Asian-Pacifi Weed Science Society

NEWS LETTER

June 2016 **Issue 1 Volume 6:**

Editor-in-Chief

Dr Bhagirath S. Chauhan
Queensland Alliance for Agriculture and Food Innovation (QAAFI)
The University of Queensland
Gatton/Toowoomba, Queensland, Australia
b.chauhan@uq.edu.au

From the editor

Dear APWSS colleagues,

I was appointed as Editor-in-Chief of the APWSS newsletter during the 25th APWSS conference held in India, October 2015. This newsletter was delayed due to some prior commitments. We are planning to publish the newsletter twice a year. Three volunteers from different countries have come forward and I would like to personally thank them (shown below). They will compile reports from their respective countries and send to us. Contributors from Bangladesh, India, and Pakistan should submit their reports to them. I am also looking for volunteers from other countries. Mr Arslan Masood Peerzada, a PhD scholar in my group, has also agreed to help me in compiling this newsletter in the future. Contributors from other countries should submit their reports to Arslan (arsalpirzada@gmail.com) and copy to me (b.chauhan@uq.edu.au). The next newsletter will be published in December 2016, so please submit your contributions by 15th November 2016.

Country & contact details

Bangladesh - Dr Sharif Ahmed
Specialist-Agricultural Research and Development
International Rice Research Institute
Email: s.ahmed@irri.org

India - Dr Disha Jaggi
Senior Research Fellow
Plant Physiology
Directorate of Weed Research
Jabalpur
Email: disha.jaggi@gmail.com

Pakistan - Dr Hafiz Haider Ali
Assistant Professor
University College of Agriculture
University of Sargodha, Sargodha, Punjab
Email: haider3993@gmail.com

Many thanks to all contributors.
Enjoy the read!
Bhagirath Chauhan

Message from Dr. Hiroshi Matsumoto, the President APWSS

I was elected as the president of APWSS at the last meeting in Hyderabad, India. I appreciate very much for your understanding and continued support on the activities of APWSS. Weed control in cultivated area is an essential for adequate food production, but in recent years, the problem of the weeds seems to become more serious.

Weed science is a comprehensive research area that covers weed ecology, weed biology and chemistry related to weed management. Currently, Weed science is an advanced science that is closely linked to human societies. Information sharing and collaborated research between weed scientists of the Asia-Pacific region become more and more important. We should use interdisciplinary and multifaceted approach to address current and future weed problems and their management. I desire that APWSS can function as a core of the researcher's community of Asian-Pacific region.

I am a chairperson of organizing committee of the 26th APWSS Conference that is to be held on September 19-22, 2017 in Kyoto, Japan. The website of 26th APWSS Conference was already initiated. Kyoto is the ancient capital of Japan and is recognized worldwide as the country's historical, cultural and spiritual heart. The city offers you numerous cultural and unique experiences with its countless shrines, temples, and architectural masterpieces including 17 UNESCO World Cultural Heritage Sites. Actually, Kyoto has taken top place in Time Inc.'s Travel + Leisure's annual World's Best List for the second year in a row (2014 and 2015). As you may know, APWSS was founded in 1967. Hence, the 26th APWSS Conference to be held in 2017 is 50th anniversary commemorative one. I encourage all of you to participate in the 26th APWSS Conference to be held on September 19-22, 2017 in Kyoto, Japan.

Hiroshi Matsumoto
President, APWSS
Professor
Executive Officer, University of Tsukuba
Provost, Faculty of Life and Environmental Sciences
Tsukuba, Ibaraki 305-8572
Japan

