereby leading to increased yield.

Application of the G gene to create the gynoecious trait in any cucurbits has been pat-

ented by INRA-Transfert*. BenchBio has obtained the worldwide license for generating the gynoecious trait in any cucurbits. Hermaphrodite flower types can also be created by mutating the M gene. Hermaphrodite flowers in combination with the seedless trait, can be valuable in this species (as every flower will result in fruit).

We can now engineer new plant types in Cucurbitaceae species to increase yield – which was not possible earlier – by using knowledge gained from melon and cucumber, and to develop unisexual flower and parthenocarpy fruits with uniform shape for use in production of hybrids.

This will lead to significantly higher yields. The proof of concept has already been demonstrated in melon (see image above).

For further info, contact:
mchatterjee@benchbio.com

* Bendahmane A, Martin A, Boualem A, Troadec C, Dogimont C (2008) Combination of two genetic elements for controlling the floral development of a dicotyledonous plant, and use in detection and selection methods. PCT/FR2009/051510, WO/2010/012948



Dr Manash Chatterjee



Dr Abdel Bendahmane

For more information:

W: benchbio.com **E:** manash.chatterjee@gmail.com



CHIA TAI SEEDS CO.,LTD.



WE CREATE
HIGH QUALITY SEEDS



Address:

295 - 303 Songsawad Road, Samphantawong District, Bangkok 10100, Thailand. Tel: +66 (2) 233-8191 Fax: +66 (2) 237-1540
70 Moo 6, Petchkasem Road, Omnoi, Samutsakorn 74130 Tel: +66 (2) 023-4920 Fax: +66 (2) 023-4921

www.chiataigroup.com E-mail: cs_international_seed@chiataigroup.com

Farmer, 26, Revives Community through Organic Orcharding

Lalida “Noi” Kumwichai, 26, is among a new and growing generation of young, educated Thai entrepreneurs opting out of a corporate career in the city to pursue a promising farming future in the countryside.

Like most in the Thai-Cambodian border district of Aranya Pratet of Sa Kaeo Province, Noi comes from an agricultural background whose household sustenance has depended on low-value “cash crops”.

For decades, Noi’s mom, a single mother, supported the family harvest-to-harvest, season-to-season working their 100-rai (or 16-hectare) plot devoted to sugarcane and cassava crops.

Vulnerable to market volatility, field crop monoculture can be tough with inconsistent returns, and like the next parent, Noi’s mother wanted a better future for her children.

At the age of 13, Noi was sent to neighboring provincial capital, Chachoengsao for high school, and she went on to continue her post-secondary studies in the Thai capital.

Working at a bank to supplement her way through university, Noi obtained an initial degree in Marketing at 19, and a second degree in Political Science by 21.

With two degrees in hand and four years’ office experience, Noi’s career in corporate Bangkok was only beginning when she received the unwelcome news from home that her mom was seriously ill in hospital.

Two decades of direct exposure to potent pesticides on the farm had taken a toll. Blood results revealed dangerous levels of chemical residue, and the prognosis was dim if major life changes weren’t made.

Noi returned home, this time for good and with an urgency to save her mom and the farm.

The only way forward, she decided, was to abandon chemical-dependent monocropping practices, and for her mom to make major lifestyle changes.

“Mom didn’t believe it was possible to go organic at first, but I persisted and supported her through detox and adopting a healthier lifestyle. I applied my knowledge and experience in marketing and learned all I could about organic agriculture – from soil revival to pest and water management, and permaculture techniques.

“I was especially inspired by the work of His Late Majesty the King,” says Noi. The cane and cassava farm was converted into a banana, mango, papaya and longan orchard, supplemented with free-range chickens, papaya, organic vegetables and vermicompost.

Her mom began to recover, and returns began to revive. Soon, others took notice of their blossoming operation, named “Rai Na Chaidan” meaning “farm at the border”.

In 2016, Princess Maha Chakri Sirindhorn was surveying the area and noticed the farm from her



Lalida Kumwichai (top and 2nd right) with Aranya Pratet District Agriculture Officer Mr. Tirasak Sittichai (2nd left) pose at Rai Na Chaidan along with Noi’s sister ‘Tuk’ (far left) and mom Ms Wattana Jajirat (far right).

helicopter. Lush and verdant, Rai Na Chaidan stood in stark contrast to adjacent plots, which appeared razed from prevailing slash-and-burn practices, if not barren from drought conditions at the time.

“Her Royal Highness was curious about our farm and arranged an official visit through local agriculture officers.”

The rest is history. Rai Na Chaidan was selected by the Royal Thai Government, through the Department of Agriculture Extension and Provincial Agriculture Office, as a model community development and learning center, where Noi and her mother organize workshops and projects to train locals in sustainable agriculture.

Appointed as a provincial representative for the first of now six generations of the DOAE’s Young Smart Farmers (YSF), Noi is proud of the positive change she has helped initiate for her community and country.

“Over the past two years, about 50 of my peers have left their jobs in offices and factories to return home and pursue sustainable agriculture.”

This new generation of Thailand’s Young Smart Farmers is growing stronger.

“Our YSF network in Sa Kaeo now includes about 300 YSF and we meet regularly to train, exchange knowledge and best practices. Through the DOAE, we also network and collaborate with other YSF networks around the country,” she said

Asked about key success factors for YSF, Noi says that in addition to learning and applying new sustainable technologies, understanding market factors is essential.

For more information, visit “Na Chaidan” on Facebook. Look out for more features on Thailand’s Young Smart Farmers. 🌱

Cutting Edge of Korean Seed



From 23 to 26 October, APSA joined the Second Korea Seed Expo, which attracted some 40,000 visitors keen to inspect the latest products and developments rolling out of a blooming Korean seed industry.

Held at K-Seed Valley, just north of Gimje City of North Jeolla Province on the Korean peninsula's southwest coast, the event featured indoor exhibitions, open-field and greenhouse variety demonstrations, as well as seminars, workshops and tours.

Organized by the Foundation of Agri. Tech. Commercialization and Transfer (FACT), the expo was sponsored by Korea's Ministry of Agriculture, Food and Rural Affairs (MAFRA), North Jeolla Province and Gimje City.

Also supported by the Korean Seed Association (KOSA) and the Korean Trade Investment Promotion Agency (KOTRA), the event featured indoor exhibitions from more than 75 Korean companies and government agencies involved in crop breeding, research, production or conservation.

In a large-scale demonstration field spanning some 4 hectares, showcased were hundreds of new and popular Korean varieties across 25 crop species, including cabbage, Chinese Cabbage, broccoli, cauliflower, sweet and hot

peppers, tomatoes, melons, cucumbers, pumpkins, radish, pak choi and various other legumes and leafy greens.

In addition to local farmers, dealers and distributors, also attending were international visitors representing 43 companies and 18 countries, including Thailand, Myanmar, Philippines, Vietnam, India, Bangladesh, Japan, China (PRC and ROC), Sri Lanka, Pakistan, Lebanon, Uzbekistan, Côte d'Ivoire, Egypt, Tanzania, Serbia and Russia.

APSA, which had a booth sponsored by FACT, was pleased to see first-hand some of the great things coming out of K-Seed Valley, South Korea's state-of-the-art seed and breeding R&D complex.

We were especially awed touring FACT's high-throughput Molecular Breeding and Functional Ingredient Analytics labs, housed in the K-Seed Valley's Seed Industry Promotion Center.

Particularly impressive were the facility's DNA extraction capabilities, with a capacity



for processing more than 50,000 DNA samples a year. Such high-throughput molecular facilities enable small- and medium-sized seed companies with limited resources to conduct advanced breeding and research without breaking the bank, and thus remain competitive on an international scale.

In addition, K-Seed Valley companies also have convenient access and support with regard to variety registration, whether their market focus is domestic or international.

'Indeed, public sector

reinforcement – through investment in fundamental infrastructure, services and technology – provides strong incentive for Korean seed companies to establish bases in the K-Seed valley, and ultimately become competitive, not only domestically, but regionally and internationally.

This area's considerable expanse of plain is also favorable geographically for seed production, distinguishing it from S. Korea's typically rugged mountainous and coastal terrain.

With a healthy soil and water profile, North Jeolla



long has been characterized by intensive rice cultivation; but as we saw during our visit, the acreage today is dotted with thousands of new greenhouses – plastic tunnels and hi-end Dutch-style glasshouses – to facilitate a rapidly-expanding vegetable industry.

The transformation has only started: we learned that the government has grand plans to expand the K-Seed Valley, and look forward to covering future developments.

While in Korea, we also got to see a bit of the local culture, staying in the

province's capital, Jeonju, which is a UNESCO Creative City for Gastronomy, and perhaps most famous for its Hanok Village, where local and international tourists can time-travel back for a day of Hanok (traditional Korean costume) cosplay and selfies.

What business trip dedicated to vegetables would be complete without sampling some of the famous local vegetable culinary treats? If you are ever in the area, be sure to try its famous *bibimbap* – rice topped with *namul* (sautéed and seasoned vegetables) *gochujang* (chilli pepper

paste), or *doenjang* (a fermented soybean paste). Likewise, don't pass on kimchi – the salted, seasoned and fermented cabbage.

If there's an important food-specific Korean phrase one should learn when visiting *Hanguk* (Korea) it's *masitda*, which means delicious or literally 'taste exists'.

Finally, we would like to extend gratitude to our hosts at FACT and KOSA for making this visit possible. Special thanks goes to Mr Kyung-Ku Ahn, Seed Industry Promotion Center Director and Mr Gab-Hee

Ryu, president of FACT, as well as Mr Isaac Kim of FACT's Seed Business Team, Ms Boram Choi of the Seed Business Supporting Team and Dr Young-Min Jeong, senior researcher at FACT's Seed Industry Promotion Center. Moreover, a big thank you to Dr Mihee Yang, the Deputy Director of Ministry of Agriculture, Food and Rural Affairs (MAFRA) and current APSA Executive Committee member.

We look forward to returning next year. In the meantime, be sure to check out all the trip's photos on apsaseed.org/news/ 📷

Inside China



A PSA led a 12-member delegation from Thailand, Indonesia, India, South Korea and the Netherlands on a nine-day Fresh Vegetable Production & Seed Operations Study Tour in China, October 9 – 17, centering on the Chinese seed industry's North China Plain 'vegetable basket'.

Organized by APSA's Special Interest Group for Vegetables and Ornamentals, the Study Tour was hosted by the Haidian Seed Chamber of

Commerce and timed to end before the Beijing and Tianjin Seed Congresses began (see page 20).

