Pest Pressure
Fall armyworm threatens field crops in South, Southeast Asia and China

Seed Meeting Reports
Reports from ISF, NSAI, CSA and THASTA annual meetings

American Quality Assurance
Detailed analysis of US seed regulatory system, standards

ASRT 3
Registration now open for the third Asian Solanaceous Round Table

Also Inside ...

APSA Midterm Meeting
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Pest Pressure
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In this issue

17
NSAI Congress in Hyderabad
The National Seed Association of India held its 9th annual Congress in the bustling south-central Indian city.

22
70 years of Chinese Seed
Seven decades of seed industry transformation observed at 2nd national seed congress hosted by China Seed Association in Beijing.

27
American Seed Industry Systems
An overview of the regulatory environment, systems, organizations and standards that reinforce USA as a leader in quality seed.

32
WorldVeg Workshop
APSA and the World Vegetable Center successfully hosted their vegetable breeding Consortium’s third annual workshop in Tainan.
Greetings from Pakistan, and welcome to the Q2 issue of Asian Seed & Planting Material.

These past two quarters have been very productive for APSA. We have accomplished a lot and have a lot more to look forward to before the year is through. Let me first take this opportunity to congratulate all delegates who participated in APSA’s second annual Midterm Meeting on April 9.

The enthusiasm, leadership, and initiative of our Working Group of Integrated Vegetable Seed Companies (WIC), Special Interest Group (SIG) and Standing Committee (SC) members, their chairs, and other active stakeholders continue to exceed expectations in driving APSA’s priorities forward.

We just completed our third APSA-WorldVeg Vegetable Breeding Consortium workshop in Tainan May 15–17, which was presided over by APSA Director Dr Kanokwan Chodchoey and WorldVeg Director General Dr Marco Wopereis. We received a lot of positive feedback from this gathering, highlighting how the program has improved every year. We will continue to listen to your comments so as to improve the program further.

In her letter on the next page, Dr Kanokwan elaborates on this meeting, in addition to other important APSA events, so let me just say that I am pleased that progress for APSA has been steady, especially regarding APSA’s registration, legal compliance, and our new-and-improved financial structure.

Regarding finance, our treasurer, Daniel Gleeson, has resigned from the board. As this goes to press, the OB and EC are actively vetting recommendations for his replacement and we will make an announcement via the Secretariat in due course. Meanwhile, we anticipate business to proceed as usual without interruption.

APSA is actively preparing for a number of upcoming events, including the 26th Asian Seed Congress, our 5th Expert Consultation on PhytoSanitary Measures in the Asia Pacific, and the 3rd Asian Solanaceous Round Table, which Dr. May will update you on in detail in the next page.

Let me just say that all of these important meetings embody why APSA exists – to bring out on the open discussion table all the issues our industry deals with day to day, week to week, so that we can devise tailor-made and harmonized strategies and solutions to be applied in all of our respective cities and countries, and the entire region.

Indeed, food security is important to all of us and it is important that APSA is proactive about addressing these issues. A case in point is underlined in our cover story about the Fall Armyworm which is seriously threatening maize production throughout the region. (See page 32) Emerging pests continue to be a challenge that we need to continue to prioritize. Similarly, extreme weather: I saw firsthand how dire the situation has been this past spring in Pakistan. The severe hailstorms, rainfalls and flooding just before harvest wiped out a significant portion of the wheat crop. At the same time, many locals continue to deal with extreme heat and water-stress related hardships.

Pakistan is not alone: from China to India, Australia to Thailand, the Philippines to Japan – all APSA countries and territories are threatened, and our breeders and scientists have their work cut out for them. No one company or country will be able to succeed alone, but only by pooling our resources can we find and employ the best solutions and mitigation strategies.

I am pleased to report that both ISF and APSA management had a joint meeting this month in Nice, France at the wonderful World Seed Congress 2019. We collaborated on ideas about transfer of knowledge and technology to Asia and the Pacific – the world’s fastest growing region, and on finding solutions to food insecurity. I am looking forward to strengthening this relationship with ISF and I am grateful to the president of ISF Mr Eduard Fitó and Secretary General Mr Michael Keller for their willingness to work jointly.

With that, I’m sure I speak for all of us in urging that we embrace the coming challenges with open arms. You can start by reading this magazine from cover to cover. I also encourage APSA members’ active participation in our SIGs and SCs. Until next issue, stay safe, healthy and prosperous.
Welcome all APSA members to our second issue of the year. First, let me extend my gratitude and appreciation to all members, associates and stakeholders for your sustained support for APSA. We are gaining ground in the process for international registration. Since April, we have been processing membership renewals under our new registration structure and have been impressed by the high level of engagement from all of our valuable members. Just in the initial month, we were able to process more than 300 membership renewals and are pleased to welcome a number of new APSA members. (See inside back cover)

On May 2 we opened Early Bird Registration for the 26th Asian Seed Congress (in Kuala Lumpur November 25–29), and our Secretariat team continues to maintain positive energy and is always ready to support you and address any and all queries you may have.

In this issue, we have prepared a lot of intriguing and timely content, covering pressing issues and market trends in not only the immediate region, but from across the globe. Looking across the Pacific, in the feature on pages 27–29 we examine in detail the American seed industry regulatory framework, which can serve as a useful reference for any members looking to trade or cooperate in the movement of quality sowing seed to/from the US, whether for trade or research purposes. A big thanks to Abigail Struxness from the American Seed Trade Association (ASTA) for coordinating information for this article.

We also have coverage of recent annual meetings of some of our active national seed associations and associates (ISF, THASTA, CSA, NSAI and GrowAsia/VNU). I was honored to attend these important meetings in person and all summaries have been prepared in this issue for your benefit.

Complementing global seed industry perspectives is an insightful article from our SIG Cover Crops Chairman, Bhupen Dubey, who is the global CEO from Advanta and shares a lot of data and forecasts for India and beyond. That article is on page 13. In China, we were honored to interview Mrs. Ma Shuping, who over the past decades has witnessed and actively participated in the modernization of China’s seed industry. That article is on page 25.

Of no lesser importance in this issue is coverage from APSA’s own midterm meeting on April 9 in Bangkok, where productive discussions were held amongst and between members from our Special Interest Groups, Standing Committees and sub-committees, including the Working Group of Integrated Vegetable Seed Companies or WIC. This meeting yielded a number of strong action points, underlining APSA’s commitment towards its priorities in the strengthening of intellectual property rights and plant variety protection; raising awareness and understanding of global seed trade initiatives; building capacity in technical matters and the regional and global harmonization efforts for disease nomenclature specific to Asian crops, for example. Be sure to read the report on pages 36 for full details.

On other timely issues affecting seed and agriculture throughout the region is the emergence and rapid spread of the fall armyworm in several APSA countries. Starting on page 32 you’ll find all the latest about this pest’s destructive path into Asia, and more importantly, proposed control and management strategies.

The APSA – World Vegetable Center Vegetable Breeding Consortium held its annual workshop in Tainan, 15 – 17 May. Going strong in our third year, we are pleased to report the highest turnout of participants thus far, and would like to thank our associates at WorldVeg for setting an impressive agenda, which included, for the first time, visits off-site, including a stop at Known-You Seed headquarters as well as the Taichung District Agricultural Research and Extension Station (DARES). Find more details on page 30.

Looking ahead, APSA is excited to organize a number of important...
meetings and activities in the third and fourth quarters. Come August 28-29, we’ll have the 5th Expert Consultation on Phytosanitary Measures.

This important meeting will bring together key industry representatives with NPPOs from various countries in Asia to discuss trends and developments in regional seed movement, and in particular, the implementation of pest risk analysis for seeds in accordance with ISPM 38. Our Phytosanitary Committees are finalizing the agenda as we speak. Look out for a summary of outcomes in the next issue.

Eyeing Israel in September, the itinerary for our next Study Tour – planned by our SIG Vegetables and Ornamentals – is nearly final. This tour will be ideal for top level management and R&D heads to see firsthand a global leader in seed technology, production and marketing. We expect to open registration within June if not early July.

After that, it’s time for savvy tomato, pepper and eggplant seed producers and breeders to join the third Asian Solanaceous Round table, which will take place in Bengaluru, India 22 – 25 October. The program will include updates from a number of expert speakers on key topics, including breeding technology, quality traits, market trends and artificial technology for production and post harvesting.

Our APSA R&D advisory committee has been meeting regularly these past few months to ensure the program is up-to-date, we will announce the itineraries and the registration is open from 1st June.

In closing, it is my hope that all of these efforts and activities will address the capacity-building needs of all your organizations and for the industry as a whole. I am always open to your comments, feedback and suggestions, so don’t hesitate to reach out. With that, I wish you all great success in the coming weeks and months, and look forward to tracking progress in Quarter Three!

More Q2 Highlights from the APSA Secretariat

The Indonesia Seed Association (ASBENINDO) Chairman Mr Ricky Gunawan (center) visited the APSA Secretariat office in Bangkok on 11 March and discussed seed industry developments in Southeast Asia’s most populous country. Look out for an article coming soon.

Mr Anan Dalodom, President of the Horticultural Science Society, giving the opening speech for a Charity Bowling event on 4 May at Major Ratchayothin in Bangkok, which APSA co-sponsored.

A visiting USDA delegation touring SE Asia stopped by for a productive chat in May. Pictured here include International Program Specialist, Mr Alex Chinh (1st left); Foreign Agricultural Office rep, Mr Indalecio Vallejos (2nd right) and Agricultural Engineer Dr Robert Malone (2nd left).

2019 NSTDA Annual Conference, from left: Mr AJ Hsieh (Sanyi Sahaisingha Seeds Co., Ltd); Simon Jan de Hoop (East-West Seeds); Dr Sithichoke Tangphatsornruang (Thailand National Center for Genetic Engineering and Biotechnology); Prof. Emeritus Dr. Morakot Tanticharoen (Thailand NSTDA); Dr Coosje Hoogendoorn (KIT Royal Tropical Institute); and Miss Sasiwimon Boonanunt (NSTDA).
Applying the “value chain” concept through innovation in agriculture and processing to ensure food security was the important theme at this year's Responsible Business Forum in Bangkok.

The three-day event, organized by Singapore firm Global Initiatives, was held at the Royal Orchid Sheraton Hotel & Towers March 25 - 27, and featured speakers from the world's leading agribusiness enterprises, financial institutions, think tanks, NGOs, government agencies and research centers.

More than four hundred attended, and witnessed signing of a Sustainable Rice Landscapes memorandum of understanding (MoU) between RBF consortium members and the World Business Council for Sustainable Development (WBCSD), the UN Environment, Food and Agriculture Organization, the International Rice Research Institute and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The initiative aims at transforming rice-based production landscapes through collaboration with private sector and multilateral organizations to ensure best practices at farm and policy levels, thereby to help meet national greenhouse gas targets under the Paris Agreement and restore degraded landscapes while conserving biodiversity.