FOPS resistance in Avena ludoviciana- first case from India

Samunder Singh, CCS HAU Hisar

A population of Avena ludoviciana Dur. (wild oat) was reported resistant to clodinafop in wheat in a farmer's field in Siswal village of Hisar district (Haryana), India. The farmer started using clodinafop in 2000 after its recommendation in 1999, till it failed to control Avena population during the winter season of 2012-13. Clodinafop was used continuously exept one year rotation with sulfosulfuron after five years of clodinafop. Initially, the farmer used lower rates (50%) for five years with satisfactory control, then resorted to full rate and finally two applications of clodinafop followed by fenoxaprop during 2012-13 was a perfect recipe for clodinafop resistance. Wild oat seed collected from the highly infested field in April 2014 were used for resistance evaluation during the winter seasons of 2014-15 and 2015-16 with different PRE and POE herbicides in the pots in a screen house at Chaudhary Charan Singh Haryana Agricultural Univesity, Hisar, along with in situ field trials using PRE and POE herbicides. During the winter season of 2014-15, the farmer was advised to rotate clodinafop with pinoxadane, which he applied in two fields, but in another one still used clodinafop tank mixed with isoproturon (a PSII inhibitor) and lost 75% crop yield from the clodinafop mixture.

The putative resistant (R) population exhibited resistance to clodinafop and fenoxaprop in the pot study during both the years. Clodinafop failed to control the R population in the infested field during 2015-16 further confirmed its resistance. The clodinafop treated wild population, was later controlled by 2X rate (growth stage) of pinoxaden. The resistance has also spread to adjoing areas under the cotton-wheat rotation sequence and will be a big challenge in the future.

Heavy infestation of uncontrolled Avena ludoviciana from clodinafop (60 g/ha) followed by fenoxaprop 100 g/ha at farmer's field on 9th April 2014.

Wild oat from Siswal, Hisar, treated with pendimethalin 1.5 kg/ha (top row), Platform 385 (pendimethalin+metribuzin) 1.5 kg/ha (Middle row) and untreated plants (bottom row), 3 WAT on December 15, 2014 (Top); Check, pinoxaden 50 g, clodinafop 60 g, fenoxaprop 100 g & sulfosulfuron 25 g/ha 3 WAT, January 5, 2015 (Bottom)

Wild oat from Siswal (Top) and Hisar (Bottom), Check, clodinafop 60 g, fenoxaprop 100 g pinoxaden 50 g, sulfosulfuron 25 g, meso+iodosulfuron (Ready mix), 14.4 g, fenoxaprop+metribuzin (RM) 275 g, metribuzin 175 g and pendimethalin+metribuzin (RM) 1500 g 50 DAT, Feb. 4, 2015

Clodinafop uncontrolled Avena (L) 40 DAT followed by pinoxaden 2X on Jan. 29, 2016, 30 DAT (Inset) and good control of Avena, by pinoxden 50 g/ha (RHS of main photo, 40 DAT)

Cotton farmers in Punjab are advised to control weeds for effective management of whitefly

Dr A.N. Rao,
anraojaya1@gmail.com

Punjab has nearly 1.2 million acres under cotton this year and almost all of it is Bt cotton, which is resistant to some major pests such as bollworm. Recently, whiteflies have regularly attacked cotton plants. Despite intensive insecticide spraying, the whitefly (Bemisia tabaci) attack continue to be a major threat to cotton in Punjab. In Bathinda district of Punjab, where the cotton is a major kharif crop contributing to the district economic development and whitefly menace is a serious problem. One of the components of integrated insect pest management is the removal and destruction of alternate weed hosts like from the fields and neighboring areas and maintaining field sanitation. Thus to save the cotton crop from the attack of white fly, the Bathinda district administration has taken up the campaign of weeds removal in the district under the guidance of Deputy Commissioner Dr. Basant Garg. As a part of it, around 15 weeds were identified as the hosts of white fly on which whitefly thrives. Some of those weed hosts include: dhatura (Datura stramonium L.), dodhak (Euphorbia hirta L.), milk weed (Asclepias eriocarpa Benth), bathua (Chenopodium album L), kanghi weed (Abutilon indicum (L.) SWEET), cholai (Amaranthus spinosus L.), and the congress grass (Parthenium hysterophorus L), which is considered as the most dangerous of all. The government officials of Bathinda district are campaigning for the destruction of these alternate host weeds prior to the sowing of the cotton crop in Bathinda district of Punjab. The PWD, Mandi Board and highways department are advised to arrange for removal of weeds from the roadside, while the irrigation and drainage department and forest department officials were directed to for ensuring weeds removal from the canals sides and drains. The officials are asked to ensure destruction of the congress grass in and around the villages. Officials were advised to use the MGNREGA program for required labour and to take the help of pancyhayats and farmers for the removal of the congress grass and other weeds. The agriculture officers were advised to hold awareness camps in the villages for creating awareness among farmers and residents of respective villages.

