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# NESAs

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

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January 2019

## Report on National Conference on Chemistry for Human Health and Environment (CHHE 2018)



“NATIONAL CONFERENCE ON CHEMISTRY FOR HUMAN HEALTH AND ENVIRONMENT (CHHE) 2018” organized by Green Chemistry Network Centre, Department of Chemistry, University of Delhi & Royal Society of Chemistry London North India Section in collaboration with National Environmental Science Academy (NESAs) was held on **15th-16th December, 2018**. The conference aimed to highlight the top pressing environmental challenges that humanity is facing today which include energy, food, water and environment, understanding global initiatives taken towards resolving some of these challenges and proposing cost-effective solutions with the cooperative introspection and analysis of leading chemists, environmentalists and other professionals.

Honourable **Shri Arjun Ram Meghwal Ji**, Minister of State for Water Resources, River Development, Ganga Rejuvenation & Parliamentary Affairs, Government of India graced this event as

the Chief Guest. Shri Arjun Meghwal Ji greatly appreciated the efforts directed by the organizing committee members especially **Prof. R. K. Sharma** (Convener) and **Dr. Kshipra Misra** (Organizing Secretary) for organizing a conference of such a stature. He also expressed deep concern for the serious environmental problems that our country is currently facing and requested all those present in this conference to collectively work for the problem. He highlighted the fact that even the great Mahatma Gandhiji had expressed his concern over wastage of water and had kept silence for a week as reciprocation of this. Shri Meghwal Ji especially highlighted that such initiatives should be embarked upon in near future also.

**Dr. Sanjay Bajpai** (Head, Technology Missions Division (Energy, Water & all Other) Department of Science and Technology) and **Prof. R. K. Mahajan** (Vice Chancellor, DAV University, Jalandhar) were the guests of honor. About 250 delegates from different



academic as well as industrial organizations participated and presented their papers in the conference on various aspects of research in the allied fields of sciences. CHHE 2018 was successful in providing a forum for all the experts and stakeholders to share their aspiration towards environmental sustainability. Through conjoint efforts, sustainable solutions towards reducing human exposure to chemicals, developing cost-effective methodologies to combat environmental problems were proposed. This was great initiative taken towards rendering our planet earth greener.



Welcome Address & GCNC Highlights by Prof. R. K. Sharma (Co-ordinator GCNC and Convener, CHHE)

Prof. R. K. Sharma spoke about Green Chemistry Networking activities in India and also introduced

the aims and objectives of the conference in brief. He also highlighted the top challenges world is facing today that primarily includes: Energy, Water, Environment and how GCNC has come up with some effective solutions for these burning problems. A small section highlighting the concern of social elements towards environment, arrival of greener approach for sustainable future, initial reluctance of the people to accept the change driven by green chemistry and the challenges faced by innovators for the establishment of new ideas into old practices was also integrated in his outline.

Address by Prof. Javed Ahmed (NESA President and Co-Chairman, CHHE)



Co-Chairman and NESA President Prof. Javed Ahmad was subsequently invited to brief the delegates about NESA awards that would be presented during this conference. After mentioning about the felicitation awards, Prof. Javed highlighted that environmental dust particles persisting in the air of NCR are considered one of the threats for respiratory diseases and these topics would be discussed in the present event. He said that our efforts shall remain focused at preventing the harmful effects of global warming and reducing the



carbon foot prints caused by emissions from burning coal, oil and gas. At the end, he extended his heartiest congratulations to the members of organizing committee, all the delegates, awardees, local committees, guests and best wishes for the grand success of the conference.

This two day conference started with an inaugural session as described above which was followed by technical sessions-keynote addresses, invited talks, oral and poster presentations.

**Session 1** started with the keynote address “SCIENCE LED ENVIRONMENTAL SOLUTIONS FOR SUSTAINABLE GROWTH” by Dr. Sanjay Bajpai (Head, Technology Mission Division, Department of Science and Technology, Technology Bhavan). This session was chaired by Dr. Lakshman Prasad and Prof. S. K. Mehta. In this keynote address, Dr. Bajpai gave a high level view of DST’s research, development, demonstrations and commercialisation endeavours for accelerating Water and Clean Energy Innovations in India.