According to the UN’s Food and Agriculture Organization, adoption will facilitate healthier watersheds, efficient use of water and fertilizer, lower greenhouse gas emissions from rice production, and reduced agrochemical pollution, among other benefits. Instruments to facilitate wide-scale adoption of sustainable rice-sector best practices include standards, guidelines, analysis tools, training modules, outreach models, and incentive mechanisms supplied via the Sustainable Rice Platform (SRP). SRP best practice guidelines comprise eight principles, 32 criteria, and more than 160 recommended practices.

Southeast Asia, where 47% of caloric intake comes from rice, is a particular focus of the SRP.

Forum business was organized under the heading Innovation in Value Chains for Food and Nutrition Security. Delegates concluded that such innovations as new “ubergaum” business models, blockchain and biotech (for improved productivity and traceability) are imperative, and partnerships vital.

Said Prof. Malcolm Preston, of Harvard Business School’s Kellogg School of Management, in his closing remarks: “We need to trust the new technologies and trust in each other to create great partnerships.”

Focus groups examined four major commodity groups: Rice, Dairy, Fisheries and Fruits and Vegetables. Traceability and innovative financing were likewise important issues.

Applying innovation to the value chain formed the subject of several talks and panel discussions: Innovation Across the Value Chain; Innovative Financing for Agriculture; Technology and Artificial Intelligence for Food and Agriculture; and Special Presentations by Innovative Startups and Social Enterprises.

Other talks covered: Tackling Food Loss and Waste in Asia; Human Rights and Women Empowerment in the Food and Agriculture Chain; Impact Investment Solutions for Agriculture; Adapting Business Practices for Socially Responsible Consumers; Partnering with Agribusiness for Sustainable Development Goal (SDG) Action; and Sharing, Feedback and Commitment from Commodity Working Groups.

“We need... new ways of consuming and new ways of moving from farm to fork along new value chains,” said Kundhavi Kadiresan, FAO Assistant Director-General and Regional Representative.

The much-talked-of “value chain” is a strategic concept that defines any organization as a system comprising subsystems: each having inputs, transformation processes and outputs that add value to the final product and better return on investment.

As well as the FAO, delegates were addressed by representatives from USAID Green Invest Asia; the Bill and Melinda Gates Foundation; the Stockholm Environment Institute; Olam International; the International Rice Research Institute (IRRI); the Commonwealth Scientific and Industrial Research Organisation (CSIRO); Cargill; Kellogg Company; ING Bank; BNP Paribas; Thailand’s National Science Technology and Development Agency (NSTDA); Myanmar’s Ministry of Agriculture, Livestock and Irrigation; and Laos’ Ministry for Agriculture and Forestry.

Key partners in the Forum include: the FAO; Thailand’s Ministry of Commerce and Ministry of Science and Technology; Corteva Agriscience; FrieslandCampina; Herbalife; the WBCSD; CropLife Asia; USAID Green Invest Asia; USAID Oceans; Winrock; GrowAsia; CSIRO; the Thai Food Processors Association; the CP Group; Food Innopolis; Whapow; and the World Wildlife Federation (WWF).

This RBF on Food & Agriculture was the sixth edition, and the first held in Thailand.
Learning from the Dutch ‘Diamond Model’
Netherlands seed innovation lessons shared at Kasetsart University talk

A Thai - Dutch Seed Innovation Meeting was held at Kasetsart University in Bangkok 27 March. Speakers included acting president of Kasetsart University, Chongrak Wachrinrat, PhD, who spoke highly of work done at – and Thai collaboration with – Wageningen University, the Netherlands’ leading agricultural institute. East West Seed’s Mary Ann Sayoc offered a detailed presentation on her company after Dutch academic and Wageningen University alum J Coosje Hoogendoorn illuminated the Netherlands’ leading-edge business model and how it can be applied globally via the country's Integrated Seed Sector Development Program.

The latter aims at bringing smallholder farmers into the global seed value chain by recognizing the roles of formal and informal seed production.

Dr Hoogendoorn is a member of the Netherlands’ KIT Royal Tropical Institute, which focuses on the UN’s 17 Sustainable Development Goals, among them “health care, gender, economic development and intercultural cooperation.” She has more than 30 years experience in international research for agricultural development, with expertise in plant breeding and seed systems, agricultural value chains, climate-smart forestry and south-south collaboration.

The Netherlands, said Dr Hoogendoorn in beginning her talk, supports Thailand’s goal of becoming the seed hub of Southeast Asia, and noted that relevant Thai public sector agencies work closely with the Dutch seed sector.

She then related how her country is one of the world’s principal centers for seed production and research, pointing out that it is especially strong in vegetables, seed potatoes and propagating materials for flowers and ornamentals. Some three hundred seed companies in the Netherlands employ about 12,000 people. Roughly 30 percent of all applications for Plant Variety Protection rights come from Dutch producers, and some 60 percent of vegetable PVP applications. In 1941, during World War II, the Netherlands was the first country to implement the concept of plant breeders’ rights.

Observing that, “Every farmer will tell you good crops start with good seed,” Dr. Hoogendoorn said seed derives from two systems, formal and informal, and that, for integrated seed sector development (called ISSD), this must be taken into account. Principles of such development, she said, require working according to the structure of the seed value chain; promoting entrepreneurship; fostering pluralism; building on the formal and informal seed systems; public - private cooperation; and promoting “evidence-based seed sector policy innovation.”

Much of her talk centered on the Netherlands’ seed sector achievements, which have made it “the number one country in the World Bank ‘Enabling Business in Agriculture’ Index”. She said Dutch companies’ average expenditure on R&D is “about 15 percent of their turnover...with some companies investing nearly 30 percent.” Dutch success in the field has resulted in Wageningen University’s Plant Breeding degree program’s popularity among international students.

The Dutch approach, she averred, may be likened to the facets of a diamond in the “synergy between public sector, private sector, civil society and research.” She said the for-profit sector “provides the economic incentive”; “government set policies and legal checks along the value chain”; knowledge institutions inject innovation and skill; while society places “checks and demands.”

Dr. Hoogendoorn also mentioned the World Benchmarking Alliance’s Access to Seeds Index, to which she is advisor, and which lists Thailand-based, Dutch-founded East West Seed as the leading Southeast Asian company for 2019.

She noted that data indicates only 20 percent of farmers “are reached by formal seed” and advocated “stronger state-operated” seed initiatives. She said that, while variety registration is “covered well” in the region, it is not clear whether “access to innovative science and response to civil society is sufficient.”

She therefore suggested the region’s seed industry players use the Dutch “diamond model” as basis for constructing “a robust and state of the art seed sector,” adding that “Dutch organizations stand ready to partner” with regional actors in the effort.

Thereafter, Dr Mary Ann Sayoc, East-West Seed’s Public Affairs Lead, detailed her company’s 37-year history in the region: how East West introduced market-oriented plant breeding to Southeast Asia, and the multinational company’s innovative and quality driven efforts to supply “local markets and local needs.”

“Smallholder farmers,” she said, are “East-West Seed’s main clients. Our mission is to increase their income.” The company has 14 research centers in six countries and some 5,000 employees world wide. It now has operations in India, China, Africa and Latin America as well as Southeast Asia.
Talkin’ ‘bout the Thai seed trade

The Thai Seed Trade Association (THASTA) on March 8 held its annual meeting at the Rama Gardens Hotel on Vibhavadi Rangsit Road. The meeting was attended by representatives from several dozen THASTA member companies and associates, including APSA.

Addressing attendees at the evening meeting, THASTA President, Dr. Chairerg Sagwansupakorn gave a presentation reviewing figures, finances and activities from the past year, and plans for the coming year.

To date, THASTA has 148 active members including 56 companies, and 92 individuals or merchants. As of December 31, 2018, the association’s database has logged a total 13,528 sowing seed varieties registered by its members, who are all listed on the company's member database online.

Some highlights from the presentation include:

- Renewal in June 2018 of the association’s “Q Mark” certificate with the Department of Intellectual Property; the certificate has a 10-year validity.
- Monitoring progress in the revision of Thailand's Seed Law and regulations, specifically concerning GMOs and New Breeding Techniques (NBTs)
- Strengthening collaboration and dialogue between Thai seed industry stakeholders from both the public and private sectors, including food standards, customs, quarantine and seed testing officials, through a number of seminars and workshops
- Sponsorship of workshops with the Department of Agriculture to train seed farmers, handlers and merchants in compliance with relevant laws and regulations, and the application of best practices, including proper ways to store, transport and test seeds
- Ongoing Corporate Social Responsibility efforts to protect and conserve national forests in Chiang Mai
- Improvement and development of THASTA’s digital communication channels, including the association’s website, social media (Facebook and Line), bi-annual E-book, and online databases.

Moreover, Dr. Chairerg reviewed progress with Thailand’s “Seed Hub” project. He noted that THASTA has been working on concept and discussion papers with the Department of Agriculture and the National Bureau of Agricultural Commodity and Food Standards, with an aim to develop a harmonized pest list to present to the Asia and Pacific Plant Protection Commission (APPPC).

He added that Thailand has specifically been developing a Regional Standard for Phy-
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h.m.current, belonging to the farmers cooperative group limagrain, is made up of a culturally diverse and collaborative team, working in over 30 countries, serving customers on every continent. our worldwide network of professionals and state-of-the-art research facilities enable us to work side-by-side with growers to provide the most regionally adapted and reliable vegetable seeds available.

on stage, left: reps from thasta member companies receive thanks for sponsoring the annual meeting. above: the meeting was followed by dinner and a short seminar led by nutritionist krai maspimol, who gave advice on health and stress reduction; right: apsa's dr kanokwan presents a token of appreciation to thasta's dr chairerg to acknowledge strong relations between the two associations.

tosanitary measures (rsm), initially for chili peppers, tomatoes, cucumbers and corn, which will be completed and presented to the apppc within 2019.

in related news, thasta announced it will host “thailand international seed trade 2019” with the department of agriculture and the national science and technology development agency (nstda) as co-organizers, to be held 13-14 september.

the event aims to bring together local seed business stakeholders with international trade partners.

scheduled to be held at the centara grand hotel @ central world in bangkok, the event targets seed producers, distributors, those involved in seed machinery and related technology, packaging and marketing people.

more info @ w: tist.in.th

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Mr Le Quoc Doanh, Vice Minister for Agriculture and Rural Development, Vietnam giving opening speech.

Vietnam shines at HortiFuture HCM City conference

On 11 April, seed industry representatives gathered at the Rex Hotel in Ho Chi Minh City for “HortiFuture Vietnam,” a joint conference organized by GrowAsia, the Partnership for Sustainable Agriculture in Vietnam (PSAV), Netherlands and Thailand-based VNU Exhibitions Asia Pacific, Vietnam’s Ministry of Agriculture, the Nature and Food Quality group of the Netherlands and Vietnam’s Ministry of Agriculture and Rural Development (MARD).