The other states of India, where cotton is an important crop and where whitefly menace is increasing, efforts must be enhanced for identifying the alternate hosts and managing them by creating awareness among farmers the importance of managing alternate weed hosts as component of integrated insect pest management.

(Source: various sources including: personal communications and http://www.tribuneindia.com/news/cities/bathinda/admn-removes-weeds-to-save-cotton-crop-in-district/203370.html; http://www.tribuneindia.com/news/bathinda/cotton-farmers-told-to-remove-weeds-to-tackle-whitefly/209751.html)

Goldenberry (Physalis peruviana L.): A wonder fruit to alleviate malnutrition

Disha Jaggi, Saurabh Pagare and Bhumesh Kumar*
Directorate of Weed Research, Jabalpur, M.P. - 482 004 INDIA
*Corresponding author: kumarbhumesh@yahoo.com

Genus Physalis belongs to “Solanacae” family and represents more than 120 species globally, out of which six are distributed in different geographical regions of India. Physalis have been introduced as exotic weeds in India. Physalis peruviana L. commonly known as “goldenberry” or “rasbhari” have many significant nutritional properties that make this plant more valuable with respect to mineral and vitamins deficiencies. More than 30 different biotypes of P. peruviana were collected throughout the country and studied at the Directorate of Weed Research, Jabalpur, M.P., India for their morpho-physiological, nutritional, and molecular portrayal. Out of 30, few biotypes were selected on the basis of superiority of plant type, fruit taste, colour, size and yield.

Physalis is an erect subtropical plant of herbaceous nature that grows up to the height 0.8-2.0 m. Leaves are ovate across all the biotypes. A normal flower shows five large purple spots near the base of yellow petals, encase male (anthers) and female (ovary) reproductive organs. A vast variation among the flowers and reproductive organs (multiple patches and multiple anthers/ovaries, 5-10) was seen during the study of different biotypes (Figure 1). Ovary is bilocular and exhibit axile placentation. Fruit is globose berry, orange, ovoid or oblong in shape, juicy having diameter 2.0 to 3.5 cm. Its inflated calyx or fruit basket make the fruit more attractive and defends from being attacked by insects, birds, diseases, and harsh climatic conditions. A single plant of Physalis can give 1-1.5 kg of fruit yield and produce up to 350-380 seeds/fruit. Orange colour of fruits denotes presence of β-carotene which is a precursor of vitamin "A".

Nutritional analysis of Physalis fruit revealed that fruits of this species are rich in, minerals like calcium (Ca), iron (Fe), zinc (Zn), sodium (Na), potassium (K), phosphorus (P), manganese (Mn), magnesium (Mg), sulphur (S), and other nutrients like dietary fibre and β-carotene. However, β-carotene concentration is temperature sensitive and varies climatically. Conclusively, the fruit is rich in many beneficial compounds and highly valued for its unique flavour, taste, texture and colour. The fruit has also been reported for its immense therapeutic potential such as antibacterial, antiseptic, anticancer, etc. Unfortunately these medicinal properties have not been used potentially. Few of the countries have been incorporated this species in their cropping system to fight with malnutrition in their native population. However, in India, this weed has not achieved that much attention due to negligence and unexplored properties of this wonder fruit. This broad investigation of P. peruviana in special context to its nutritional quality is a purposeful effort to advance its utilization and domestication in mitigating vitamin "A" deficiencies. Domestication of such wild, nutritiously rich, environmentally adapted, and locally accessible natural products alongside the intriguing ones will go far to battle with malnutrition and will guarantee dietary assorted qualities that are closely correlated to family nourishment security.