The tour kicked off in Shanghai, the world's third largest metropolis and an area not readily associated with agriculture. In fact, it is home to several modern agriculture zones and in 2005 hosted APSA's Asian Seed Congress.

On October 10 we visited the headquarters of APSA member Shanghai Wells Seed Co., Ltd. Located in suburban

Shanghai's Jiadiang district, the site's facilities include 5,000 square meters housing laboratories and facilities for seed selection, processing, packaging and storage. Much seed is developed or processed on the site's 40-hectare farm, where trials for allium, cucurbit, brassica and solanaceae crops were conducted in open-field plots and plastic-houses.



Fresh Vegetable Production & Seed Operations Study Tour



On hand were General Manager Mr Jia Huibiao, Assistant GM Ms Cindia Jia, Ms Overseas Business Department Manager Nancy Cao and Marketing Department Manager Mr Rong Zhang. The company breeds and distributes all types of vegetable seed. Shanghai Wells has strong market presence throughout China, having led in introduction of imported varieties. The latter accounts for just over a third of turnover. Overseas business, meanwhile, grows rapidly, especially in neighboring countries.

The firm operates through three subsidiaries: Shanghai Wells Seedlings Co., Ltd., Shanghai Wells Squash Co-operative, and Shanghai Vegetables Institute. The latter institute is a breeding center which aims for high quality varieties.

APSA delegates inspected some of these and saw trials of new material. Of particular interest were Shanghai Well's sweet melons, tomato root

stock and their famous "Bei Bei" pumpkins. The company produces more than 100 tonnes of seed and imports about the same quantity – for breeding, domestic distribution and re-export.

Key business challenges in China relate to Intellectual Property, such as PVP and trademark infringement (see story on page 21), and a unique consumer-direct supply chain. Shanghai Wells increasingly deals directly with fresh produce retailers, who procure seeds and manage their own production – thereby eliminating wholesale fruit and vegetable suppliers. As producers deal directly with end-users, they can adapt quickly to new demands.

VEGETABLE HUB

We next went north to Weifang City in Shandong Province, 780km distance, by high-speed rail. By road the trip takes eight or nine hours. The train takes half that, reaching speeds up to 305kph. We proceeded thereafter by

bus to Shouguang, a town 50km west of Weifang.

Several delegates said they signed-up for the tour specifically to visit Shouguang, which is famous for fresh vegetables. Shouguang boasts 40,000 ha of vegetables. Annual output exceeds 4.5 million tonnes. Produce includes: garlic, tomato, peppers, cucumbers, carrots, eggplants and leafy greens.

Nicknamed by the State Council 'Zhong Guo Shu Cai Zhi Xiang' (the Home of Chinese Vegetables), Shouguang supplies perhaps half of China's vegetables in winter despite its northern latitude. Such production is facilitated by 'solar greenhouses' allowing for year-round cultivation. Heat is trapped inside these low-tech structures during day while thick earthen or brick walls absorb the heat and keep temperatures stable at night. Some 150,000 greenhouses are spread throughout Shouguang,

including both solar greenhouses and conventional plastic and glass houses.

To meet China's high vegetable demand results, many multinational seed corporations have established bases and stations in Shouguang. Morning, October 11, APSA's delegation visited those of Syngenta, Enza Zaden and BASF (formerly Nunhems) to view demos and trials in solar greenhouses and conventional plastic-houses: hot peppers, tomatoes and eggplants thrive in 25-to-30 degree artificial micro climates shielded from dropping external temperatures.

For this segment we were welcomed by Syngenta tomato breeder Ms Chen Xiaopeng and Syngenta Shouguang Station Manager Mr Luo Shoubing; Enza Zaden Deputy GM Ms Liu-fang and Enza Zaden Product Development Manager Mr. Hao Shuqiang; BASF Shouguang Head of Breeding Wang Shigang and BASF Shouguang

Farm Manager Mr Lin Chao.

BASF took us to the China Shouguang Agriculture Products Logistics Park (CSLAP), where we saw a wholesale fresh-produce market and seed shop 'market town'. The latter comprised about 100 sowing seed retail shops in three lanes. Particularly impressive was the wholesale vegetable market, divided into 12 massive open-air warehouses where bulk produce from Shouguang is piled daily before distribution nationwide.

Next morning at the Shouguang Vegetable Industry Holding Group – a public-private conglomerate active in research, marketing, logistics, breeding, distribution and intellectual property rights protection – we were welcomed by SVIHG Vegetable Group Deputy GM Mr Guo Jiajin, Seed Group GM Mr Wang Yaoxun, and tomato breeder Mr Chen Fudong, and saw molecular and tissue-culture labs with Dutch-style glasshouses featuring tomato and pepper trials.

At the Shouguang Modern Agricultural Industrial Park we inspected solar greenhouse and plastic-house Solanaceae and Cucurbitaceae trials.

Our Shouguang visit concluded with lunch hosted by Shouguang Vice Mayor Mr Liu Wei and other officials, who provided interesting discourse before seeing us off to Xingtai by rail.

We were welcomed to Xingtai by APSA member, Beijing Jewelry Seeds (BJS), led by Mr Zhang Quanjie (President and R&D Director), Mrs Liang Huimin (Vice General Manager), Mr Zhang Wei (Manager of International Trade Dept) and Ms Li Junxiang (BJS International Trade Department Assistant), along with Xingtai Vice Mayor, Mr Hu Rencai and Ren County Party Secretary, Mr Li Hailin and several other officials from Ren County.

We visited Beijing Jewelry's research park in Ren County, just outside Xingtai city. BJS is a fully-integrated company that breeds, processes and produces seeds – including cabbage, radish, cherry radish,

kale, cauliflower, pakchoi, squash, pumpkin and bunching onion – for domestic and international markets.

BJS showed us state-of-the-art processing and packaging plants, featuring high-tech seed-cleaning machines, color-sorters and special QR-label printing equipment.

BREEDERS OF BEIJING

In Beijing, Haidian Seed Chamber of Commerce (HSCC) President Mr Zhang Yanming hosted dinner with the association's two Vice Presidents, Dr Yan Shupeng and Dr Huang Ruiqing, and several senior members. HSCC is one of three Beijing-based seed associations (along with Fengtai Seed Association and Beijing Seed Association). It comprises 93 companies: a third trade seed internationally while a fifth have in-house R&D capabilities.

In suburban Daxing we toured Beijing Yunong High Quality Agricultural Products Cultivation Co. Ltd, welcomed by General Manager Mr Chang Xiguang, Deputy GM Mr Han Guicheng and Marketing Manager Ms Feng Shuang. Their veg-processing operations provided a unique glimpse downstream.

Yunong is part of state enterprise agro-food conglomerate Sunlon, with bases in Yangzhen, Chicheng, Guyan, Yunan and Shouguang. Vegetable cultivation and processing occupy farms and factories covering 180 ha. Yunong-processed vegetables are offered in 6,736 chain stores, 50 restaurant chains and 6,000 restaurants, including popular western chains such as KFC, Pizza Hut, Burger King and Starbucks.

The company was first in China granted commercial license to supply fresh-cut vegetables and, with 150 products, claims a 65% market share for such in north China. Emphasis is on ready-to-consume carrots, tomatoes, cucumbers and lettuce, among others.

To ensure year-round supply, Yunong procures enough seed to produce 100,000 tonnes of vegetables, processed into 50,000 t of product and yielding RMB300

million in annual revenue. Quality and safety assurance procedures necessarily characterize this scale of operation.

Yunong showed us a nearby government facility covering 1,000 ha, capable of outputting up to 150 million seedlings in fully-automated glasshouses. Other highlights included seed processing sections, state-of-the-art water purification processes, and R&D trials emphasizing optimal irrigation and grow media applications.

Our tour wrapped up October 16 in Shunyi district at 'Brassica Field Day 2018', an annual fair that highlights the strengths of Chinese agriculture organized by CVST – the China Vegetable Seed Technology Co., Ltd. (Beijing), a wholly-owned subsidiary of the Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences.

CVST General Manager Dr Yan Shupeng and International Trade Dept Manager Mrs Yang Lin showed their new varieties of Chinese cabbage, cabbage, broccoli, Chinese Kale, and important leafy brassica crops developed by IVFCAAS breeders.

IVFCAAS seeds are multiplied, marketed and distributed domestically and globally by CVST, which derives all income through a network of over 2,000 dealers across China – and an increasing number of partners overseas, notably in New Zealand, Japan, France and the US.

Such strong collaboration among public and private entities is what makes China's seed industry resilient, with government providing infrastructure, research facilities and value-chain reinforcement that enable Chinese seed firms to concentrate on marketing competitiveness and consumer satisfaction.

This Study Tour was, indeed, most edifying.

All photos from the tour uploaded to APSA's website. To see them, go to tinyurl.com/apsa-china 🍷





Trade Flourishes at Chinese Seed Expos

Thousands swarmed the exhibition floor and VIP 'hotel trading rooms' for the 26th Beijing Seed Congress, China's premier seed trade exhibition, which was held 18–20 October at the Langfang Ovation Seven-Cultivation Hotel.

The Chinese seed market is the world's largest. Most seeds produced supply domestic demand.

A unique feature of such expos in China involves the aforementioned 'hotel

trading rooms': vendors with deep pockets and varied stock display it in posh hotel rooms in addition to conventional convention floor booths and tables. The rooms are remarkably well-appointed.

Meanwhile, on 21 October the first Tianjin International Seed Expo attracted more than 10,000 visitors. Large-scale growers, seed enterprise representatives, scientific researchers, fresh vegetable

purchasers, supermarket retail chain reps, members of farmers' cooperatives, and others attended.

Nearly 800 seed enterprises from China and abroad opened booths (including 41 well-known foreign firms such as Lima Grain, Bejo and BASF).

Organized by the Tianjin Seed Industry Association in Tianjin's Xiqing District, the expo theme was 'Gathering, Innovation, Sharing and High-Efficiency'. The field

demonstration showcased more than 4,400 superior varieties in 20 categories, among them: 789 broccoli, 180 green onion (80% of which were hybrids from Japan and Korea), 312 spinach and 381 tomato varieties.

No fewer than 50 APSA members attended.

Another major Chinese seed expo, the 17th Guangdong Seed Expo, was held 11–13 December. For news and photos, please see apsaseed.org/news/.