Some 150 delegates mapped out how to bridge the gap between Vietnamese growers and smallholders with new technology – to ensure that the latter benefit from Vietnam’s thriving horticulture industry and that the country retains global competitiveness. Recommendations championed by the Agriculture Ministry’s public-private coordination mechanism PSAV included: greater access to finance; promoting consumer and retailer awareness; and establishing national standards for quality and certification.

A post-conference release noted VNU Exhibitions’ Horticulture Project Manager Manuel Madani’s observation that, “the bridge between innovative growers and smallholders is key to growing the industry collectively.... If farmers actually learn from earlier success... astonishing milestones can be reached...”

Speakers included Le Quoc Doanh, Vice Minister for Agriculture and Rural Development, who expressed concern over climate change and called on “the private sector to share technology.”

Other speakers were Vietnam Cooperative Alliance president Nguyen Ngoc Bao; the Netherlands’ Marjolijn Sonnema; Gabrielle Nuijten of Topsector Horticulture; former businessman of the year Meiny Prins, CEO and founder of PRIVA; and growers from the Pan Group, the Fruit Republic, Unifarm, Phanco, and Satra.

HortiFuture sponsors included: Signify Lighting, Rijk Zwaan, PRIVA, Bejo Seeds, Richel, Speedy Access and Agri Solutions Asia.

Said Willem Schoustra, the Netherlands Embassy agricultural counselor to Vietnam: “I am amazed by the great potential of Vietnam in terms of agriculture, particularly in horticulture.” He also noted that the country is ambitious of becoming “a strong regional and global player.”

Somang Yang, GrowAsia’s Partnership Manager, meanwhile expressed his organization’s pride in supporting “this milestone event” aimed at spurring “collective action towards a more sustainable and inclusive future for Vietnam’s horticulture industry.”

In 2017, Vietnam fruit and vegetable exports reached a record US$3.5 billion, with 43% year-on-year growth – exceeding the export value of key export products such as rice, oil and gas.

APSA Director Dr Kanokwan Chodchoey moderated the technical session on Innovations in Horticulture and a panel discussion following various presentations.

For more details, visit hortifuture-asia.com
Advanta chief fathoms
India's seed hub prospects

Bhupen Dubey is global CEO of Advanta Seeds, a subsidiary of the UPL Group (formerly United Phosphorus Ltd.), a Mumbai-based multi-national agrochemical giant with revenue last year of US$2.6 billion and products sold in 120 countries – making it the fifth largest in the world after Bayer, Dupont, Syngenta and BASF. Advanta Seed is the first Indian seed company with world wide reach, holding leading positions in forages, corn, hybrid rice, mustard and sunflower in field crops; and okra, peas and tropical cauliflower in vegetable crops, and aims “to drive sustained growth with world-class genetics and innovative technology.”

Mr. Bhupen has been with UPL 15 years, and during his 30 years in agriculture and food production industries has also worked with Hoechst, Optimagro and Bayer. A graduate with honors from Gujarat Agriculture University, where he was recipient of a gold medal for his work in plant protection, he is a member of many professional organizations and has participated in the World Economic Forum’s multi-stakeholder project “Transformational Leadership, Agriculture Development.” Currently co-chair of APSA’s Cover Crop SIG, Mr. Bhupen presented an “Overview of the Indian Seed Industry in Global Seed Trade” during the Indian Seed Congress 11 - 12 March in Hyderabad (coverage on pp 16-17), from which the following is derived:

“The global seed industry is on an accelerated growth curve with faster penetration of new technology, higher value traits driving seed prices and OP to F1 conversion,” he says. “New lifestyles and new regions are emerging as growth drivers.” Mr. Bhupen notes that European countries and the US still dominate the market, and that Asia, though emerging as a player, remains a “deficit region”, with imports out-pacing exports, as in the Middle East and Africa.

While India’s seed market is sixth in size, it is 27th in terms of global trade, and its top crops – cotton, OP paddy and wheat – do not figure in the nation’s list of exports. OP paddy and wheat exports are crippled by food security crop seed restrictions set by the Indian government, and cotton by the Bt restrictions of foreign governments on such imports. The country’s US$190 million seed trade is roughly 60 percent import and 40 percent export; the total domestic market is estimated at US$1.4 billion. Nonetheless, Mr. Bhupen says, “India has potential to become an export hub,” given the country’s talent pool, seed production capability and close association with the Organisation for Economic Co-operation and Development (OECD), which has been co-operating with India since 1995.

“A new revolution can be created by boosting India’s exports,” Mr. Bhupen averred during his presentation. “India’s attractive seed industry is the home of multi-national corporations and several seed companies.” It is the appropriate time, he thinks, for the seed industry to adopt a “Made in India” policy, thereby to double seed exports – but that goal will require structural, policy and legislative efforts, and adopting the best practices of other countries.

With regard to the latter, Mr. Bhupen says France and the Netherlands excel as traders: “For example, the Netherlands’ trade is 2.5 times its domestic seed market” and that “for other countries across the globe, the production potential is at the max 1.4 times...”. The value of the two countries’ trade is comparable in size to India’s seed market. He adds that, though India’s trade is growing fast, it has “no focused approach for boosting trade.”

He says crops for Indian export could be: vegetables; rice; forage; and pulse.

Looking at the near term, Mr. Bhupen says, “Increasing vegetable consumption in developing countries is rapidly expanding the seed market.” He says India’s “vegetable export portfolio is dominated by solanaceous crops, okra and gourds.” He feels the country has “a comparative advantage” when it comes to growing crops in tropical climates for export to Western markets and an increasing demand for “value-added traits.” To achieve penetration, however, it is necessary for India to pursue even further development of “quality-certified seed”, otherwise “aggressive market expansion” will remain merely a goal.

Concerning rice: Mr. Bhupen thinks the problem of “very low” rice seed productivity in Southeast Asia and African countries can be “tackled” by hybrids, “but at the cost of not meeting” cooking-quality requirements. The largest importers of Indian rice are the Philippines, Indonesia and Nepal. Indian access to markets in Southeast Asia is hobbled by “regulatory hurdles and quarantine rules.” The way to overcome such obstacles, he thinks, is by “aggressive...tie-up with local seed companies.”

Regarding forage crops, he says the market is presently in its “nascent stage”, and that India might become a “forage nutrition specialist”, thereby to create a “crop revolution like that with Bt Cotton.”
India’s giant seed breeding talent pool is key to the country becoming a seed hub. Photo: APSA file

In the maize market, Mr. Bhupen says Indian suppliers are losing out to their Thai and American counterparts owing to the latter’s “assured quality.” (See also story on pp 27–29) When the problem of quality seed production is overcome, other nations in southern Asia will be attractive markets for Indian maize, but exports to Africa, Mr. Bhupen believes, are “not feasible” economically. Partnerships on that continent for local production are feasible, however, and markets are waiting to be tapped – though “not in the GMO scope so far.”

Bt cotton, he says, has “revolutionized the Indian seed market”, yet exports presently are limited to Myanmar and South Korea. Expansion is “completely dependent upon whether destination countries accept GM non-food crops,” a circumstance that may change if India can export the idea, instead of the cotton, abroad – the idea of reaping the same benefits India has, and thereby fast-tracking growth in other developing countries.

The United Nations urges planting of pulse varieties in order to provide food security and nutrition. Of these, India is the world’s largest producer, consumer and importer. To do this, hybrids must be developed, requiring more R&D and “policy initiatives from the government of India incentivizing pulse production.”

He further suggests adopting “the Netherlands model” to boost exports by outsourcing seed production to other countries, importing it into India and then re-exporting. He suggests Myanmar as a likely base for Indian outsourcing. That, however, first requires building trade relations, then training and “up-skilling” local people to “deliver quality seeds.”

He urges Indian companies to become multi-national, thereby expanding geographically, by entering into local partnerships, creating “world-wide networks to obtain, breed, multiply and distribute seed.” This model is especially attractive when “Indian germplasm is not adequate to meet the needs” of targeted foreign markets, such as the white maize market in Africa.

To achieve the goals outlined above, Mr. Bhupen says, will require the concerted effort of India’s government, seed associations and private companies. He criticizes “various stand-alone approaches being adopted to accelerate exports with no clear goal.” India’s state governments must “step up with defined targets” for their exports.

If India is to “double seed exports by 2025” and “double farmers’ incomes by 2022”, road-maps with milestones, need-gap analysis and implementation plans must be detailed, and these will be dependent upon “assessing market attractiveness and destination of key crops.” The present “dearth of information”, however, hinders such planning.

Important policy initiatives undertaken recently by India’s government include a “Draft Export Policy” in 2018 that “mentions import of export-oriented germplasm”. A sticking point has been private sector reluctance to transfer technology “owing to lack of clarity” regarding IP product protection. It is thus proposed that the central government create a “matching fund for importing germplasm...from breeders across the world.”

As India’s northeast has potential for growing export-quality organic produce, the government has another initiative for setting up testing, quarantine and certification laboratories there to “promote and regulate informal trade via Myanmar en route to Southeast Asian nations.”

Other initiatives to be carried out include:

- Ensuring enforcement of IP/PVP rights, lack of which disincines seed firms to develop pulse varieties
- Creating efficient systems for germplasm and phytosanitary processing
- Establishing a Seed Growers Association
- Export incentives such as cheap concessional air freight
- Infrastructure upgrades, including cold storage, advanced seed processing units and digital technology in the field – all to reduce costs and improve quality
- Allowing states in some agro-economic zones (AEZs) to work exclusively with other countries on specialized production
- More bi- and multi-lateral trade agreements to facilitate free trade
- Greater investment in R&D, which today stands typically at 8-9 percent of sales turnover, via government co-investment and allowing the private sector to use government laboratories and lands
- Specific breeding programs for export-seed crop variety development

In sum, Mr. Bhupen is confident close integration of public and private sector resources can conduce to make India a force in world seed markets.
KOREA SEED EXPO 2019

2019. 10. 16. (Wed)~18. (Fri)
K-Seed Valley, Gimje, Korea

* K-Seed Valley is a R&D complex for plant breeding companies

1. New varieties evaluation in demonstration fields and greenhouses
2. Business programs for international seed trade
3. Various experience programs for everyone

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The National Seed Association of India (NSAI) organized its ninth flagship event, the Indian Seed Congress 2019, 11–12 March in the Telangana State city of Hyderabad, which APSA attended along with more than 500 NSAI members, representing some 75% of the Indian seed industry. International delegates from 16 countries also came to what is now a global event.

Of note were several keynote addresses from policy makers, industry leaders, researchers and techno-legal professionals.

NSAI President M. Prabhakar Rao in his address credited the industry’s positive growth to what he called a “healthy trend” of “farmers choosing quality seeds produced by the organized sector.”