flower

Different reproductive organs and fruits of Physalis peruviana

T. S. of Anther

T. S. of Ovary

Fruits with Calyx

Mature Fruits

Abrasive weeding, or "weed blasting," another weed management tool for organic farming

Dr. A.N. Rao, email: anraojaya1@gmail.com

In abrasive weeding, weed seedlings are blasted with tiny fragments of organic grit, using an air compressor. The stems and leaves of weed seedlings are severely damaged by the force of the abrasive grit applied at right plant growth of the weeds. It has the potentiality of reducing the use of tillage and hand weeding in organic agriculture. A two-year field study was conducted at the University of Illinois in organic tomato (Solanum lycopersicum L.) and pepper (Capsicum annuum L.) cropping systems by Dr. Samuel Wortman. Granulated walnuts shells and maize cobs, greens and fertilizer, and soybean meal, were used as abrasive-grits. Abrasive-grits were applied using compressed air between one and four times within planting holes of plastic mulch. The study revealed that: a) Weed density was reduced by 63% and 80% in tomato and pepper, respectively, with two applications of abrasive grits, regardless of grit type; b) Broadleaved weeds were found more susceptible than grass weeds, to abrasive-weeding; c) Abrasive-weeding in conjunction with plastic mulch reduced final weed biomass by 69–97% compared with the weedy control, regardless of grit type or application frequency; d) an increase in yield of 44% and 33% of tomato and pepper, respectively, was observed with abrasive weeding treatment, despite minor stem and leaf tissue damage after applications.

Such innovative approaches may be tested in India and other Asian-Pacific region also as a component of integrated weed management in different crops and cropping systems. Further details of the study can be obtained from: Sam E. Wortman. 2015. Air-propelled abrasive grits reduce weed abundance and increase yields in organic vegetable production. Crop Protection. 77, 157–162.

A weed that is troubling a part of Australia

Dr. A.N. Rao, anraojaya1@gmail.com

Residents of a rural Australian city - Wangaratta in north-east Victoria - are frustrated by a fast-growing tumbleweed called hairy panic (Panicum effusum R.Br) that is piling up outside their houses, covering lawns and blocking doors and windows.

Hairy panic is piling up outside several homes in Wangaratta – at times reportedly reaching roof height – forcing residents to clear it several times a day. The residences on Bella Way, a new development hard against the fringe of farmland, have been particularly affected, with the grass blowing over from neighbouring fields. Outbreaks of the weed take place across the country every year but Wangaratta has been hit particularly badly this year because of dry conditions. The authorities say they have limited powers to do anything about the problem.

Panicum effusum, commonly known as hairy panic, is a grass native to the inland of Australia and iIt occurs in every mainland state in Australia. It's called "hairy" because while there are a number of other Panicum species, none have long hairs along the edges of their leaves. Hairy panic is a short-lived perennial native to inland Australia. It grows rapidly and can form tumbleweeds which are dead grass with seeds inside designed to disperse them for reproduction. It can cause a potentially fatal condition called "yellow big head" in sheep if eaten in large quantities

Panicum effusum R.Br (Sources: http://www.bbc.com/news/world-australia-35600546; http://edition.cnn.com/2016/02/17/asia/australia-hairy-panic-grass/)

Sustainable rice production in Asia by improved management of weedy rice

Dr R. Busi, Dr B.S. Chauhan, Prof. S. Powles

Rice is the world's most important food source, with 90% grown and consumed in Asia. In Asia, food security depends on sustainable rice supply and significant among the challenges to rice production are the increasing spread of weedy rice. From a global perspective, the increasing adoption of direct-seeded rice (DSR) has resulted in greater use of herbicides for weed control, often leading to an increase in weedy rice infestations and selection of herbicide-resistant weeds. The adoption of DSR, replacing transplanted rice, has increased significantly in most Asian countries during the last two decades because of water and labour shortages. Currently in the Philippines, DSR occurs on approximately 35% of the rice-cultivated area, whereas in some areas of Vietnam, DSR reaches 90%. In Vietnam, weedy rice and the evolution of herbicide-resistant weeds are major problems facing rice farmers.