HM●CLAUSe



HM.CLAUSE is proud to be a work environment that fosters respect, and inspires a collective passion for ensuring the ongoing success of our customers, our company and our industry.

To learn more, please visit us online at www.hmclause.com

HM.CLAUSE proudly sells vegetable seed throughout Asia under our 3 commercial brands:



Rallying for IPR in Asia-Pacific

APSA joined the China National Seed Trade Association (CNSTA) and organizers of the 26th Beijing Seed Congress on October 17 to co-host a seminar about Intellectual Property Rights (IPR).

Held at the Langfang Ovation Seven-Cultivation Hotel in Hebei province, the Asia-Pacific Forum on Intellectual Property & Plant Variety Protection (PVP) drew sponsorship from Sinochem Agriculture, CropLife Asia (Singapore) and China's southern rural newspaper 'Agricultural Wealth'.

More than 100 seed industry reps and government officials attended. PVP enforcement in China, India, the Philippines, Thailand, Cambodia, Spain, the Netherlands and Italy was discussed, as well as regulations, legal precedents and counter-infringement strategies – including application of molecular fingerprinting and DUS testing of suspected material.

Speakers affirmed that intellectual property protection is "the lifeline of seed industry development" and a guarantee for promoting independent research and development. Forum objectives aimed at increasing intellectual property rights and plant variety protection awareness among Chinese companies conducting business domestically and in other Asia-Pacific countries – while swapping regional IPR and PVP enforcement info.

The agenda included: an 'Introduction to IP &



SPEAKERS: Back row, from left to right: Mr. Feng Herbt, Dr Xu Yong, Dr Cui Yehan, Mr Song Weibo, Mr Li Jianmeng, Mr Liu Wei and Ms Tian Weihong; Front row, from left to right: Ms Trina Jose de Vera, Dr Kanokwan Chodchoey, Mr Casper van Kempen, the Honourable Ms Luo Xia, Ms Irene M Sion, and Mr Cheng Jun.

PVP in India'; 'European IP & PVP enforcement'; 'IP protection and modern seed industry development'; and 'Advances in Nucleic Acid Fingerprint Detection Technology for Protection of Vegetable Varieties', among others.

Speakers included a Chinese Supreme People's Court justice, Luo Xia, who specializes in trying cases involving patents, new plant varieties, technology contracts and unfair competition – and literally wrote the law on judicial interpretation of issues concerning PVP infringement.

CNSTA President Song Weibo, and Secretary-General Tian Weihong both stressed the conference's importance, while APSA acting director Dr Kanokwan Chodchoey observed that government support is essential to IP protection.

Meanwhile, with China's seed enterprises now central to breeding innovation – and gaining awareness of intellectual property protection – the nation's Science and Technology



Dr. Cui (3rd left) addresses a question during the panel discussion.

Development Center and the departments of Agricultural and Rural Development, Seed Industry Management, and Plant Variety Protection, among others, necessarily attach great importance to plant variety IP protection.

Li Jianmeng, Deputy Director of Variety Innovation Division, Ministry of Agriculture and Rural Areas, noted that with continuous strengthening of foreign cooperation, China needs to take a more active role in the international protection of new plant varieties, while making greater contributions to the world in the development and enforcement of these protections.

In his report, Cui Yehan, Director of the New Plant Varieties Protection Department of MARA pointed out that from

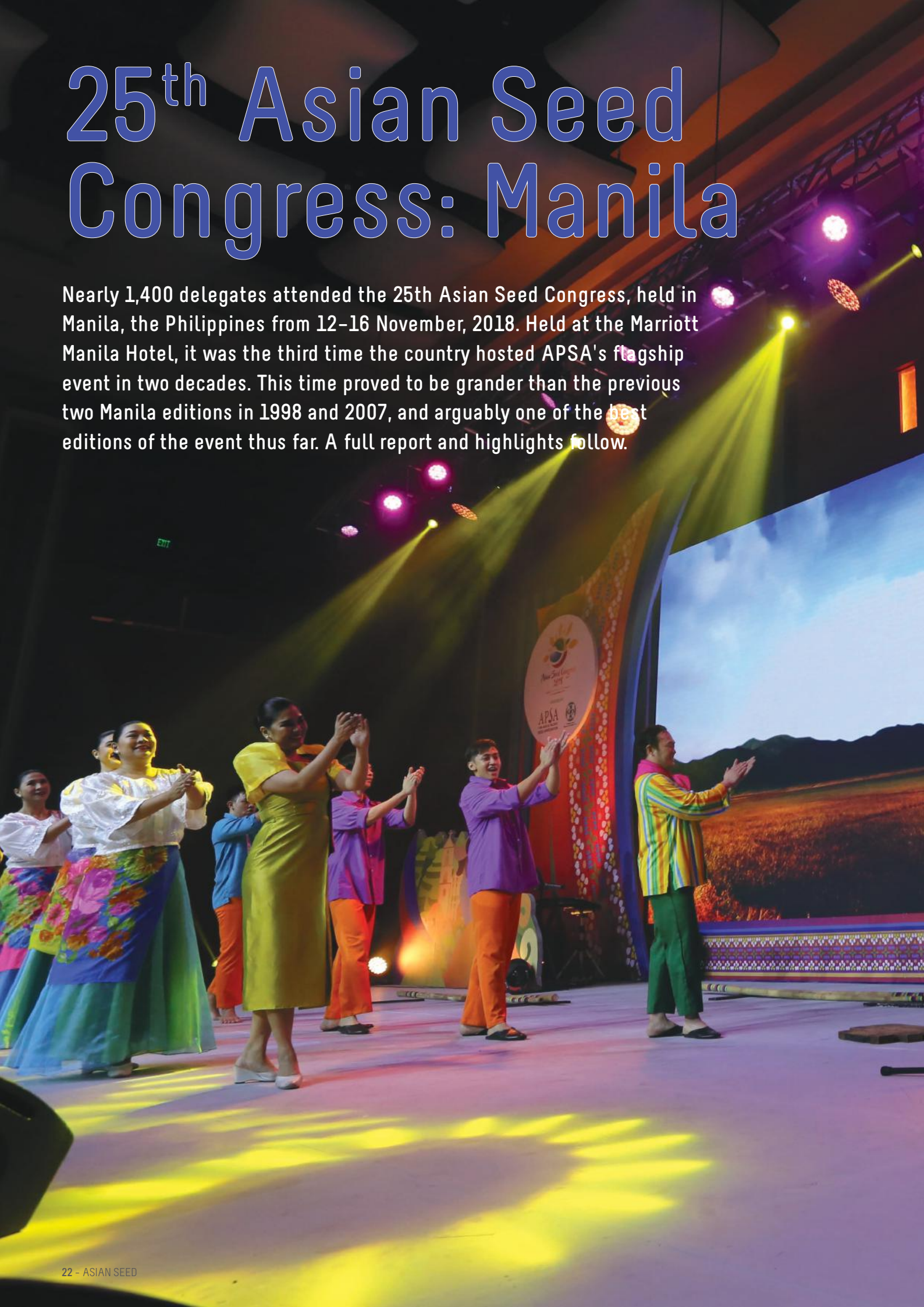
1999 to 2017, the annual application volume of new plant varieties in China totaled 21,917, and the annual authorization volume was 9,681. In 2017, the application volume reached a new height, and the awareness of plant variety protection in China's seed enterprises was constantly improving.

Seed company scientific research investment reached 4.233 billion yuan (US\$615 million) last year, a record high, with the top five enterprises investing 622 million yuan (US\$90 million). Half of all Chinese seed enterprises applied for new-variety rights.

The forum concluded with a round-table discussion focused on IP protection and anti-counterfeiting measures. See more IPR news on apsaseed.org

25th Asian Seed Congress: Manila

Nearly 1,400 delegates attended the 25th Asian Seed Congress, held in Manila, the Philippines from 12–16 November, 2018. Held at the Marriott Manila Hotel, it was the third time the country hosted APSA's flagship event in two decades. This time proved to be grander than the previous two Manila editions in 1998 and 2007, and arguably one of the best editions of the event thus far. A full report and highlights follow.





PARTNERS

NSIC GEISER MACLENNAN

GOLD SPONSOR

Bayer

SILVER SPONSORS

syngenta

BRONZE SPONSORS

AGS-EN

Forward for Plant Breeding Innovation

Opening remarks – by outgoing APSA President Ms Brenda Dossey, and Acting Director Dr Kanokwan Chodchoey – set an optimistic tone for the Pre-Congress Workshop on the first, unofficial, day of Congress. The theme: Plant Breeding Innovation.

The first speaker was Dr. Szabolcs Ruthner, ISF Regulatory Affairs Manager, who delivered a paper introducing plant breeding innovation and concepts in which he explained how differing approaches characterize biotech regulations world wide, limiting use of new tools. The challenge is to formulate consistent policies for plant varieties developed through gene editing. The question is which products should be governed by GMO regulations: ISF has criteria governments can use to find the answers.

ISF's stance is that products not containing novel combinations of genetic material should be excused from such regulation. Stable insertion of inherited genetic material from sexually compatible plant species might thereby escape the misguided regulation that has led to restricted access to gene-editing tools, reduced seed and grain economic activity, burdensome regulatory costs, and impediments to research cooperation and germplasm exchange.

During the Workshop's second session, Dr Inez H. Slamet-Leodin, the Philippines' IRRI Cluster Lead - Trait and Genome Engineering, delivered a talk on 'Genome editing for rice improvement' centering on

the organization's use of CRISPR-CAS9/CPF1 and TALEN gene-editing to develop healthier rice varieties, including biofortification of variants with zinc. These include varieties resistant to Tungro virus disease Bacterial leaf blight, and drought-tolerant varieties to improve nutritional and health status in Bangladesh and the Philippines.

In the following presentation, Dr Hiroshi Ezura, Tsukuba Plant Innovation Research Center director, focused on 'Current research on gene editing in Tomatoes', explaining how CRISPR-Cas9 has been used to breed high-GABA hybrid tomatoes. Gamma-Amino Butyric Acid is an inhibitory neurotransmitter that calms and relaxes while lowering high blood pressure. The CRISPR-edited tomatoes show highly increased GABA levels, and showcase the technology's capacity for rapid and precise breeding.

Next, Corteva Agriscience Global Seed Policy Leader Marc Cool introduced his firm, Corteva – the newly-formed agricultural division of DowDuPont Pioneer – then delivered a talk on gene editing developments.

He highlighted that CRISPR is being used by his company to develop promising traits in maize, paddy, soya and wheat, and that some gene-edited products were already in pre-market trial stages.