He also emphasized the need for seed testing centers and for uniform regulatory provisions among India’s 29 states and seven union territories, saying that current regulation is not in harmony with central government legislation. Presence of an organized sector, the president explained, is beneficial to farmers as it enhances quality seed availability and reduces scope for illegal operators. Thus, regulatory bodies – such as the Department of Biotechnology and the Genetic Engineering Approval Committee (GEAC) – must adopt procedures in line with legislative provisions.

Some 130 seed testing and certification centers are in the country, but are not all linked.

Statistics support the NSAI president’s concern with regulatory and testing harmony: cost of registering new varieties in India, according to the World Bank’s Enabling the Business of Agriculture 2017 report, was relatively high at 98 percent of per capita income, placing India 20th among 21 countries listed, while scoring only 4.5 points on the bank’s 12-point Seed Quality Control Index – 19th among the 21 nations. Leaders Netherlands, Spain and Denmark all received 12.

In all categories, India placed 21st among 62 countries ranked — not bad, but both the government and private sectors are anxious to advance the country’s agricultural efficiency as practically all arable land is already under cultivation and expansion has slowed in recent decades. The answer to stimulating the sector, it is believed, will be found in exploiting new varieties and better market penetration.

Giving credit where credit is due, therefore, the NSAI cited the Telangana State Seed and Organic Certification Authority (TSSOCA) as a model in India for “strengthening the seed industry” through “national and international seed certification systems” and for creating seed certification awareness among industry workers, farmers and policy makers. The award certificate was issued on behalf of Telangana Agriculture Production Commissioner and Principal Secretary C. Parthasarathi by Union Agriculture Secretary Sanjay Agarwal.

Telangana State reportedly supplies more than 60% of India’s seed and has certified more than two million quintals (200,000 tonnes) of seed.

During ISC technical sessions, highlights included:

- Dr Pawel Wiatrak of Cytozyme Laboratories describing use of bio-stimulants and bio-inoculants in integrated crop management
- Dr Rajeev Varshney’s talk on how genome sequencing, genomics-assisted breeding and gene editing will dominate new innovation in the next decade

India’s Secretary of Agriculture Shri Sanjay Aggarwal and Joint Secretary (Seeds) Shri Ashwani Kumar addressed delegates on ISC’s last day.

Progressive government policies such as the Seed Development Act of 1988 and the National Seed Policy of 2002 have helped strengthen the Indian seed industry’s R&D, product development, supply chain management and quality
assurance. The industry is currently booming, with a mean compounded annual growth rate (CAGR) touching 12 percent. India is the world’s fifth largest seed market. Estimates of the Indian seed industry’s size, however, vary: from US$1.28 billion to US$3.6 billion, with annual growth rates from 6 - 7 percent to 17 percent. Indian MNC Advanta Seeds estimates the market in foreign trade at US$190 million. (see pp 13-14)

Moreover, it is now reported (via Hindu Business Online) that the Indian government is cooperating with industry representatives to improve seed traceability mechanisms. The NSAI, meanwhile, has requested reduction in fees for variety registration.

Active participation of public and private sectors has benefited the seed industry, notably, by promoting use of hybrid seeds among farmers who earlier used open pollinated varieties. IPR protection has also spurred development. According to one forecast by research firm Imarc Group, the Indian seed market is expected to grow at a CAGR of between 6 – 14.3% during 2018-2023 to more than US$8 billion.

Major growing regions are Uttar Pradesh, Madhya Pradesh, West Bengal, Rajasthan, Punjab, Maharashtra, Andhra Pradesh, Bihar and Karnataka. Populous Uttar Pradesh is the largest foodgrain producer with roughly 18% of total market share in 2014. Grain seed accounts for more than half of total seed production; vegetables about 20 percent. Other major seed types include oil and fruit.

The hybrid seed sector has grown 15 – 20 percent annually during the past decade, led by increased adoption of Bt cotton hybrids, single-cross corn hybrids, and hybrid vegetables owing to their disease and pest resistant properties, which reduce losses and cost of production.

In contradistinction to the world market, India’s seed market has resisted concentration: the top eight companies account for little more than 25% market share, the remainder split among many small domestic firms, though the latter are decreasing rapidly in number through acquisitions and mergers.

Learn more about the Indian seed industry and the NSAI Congress by visiting nsai.co.in
Access to Seeds Index ranked East-West Seed #1
in the 2019 Global Index and the Regional Index
for South and Southeast Asia
70th World Seed Congress in Nice, France
More than 1,700 international professionals and business leaders from 63 countries attended

Organized 3-5 June by the International Seed Federation (ISF) and the Union Française des Semenciers (UFS) this year’s Congress marks the 70th edition of the international seed meeting.

The first international gathering of seedsmen in London in 1924 resulted in the formation of FIS (Fédération Internationale du Commerce des Semences) and ISTA (International Seed Testing Association).

Since then, meetings have been organized in different locations around the world, initially by FIS and the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL – Association Internationale des Sélectionneurs pour la Protection des Obtentions Végétales), and finally by ISF, which was formed with the merging of FIS and ASSINSEL in 2002.

“The theme of this congress, ‘Where knowledge flows’, highlights the importance of international exchange and the sharing of knowledge, experiences and expertise to bring professionals to discuss the future of the industry,” said Eduard Fito, president of the International Seed Federation (ISF), organizer of the congress alongside the Union Française des Semenciers (UFS).

“France, one of the historical leaders in the seed industry, is a destination of choice for the ISF International Congress,” explains Michael Keller, General Secretary of ISF. The country has skills and recognized know-how, a public/private coordinated research, and a successful industry organization.

“France is the world’s leading exporter of seeds and the leading European producer,” says Franck Berger, president of UFS. “We are small and medium enterprises, family businesses, international companies, cooperatives, all directly linked with the farmers and all creators of a great diversity of species and varieties of seeds, which are the starting point of our food chain. Our diversity is a strength.”

According to the ISF, principal world seed exports comprise those for: cereals, turf, flowers, vegetables and oilseeds.

Key World Seed Trade Figures
• 4.4 million tonnes of seed exports, worth USD 11.4 billion (2016)
• Tens of thousands of seed varieties registered with UPOV internationally
• More than 15% of sales dedicated to R&D internationally
• 7,500 ISF member companies

This year’s WSC host, France, is the no. 1 European seed producer and no. 1 international exporter. The French seed industry produces more than one million tonnes annually and provides direct employment for 12,000.

Next year’s WSC will take place in Cape Town, South Africa.

For more on the World Seed Congress and international seed trade trends and data, visit www.worldseed.org
Asian Solanaceous Round Table III
the Sheraton Grand Bangalore at Brigade Gateway
22 – 25 October 2019

The program includes current updates, covering everything from breeding to market trends in Solanaceous crops.

The theme of the main sessions are as follows:
• The modern breeding technologies for diseases and pest resistance
• Quality traits and disease resistance
• Modern production technology
• Post-harvest technology (processing and value addition)
• Market trends
• Possible collaboration with research institutes

On 25 October 2019, the field visit is hosted by the Indian Institute of Horticultural Research, Bengaluru

Registration fee

• APSA member companies : 180 USD per person
• Non-member : 200 USD per person
• Government officials : 100 USD per person
• Students : 50 USD per person
• Booth Exhibitor : 75 USD per person
• Big booth (3m X 3m) : 500 USD
• Small booth (2m X 2m) : 300 USD

For more information, please contact Ms. Kunaporn Phuntunil (APSA Technical Coordination Manager) at kuna@apsaseed.org or visit www.apsaseed.org or Scan QR Code
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More than 1,200 seed industry representatives attended the 2019 China Seed Congress (CSC) 31 March through 1 April at the Beijing International Convention Center. This was the second annual CSC. Delegates included, among others, those from China, Pakistan, Tajikistan, the United States, Germany, Japan, France, the Netherlands and various seed industry organizations (including APSA).

Timeline of China’s Seed Industry and Regulatory Developments

1949: the People’s Republic of China is proclaimed. The Ministry of Agriculture (MOA) creates a seed management department, organizes seed science and breeder training. The ministry encourages agricultural production cooperatives with regard to selecting, producing, storing, planting and exchanging seed among farmers.

1964: China starts hybrid rice research.

1970: China discovers a commercially usable genetic tool for hybrid rice (male sterility in strains of wild rice, called the “Wild Abortive”).

1973: PTGMS rice is found in China. This refers to how male sterility is controlled by nuclear gene expression, the latter influenced by such environmental factors as temperature (TGMS), daylength (PGMS), or both (TPGMS).

1973: China, the largest producer and consumer of rice, develops three-line hybrid rice. Hybrids show a 15-20 percent yield advantage, giving higher return on investment and better food security.

1974: First commercial three-line rice hybrid, affording stable male sterility (and thus predictable hybrid vigor) via CMS, is released in China. Hybrid vigor, or Heterosis, is a universal phenomenon in which the F1 shows superiority to both parents in agronomic traits (or yield). Cytoplasmic genetic male sterility (CMS) is induced through interaction of genetic factors present in the cytoplasm and nucleus.

1978: China starts reform program and begins opening up. The seed industry develops fast. Public institutes do research and achieve great success. Seed production becomes more specialized, production base increases along with processing facilities. Seed quality standards improve, and planning develops a seed supply system.

1980: ChinaSeed Group Company transfers hybrid rice technology to a subsidiary of Occidental Petroleum Corporation.

1991: More than 50 percent of China’s rice is planted with hybrids.

1994: First commercial two-line rice hybrid is released in China, affording a simplified procedure for hybrid seed production with multiple and diverse germplasm available as parents, in which any line can be bred as female and there is increased chance of developing desirable heterotic hybrids with multiple cytoplasm sources as female parents.

China’s Vice Minister of Agriculture and Rural Affairs, Mr Zhang Yanqiu, Director of the Seed Management Division of the Ministry of Agriculture and Rural Affairs (MARA) and President of the China National Seed Association (CSA).

Presiding over the opening ceremony was Mr Zhang Yanqiu, Director of the Seed Management Division of the Ministry of Agriculture and Rural Affairs (MARA) and President of the China National Seed Association (CSA).

Throughout these years of step-by-step development, average yields increased year-on-year. The market value of China’s crop seed presently reaches over 30 percent of the state’s total agricultural output, and the crop seed industry has become the third largest agriculture product after grains and livestock.

In 2015, the total value of China’s seed industry reached an all-time high of 122.7 billion yuan. The seed industry business for US$1.1 billion and enters the top 10 seed producers. Private enterprises form partnerships.

It contributes greatly to the nation’s food security while benefiting farmers, consumers and the environment. China’s seed industry development has become a success story.

The Ministry of Agriculture, China's Seed Group Company enacts a revised seed law is promoted. Protections are put in place. More funds go to research, and innovation is encouraged. Coverage of UPOV’s 1978 Seed Protection Act reaches every province and city. New Variety Protection is improved. More than 50 approved varieties, more than 1,400 seed companies, more than 2,700 seed sellers are in operation.