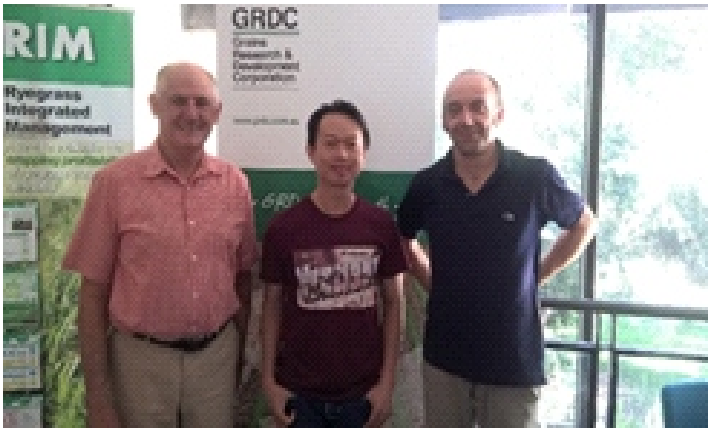
The Australian Centre for International Agricultural Research (ACIAR) has funded in 2015/16 a one year research project to foster collaborative efforts between Australian research institutions (The University of Western Australia, UWA and the University of Queensland, UQ), allow training of a young talented researcher from a target country to be trained at a leading Australian University through support of the Crawford Fund and synergize with previous Australian investments, including the development of conservation farming methods for rice. The research aimed to:

1) Establish the extent of the weedy rice problem weeds in relevant rice systems, quantify levels of rice crop seed contamination and determine the constraints to adoption by farmers of mitigating practices (data elaboration currently under way).
2) Design and assess novel technologies for weedy rice control in rice crops (a research paper titled “An innovative method to manage weedy rice in global rice crops” is in preparation to be submitted to a relevant peer-reviewed journal).
3) Survey the expert opinion of Asian scientists to capture their views on: future socio-economic trends, extent of rice weed issues and evolution of rice systems (Satellite Symposium at the XXV APWSS Conference, Hyderabad, India, 13 - 16th October, 2015)

Dr Nghia Nguyen from Cantho University, Vietnam, was identified as a young research leader and invited to participate in a 2-month training period at the Australian Herbicide Resistance Initiative at UWA under the supervision of Dr Roberto Busi and Professor Stephen Powles.

Dr Nghia is currently the Vietnamese research coordinator in this joint research endeavour between UWA, UQ, Cantho University (Vietnam), and PhilRice (Philippines) funded by ACIAR (CIM project 2015/010) focused on the control of weedy rice in South East Asia. The Crawford fund provided a scholarship to allow training of Dr Nghia and such an improved knowledge should help Dr Nghia, via extension centres in the Mekong Delta, to raise awareness in rice farmers and local agronomists in Vietnam of the damaging effects of weedy rice, the threat of herbicide resistance in rice weeds and illustrate possible future options for effective weed control in rice.

The training undertaken at UWA allowed Dr Nghia to build up fundamental knowledge in weed science research principles which will provide common ground to foster future possible collaborations between UWA and Cantho University (i.e., 5-year ACIAR projects) focused on sustainable rice production systems in Asia, novel technologies for weedy rice and weed control and integrated management strategies.



Prof. S Powles, Dr N Nguyen, and Dr R Busi at the University of Western Australia

Weed management strategies for dry-seeded rice in Bangladesh

Sharif Ahmed

Rice production plays a vital role in the food security and livelihoods of the people of Bangladesh; however, the sustainability of commonly practiced puddled transplanted rice (PTR) is threatened by increasing costs of production (labour and inputs) and declining groundwater levels in major rice producing areas. Replacement of puddling and transplanting with dry seeding of rice (DSR) into non-puddled soil has the potential to facilitate timely establishment and reducing establishment costs. Results from different countries have shown that weeds are the major constraints to the success of DSR and it is also true for Bangladesh (Ahmed and Chauhan, 2014; Ahmed et al., 2014). Potential yield loss due to weeds (season-long) in DSR is up to 93% in Nepal (Ranjit, 2007), more than 80% in Pakistan (Khaliq et al., 2012a), more than 70% in the Philippines (Chauhan and Opeña, 2012), more than 63% in India (Singh et al., 2006), and more than 85% in