With respect to the technology, Mr Cool emphasized the importance of a "Social License" referring to open, critical dialogue to promote

mutual trust among stakeholders.

The next presentation, by Dr Vivencio R. Mamaril, Director, Bureau of Agriculture and Fisheries Standards, and Biotechnology Program Office, Department of Agriculture, Philippines, was on a "Regulatory framework in Philippines toward new breeding technologies"

As part of its process to develop a legal framework for "New Breeding Techniques", Dr Mamaril's department recently conducted a study mission to Canada to benchmark the successful PBI regulatory framework there. Results of the study will be publicised soon, with public discussions expected to take place early in 2019.

Regional and global PBI regulatory trends were further elaborated on in presentations by ISF Secretary General Michael Keller, and Dr Judy Wang, Director, APAC Product Approval and Advocacy, Corteva AgriScience.

Focus then shifted to communication initiatives and strategies: a panel discussion led by representatives from India, China, Japan, Thailand and the Philippines provided country-by-country updates on the status and sentiments of PBI.

For full details APSA members are encouraged to download the session's minutes and presentations, which are available on the members announcements page of the APSA website. 🐦



(From left), Mr Marc Cool, Dr Szabolcs Ruthner, Mr Michael Keller, Mrs Brenda Dossey, Dr Vivencio Mamaril, Dr Judy Wang and Dr Inez Slamet-Leodin and Dr Hiroshi Ezura



Dr Sumitra Kantrong (THASTA), Dr Gabriel Romero (PSIA), Dr Arvind Kapur and Dr Shivendra Bajaj (FSII), Dr Dehua Ma (CNSA) Dr Kanokwan Chodchoey (APSA), Ms Weihong Tian (CNSTA) and MrTomohiro Kondo (JASTA)

Emphasizing Ethics and Education

Veg Seed Industry Leaders Mark Progress at APSA's 2nd WIC Meeting

In a day-long session on 11 November, members of APSA's Working Group of Integrated Vegetable Seed Companies (WIC) met to cement the path forward in tackling key industry challenges in the Asia-Pacific region. In addition to approving a draft for a revised Code of Conduct, the group was updated on international variety-registration, phytosanitary and regulatory initiatives, while naming a new Chair.

Members agreed the Code of Conduct – which emphasizes ethics and accountability among APSA members – should be honor-based, and that the draft should be submitted for government feedback. It was suggested that training courses for breeders and R&D managers be undertaken as a means of 'training the trainers'; also that a database of registered commercial names and a list of varieties in each country be compiled to avoid duplication. Members agreed the Code, which would not be legally-binding, would be finalized and reviewed during the APSA Midterm Meeting in April 2019 and endorsed by honorarily endorsed by all WIC members in November.

In other business:

- The group discussed a proposal to establish a body dedicated to promotion and protection of IP rights. Reviewing similar initiatives in the Americas and Europe (Seed Innovation and Protection Alliance and the Anti-Infringement Bureau for Intellectual Property Rights on Plant Material), members



Members of the WIC represent vegetable seed companies fully-integrated in research, production and marketing.

agreed that education should be emphasized over enforcement, at least initially, with the new organization, which will be called Seed Innovation and Protection Initiative or SIPI. Three companies were appointed to come up with a proposal for the initiative to be considered by the SIG for Vegetables and Ornamentals. They are: Limagrain (Rahul Pagar Ashok and Jack Metzelaar), Celestial Seeds (Wang Zhiping) and Nunhems BV (Liu Wei).

- UPOV Technical/Regional Officer (Asia) Mr. Tomochika Motomura explained the benefits and advantages of joining UPOV. He also introduced the new Plant Breeder Rights application tool, UPOV PRISMA, registration for which is free until December 2019.

- Regarding disease resistance nomenclature specific to the APSA region: a pathologist will examine the WIC's working-list and prepare a proposal for the ISF, which will welcome the WIC's help as a community contribution. Chia Tai's Dr. Sumitra Kantrong will take the lead on this initiative.

- Mr Robert Keene of Enza Zaden offered a phytosanitary expert consultation summary update of ISPM 38 and the Systems Approach.



APSA Membership Programs Officer Kunaporn Phuntunil (2nd right) presents a memento to retiring WIC Chair, Dr Anthony Tse, with new Chair Dr Sumitra Kantrong (far left) and Vice-Chair, Rahul Pagar Ashok (far right).

A phyto committee, led by Mr Keene, and also comprising Mr. Santosh Attavar of Indo American Hybrid Seeds, Wang Zhiping of Celestial Seeds and Takahiro Ando of Takii Seeds was formed thereafter to stay abreast of phytosanitary trends.

- APSA Research Officer Pot Phetlorlian gave an update on a study of regional seed regulatory trends conducted jointly by APSA and the FAO. WIC members were urged to contribute by completing questionnaires.

- The group also proposed recruiting an APSA R&D committee for Vegetables and Ornamentals from WIC companies, and to share comments on research into insect resistance in solanaceae crops. Key topics

for APSA's SC Seed Technology group to focus on were discussed. They include: a seed technology workshop for quality assurance staff; a seed germination workshop for seed-lab technicians; and seed treatments.

- Finally, Dr Anthony Tse of Clover Seeds was formally thanked for his service as Acting Chair of the group since its formation earlier this year. Members then agreed to appoint Dr Sumitra Kantrong as the WIC's new chair, and agreed to add a 20th member after the Code of Conduct – which all agreed to respect – is complete.

The next WIC meeting is scheduled during the APSA Midterm Meeting, April 8 - 9, 2019 (Mon-Tue) in Bangkok. 🌱

Philippines in the Spotlight



From left, Dr. Sayoc, Mr Gesmundo, Mrs Dossey and Senator Villar perform inauguration rites.

The Asian Seed Congress officially got underway in fine tradition with an entertaining and informative Inaugural Ceremony, held on the morning of November 13 in the Grand Ballroom of the Marriott Manila Hotel.

The morning kicked off with an awe-inspiring performance to promote Philippines tourism by award-winning shadow-theatre troupe, El Gamma Penumbra, followed by the singing of the national anthem by ICT Chorale choir.

Outgoing APSA president Brenda Dossey in her welcome speech said APSA's *purpose* is to serve members while acting as a mouthpiece for their "cares and viewpoints." Ms Dossey affirmed regional diversity makes APSA like a "big extended family – and I think that makes us unique."

Representing the Philippines Seed Industry Association (PSIA), which led the National Organizing Committee of this year's ASC, Dr Mary Ann Sayoc noted that, in 1998, fewer than 500 delegates attended the Congress, and that in 2007 "a little more than 800" came, whereas this year "more than 1,300 participants" arrived – thereby eliciting considerable applause.

The Congress, she said, required "practically two years of preparation."

The PSIA "engages with the Department of Agriculture in advocating policies and regulations." She cited as evidence the World Bank ranking the Philippines no. 11 among 62 seed producer countries.

Also addressing the fully-packed ballroom was Senator Cynthia Villar. The Philippines, she said, is an agricultural country – with two-thirds of the population somehow involved therein.

She said Filipino farmers need more technical expertise, financial literacy, quality seeds and access to cheap credit, and called for the government to ensure budgeting for such programs.

To recognize contributions to the seed industry, the NOC nominates outstanding individuals every year to be recognized with the APSA award.

Nominated for the accolades this year were Ms Dalisay Caraos, R&D Operations Manager at East-West Seed (private sector) and Dr Vivencio R. Mamaril, Director IV - Executive Director of the The Bureau of Agriculture and Fisheries Standards (public sector).

In her acceptance speech, Ms. Caraos called it "a great honor and distinction for the 35 years of hard work and dedication, not only by me, but by my colleagues and workers who have helped me along."

As one of five pioneering employees of East-West Seed, Ms Caraos was recognized for her contributions in developing a number of popular hybrids and for her leadership in the company's successful technology transfer programs. Strong leadership was also cited in



AWARDEES: Ms Dalisay Caraos (left) and Dr. Vivencio Mamaril received the APSA Award.



the nomination of Dr Vivencio Mamaril who faithfully served the National Seed Industry Council and Bureau of Plant Industry, instrumental in the drafting and implementation of numerous rules and regulations.

'Expressing his gratitude, Dr Mamaril said: "I would like to share this award with my former colleagues from the Bureau of Plant Industry," citing also the "passion and fervor" of farmers and seed industry workers

In the Philippines' Country Report, Ruel Gesmundo, Chief Agriculturist of the Bureau of Plant Industry, noted that farming is equally divided between perennial crops, such as coconuts, and annual and biannual crops, e.g. vegetable crops.

About 9% of GDP comes from agriculture. Principal exports are banana, pineapple, pressed mango, and matured coconut. Imports include rice, corn, tobacco, garlic and onion.

Export earnings increased last year at 9.58 percent.

The Seed Industry Development Act of 1982 promotes the sector. From the 1950s until 2018 the total number of crop varieties registered in the Philippines is 1,580: Cereals form the largest portion -- 54%.

During 2013 - 2018 the Plant Variety Protection Office received 367 applications and 224, or 61%, were granted protection. 84 percent came from domestic companies. 🌱

Technical Session Summaries

Highlights from APSA's Special Interest Groups (SIGs) and Standing Committees (SCs)

SC Trade & Marketing

Acting APSA executive director Dr Kanokwan Chodchoey chaired the meeting, with Dr Dehua Ma as co-chair on the afternoon of 13 November, where four speakers addressed members.

The first was International Seed Federation secretary general Mr Michael Keller, who presented an update on the 'ISF Systems Approach and e-Phyto'. He noted that seed trade today is six times higher than two decades ago, adding that differing importation requirements cause too much complexity, especially with more and stricter regulations per country and presence of new pathogens.

Thus the International Standard for Phytosanitary Measures (ISPM) 38 and a risk-based, data driven Systems Approach – flexible across different crops – must be implemented by National Plant Protection Organizations (NPPOs). He also highlighted that the Systems Approach

applies industry best practices and phytosanitary certificate accreditation to achieve multilateral acceptance.

After Q&A on that topic, East-West Seed Philippines Seed Technology Manager Ms. Ruby Samonte addressed the issue of ensuring the NPPO Accreditation Process is founded on Private Sector Collaboration, in which she cited the experience of her company -- an industry leader -- in gaining accreditation.