China Seed Group Company transfers hybrid rice technology to a subsidiary of Occidental Petroleum Corporation.
Morning of the first day featured various speeches from representatives of Syngenta China, MARA and Sinochem; and ceremonies, including presentation of the “ten most outstanding persons in China’s seed industry”. This year’s theme centered on “New era, New mission, New seed industry, New journey”.

Other business included results of a “search for high-yield maize activity” and issuing certificates for enterprises that rated a “seed industry AAA Credit-Rating” in 2018, both by the CSA.

In the afternoon, ChemChina, Longping High-Tech, Anhui Win-All High-Tech, and SinoChem Agriculture gave presentations on the way forward; meanwhile Jeff Rowe, global head of Syngenta, talked about seed innovation and strategy.

The second day, 1st April, featured parallel or concurrent forums on Intellectual Property Rights, Field Crops, Corn Industrial Chain Cooperation, Economic Crops, the Potato Industry, Applied Seed Technology, Seed Industry Services and Support, Entrepreneurs, and International Cooperation.

Topics, in no particular order, included: “ten typical case-analyses of new variety plant protection” from MARA’s Development Center of Sciences and Technology; “tools and application of agricultural IP protection” from the PRC’s National Intellectual Property Administration; and “IP challenges and countermeasures” from Syngenta China, along with a dialogue on aspects of certification and registration — all in the IP Forum.

In the Field Crops Forum, Hu Peisong from China’s Rice

Throughout these years of step-by-step development, average yields increased year-on-year. The market value of China’s crop seed presently is about 120 billion yuan. China is the world’s second largest seed market. It contributes greatly to the nation’s food security while benefiting farmers, consumers and the environment.
Research Institute (CNRRI) spoke on “high quality rice breeding and industrialization in China”; Xiao Jinhua, chief scientist at Huazhi Rice High-Tech, explained current “progress and application of rice molecular design and breeding”; and Fang Fuping of the CNRRI looked at the “present global rice situation, and how the Chinese rice seed industry can go global”. Other talks centered on bioethanol, soybean, corn and wheat, and “application of molecular technology”.

During the International Cooperation Forum, with 150 in attendance, International Seed Federation (ISF) Secretary General Mr Michael Keller discussed global seed industry trends and his organization’s work. APSA Executive Director Dr Kanokwan Chodchoey offered her views on “development of the Asia-Pacific region’s seed industry”.

Some 70 presentations were given during the Congress, many with simultaneous English and Chinese translation.

Along with the technical sessions were 18 exhibitions from sponsors, CSA members and others.

Jointly organized by CSA, Sinochem Agriculture, China Chemical Agrochemical, Syngenta and Anhui Winall High-Tech Seed, the 2019 CSC was held under the auspices of the Chinese Academy of Agricultural Sciences, the National Agricultural Technology Extension Service Center, and the Science and Technology Development Center of the Ministry of Agriculture and Rural Affairs. Additional support was supplied by the southern rural newspaper Farmers’ Daily and the Agricultural Finance Treasure Book.

Representing APSA at the prestigious event were both Chinese members of the association’s 15-member Executive Committee (EC), Dr Yan Shuping and Mrs Zhu Xiaobo, along with APSA past presidents Dr Zhang Mengyu (one of only five Honorary Life Members) and Mr Wang Zhiping, past EC member Dr Ma Dehua, current Executive Director Dr Kanokwan Chodchoey and China Liaison Manager Mrs Li Xiaofeng.
Evolution Eyewitness

Leading Transformation of the Chinese Seed Industry

Mrs Ma Shuping, 63, is a Vice President of the China Seed Association (CSA). A former Deputy Director General of the Seed Management Bureau of the Ministry of Agriculture (Ministry of Agriculture and Rural Affairs now) of the People’s Republic of China, Mrs Ma has 41 years’ experience in agriculture and seed, and in that time has witnessed, experienced and participated in the evolution, reform and transformation of these industries. Here she reflects on her life and career as a prominent Chinese Woman In Seed.

“I was born in a village near Chifeng City, Inner Mongolia. In April, 1978 I enrolled at Shenyang Agricultural University to study agriculture, and by 1982, started my career, working in the Ministry of Agriculture.

In 2011, with the establishment of the Seed Management Bureau of the MOA, I was appointed as the Deputy Director General. During my time in the MOA, I participated in the planning, drafting and revision of several major changes in seed documents, laws and regulations. After retiring in December 2016, I joined the China Seed Association.

The Chinese seed industry has come a long way over the years. Just in the last six years, the industry has grown robustly, from a market value of ¥67 billion yuan (about $9.84 billion) to ¥123.9 billion yuan (about $18.19 billion). Since my time in charge of seeds, I have had the privilege of witnessing and being directly involved in several major developments.

First, I was involved in the planning, drafting and promulgation of State Council Document No. 8, titled “Opinions of the State Council on Speeding up the Development of Modern Crop Seed Industry”, which our drafting committee worked on for 14 months, during which it underwent thorough scrutiny through 34 drafts and 20 symposiums before finally being adopted by the State Council February 23, 2011. Document No. 8 paved the way for a strong and modern seed industry today, addressing many challenges and opportunities posed by the market economy environment. There are several key “firsts” or milestones in this document as follows:

1. It’s the first time the seed industry had been identified as a core industry. In the past, the seed industry had been considered as an ancillary industry.

2. It’s the first time enterprises had been considered as main players in the seed industry; in the past, it was scientific research institutes that were considered the main players.

3. Likewise it’s the first time enterprises were recognized as the primary drivers of innovation for commercial breeding, whereas it was stated that scientific research institutes should provide services to the industry in line with what enterprises require, and with funding support from the government.

4. And thus, it mandated that scientific research institutes were to gradually withdraw from commercial breeding activities and as companies.

Furthermore, I was involved in the drafting and revisions of the Seed Law. The Seed Law was introduced in 2000 and revised, starting in December 2012, when the National People’s Congress adopted a motion to formally begin revisions, a process which lasted three years. The revised law was finally promulgated in November 2015, I participated in the entire revision process as deputy head of the drafting group. More than ten drafts – 57% of the words of the original seed law were revised. Revisions cover the establishment of legal guarantees and safety mechanizations for seed production and food security; stronger emphasis on marketization, as well as the reduction of state supervision while emphasizing more self-responsibility. Essentially, the revised Seed Law legalizes policies from Document No. 8.

Moreover, I presided over the development of the National Medium- and Long-term Plan for the Protection and Utilization of Crop Seed Resources. This plan, issued in March 2015, is the first such document to give importance to germplasm resources in China. It summarizes past efforts in protection and utilization while putting forward five key actions: collection, identification, conservation, distribution and utilization as well as international exchanges. This plan will reap benefits far into the future.

Engaging in reform of the national seed industry at the policy level has been a challenging process, but has been a fulfilling experience that has provided a sense of achievement and self-worth. Not only has it been a benefit for China’s seed industry, but a major experience for me. Of course, none of it would have been possible without the support and dedication of all my team members, colleagues and associates over the years. I am forever grateful to them.

LIFE BALANCE

As a woman, sometimes you need to do more than men in terms of balancing family and work, and try to spend more time with your children at a critical time when they need to be with you.

My small family is very simple. My husband also has an agriculture background. Support is essential to keep a healthy relationship. My work has been very demanding. I often arrived home after 8pm, and always worked on weekends. Fortunately, my husband was very supportive. In retrospect, I paid little attention to my child. I remember just before the 2003 college entrance examination, SARS broke out in Beijing, and my son’s high school closed for two and a half months. I was too busy with work to take care of him and he was left home by himself. On the other hand, my son has adopted my strong work ethic now in his own careers.

Having a family shouldn’t be a restriction. Women should also have their own career, be independent, and have their own economic status. The difference between husband and wife should not be too wide, which is conducive to the harmony and stability of the family.

Other than for family, it’s important to have hobbies to maintain sanity. In my spare time, I like reading books, especially biographies and novels, and writing. Moreover, I like to do some housework.

Finally, it’s important for Women In Seed to realize why they chose this path. Working in the seed industry might not yield a high income, but it is very meaningful work – we pay more attention to vulnerable groups.

I hope our younger generation will cherish this opportunity and realize the value of it in their lives.”

– By Mrs Ma Shuping
Standards used globally by seed researchers, producers, technologists and traders are based on, or to some extent, influenced by the American system. To better understand the US regulatory environment, whether the aim is to import to, export from, or collaborate with the US, read on.

The following overview covers the US seed regulatory framework, including seed testing, and what embracing the “systems approach” means. We also look at tools available to protect intellectual property rights, and introduce relevant US seed laws and regulatory bodies.

**LAWS OF THE LAND**

Governing seed standards at the interstate level is the **Federal Seed Act.** Enacted in 1939, this fundamental legislation requires accurate labeling and regulations stipulating requirements for production, sale and distribution of seed within state boundaries.

**The US Plant Variety Protection (PVP) Act,** enacted in 1970 and amended in 1994 (to include potatoes and other tuber crops as well as **UPOV 91 provisions**), provides the basis for Intellectual Property Rights to breeders, developers and owners of plant varieties, affording them 20 years of exclusive control over new, distinct, uniform, and stable sexually-reproduced or tuber-propagated plant varieties. This has resulted in the current market dominance of such protected modern varieties.

A similar process will be available to asexually propagated plant varieties later this year.

“Our services create an incentive for development of new and improved varieties,” says Ruihong Guo, PhD, Deputy Administrator, Science & Technology Program, US Department of Agriculture. “New varieties, better suited for the environment and pest/disease control, promote agricultural production and food security for an increasing world population.”

Exceptions are provided for experimental use by third parties for plant breeding and new variety development, and allow farmers to save seed for limited propagation on their own holdings.

In order to apply for a **Plant Variety Patent,** the seed must not have been sold or advertised for sale for more than one year in the US prior to application. If seed has only been sold outside the US, typically application for a PVP must be filed within four years from the first sale outside the US.

Developers of new plant varieties may also pursue other forms of intellectual property rights protection in addition to – or instead of – a Plant Variety Patent. This includes **Utility Patents** filed with the US Patent and Trademark Office, and **trade secret protection.**

Several important national bodies are tasked with ensuring regulatory compliance:

**The Animal and Plant Health Inspection Service (APHIS),** which was authorized by the Federal Seed Act in conjunction with the **Plant Protection Act of 2000,** serves as the country’s National Plant Protection Office (NPPO) to regulate field crop, pasture, forage, or vegetable seed imports with the aim of preventing noxious weeds and other pests from becoming established in the US.

**The USDA Agricultural Marketing Service Seed and Regulatory Testing Division (SRTD)** enforces labeling, germination and purity standards at the federal level.
American Seed Trade Association (AOSA) has developed, especially in connection with the enforcement of labeling laws, standard analyses for testing to determine seed sample composition and the ability of seed to produce plants. This standard is used in all 50 states and by the SRTD: State, federal, and university laboratories from the US and Canada are members.

Reinforced by the strong US regulatory environment, the private sector plays a central role in developing American seed, especially with regard to intellectual property rights (IPR). Perhaps one of the strongest advantages of the American seed industry is the close collaboration between private and public sectors.