Bangladesh (Ahmed and Chauhan, 2014). Therefore, appropriate weed management strategies is important to the success of DSR. On-station studies in DSR in Bangladesh shown that weed problem could be minimized and equivalent yield to PTR is possible if it is manage using integrated approaches (e.g., pre-emergence followed by post-emergence herbicides followed by one hand weeding with 40-60 kg seed rate ha-1 and 160-180 kg N ha-1). Large scale adoption of DSR to the farmers are required in Bangladesh, however, effective weed management strategies for DSR are not yet available to farmers. Government programs to promote sustainable weed management strategies for DSR systems are needed; this should include on-farm trials, training to resource persons and farmers.

Weed management in conservation agriculture
Prof Deirdre Lemerle

Conservation agriculture (CA), incorporating crop residues and reduced or no-tillage has benefits and costs, including, increased groundcover, soil conservation and productivity, lower energy and labour costs, and improved sowing time. CA is dependent on herbicides for weed control leading to herbicide resistance, changes in weed species and dynamics, and reduced herbicide performance.

Weeds have a major impact on global agriculture and food security through reduced production and high control costs. New knowledge is urgently required to ensure durable and safe herbicide use, and the development of cost-effective non-chemical (cultural and physical) options and the integration of these with herbicide use. There is considerable concern worldwide about the lack of new modes of action entering the marketplace to replace herbicides as resistance spreads.

In Australia, CA has been practiced since the 1980s and herbicide resistance is widespread. Herbicides are simple and cost-effective and it is not until farmers 'hit the wall' with resistance that they consider alternative non-chemical options. Leading farmers now are managing resistance and reducing weed seedbanks with diverse crop/pasture rotations that provide more control options.

A symposium 'Weed management in conservation agriculture' was held as part of the 25th Asian-Pacific Weed Science Society Conference in Hyderabad, India 13-16 October 2015. The Symposium saw invited presenters discuss the opportunities and challenges facing weed management in CA as agricultural production intensifies in the Asian-Pacific region, by integrating 'lessons learnt' in Australia with traditional practices used in other areas.

In contrast, many smallholder farmers in south Asia still practice aggressive tillage with traditional weed control. Low adoption of CA in these areas is due to lack of knowledge, system complexity, lack of suitable planting equipment, and limited access to herbicides. Recently, rapid increases in herbicide usage due to rising labour costs, is leading to risks of environmental pollution, human and animal safety, and development of herbicide resistance.

As community and political pressures increase for food security, environmental protection and adaption to climate change, government incentives for farmers to adopt CA will increase. Farmers require reliable information on the benefits and costs of weed control technologies. As complex biophysical and socio-economic factors influence adoption, this is more likely if practices lead to systems that are flexible, profitable, and reduce risk.

A symposium 'Weed management in conservation agriculture' was held as part of the 25th Asian-Pacific Weed Science Society Conference in Hyderabad, India 13-16 October 2015. At the symposium, six invited presenters discussed the opportunities and challenges facing weed management in CA as agricultural production intensifies in the Asian-Pacific region, by integrating 'lessons learnt' in Australia with traditional practices used in other areas. Collaboration, effective communication and sufficient funding will facilitate this process.

Thank you to the Australian Centre for International Agricultural Research for providing funds to support travel to the Conference.