Collaboration approaches, she explained, included inviting Bureau of Plant Industry personnel to inspect Seed Health testing facilities; joint phytosanitary field inspection; joint Seed Health disease detection and protocol validation; and compliance of required facilities for imported seeds' post entry quarantine. That, and other initiatives, led in 2016 to a BPI Award for Temporary Authorization

for EWS to conduct in-house Seed Health Testing. Such collaborative effort, she said, facilitates seed trading while protecting the country from pests and disease.

Among vegetable seed companies, presently only EWS collaborates in this way with BPI but the organization has memorandums of understanding with three other companies.

Ms Joan-May R Tolentino, Supervising Agriculturist of the Philippines' National Plant Quarantine Services Division then gave an update on International Standard for Phytosanitary Measures 38 (ISPM38) Implementation. The standard was adopted in April 2017.

Discussion then centered on updated pest lists: Dr Andreas Wais of the International Seed Testing Association offered to help on field crop pests updates, referencing his organization's

recent work on such a list.

Then, APSA's Dr Kanokwan Chodchoey provided an update on plans to incorporate new crops for Asia on the ISF regulated pest list, and gave a summary about APSA's latest Phytosanitary Expert Consultation.

Ms Tolentino said such information is most helpful, as she found after attending the APSA meeting in Thailand last August where a reference and pest list was presented. She added that a Philippines pest list has been drafted and will be uploaded to the NPPO Website.

Finally, former chair of the Organization for Economic Cooperation and Development (OECD) and head of the Italian Seed Certification Authority Mr Pier Giacomo Bianchi addressed members regarding 'OECD Seed Schemes: An International Seed Varietal Certification System'.

At the Vegetables and Ornamental Special Interest Group session on 13 November, vertical farming was presented by Christine Zimmermann-Loessl, chair of the Association of Vertical Farming, to members as a possible solution to global challenges involving climate, urbanization, over-population, finite resources, and degraded ecology.

Vertical farming typically is practiced using vertically stacked crop layers in tall buildings, warehouses and shipping containers. It usually depends on hydroponics, aquaponics (with fish in the ecosystem), or aeroponics (wherein mist replaces water). Such farming is resource efficient, using as much as 98% less water.

It needs no agro-chemicals or fossil fuels; is independent of season, climate and region; and affords year-round crop production with no agricultural run-off. Ms Zimmermann-Loessl noted the concept attracts young people and investors while creating green jobs, localizing production and decreasing transport costs.

Moreover, it breathes new life into depressed urban areas and gives purpose to abandoned buildings. Aside from food, crops may include those producing bio-fuels, plant-derived vaccines and rubber.

She said the future of agriculture will be in growing without soil.

Japan leads in the number of plant factories with 200, followed by Taiwan with 120, the Netherlands with 20, and Germany with a large vertical farm.

Prime obstacle to implementation of vertical farming is high initial investment. Industry output worldwide was valued at US\$2 billion in 2015 and may hit US\$12 billion in 2025. Advanced technology should enable greater production.

During subsequent discussion, in reply to a question by SIG member Francois Burgaud regarding electrical costs for lettuce production, Ms Zimmermann-Loessl said they are comparable to those of organic products. A Filipino audience member said his company uses solar power in vertical farming, adding that:

"From an energy point of view, VF production is very efficient." Member Dr Anthony Tse asked what the focus for plant breeders should be, to which Ms Zimmermann-Loessl said plants should be shorter and accommodate dense growth in narrow spaces.

In answer to other questioners, she noted that vertical farming is "beyond organic because it is cleaner, pesticide- and pollution-free," and suggested concerns about pollination may be unfounded as she has seen "VF greenhouses in Europe where pollination thrives."

Other presentations included:

- 'Introducing low-risk plant protection products to vegetable production management for reducing usage of chemical pesticides', from Li Hsin-huang, Associate Researcher, Taiwan Agricultural Chemicals and Toxic Substances Research Institute, Council of Agriculture

- 'Organic Farming and Marketing: The Melendres Farm Experience', from Michael Melendres of Melendres Farm in the Philippines

- 'Philippine Partnership for Sustainable Agriculture', by Ms Caroline Grace Pedragosa, Director for Livelihood Development PMO, Philippines Business for Social Progress

In other Vegetables and Ornamentals business:

- SIG chair Michel Devarreware told attendees the Working Group on Integrated Vegetable Seed Companies (WIC) had been formed with 19 active member companies, headed by Dr Anthony Tse. The WIC met 11 November. Dr Sumitra Kantrong will replace Dr Tse as chair.

- The APSA-World Vegetable Center Consortium now has 33 member companies. Registration for new members opens in February.

- The China Vegetable Seed Operations Study Tour was held October 10 – 16 with nine participants.

- Regarding Myanmar: a national seed partnership meeting was held 25 September. A Myanmar Seed Association has been announced for formation.

SC Intellectual Property Rights & Biodiversity

At the Standing Committee on Intellectual Property Rights & Biodiversity meeting on 14 November three presentations were made.

Co-chair Mr Casper van Kempen first introduced attorney Edmund Jason Baranda, managing partner of the Philippines' intellectual property specialist law firm Baranda & Associates, who gave a talk on IP matters in the archipelago.

He noted that the United States Trade Representative (USTR) has not listed the Philippines on the annual Special 301 Report – which lists countries with weak IPR enforcement – since 2014.

Mr Baranda cited this as evidence of an increasingly robust environment for intellectual property protection, with active enforcement and engagement by the Intellectual Property Office of the Philippines (IPOPHL), together with National Committee on IP Rights (NCIPR).

Nonetheless, there are still some areas for improvement, he noted.

In the Philippines it is not possible to patent plant varieties, animal breeds or biological processes for production of plants and animals. Consequently patents on plants and seeds are not possible. Microorganisms and processes using microorganisms are, however, patentable.

'The main channel for seed and plant IP protection is the Plant Variety Protection (PVP) Act, ratified in 2002. Though this legislation is based on the Union for Protection of New Varieties of Plants (UPOV) rules, Mr. Baranda said, the Philippines is not party to UPOV because of an exception in Section 43(d) of the PVP Act, which affords small farmers the right to "exchange, share or sell the farm produce of a protected variety" for purposes of non-commercial reproduction.

Such farmer seed-saving / seed-sharing exceptions are not

compatible with current UPOV rules that require royalties or licensing structures in place for protected material, regardless of whether the intended use is commercial or not.

The Philippines also recognizes geographical indications (GIs) as affording IP rights, but regulations must still be formulated.

In another presentation, Mr. Manabu Suzuki, Deputy Director of Japan's Plant Variety Protection Office, introduced the East Asian Plant Variety Protection (EAPVP) Forum's new '10-Year Strategic Plan'. The Forum, established in 2007, includes ASEAN, China, Japan and South Korea.

Achievements in the last decade include: enriched information exchange, improved technical capacity, and raised awareness of PVP. Future challenges include further harmonizing regional PVP, and the concept of an EAPVP Regional Mechanism

so breeders can file applications using the harmonized regional application form.

Noting key conditions of the EAPVP regional platform, he said responsibility for examination and granting of certificates will still lie with each PVP Office: countries do not need to change their existing legal frameworks -- but only UPOV members can participate in the EAPVP.

Next, Mr. Tomochika Motomura (Technical/Regional Officer, ASIA UPOV) presented on UPOV PRISMA, a PBR Application tool which can be used to protect plant varieties in all target markets.

The tool covers 69 countries, with 30 members. Search parameters function by crop and country. It is free to use until December 2019.

SC IPR&BD Chair Dr Arvind Kapur wrapped up the session and thanked speakers.

APSA's Standing Committee for Intellectual Property Rights on 14 November hosted a workshop to promote understanding on the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

East-West Seed's Dr Mary Ann P Sayoc welcomed participants. Nine speakers focused on the issues of Benefit-Sharing and Farmers' Rights. In her opening remarks, she noted that "this is the first time for APSA to conduct a workshop on plant genetic resources."

An overview of issues involved in Farmers' Rights was given by Francois Burgaud, International and Public Affairs Manager of the French Interprofessional Organisation for Seeds and Plants (GNIS). He noted that ITPGRFA aims at rewarding farmers for past contributions and encouraging continued effort to conserve and improve plant genetic resources, while affording participation in benefits derived from plant breeding and other scientific methods. He said UPOV Plant Breeder Rights are not incompatible with ITPGRFA's aims.

Thus, at the 7th session of the International Treaty's Governing Body, an ad hoc Technical Expert Group on Farmers' Rights was formed, which first met

last September, and created a template to 'inventory' national measures, best practices and lessons learned in implementing Farmers' Rights.

Contributions from member states and stakeholders will be discussed at the next meeting in May 2019, which will include participants from Asia and the Pacific.

During discussion, Mr Burgaud averred that the UN Declaration for the Rights of Peasants and Other People Working in Rural Areas "is totally opposite, on many points, to the ITPGRFA – which was ratified by 144 nations," whereas "30 nations voted in favor of the declaration." He called the declaration "totally political" and said it is "totally against what ITPGRFA and UPOV are trying to build."

ISF Secretary-General Michael Keller said the issue should not be framed as "farmers' rights versus breeders' rights" because "the common goal" is food security.

In other ITPGRFA matters, the Philippines' delegate, Associate Professor Mr Nestor C. Altoveros of UP Los Banos' Institute of Crop Science, said that "An Act Providing For the Collection, Characterization, Conservation, Protection, Sustainable Use and

Access to and Benefit Sharing of Plant Genetic Resources for Food and Agriculture" was introduced into the Philippines' lower house last October, and that the nation has several laws to help implement farmers' rights consistent with provisions of the Treaty. The Philippines is a member of the Ad Hoc Technical Experts Group.

He noted that 64 crops account for 80% of human consumption and comprise the pool of genetic resources accessible through world gene banks. Prof. Altoveros called sharing under the Multilateral System (MLS) "the centerpiece of ITPGRFA," and pointed to Article 10.2 which states that the MLS of the Treaty's contracting parties must be efficient, effective, and transparent to facilitate access to PGR and to share benefits from such resources – accomplished via the Standard Material Transfer Agreement (SMTA).

The important provision therein is that MLS recipients shall not claim rights that limit access to material in the form received.

In her talk on 'Why ITPGRFA Matters' ISF chair and deputy director of Plantum Ms Anke van den Hurk stressed that 90–95% of materials used in plant breeding are modern varieties, while only 5 – 10%

come from landraces or wild relatives. She said many have felt the Convention on Biological Diversity (CBD) does not sufficiently cover access and benefit-sharing. Thus ITPGRFA aims to conserve and sustain Plant Genetic Resources (PGR); secure equitable sharing of benefits therefrom; and establish a system for PGRFA compatible with the CBD.