For this, much credit is due to multi-stakeholder trade organizations such as the American Seed Trade Association (AOSA) – one of the oldest seed trade associations in the world – as well as dedicated IPR knowledge and education platforms. (More details below)

**TESTING**

Hand-in-glove with AOSA is the Society of Commercial Seed Technologists (SCST), the organization of professionals who conduct seed testing in the US. SCST maintains certification programs for the seed lab industry, certifying Registered Seed Technologists (RST) and Certified Viability (CVT) & Purity Technologists (CPT), among others. Seed regulatory labs are generally required to employ at least one RST.

In 2001, SCST founded the Seed Testing Research Foundation (STRF) to support applied research, promote seed testing standardization and provide analysis to the seed industry. In addition to formal research, the STRF has a small-scale research program intended to improve or modify existing procedures – e.g.: introducing new types of germination media or determining optimum temperatures for germination – as the need for seed quality evaluation research grows in tandem with the seed industry’s many new methods of marketing seed.

Regulatory seed tests require product name, and percentages of pure seed, other crops’ seed, weed seed, and inert matter. Address, origin, lot number, test date, germination, treatment and other items deemed necessary by the state are also required. (This list is not exhaustive)

Labs test for seed count; detection of seed treatment, bulk examination for contaminants, tetrazolium viability, detection of fungal endoptyes, and seed moisture content.

Procedures include: AOSA’s Rules for Testing Seeds, covering domestic US and international seed movement; those of the International Seed Testing Association (ISTA) for international movement; of the Canadian M&P (Methods and Procedures for Testing), for seed shipped to Canada; of the National Seed Health System (NSHS), for phytosanitary testing; and of the Biotech Trait Providers, for trait testing.

**CERTIFICATION**

Though conventional certificates for seed health, quality and compliance with phytosanitary standards are still widely recognized in the US, the industry is evolving rapidly, as efforts to streamline and modernize testing, tracking and trade processes are gaining steam thanks to schemes that emphasize a systems approach.

One such initiative currently in its conceptual stage is ReFreSH, the anagram for APHIS’ Regulatory Framework for Seed Health, an integrated supply-chain accreditation scheme.

As IP-protected varieties undergo “extensive selection and years of plant breeding”, their testing is less subject to unanticipated variables, and that makes feasible the “systems approach” by which individual companies will be issued “clean-seed” passports, or phytosanitary certificates with an additional declaration that the seed was produced under a recognized systems approach, after accommodating their practices to the common ReFreSH framework.

Unlike conventional methods involving expensive, time-consuming lot-by-lot, sample-by-sample seed inspection, the ReFreSH framework essentially takes a science-based systems approach to work within the current seed trade model while leveraging universally acknowledged industry best practices. The goal is global adoption of the common seed trade framework so that companies with clean-seed documents can move seed among participating countries without phytosanitary certificates for each consignment.

To ensure that this does not
result in dangerously lax vigilance, ReFreSH certificates and accreditation will be necessary for each step in the production process. Practices will be audited and pests reported.

Accreditation standards include: documenting and evaluating production practices; evaluating current best management practices with regard to phytosanitary risk reduction; and identifying key risk management points in production and post-harvest processing. Companies will need to submit applications for accreditation based on APHIS-developed standards for production, post-harvest processing and storage.

Moreover, the framework is not carved in stone. It is developed via ReFreSH Workshops aimed at helping APHIS understand current industry practices and their effectiveness in reducing and managing phytosanitary risk.

The first APHIS-seed industry workshop was held 27 January, 2017. The range of workshops covers: pest management; post-harvest processing; quality management; risk evaluation; and available risk mitigation tools. APHIS expects thereby to identify any gaps in the approach, and emphasizes the importance of collaboration between regulators and industry so that information can be acquired regarding seed production practices, global production areas, typical movement patterns, pests of great concern and differences between small and large producers.

Rapid risk characterization for pests and crop species is facilitated by pathway analysis and pest-risk assessment of high-profile crops. The framework thus anticipates problems before they arise so that pests following the seed pathway can be prevented even before their presence is apparent. APHIS is conducting draft risk assessments for the systems approach with spinach, and melons, and is in continuous discussion with National Plant Protection Organizations (NPPOs) to establish a widely accepted global seed movement system – one that promotes the “managed risk approach” to accord with the International Plant Protection Convention’s (IPPC) International Standard for Phytosanitary Measures (ISPM) governing such movements. The latter also addresses the issue of harmonizing import requirements, and export or re-export procedures.

In April, the Commission of Phytosanitary Measures (CPM) agreed to develop a guidance document on the systems approach as an Annex to ISPM 38 – the standard on the International Movement of Seed.

"Today’s non-harmonized, country-by-country patchwork system of phytosanitary regulations creates unnecessary delays, added costs and duplicate testing requirements for seed importers and exporters,” says ASTA President & CEO Andy LaVigne. “We look forward to working with the Commission on Phytosanitary Measures to ensure a consistent and workable system for NPPOs around the globe.”

**IPR = INNOVATION**

The US is a leading global advocate for the protection of Intellectual Property Rights — arguably among the main drivers of profit and innovation.

According to the American Seed Trade Association (ASTA): “Investments in research and development by the seed industry are directly related to the effectiveness of intellectual property protection.” ASTA therefore actively promotes IPR abroad while noting that a variety of legal tools are available to developers and breeders within the US.

In addition to the international 1991 UPOV system and PVP Act, legal remedies include utility patents and trade secret protection. An important recent development is the biotech-focused AgAccord, which provides a predictable, transparent mechanism for addressing agricultural biotechnology patent expiry, and establishes a contractual framework to support those seeking use of off-patent events in the US while ensuring important off-patent global regulatory commitments are maintained.

US export of products containing these events are thereby not disrupted.


To increase seed industry awareness and understanding of IPR, ASTA created the Seed Innovation and Protection Alliance (SIPA) in 2014. The key purpose of the organization is to provide education to seed companies and grower organizations so that they can better use the intellectual property that is part of the research, development and distribution of seed.

In addition, SIPA works to educate seed companies about methods they can employ to facilitate enforcement of licensing agreements, trade secrets and contracts pertaining to production, marketing, distribution and sale of seed.

Other IPR resources are available through the US Patent and Trademark Office and the International Seed Federation.

Detailed information on points mentioned above, and many useful links, will be found at the ASTA Website: betterseed.org
Public Private Symbiosis

New, improved varieties revealed at APSA-WorldVeg Consortium Workshop

The Asia & Pacific Seed Association (APSA) and World Vegetable Center (WorldVeg) Vegetable Breeding Consortium held its third annual workshop 15 – 16 May at WorldVeg headquarters in Shanhua, Tainan. APSA Technical Coordinator Pot Phetlorian reports:

This year’s workshop was attended by 46 representatives of 34 companies from across Asia and the Pacific, including China, Japan, India, Indonesia, Pakistan, Sri Lanka, Chinese Taipei and Thailand.

The aim of the workshop is to demonstrate and introduce Consortium members to the latest disease- and pest-resistant lines of pepper, tomato and cucurbit being developed by WorldVeg breeding teams.

Not only does the Consortium offer members early and pre-market access to some of these lines, the annual workshop provides an exclusive opportunity for members to interact directly with WorldVeg breeders, scientists and staff.

Therefore, it facilitates a regional-scale feedback loop in which APSA member breeders and executives can share with WorldVeg breeders their ideas, challenges, successes and experience in the field and in the market. In addition to demonstrating new and promising varieties, discussions also focused on intellectual property rights – especially with regard to plant variety protection – and opportunities for future collaboration.

STRENGTH TO STRENGTH

This year’s increased enrollment and number of participants underlines the effectiveness of the Consortium in addressing the unique R&D needs of member companies. “This is the third edition of the annual workshop, and it has grown from strength to strength,” affirmed WorldVeg Director General Dr Marco Wopereis.

Dr Kanokwan Chodchoey added, “It is clear to everyone how much we have grown since 2016, and especially how important and valuable WorldVeg’s breeding program is to the seed industry and farmers.”

Following are highlights from this year’s Workshop, from both keynote presentations and the field tours:

On the morning of May 15, APSA’s Dr Kanokwan Chodchoey pointed out an opportunity for the seed industry in the region. She stressed that Asian farmers hold less land than their counterparts in other regions. Therefore, innovative breeding techniques and quality seeds are essential for improving yield.

Next, Dr Pepijn Schreinemachers presented on the use of WorldVeg germplasm by members of the Consortium in 2017 – 2018. Dr Roland Schafleitner then illustrated the Horizon 2020 G2P-SOL project, which is an EU-funded project aiming to set up a global inventory of Solanaceae genetic resources for mobilizing trait diversity for breeding.

A presentation on the recent finding of 2019 Preliminary Yield Trials (PYT) of tomato with the crimson gene showing promising fruit yield and disease resistance, was delivered by Dr Peter Hanson.
There were also updates on WorldVeg pepper and cucurbit breeding presented by Dr Derek Barchenger and Dr Narinder Dhillon, respectively.

Exclusively for this year, there were three proposals presented for potential workshop projects vying for funding. Only APSA-WorldVeg consortium members can join such collaborative projects. The first proposal was “Multi-location evaluation of chili lines carrying different combination of PVR and CVR genes for resistance to Chili veinal mottle virus (ChiVMV)”, presented by Dr Derek Barchenger. The second proposal, “Identification and introgression of insect resistance genes from close wild relatives into improved tropical tomato lines”, was presented by Dr Mohamed Rakha. The third proposal, presented by Dr Lawrence Kenyon, was for a project on “Chili leaf curl disease in Asia: Diversity and resistance”. On May 16, workshop participants visited field trials to inspect first hand the aforementioned lines among other promising vegetables in the breeding pipeline.

The first stop was a visit to the WorldVeg Demonstration Garden, introduced by Mandy Lin (Manager - Private Sector Relations). Participants then boarded a bus to visit tomato and pepper trials. At the pepper demonstration field, Derek Barchenger, Susan Lin and Vivian Wang showed participants the newly developed CMS (cytoplasmic male sterility) and GMS (genetic male sterility) Lines and selected hybrids.

At field #95, Peter Hanson, Grace Hsu and Shu-fen Lu showed the participants the new preliminary yield trials of WorldVeg tomato lines and hybrids. Yuan-li (Sophia) Chan demonstrated for participants the screening trial of pumpkin resistance to SLCuPV. Narinder Dhillon and Vicky Cheng introduced the trial of pumpkin lines with multiple virus resistance. Entomologists Paola Sotelo-Cardona, Mei-ying Lin and Srini Ramasamy were waiting in front of the stunning pink net house, where they demonstrated the effects of different light spectrums on yields of tomato and other crops.

On 17 May, some participants joined a field trip to interact with Taiwan, China seed industry – the first year the itinerary was offered. The group visited Known-You Seed Company as well as the Tainan District Agricultural Research and Extension Station (DARES) where local seed companies set up display booths for further interaction.