If people are interested in being involved in a steering committee 'Weeds in Conservation Agriculture Context please contact Professor Deirdre Lemerle dlemerle@csu.edu.au

The proceedings of APWSS conferences are available on APWSS web site

Dr. A.N. Rao, Secretary, APWSS. Email: anraojaya1@gmail.com

The APWSS has initiated efforts to place the Proceedings of the conferences of APWSS held so far in different countries across different years, since its inception in 1967. This effort is being made with an objective of making available to the younger weed scientists, the research efforts made by scientists of Asian-Pacific Region and presented in APWSS conferences across years. Now on the APWSS web site, proceedings of APWSS conferences 1st; 3rd (Vol1); 4th (Vol 1,2,3); 5th (Vol1); 6th (Vol 1,2); 8th (Vol 1,2); 9th (Part 1 and 2); 14th (Vol 1,2); 15th [Vol 1 (Part 1), Vol 1 (Part 2), Vol 2]; 17th (Vol 1,2); 20th (Part 1,2,3); 21st (Vol I); 22nd (Abstracts, Vol 1,2,3); 23rd (Vol 1 and II); 24th (Vol I); 25th (APWS Societies, Souvenir, Vol 2, 3) are available. The weed scientists across the world may read and enjoy the knowledge of weed science accumulated across years.

APWSS wishes to thank: Dr. Hiroshi Matsumoto; Prof. Tohru Tominaga; Dr. Yoshiharu Fujii; Dr. Anis Rahman; Dr. James Trevor; Dr. Rachel Melland; Dr. Steve W. Adkins; Dr. Gul Hasan; Dr. Aurora Baltazar; Dr. A.R. Sharma; Dr. N.T. Yaduraju; Dr. P.J. Mody; Dr. M.T. Sanjay; Mr. Kiran; the Weed Science Society of Pakistan; the Weed Science Society of Japan; the Council of Australasian Weed Societies Inc.; the New Zealand Plant Protection Society; and the Indian Society of Weed Science, who helped in this effort.

APWSS is making efforts to place on APWSS web site, the proceedings of rest of the APWSS conferences also. An open appeal is made along with this news item for the help from all in this respect. If you have PDFs of the proceedings of rest of the APWSS conferences, please send them to: anraojaya1@gmail.com. They will be uploaded on APWSS web site with due acknowledgement.

New additions to APWSS membership

Dr A.N. Rao, Secretary General, APWSS; anraojaya1@gmail.com

The following additions occurred in the membership of APWSS, since November 2015 to to-date.

I. Affiliated Weed Science Society:

Council of Australasian Weed Societies Inc

The Council of Australasian Weed Societies (CAWS) is an independent body that brings together weed managers, researchers, volunteers and policy makers, and can express national and regional views on all issues relating to weeds and their management within Australia and New Zealand. The Council is composed of delegates from Australian State Societies and the Plant Protection Society of New Zealand that have weed management as their major focus. Web-site: www.caws.org.au

II. Life members:

1. Dr. R. Charudattan, President & CEO, BioProdex, Inc., Emeritus Professor, Plant Pathology, Univ. Florida; 3131 NW 13th Street, #54; Gainesville, FL 32609-2183

2. Dr. Askif Pasaribu, Crop Protection TD Lead; Monsanto Asia Pacific, Indonesia

3. Dr. Bhagirath Singh Chauhan, Principal Research Fellow and Weed Team Leader, The University of Queensland, Queensland Alliance for Agriculture and Food Innovation; Gatton/Toowoomba, Queensland, Australia

APWSS encourages all the weed scientists of Asian Pacific Region to become life members of the APWSS, strengthen APWSS and get actively involved in all weed science related activities of APWSS. The details of the membership are available at: http://apwss.org/apwss-membership.htm

Upcoming conferences on weed science

20th Australasian Weeds Conference (20 AWC)

Venue: Perth, Australia

Website: http://www.20awc.org.au/

Dates: September 11-15, 2016

Global Herbicide Resistance Challenge

Venue: Denver, Colorado, USA

Website: http://www.ghrc2017.org/home.html

Dates: May 14-18, 2017

26th Asian-Pacific Weed Science Society Conference

Venue: Kyoto Research Park, Kyoto, Japan

Website: http://www.c-linkage.co.jp/apwss2017/

Dates: 19-22 September, 2017