Other presentations included: the 'Position of Japan in Discussion on Benefit Sharing', by Mr Akio Yamamoto from Japan's National Agriculture and Food Research Organization; the 'Global Exchange of Vegetable Genetic Resources', by World Vegetable Centre's genebank manager Maarten van Zonneveld; the Philippines' IRRI and PGRFA Benefit Sharing by the IRRI's Tech Transfer senior manager Mr Ajay Panchbhavi; a discussion on Farmers' Rights from the Philippines' Ms Amparo Ampil; another on the same topic in Indonesia by Mr Erizal Jamal, director of Indonesian Center for Plant Variety Protection and Agriculture permits; and of industry in general by the ISF's Mr Michael Keller.

Ms Anke van den Hurk then summarized and closed the workshop.

ITPGRFA Workshop

Joint Session: SIGs Cover Crops, Field Crops and Hybrid Rice

At the 15 November joint technical session of APSA Special Interest Groups for Hybrid Rice, Forage Crops and Field Crops, SIG chairs reported on activities, followed by presentations on the Access to Seeds Index for South & Southeast Asia and Biofortification for Improving Human Nutrition.

During his report, Dr Frisco Malabanan, who chairs SIG Hybrid Rice, announced the ASC's first post-congress hybrid rice tour at the Philippines' International Rice Research Institute (IRRI).

The chair of SIG Cover Crops (Forage and Amenity Seeds), Mr Bhupen Dubey distributed a market research study on cover crops to members, which was the centerpiece of his report. Growing at 8% per annum, global forage crops were forecast in the study to double in value over the next decade, from US\$9.9 billion to US\$17 – 21 billion, a result of increased milk demand. Mr Dubey mentioned that the group would

also like to plan a Study Tour in the coming year, possibly to Australia.

SIG Field crop chair Dr P Sateesh Kumar, reported that his group had added cotton, millet, wheat, and other major field crops grown in the region to their agenda, and that major players have been invited to brief members on opportunities. The group looks to plan a Study Tour to inspect the Philippines' successful GM maize crop.

The presentation from Access to Seeds' Ido Verhagen prompted spirited discussion. Mr. Verhagen announced the publication of the 2019 Index, which ranks leading regional and global seed companies on various indicators. The Index is aimed at providing an evidence base for dialogue with the industry for farmers, while improving seed availability, affordability and suitability; and enhancing farmers' capability, profitability, and autonomy.

Among key findings presented:

- Leading seed companies are

present with sales activities throughout the region, but seed hubs are only in a select number of countries—India, Philippines, Vietnam, Thailand, Bangladesh and Indonesia.

- Companies have a broad portfolio, but hybrids are dominant. Regional companies extend the availability of open-pollinated varieties.

- The South and Southeast Asia seed industry is a strong research-driven industry, with robust and broad breeding programs, releasing new varieties into the market.

The final presentation of the session was by Mr Binu Cherian (Country Manager, HarvestPlus), on "Biofortification: An Agricultural Strategy for Improving Human Nutrition and Health" Mr Binu introduced biofortification as one of several promising strategies to tackle a global prevalence of micronutrient deficiency. He defined biofortification as a process of

developing nutrient-dense staple food crops through conventional 'crossing of varieties having preferred traits with those found to be high in target micronutrients, such as Vitamin A, zinc, and iron, noting that once a particular micronutrient is bred into a crop line, it remains.

HarvestPlus is leading global efforts to develop and disseminate biofortified crops, currently with 290 varieties of 12 staple food crops that have been released or in testing in 60 countries. Target crops are maize, wheat, rice, beans, pearl millet, sweet potato, and cassava.

The session was summarized and closed by retiring Hybrid Rice co-chair, Mr Vaibhav Kashikar.

The Access To Seeds 2019 index and report is available in English, French and Spanish via accesstoseeds.org. More info about biofortification at harvestplus.org. Asian Seed plans to cover these topics in the future.

Taiwan Agricultural Research Institute Biotechnology Division director Dr Tso-chi Yang as co-chair of the Standing Committee on Seed Technology welcomed participants to the workshop on November 15, which was the final technical session of the 2018 Asian Seed Congress.

Discussion was led by SC Seed Technology Chair, Mr John Van Asbrouck under the rubric 'Taking the Wrong Train'.

Mr Van Asbrouck noted that protected seed cleaning techniques of 30 years ago are today commonly shared -- but some companies were shuttered

after missing the tech train. He thinks the process of spreading such new technology via APSA's Standing Committee on Seed Technology has not been sufficiently effective, and so – in order not to miss the train – he posed two questions:

First, what tools will enable APSA to help executives make the right decisions on seed technology?

Second, can members work out one practical proposal whereby APSA supports seed companies with seed technology?

Among responses to the first question, were the following:

SC Seed Technology

- Create a core group of technical people to help small- and medium-sized seed companies lacking available technology

- Prepare case studies of successful and unsuccessful technologies

- Help in licensing technology for farmers

- Provide a platform for technical people and organize a roundtable for seed technology

- Harmonize phytosanitary, regulatory, and best practices language, and assist in cost/

benefit analyses

Among responses to the second question:

- APSA's Website should contain all technologies available and APSA should develop a copyrighted app for members' access

- Roundtable discussions for technical people, quality control and quality assurance personnel

Mr Van Asbrouck closed discussion by observing that the ideas suggested show "participants are seeing the true picture."

APSA 2019 SIG & SC Chairpersons



SC Seed Technology
Chair: Mr Johan van Asbrouck
Co-Chair: Dr Manish Patel



SC Trade & Marketing
Chair: Mr Niranjana Kollipara
Co-Chair: Mr John Mizicko



SC IPR & Biodiversity
Chair: Dr Arvind Kapur
Co-Chair: Mr Casper van Kempen



SIG Vegetables & Ornamentals
Chair: Mr Michel Devarreware
Co-Chair: Dr Yan Shupeng



SIG Field Crops
Chair: Dr P Sateesh Kumar
Co-Chair: Mr Muhammad Asim Butt



SIG Hybrid Rice
Chair: Dr Frisco Malabanan
Co-Chair: Mrs Zhu Xiaobo



SIG Cover Crops
Chair: Mr Bhupen Dubey
Co-Chair: Ms Brenda Dossey



Special Acknowledgements



SIG VEG & ORN: Front row (from left): Caroline Grace Pedragosa (Philippines Business for Social Progress), Michael L. Melendres (Melendres Agricultural Farm), Dr Li-Hsin Huang (Taiwan Agricultural Chemicals and Toxic Substances Research Institute) and Christine Zimmermann-Loessl (the Association of Vertical Farming); Back row: Kunaporn Phuntunil (APSA), Jack Metzelaar (SIG V&O Co-Chair) and Michel Devarrewaere (SIG V&O Chair)



JOINT SESSION SIG HYBRID RICE, FIELD CROPS & COVER CROPS: From Left: Dr P Sateesh Kumar (Chair SIG Field Crops), Ido Verhagen (Access to Seeds Foundation), Muhammad Asim Butt (Co-Chair SIG Cover Crops), Vaibhav Kashikar (Co-Chair SIG Hybrid Rice), Dr Frisco Malabanan (Chair SIG Hybrid Rice), Bhupen Dubey (Chair SIG Cover Crops) and Binu Cherian (HarvestPlus).



ITPGRFA WORKSHOP: From Left: Kunaporn Phuntunil (APSA), Dr. Mary Ann Sayoc (East-West Seed Philippines), Anke Van Den Hurk (Plantum), Michael Keller (ISF), Akio Yamamoto (NARO), Francois Burgaud (GNIS), Nestor Altoveros (UP Los Banos) and Amparo Ampil (Department of Agriculture, Philippines)



SC TRADE & MARKETING: From Left: Dr Ma Dehua (Co-Chair), Joan-May R. Tolentino (National Plant Quarantine Services Division), Ruby Samonte (East-West Seed Philippines), Pier Giacomo Bianchi (OECD), Michael Keller (ISF) and Dr Kanokwan Chodchoey (APSA).



SC IPR & BIODIVERSITY: From Left: Edmund Jason Baranda (Baranda & Associates), Manabu Suzuki (MAFF, Japan), Tomochika Motomura (UPOV) and Dr Arvind Kapur, (Chair SC IPR&BD)



SC SEED TECHNOLOGY: From Left: Johan Van Asbrouck (Chair- SC Technology) and Kunaporn Phuntunil (APSA)



BEST BOOTHS: APSA President Mr Tahir Saleemi (2nd left) poses with reps from CNUS (left); East-West Seed (center) and Chia Tai Seeds (right).



GOLF TOURNAMENT: From left, Ms Chen Qianyu of ASC Golf Tournament sponsors, Wuhan Yafei, presents awards to the top golfer, Mr. Anshuman Marodia, with APSA President Mr Tahir Saleemi standing by.



Business Savvy

Most delegates (1,300 this year) attend the Asian Seed Congress to maintain and build their business, which is conducted at trading tables, exhibition booths and meeting rooms, where delegates find both old and new customers, distributors, marketeers and markets. This year there were 55 exhibitors, 200 reserved trading tables, and a few dozen private and semi-private meeting rooms.





Social Stimuli

The Asian Seed Congress is not just about serious meetings and business. The culture and entertainment programs are always a treat at the Welcome Cocktail and Gala Dinner, which truly give APSA's flagship event its charm and character. This year we were all mesmerized and enthralled by a historical and modern mix of Filipino heritage and musical prodigy, not only on-stage, but on the dance floor!







National Seed Associations Meeting

National Seed Associations are an important link to domestic governments, markets and the industry at large, and thus are integral to the work of regional seed associations like APSA.

On 14 November, APSA Acting Executive Director Dr Kanokwan Chodchoey welcomed representatives from 18 national seed associations (NSAs) and stakeholders to APSA's annual NSA Meeting, this year held at the Manila Marriott Hotel.

Dr Kanokwan (or 'May' as she is known informally) told those attending that the meeting was not a formal conversation – anyone was free to share ideas about what APSA and the NSAs should work on.

The two-and-a-half hour period was taken up with presentations and discussions.

Dr Michael Turner, of the World Vegetable Centre, gave a progress report on the FAO/APSA Joint Study of Seed Legislation and Policies in the Asia and Pacific Region, which aims at gathering information on the status of relevant policies and legislation.