An open discussion forum was held at Tainan DARES and participants were warmly welcomed by Mr Jenn-Mao Wang, Chairman of the Taiwan Seed Trade Association; Dr Jung-Jui Cheng, Director of DARES; and Dr Wen-Chuan Chung, Deputy Director of the Taiwan Seed Improvement and Propagation Station.

Participants had an opportunity to exchange ideas and experiences with the local seed companies on breeding, disease resistance and climate change management.
After devastating agricultural economies in sub-Saharan Africa over the last three years, the voracious Fall Armyworm (Spodoptera frugiperda) has now spread through Yemen to India, Sri Lanka, Thailand, Myanmar, Bangladesh and China. Endemic to South America – where Brazil spends some US$600 million yearly to manage it – it has no natural predators elsewhere, and control has so far proved elusive.

Agricultural experts are reduced to advising desperate farmers to kill the caterpillar by hand one-by-one. Associated Press reported in March on how Kanchanaburi Province in western Thailand was circumstanced after discovery late last year and in January of the pest, which can affect over a hundred crops but thrives on maize.

An expert from Thailand’s Agriculture Department noted the Armyworms cause damage at all stages of the maize crop and “turn sweet corn cobs...into yellowish brown mush.” They pose a considerable economic threat to farmers, who see profits dissipate after applying costly but toxic pesticides with uncertain results.

The pest’s native range stretches from Argentina to northern Canada, according to season. There, its depredations are somewhat held in check by natural enemies, including predators, parasites, bacteria and viruses. These so far have been absent in Africa and Asia — where the worm conquers all while multiplying unchallenged.

Amid a “growing sense of alarm”, the United Nations’ Food and Agriculture Organization (FAO) held a Regional Conference on Fall Armyworm (FAW) in Bangkok 20 – 22 March, whereat it was noted that, though East Asia is mostly known for rice growing, maize is an important staple crop and crucial for poultry and livestock feed.

In Kanchanaburi, farmers have tried various ways of dealing with the pest: topping corn stalks and discarding affected cobs, causing the plant to sprout new ears; and spraying such biomaterials as fungi and thread worms – in hope they might prove Armyworm parasites.

Still, many lost about a third of their first baby corn harvest this year.

On taller plants, where holes in the stalks reveal how the pest works its way inside, drone aircraft were used to spray pesticides, said to be the only way small-scale farmers can get at the pests once they are established: they are often inaccessible to insecticides because they hide in the whorls and reproductive parts of the host plant.

The FAO's Marjon Fredrix, based in Bangkok, said her organization stresses taking early action and learning lessons from other regions while putting adequate management measures in place once an area is invaded. Adult moths spread with remarkable speed, flying more than 100 kilometers nightly — farther with a tailwind. Some have traveled 1,000 kilometers. The best-case scenario is in locating the pest early. The FAO has an app teaching the basics of finding and dealing with them by crushing egg masses and using biopesticides.

According to the FAO, chemical pesticides are an option but risk environmental and health damage as they affect non-targeted organisms, such as bees (and farmers). Moreover, resistance to many chemicals is apparent throughout the insects’ native range. Thus the agency offers little hope of eliminating them in their new habitats, saying that the Fall Armyworms are “here to stay” and can only be “managed in years to come”.

The insects have caused US$3 billion of damage or more in Africa thus far. In 2018 they arrived in Asia, feeding largely on maize, of which China is the world’s second-largest producer, but also on rice and sugar cane (for production of which Thailand is prominent), and on such key crops as sorghum, cotton, soybeans, groundnut, peanut, cowpea, potato, sweet potato, spinach, tomato, sweet peppers, tobacco, cabbage and various other vegetables — numbering nearly 100 cereal and non-ce real host species of plants in 27 families.

Although polyphagous — able to feed on many species — they prefer grass-based plants and eat pasture grasses, thereby affecting livestock production. Some researchers think as many as 350 species might be at risk.

The Fall Armyworms reached Karnataka in India during June
2018, hitting crops in more than ten states, and affecting 170,000 hectares of maize. Partly as a result, India removed the 60% duty on 500,000 tonnes of maize for import this year to make up the domestic shortfall as wholesale prices of maize are racing from 1,800 (US$26.00) in February towards a record high of 2,500 rupees (US$36.00) per 100 kg in May and perhaps 3,000 (US$43.00) later this year.

In late March, five months after the insect’s arrival, four of Bangladesh’s 64 districts were affected, and farm officials feared further spread with the onset of summer. At the FAO’s Bangkok meeting, it was reported that 20 percent of Sri Lanka’s crops were damaged and that the pest infested up to 40,000 hectares.

The pest was detected in China’s Yunnan province this past January, and in Guangxi by March. According to reports in June, the pest was reported to have likely already impacted 92,000 hectares of Chinese cropland, mostly maize, sugarcane and sorghum.

With China’s field crop sector, and thus food security facing imminent threat, the Ministry of Agriculture and Rural Affairs on June 3 announced the approval of 25 pesticides, instructing agricultural and rural departments of all localities to “select the recommended drugs according to the local conditions and recommend them to farmers.”

In Myanmar, US agricultural researchers conducted a two-day workshop with the Ministry of Agriculture, Livestock, and Irrigation to mitigate the Armyworm’s spread after its discovery in January by farmers in Zalun and Hinthada townships of Ayeyarwady Region. It is believed that maize farmers in Shan State — Myanmar’s largest maize producer — will likely be hardest hit.

In Bangladesh chemical pesticides were ruled out by the Bangladesh Agricultural Research Institute (BARI) for use against the pest, as they failed to contain its spread in Sri Lanka “where the FAW situation has taken a serious turn”, so biopesticides and pheromone traps are employed. 35,000 units of sex pheromones are being imported from China and the Netherlands.

Field pheromone traps lure males hungry to mate to places where farmers catch and kill them; they are also useful in early detection of infestations. The female Fall Armyworms produce between 50 – 200 eggs per batch, having up to 10 batches in a lifetime. In the caterpillar stage, the pests number up to a thousand-per-square meter as they travel from patch to patch — thus the name ‘Armyworm’.

**CONTROL MEASURES**

Aside from chemical pesticides and pheromone traps, recommended control methods include:

1) ‘Push-pull’ and other intercropping technology, whereby crops are grown alongside one another, with some acting as deterrents. This works to great extent when maize is inter-cropped with drought-tolerant greenleaf desmodium and encircled by Brachiaria, showing a reduction of 82.7% in the average number of larvae per plant and 86.7% in plant damage per plot according to data collected from over 250 African farmers. Intercropping maize with edible legumes can also result in up to 40% reduction in pest incidence.

2) Biocontrol involves release of natural enemies such as the parasitic wasps mentioned above, providing up to 70% control: these lay their eggs on or inside Fall Armyworm eggs or larvae.

3) Biopesticides are fungal, viral or bacterial in nature such as the fungi-like Metarhizium anisopliae or bacteria-based Bacillus thuringiensis used to
control Armyworms in the US and Brazil. 50 biopesticide active ingredients are registered in the Fall Armyworm’s native range and some African countries, with 23 active ingredients considered well worth studying and eight “that should be brought to market immediately.”

4) Botanical pesticides, which both deter and poison, preventing the caterpillar from feeding on the crop and interfering with its ability to grow.

Planting BT-maize is an alternative strategy but Fall Armyworm has evolved resistance to some Bt toxins so it is not always effective.

In Africa, since arriving via São Tomé and Príncipe in 2016, up to 18 million tonnes of maize in 44 countries are affected by the pest annually — almost half of the continent’s roughly 39-million-tonne annual harvest.

The FAO is collaborating with the Rockefeller Foundation-supported International Maize and Wheat Improvement Center (CIMMYT), the International Institute for Tropical Agriculture (IITA), the International Centre for Insect Physiology and Ecology (ICIPE) and the Centre for Agriculture and Bioscience International (CABI) to control the pest and thinks US$30 million annually for Fall Armyworm-related research is needed over the next five years. The program is supported by Belgium, Ireland, Japan and the United States.

Economic & Action Thresholds of Fall Armyworm Management

Dr BM Prasanna is the Director of Global Maize Program at the The International Maize and Wheat Improvement Center (CIMMYT) and also directs the Maize Research Program at the Consultative Group for International Agricultural Research (CGIAR). He recently presented on efforts to control the Fall Armyworm at the Indian Seed Congress. Following is an excerpt from his presentation about management of the pest in the maize seed industry and determining when it is necessary take action from an economic point of view:

Seed security is indeed the foundation for food security. With the onset of Fall Armyworm, several seed companies in both Africa and South Asia have been informally reporting significant damage to their maize seed production fields. If proper interventions are not taken by commercial maize seed producers, including contract growers, FAW can seriously impact the availability of quality seed to the farmers. This also can have serious impacts on regional and international trade. It is, therefore, essential for the seed companies to develop effective, coordinated, and flexible approaches to manage FAW within the endemic areas, especially in the hybrid maize seed production hubs in states such as Andhra Pradesh and Telangana. Such an approach should be informed by sound scientific evidence, built on past experiences combating FAW, and be adaptable across the agro-ecologies in which hybrid maize seed is produced.

Integrated Pest Management (IPM) components can be effectively implemented by smallholder farmers, commercial farmers as well as seed producers. However, it must be noted that the economic value of the maize crop produced on a commercial farm or in a hybrid maize seed production field could be much higher than the crop produced by smallholder farmers. Therefore, the concepts of Economic Threshold (ET) and the Economic Injury Level (Ell) (Huesing et al. 2009) become even more relevant in the hybrid maize seed industry context:

• Economic Threshold (ET): The density of a pest (or level of injury) at which control measures should be initiated to prevent an increasing pest population from reaching the Ell.

• Economic Injury Level (Ell): The smallest number of insects (or amount of injury) that will cause yield losses equal to the insect management costs. At the Ell, the cost of the control is equal to the economic loss resulting from the insect damage. The pest density or extent of crop damage at which a control treatment will provide an economic return.

Ell is calculated as follows: Ell = C/(V x DI x K), where C = Pest management costs; V = Market value of the commodity; DI = Yield loss per pest; and K = Pest population controlled. Thus, Ell is the break-even point between economic loss resulting from the pest and the cost of managing the pest, e.g., equipment, labor, and pesticide costs. Because economic conditions (e.g., commodity market value, management costs) fluctuate, the Ell will also fluctuate.

In practice, ETs and Ells have not yet been determined for most crops, including maize, in Africa or Asia. Instead, one may rely in the short term on Action Thresholds, which are calculated based on expert opinion and experience coupled with accurate field scouting assessments (Huesing et al. 2018). When pest populations reach the Action Thresholds, appropriate interventions must be taken.