Results thus far were presented by APSA

Research Officer Pot Phetlorlian: 21 responses to the questionnaires had been received: seven from local seed companies; ten from multi-nationals; and four from NSAs.

- 52% of respondents agreed seed-related laws in their countries support the private sector
- 61% agreed that seed-related policies are effective
- 61% said seed-related agencies covering seed quality control are adequately resourced

During discussion, Dr Turner noted in response to questioning that the study shows no value-added figures but that it does provide some information on the 'informal seed system'.

Reps from the Federation of Seed Industries of India (FSII), Thai Seed Trade Association (THASTA) and the Philippine Seed Industry Association (PSIA) expressed that more local companies should be engaged, and focus should also be given to seed quality.

One from the China National Seed Trade Association (CNSTA) said "the questionnaire is very good because it covers many areas," and that "it is also important that

the MNCs are included... because they show the level of openness of foreign seed companies." The rep said distributing the questionnaire via NSAs would ensure "all categories are represented."

Francois Burgaud, of the French Interprofessional Organisation for Seeds and Plants (GNIS), suggested appointing an official to help seed associations fill in the questionnaire.

Other presentations focused on:

- Educational materials by APSA for NSAs, including an ASTA video to be translated into Japanese and Chinese and a poster – with NSAs asked to comment thereon.
- Seed Sector development in Myanmar, by Thura Soe, Director, Department of Agriculture, wherein it was noted that the country presently has 53 private seed companies. He said "100% foreign ownership" is allowed in the agricultural sector and that the PVP law has been amended to conform with the UPOV Convention, though the country is not yet a UPOV member.

- The Taiwan Seed Trade Association's on-line pest database in Chinese Taipei and upcoming events, including the International Seed Industry Forum (30 November) and the Seed Innovation Technology fair next year. The island's seed industry is valued at US\$3 billion.

- Revision of the Philippines' 26-year old Seed Law by the PSIA, which has been "very much involved in the revision." The law expands coverage of illegal seed practices, formerly limited to infected seed lots. Farmers' rights were expanded as well.

- The Japan Seed Trade Association announced abolition of the country's old Main Crop Seeds Law, effective last 1 April, which affects such staples as rice, barley, wheat and soybeans.

- CNSTA announced that, to facilitate seed imports, documents can now be submitted online using electronic data.

Other topics related to India, Thailand, Chile and penetrating the French market.

Green Light at General Assembly

Well over a third of APSA's active members attended the association's joint 23rd and 24th General Assembly Meeting on the afternoon of November 15, to comfortably meet the quorum requirement of 25%. Outgoing APSA president Brenda Dossey welcomed participants and announced that electronic ballot tests would be held.

Incoming APSA president Tahir Saleemi then addressed the meeting to conduct an e-ballot trial. Due to some technical issues in the trial, Mr Saleemi announced that the GAM agenda would proceed with paper balloting.

Next came the President's Report, in which Ms Dossey noted that APSA continues to thrive, with many new members, a "competent and hardworking staff" and "Executive Committee members who meet frequently to discuss issues and recommend strategies." She then gave an overview of APSA activities, which are planned and executed through the association's Standing Committees and Special Interest Groups. Full details of these activities can be found in the minutes of each group, posted to the members section of the APSA website.

Thereafter Mr Wichai Laocharoenpornkul delivered the Treasurer's Report for the years 2016 and 2017, before proposing an auditor for the current and coming fiscal years. Mr Wichai then proposed a budget for 2019. The reports, proposed auditor and budget were all passed unanimously.

In other business, delegates approved international registration in Thailand by having APSA headquarters registered in Singapore as the Asia Pacific Seed Alliance. Ms Dossey explained that the action will have no effect on APSA operations, but that members would have dual status in both jurisdictions, effective 1 January 2019. Such measure is necessary, preparatory to gaining Thai international registration.



The move is aimed also at securing APSA's reserves: APSA has an international board of directors and derives income from abroad – it must therefore register as an international organization.

The service of retiring Executive Committee members was recognized during the assembly. They were: Mr Zhiping Wang, Mr Vaibhav Kashikar, Dr Dehua Ma, Mr Casper van Kempen, and Mr Jack Metzelaar.

Next were ballots to fill five vacancies on the EC, with a total of 11 candidates standing for election. Facilitating the procedures were representatives from APSA's election committee: Mr Madoka Koshibe from Japan, Mr Avtar Singh Dhindsa from India and Mr Zhiping Wang from China – all past presidents of the association.

The first ballot was for 2017 Seed Association (GAM no. 23), in which Dr Manish Patel (National Seed Association of India) was elected; next, in the 2018 ballot for Seed

Enterprises, two candidates were elected: Mrs Zhu Xiaobo (Wuhan Qngfa-Hesheng Seed Co., Ltd.) and Mr Jinman "James" Lee (Nongwoo Bio). In the 2018 Seed Association ballot, Dr Shupeng Yan (Haidian Seed Chamber of Commerce) was elected. In the final ballot for 2018 Seed Associate, Mr Casper van Kempen (AIB) was re-elected for his second consecutive term. All EC member profiles are on the next page.

To conclude the meeting, Ms Dossey thanked everyone for the opportunity to serve as president of APSA, then handed over the presidency to Mr Tahir, who observed during his speech that it is not "an easy job."

He enjoined all to embrace common goals, to celebrate differences and strengths while coming together as a family "in addressing challenges facing the seed industry."

APSA members can download the GAM minutes via apsaseed.org

Meet the Executive Committee

OFFICE BEARERS

Mr. Tahir Saleemi, President



Joining the EC in 2014, elected Vice-President in 2016 and stepping up as president from 2019, Tahir Saleemi is the CEO of Haji Sons, a renowned family-owned seed and extension services company based in Lahore, Pakistan, which supplies fertiliser, irrigation solutions and high quality vegetable and field crop seeds and seedlings to local farmers, greenhouses and for export. An MBA Graduate from Pakistan's Qaud-i-Azam University

in Islamabad, and an Executive Committee member of the Seed Association of Pakistan (SAP), Mr. Saleemi has more than two decades' experience in the international business of seeds, chemicals, irrigation systems and horticulture.

Ms. Brenda Dossey, Immediate Past President



Brenda Dossey is an agronomist who received her degree from the University of Arizona, Tucson, USA. Her background is primarily in turf and forage seeds for temperate, subtropical and tropical conditions. The first twenty-five years of her career were in the USA, culminating as Vice President of Pennington Seed. In 2001, she and her family migrated to Australia where she continued to work in turf and forage seeds. In addition to her service with APSA as an EC member since 2012, she served as Chair of the Special Interest

Group (SIG) Forage and Amenity Seeds for APSA for several years prior. She is also past President of the American Seed Trade Association Lawn Seed Division. Today, she is Managing Director of her own company, Gold Coast Agribusiness which she owns with her son, Grant. The company specializes in exporting seeds to Asia and the rest of the world.

Mr. Wichai Laocharoenpornkul, Vice President



Elected to the EC in 2016, Mr. Wichai Laocharoenpornkul is the General Manager of Seed Business at East-West Seeds Company Limited, as well as being a representative of the Thailand Seed Trade Association. Mr. Laocharoenpornkul holds a master's degree from the University of Central Queensland and is a graduate of Mahidol University. When not hard at work, Mr. Laocharoenpornkul dedicates his time to his wife and two children. Prior to working in the seed industry, he gained extensive experience in the pharmaceutical industry.

Mr. Daniel Gleeson, Treasurer



Appointed to the EC in 2018 to fill out the term of Jack Metzelaar from HM.CLAUSE, Daniel Gleeson is an Australian national who graduated from La Trobe University (Melbourne) where he completed a bachelor's degree in Zoology and Botany with a master's in Plant Pathology. Mr Gleeson is currently the Vice President of HM.CLAUSE Asia, overseeing both the strategy and business operations in the region. His experience spans over 17 years in the vegetable seed industry having worked in global roles located in Australia, United States and Thailand.

GOVERNMENT SEED AGENCY

Dr. Tso-Chi Yang



Re-elected to the EC in 2016, Dr. Yang holds a Ph.D. in Plant Pathology from the University of Florida while having obtained his bachelor's and master's degrees from the department of Plant Pathology at the National Chung-Hsing University. Dr. Yang is currently the Director of the Biotechnology Division at the Taiwan Agricultural Research Institute, Council of Agriculture, and is a board member of the Taiwan Seed Society and Agricultural Association of Taiwan.

Mr. Tsukasa Kawakami



Re-elected to the EC in 2016, Mr. Kawakami works in the Department of DUS Test and Seed Inspection, Center for Seeds and Seedlings, National Agriculture and Food Research Organization (NARO) in Japan. A graduate of Sanno Junior College in Tokyo, Mr. Kawakami is engaging in work that supports enforcement of PBR in NCSS. Mr. Kawakami also held the position of Associate Director in the Seeds and Seedlings Division at the Plant Production Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), and he took charge of the operation of the EAPVP Forum for developing PVP systems in the East Asian region.

Dr. Mi-Hee Yang



Re-elected to the EC in 2016, Dr. Yang serves as the Deputy Director at the Korea Seed & Variety Service (KSVS), Ministry of Agriculture, Food and Rural Affairs (MAFRA) in Korea. Dr. Yang has been in charge of supporting and promoting the seed industry as a policy maker. She is working on the enforcement of seed regulations, management of R&D projects, strengthening capabilities, and building infrastructure. Dr. Yang has an MS degree in Environmental Horticulture from the University of Seoul and also completed her Ph.D. coursework at the same university.

SEED ENTERPRISE

Mr. Isao Iuchi



Elected to the EC in 2016, Isao Iuchi is a Japanese national and a graduate of Doshisha University in Kyoto. With more than twenty years of experience in the seed industry, Mr. Iuchi is currently the General Manager of the Vegetable Sales Department and Overseas Sales and Marketing Division at Sakata Seed Corporation based in Yokohama Japan. His experience as a seed man spans over two decades, extending from Japan, Asia and Oceania regions to NAFTA and EMEA. He passed the examination of USCPA (Certified Public Accountant of the United States) in 2009.

Mr. Muhammad Asim Butt



Elected to the EC in 2016, Muhammad Asim Butt is a Pakistani National with more than 25 years' experience in the seed and agriculture sector, with his organisation specifically focusing on hybrid vegetable seeds. He served as a Member of the Executive Committee for APSA from 2010-2013 and was 2nd Vice President of the association from 2012-2013. He is also an Executive Member of the Seed Association of Pakistan while holding the Chair position of their Vegetable Seeds Committee.

Mrs. Zhu Xiaobo



Elected to the EC this year, Mrs. Xiaobo holds a Bachelor's Degree in Horticulture from Huazhong Agricultural University, as well as an Associate Degree in vegetable breeding from Jiangnan University, China. Currently, she is a General Manager of Wuhan Qingfa-Hesheng Seed Co., Ltd. In addition, she is a member of Field Crops Section Boards, ISF, and Vice President of China Seed Trade Association. She has previously served as a Co-Chair of APSA's Special Interest Group (SIG) for Hybrid Rice.

Mr. Jinman Lee



Elected to the EC this year, Mr. Lee holds an MBA in Business Administration from Sungkyunkwan University and a B.S in Agriculture Science from Kon-Kuk University in Seoul, South Korea. He is the Director and Head of Strategy at Nongwoo Bio and is the company's representative in APSA's Working Group of Integrated Vegetable Seed Companies. He has 26 years' experience in the vegetable seed industry in Asia-Pacific and globally, and prior to joining Nongwoo Bio worked with Seminis and Nunhems.

SEED ASSOCIATION

Dr. Manish Patel



Elected to the EC this year, Dr. Patel holds a Ph.D and M.Sc in Plant Breeding & Genetics (Agriculture Science) from Gujarat Agriculture University. He has more than 20 years' experience in seed science and technology, and has been a Governing Council board member of the National Seed Association of India for the last eight years. Since 2000 he has been Executive Director of Incotec India Pvt Ltd., and has previously served as an APSA EC member, and as an Office Bearer, Vice President and Co-chair for the Standing Committee on Seed Technology. He is one of the founding directors of Gujarat Seed Valley.

Dr. Yan Shupeng



Elected to the EC this year, Dr. Yan holds a Ph.D in Agricultural Economics from Shenyang Agriculture University in China and a Master's Degree in Business Administration from the University of Iowa, in the US. Currently he is the General Manager of China Vegetable Seed Technology Co.,Ltd. and also a Vice President of Haidian Seed Chamber of Commerce and Vice President of the China National Seed Association (CNSA) vegetable sub-committee.

ASSOCIATE MEMBER

Mr. Casper van Kempen



Re-elected to the EC this year, Mr. van Kempen is from the Netherlands. He has a master's degree in Economics from Rotterdam University, in the Netherlands, as well as in Agricultural Economics from Reading University in the UK and in Business Administration from IMD in Lausanne, Switzerland. Having spent 17 years in international assignments abroad, Casper has held several international senior sales and marketing management positions in flower and vegetable seed companies. He took up his present position at the Anti-Infringement Bureau for IP Rights on Plant Material, Brussels, in 2010.

AFFILIATE MEMBER

Mr. John Mizicko



Appointed to the EC in 2018 to fill out the term of Ms. Michelle Klieger, Mr. Mizicko works for Eurofins BioDiagnostics and represents the American Seed Trade Association. Mr. Mizicko has worked in the seed industry for 40 years and has participated in APSA for the past 13 years. He has served on numerous boards and committees for several state, regional and national seed associations, most recently as Chairman of the Seed Industry Relations Committee and member of the International Executive Committee for the American Seed Trade Association.

International Meetings 2019

DATE	MEETING	VENUE
1-5 Feb	ASTA Vegetable & Flower Seed Conference	Orlando, Florida, USA
24 Feb - 1 Mar	ISF: March Meetings	Zurich, Switzerland
4-7 Mar	AFSTA Congress	Mombasa, Kenya
11-12 Mar	NSAI Indian Seed Congress	Hyderabad, India
31 Mar - 1 Apr	China National Seed Congress (organized by CNSA)	China
8-9 Apr	APSA Midterm Meeting	Bangkok, Thailand
15-17 May	APSA-WorldVeg Annual Workshop	Tainan, Chinese Taipei
3-5 Jun	ISF World Seed Congress	Nice, France
15-19 Jun	ASTA's inaugural Policy & Leadership Development Conference	Denver, USA
26 Jun - 3 Jul	32nd ISTA Congress	Hyderabad, India
Oct (TBC)	Beijing Seed Congress	Beijing, China
13-15 Oct	ESA Annual Meeting	Stockholm, Sweden
18-20 Oct	Tianjin International Seed Expo	Tianjin, China
20-25 Oct	ISF: Mid-term Meetings	Amman, Jordan
22-25 Oct	APSA Asian Solanaceous Roundtable (ASRT) 3	Bangalore, India
28 Oct - 1 Nov	UPOV Meetings	Geneva, Switzerland
25-29 Nov	Asian Seed Congress	Kuala Lumpur, Malaysia
Dec (TBC)	Guangdong Seed Expo	Guangdong, China

New APSA Members

M/S MASUD SEED COMPANY

174 SIDDIQUE BAZAR
HANNAN MANSION
DHAKA DHAKA 1000
DHAKA
Bangladesh

ZHANGYE RUIZHEN SEED Co., Ltd.

Pingyuanbu Street, Wujiang Town, Ganzhou,
Zhangye, Gansu, China.
GANZHOU ZHANGYE 734000
GANSU
China

Shenyang Tech-Park Seed Co., Ltd.

#7-206 Yangguang Huyuan Yuming Road,
Mingshan Benxi 117000
Liaoning
China

Ho Sheng Seeds. co., Ltd.

No. 41, Lane 24, Kuo Kuang 8 Street,
Yung Kang Tainan 710
Taiwan
Chinese Taipei

EXCEL GENETICS LIMITED

606, Sakar III,
Opp. Old Gujarat High Court, Navrangpura,
Ahmedabad Ahmedabad 380014
Gujarat
India

ECO AGRISEEDS PVT. LTD.

804, VSS NANDADEEP,
NH44, PETHBASHEERABAD,
MEDCHAL MALKAJGIRI HYDERABAD 500055
TELANGANA
India

PT. MASCO AGRI GENETICS

Palma One, Suite 205, 2nd Floor, JL. H.R. Rasuna
Said, Kav. X-2 NO. 4
Kuningan, Setiabudi
Jakarta Jakarta 12950, DKI JAKARTA
Indonesia

Continental Semences SPA

Via Monzato,9
Traversetolo PR 43029
Italy

Millan Agro Seed

1304 Old Vegetable Tower Market
Hyderabad Hyderabad 71000
Sindh
Pakistan

W. Legutko Breeding and Seed Company Ltd.

Nad Stawem 1F
Jutrosin 63 - 930
Poland

Ispahani Agro Limited

14-15 Motijheel, Ispahani building 7th Floor,
Dhaka-1000
Bangladesh

Panjin Xinye agricultural science and Technology Co.

tuozili village, xinxing town, Dawa county
Panjin 124219
Liaoning
China

SHENYANG FENGHUI SEED CO., LTD

NO.19 Youhao Street,
Shenhe District, SHEN YANG 110013
LIAO NING
China

AGRI OBTENTIONS

Chemin de la Petite Minière
Guyancourt 78280
France

DEVKISHANJI VAKTAJI SEEDS

NO. 7, ASHWAMEGH VER HOUSE,
BEHIND UJALA HOTEL
SARKHEJ AHMEDABAD 382210
GUJRAT
India

TROPICA SEEDS PRIVATE LIMITED

373/1A, 2nd Floor, 7th Main Road
11th Cross, Jayanagar 2nd Block,
BANGALORE BANGALORE 560010
KARNATAKA
India

Iran Bazr Co

182 Daneshkadeh Ave
Karaj 3134983847
Alborz
Iran

ARD (Unifert) SAL

Unifert house- street no. 41 sector 6
Jdeidet El Metn
Jdeidet El Metn Jdeidet El Metn 1202 2070,
Metn
Lebanon

PLATINUM AGRI BUSINESS PVT. LTD.

3 Siddque Center Near Malik Travel sheikhupura
Road Gujranwala Pakistan
Gujranwala Gujranwala 52250, Punjab
Pakistan

Browns Agri Solutions (Pvt) Ltd.

481, T. B. Jayah Mawatha
Colombo Colombo 01000, Western Province
Sri Lanka

Semillas PanAmerican Chile Ltda.

Casilla 40 Pichidegua
Callejón Los Guindos Cerro
Pichidegua Pichidegua 2980000
Rancagua
Chile

Bright seeds Co., Ltd

Beizhagou Village, Guoyuan Country, Suzhou
District, Jiuquan City, 735000, Gansu Province
Suzhou District Jiuquan city 735000
Gansu province
China

Wuhan Chuwei Bio-tech CO., LTD

401 Room, 41A Building, Silver lake Baishazhou
Small and Medium Enterprises, Qingling Lake
North Rd, Hongshan District, Wuhan City, Hubei
Province,
China.

GEOSTORE A.E

ADAMON 16-18 ACHARNES
VARIBOBI ATTIKI 136 71
Greece

Rama Krishna Hybrid Seeds

145 Indra Market, Old Subzi Mandi
Delhi 110007
Delhi
India

SRI SATHYA AGRI BIOTECH PVT LTD

11-13-175/1, PVR ONE BUILDING, THIRD FLOOR
ALKAPURI, ROAD NO.3, SRK PURAM,
HYDERABAD, RANGA REDDY HYDERABAD
500035
TELANGANA

CORA SEEDS

Via Boscone, 1765/A
cesena Cesena I - 47522
Italy

ANNAPURNA BEEJ BHANDAR

Gha 2-664, Ason Tole
126/5, Dharma Chakra Gali, Bagbazar
Kathmandu Nepal 977
Province 3
Nepal

Department of Environment and Natural Resources-Ecosystems Research and Development Bureau

College, Los Baños, Laguna, Philippines
2 Los Baños 4031, Laguna
Philippines

California Seed & Plant Labs

3556 Sankey Road
Pleasant Grove
Pleasant Grove Pleasant Grove 95668, CA
United States

Asian Seed Goes Quarterly

In 2019, Asian Seed & Planting Material will be shifting print production to a quarterly schedule instead of bi-monthly. This is so that we can continue to emphasize quality of our content through both print and digital channels. We will still offer APSA members opportunities to advertise in print publications, as well as through our digital channels. For more details about these opportunities, please email Suchada@apsaseed.org

Asian Seed Congress 2019

KUALA LUMPUR • MALAYSIA

25 -29 November 2019

Registration Opening Soon



APSA
THE ASIA & PACIFIC
SEED ASSOCIATION

www.apsaseed.org