For a commercial maize seed production field, besides rigorous monitoring and scouting from very early stages of crop growth (Huesing et al. 2018), wherever required, a combination of interventions, including environmentally safer systemic pesticides for seed treatment, coupled with foliar applications, cultural control, agronomic management, host plant resistance, and biological control have to be used to keep the pest populations below economically damaging levels.
A progressive tone was set on the opening day’s meeting of the Working Group of Integrated Vegetable Seed Companies (WIC), which was also attended by Chairs and Co-Chairs from APSA’s three Standing Committees (SCs) and four Special Interest Groups (SIGs). Discussion centered on Plant Breeding Innovation, Intellectual Property and Plant Varietal Protection initiatives in Asia, Codes of Conduct, Seed Trade challenges in Asia and Disease Resistance Terminology, among other topics. APSA activities from the APSA R&D Advisory Committee on Vegetables & Ornaments, SC Seed Technology, SC Trade & Marketing and APSA-World Vegetable Center Breeding Consortium were also addressed.

APSA President Tahir Saleemi welcomed the distinguished delegates in his opening speech and noted that through their contributions APSA is comprehensively involved not only in agribusiness, but in issues related to climate change, trade restrictions and food security. He also announced that APSA is now legally registered in Singapore.

On the second day, three parallel meetings were held: the Standing Committee on Intellectual Property Rights & Biodiversity (SC IPR&BIO); the Standing Committee on Trade&Marketing (SC T&M)/Phytosanitary Working Group; and the Special Interest Group on Vegetables & Ornaments (SIG V&O).

Meeting Summaries

Working Group of Integrated Vegetable Seed Companies (WIC):

1) Plant Breeding Innovation:

APSA Executive Director Dr. Kanokwan Chodchoey showed WIC members the finalized version of APSA’s Plant Breeding Innovation (PBI) video, available in Chinese, English and Japanese, as well as a poster available from the APSA Website. Both were approved.

2) APSA's Plant Breeding Innovation (PBI) Paper:

Members agreed developing a PBI Position Paper is of importance, the final draft of which will be shared with National Seed Associations. The ISF’s position paper will be used as a resource reference, and APSA’s paper will differ in having an Asian focus. A few WIC members were appointed to the drafting committee.

3) Intellectual Property/Plant Varietal Protection initiatives in Asia – Seed Innovation and Protection Initiative (SIPI):

Harry Singh represented the SIPI working group in presenting the background, objectives and structure of SIPI, conceived as an institution separate from APSA aimed at keeping the ‘business’ in ‘agribusiness’.

Among obstacles to be overcome, Mr. Singh explained, are the fact that, in the Asian region, only five percent of varieties are currently protected, and, as yet, no central place can store protected varieties’ data. These circumstances lead to the prevalence of plant variety infringement. SIPI’s knowledge-base, once in place, will provide a resource for tackling the issue of IP infringement while raising awareness and educating those still in the dark about how to deal with patented life-forms.

The SIPI sub-group proposed pilot programs in three countries: China, India and Thailand. They also agreed that SIPI will be separate from APSA. WIC members agreed to move forward on the SIPI proposal, to join the resulting institute. A draft proposal regarding SIPI including the membership structure and fee are tentatively scheduled for presentation during ASC 2019.

4) Code of Conduct Final Review:

Some amendments were made to the draft Code of Conduct (COC) for APSA WIC committee members. Dr Anthony Tse’s suggestion, that the definition of Plant Breeder Rights in the annex should be specific, was adopted. Three companies volunteered to have company lawyers review language and definitions. When complete, the COC will be presented and signed by WIC members in November 2019.

5) Workshop to Enhance IP Awareness Through Seed Multiplication Processes:

A workshop will be developed as a Train the Trainers program intended to empirically supplement the APSA WIC Code of Conduct (COC) while strengthening its implementation. The programs will include a number of curricula (e.g., plant breeder rights and technology transfer). WIC members who become contracting parties to the COC are expected to nominate delegates to attend programs. Participants from National Seed Associations (NSAs) are also welcome as they can transfer relevant information to their members.
6) APSA Educational Materials Review and Discussion:

The key messages for two posters and one video on IPR and plant variety registration proposed by the Standing Committee on Intellectual Property Rights and Biodiversity (SC IPR & BOD) will be revised by Dr. Mary Ann Sayoc and Dr. Arvind Kapur. These educational materials will be introduced at ASC 2019, the theme of which is Intellectual Property Rights Protection.

7) Seed Trade Challenges in Asia:

Robert Keene (a representative member of WIC from Enza Zaden, Malaysia) presented a talk on international seed trade challenges related to phytosanitary issues, discussing along the way the Systems Approach, ePhyto, the International Year of Plant Health 2020, new European plant health regulations and the ISHI & ISF regulated pest list. He explained that the Systems Approach aims to be one globally accepted system that will enhance existing pest risk management options to secure phytosanitary certification for international seed movements, while ePhyto is an electronic phytosanitary certificate – not a scanned phytosanitary certificate PDF or JPEG – that can cut through red-tape and avoid document errors. The New European Plant Health Regulations, he said, modernize the plant health regime, enhance protection of EU plants, ensure safe trade and mitigate the impact of climate change.

APSA’s Dr Kanokwan discussed regional phytosanitary activities, noting that the working group under the Asia and Pacific Plant Protection Commission (APPPC) of the Food and Agriculture Organization of the United Nations (FAO), Regional Office for Asia and the Pacific is developing a chili pepper Regional Standard for Phytosanitary Measures or RSPM – the first time that pepper is being investigated for the RSPM. To benefit the industrial sector, APSA and ISF have submitted comments on the first draft. After review, the working group has agreed to remove all “pathway-not-proven” diseases. The second draft is under review.

Dr Kanokwan announced APSA will host the 5th Phytosanitary Expert Consultation Meeting 28-29 August 2019 in Thailand, with NPPO officers from across the region, the agenda to include issues related to ISPM 38 among other topics.

8) Seed Technology Workshop Discussion:

Johan van Asbrouk (chair of APSA’s Standing Committee on Seed Technology) suggested, for the short-term, that the technical session on seed technology was not ideal since the audience mostly comprises executives of companies; thus the theme should focus on how technology can help companies earn more profit. WIC members agreed a separate session, specifically for seed technologists, should be held either in June or July. The program is under development and the WIC suggested that the training evaluation or recognition program for the trainees
should be considered to make the program more sustainable.

9) Breeding & Seed Production

Activities of R&D Advisory Committee on Vegetables & Ornamentals

Dr Naren K. Singh, chair of the R&D Advisory Committee on Vegetables & Ornamentals, talked about activities in 2019 and encouraged other WIC members to join R&D committee. Dr Singh also confirmed collaboration with the Indian Council of Agricultural Research (ICAR), and presented a proposal from Thailand’s National Center for Genetic Engineering and Biotechnology (BIOTEC) for an efficient inoculation protocol related to PBNV resistance screening in tomato (Indian strain), screening of tomato necrotic ringspot virus (TNRV) and CaCV-resistance sources in pepper germplasm.

The R&D committee received two proposals focused on tomato and pepper with several pest priorities identified: spodoptera, tuta, whitefly, thrips, aphids and caterpillars.

Dr Ben Vosman from Wageningen University proposed the topic of Spodoptera and/or tuta resistance in tomato for discussion; Dr Mohamed Rakha from the World Vegetable Center proposed development of improved tropically-adapted tomato lines with insect and disease resistance.

Disease Resistance Terminology – Covering Crops of Asian Origin

Dr Sumitra presented WIC members the completed list of Disease Resistance Terminology drafted by WIC members. On condition that the insect category be removed, WIC members approved the list. It will next be forwarded to the ISF’s Disease Resistance Terminology Working Group.

10) The Standing Committee

on Trade and Marketing:

John Mizicko, Co-Chair of the Standing Committee on Trade and Marketing, announced that two new members had joined the committee: Mr Hamzah Imran and Ms. Cindia Jia.

In other Midterm business:

During the SC IPR & BOD meeting on the second day Mr Casper van Kempen gave a summary of APSA’s PVP Forum in China (co-organized last October with CNSTA), and Ms Thelma Soriano informed members that CropLife China has issued guidelines on IP enforcement.

Dr Mary Ann Sayoc said that the 2018 ASC Workshop on Biodiversity was successful and participants were impressed by its useful information. On APSA’s IP Position Paper, the committee agreed APSA should make a survey on the IP position (e.g.: EDV, DNA markers and DUS) of each country through their NSAs and government officials.

The Phytosanitary Working Group, attached to the SC T&M, developed a tentative agenda for the 5th Phytosanitary Expert Consultation in August, which includes updates on ISPM 38 from NPPOs, ePhyto, the RSPM drafting paper on chilli and the Systems Approach concept.

In the SIG Vegetables & Ornamentals meeting, it was proposed that, as the WIC is quite popular among companies, membership be either expanded to 25 or that more outside observers be allowed in. Membership currently stands at 19 and is limited to 20. This issue, and other administrative points, will be addressed at the next WIC meeting.

WIC members will have a face-to-face meeting on 25 November during ASC 2019 in Kuala Lumpur, Malaysia.
### Q3/2019 Important Dates in APSA Region

<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting / Event / Occasion</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>24–27 June</td>
<td>Agrisrael 4.0</td>
<td>Tel Aviv, Israel</td>
</tr>
<tr>
<td>26 June–3 July</td>
<td>32nd ISTA Congress</td>
<td>Hyderabad, India</td>
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<tr>
<td>17 July</td>
<td>Buddhist Lent Begins</td>
<td>Buddhism</td>
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<tr>
<td>21–22 July</td>
<td>16th China (Kunming) Seed, Agriculture Means &amp; Machinery Expo</td>
<td>Kunming, China</td>
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<tr>
<td>1 Aug – 30 September</td>
<td>26th Asian Seed Congress Normal Registration Period</td>
<td>Global</td>
</tr>
<tr>
<td>9 August</td>
<td>National Day</td>
<td>Singapore</td>
</tr>
<tr>
<td>12 August</td>
<td>Eid al-Adha</td>
<td>Islam</td>
</tr>
<tr>
<td>15 August</td>
<td>Independence Day</td>
<td>India</td>
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<tr>
<td>15 August</td>
<td>Gwangbokjeol</td>
<td>South Korea</td>
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<tr>
<td>17 August</td>
<td>Independence Day</td>
<td>Indonesia</td>
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<tr>
<td>28–29 August</td>
<td>5th APSA Expert Consultation on Phytosanitary Measures in the Asia-Pacific</td>
<td>Bangkok, Thailand</td>
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<td>31 August</td>
<td>Hari Merdeka</td>
<td>Malaysia</td>
</tr>
<tr>
<td>9 September</td>
<td>National Day</td>
<td>North Korea</td>
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<tr>
<td>13–14 September</td>
<td>Thailand International Seed Trade expo</td>
<td>Bangkok, Thailand</td>
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<tr>
<td>23 September</td>
<td>National Day</td>
<td>Saudi Arabia</td>
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Quarter (1/4) Page

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