Thereafter, Dr. Alok Adholeya (Programme Director, Sustainable Agriculture, TERI, New Delhi and Director, TERI Deakin Nanobiotechnology Centre, TERI Gram, Gurugram) was invited to deliver his keynote address on “BIOLOGICALLY PRODUCED NANOFERTILIZERS: NEXT GENERATION PRODUCTS.” He began his talk by highlighting major challenges agriculture is facing such as reduced productivity, nutrient deficiency, pest and disease resistance, and climatic changes. Subsequently he mentioned that nanotechnology offers a great potential to produce tailor-made high use efficiency nano structured fertilizers with the desired chemical composition along with the smart delivery system.



Finally, Session 1 was concluded by keynote address by Dr. Rakeshwar Bandichhor (Director, API-R&D, IPDO, Dr. Reddy's Laboratories Limited, Bachupally, Hyderabad) who spoke on "Two Decades of Green Chemistry." Dr. Rakeshwar in his keynote address said that the pharmaceutical industry turns out to have higher E-factor. Due to lack of innovative green chemistry, the multi-fold production of active pharmaceutical ingredients (APIs) always concomitantly yields exorbitant amount of waste (E-factor: 25-120 kg).

### Poster Session

Chairpersons for the poster session were Prof. R. K. Mahajan, Prof. S. K. Mehta and Prof. R. V. Singh. Around 18 posters were presented during this day by participants who came from different academic institutes from different parts of the country.

In Session 2 the first invited talk was on "Network Analysis, Modeling of Intellectual Development and Sustainable Future" which was delivered by Dr. Prabir G. Dastidar, Scientist/Director,

Ministry of Earth Sciences, Government of India. In his talk, Dr. Dastidar made an effort to reconstruct the research and development space in the context of climate change and ozone hole research. He highlighted the imperative need to change from a discovery oriented to a solution oriented approach for meeting socio-economic challenges.

The next invited speaker Prof. S. K. Mehta (Professor, Department of Chemistry, Panjab University, Chandigarh) presented a talk on "Greener Synthesis of Mesoporous Silica from Industrial waste for waste water treatment" which had a great relevance with the theme of the conference.

Thereafter, Dr. B. Rupini, Director, SOITS, IGNOU, New Delhi, India was invited to speak about "Opportunities in Inter disciplinary Science research." She began her talk by saying that the concept of environmental and ecological sustainability and green design is momentous to address from various disciplines around the globe in the last decade. In her talk, Dr. Rupini examined three vignettes of science research which revealed the



interdisciplinary process at work and considered the implications for education by considering some examples of chemical science research with interdisciplinary approach.

The third technical session of the day: Invited Talk and Oral Presentations was chaired by Dr. Kalpana Bhargava and Dr. S. K. Singh. Dr. Prashant Singh, Associate Professor Chemistry from DAV (PG) College, Dehradun, Uttarakhand, District Coordinator UCOST Dehradun, Co-ordinator State Level Water Quality Testing and Monitoring Laboratory, UJS, Dehradun delivered an excellent talk on “Drinking Water Quality Assessment Using Advanced Multivariate Statistical Techniques.”

#### Session 4

Day 2 of CHHE 2018 commenced with invited talk by renowned academicians and scientists. Dr. Rakeshwar Bandichhor and Prof. Javed Ahmad were the chairpersons of this technical session.

The first talk of this session was delivered by Prof. R. K. Mahajan from Vice-Chancellor, DAV University, Jalandhar on “Chemical Sensors for Selective Recognition of some Cations and Anions.” Dr. Mahajan threw light on his research work which is primarily focused on the development of potentiometric and voltammetric sensors for the selective recognition of variety of cations (mercury, lead, copper zinc, cadmium, cesium, uranyl etc.) and anions (chloride, hydrogensulphate, nitrate, perchlorate, ionic surfactants, dyes etc.) by employing the various potential organic compounds as ionophores and electroactive receptors.

The next invited speaker Dr. P. K. Rai- “Scientist-G” from CFEES, DRDO, New Delhi delivered an interesting talk on “Green Technology and Environment Safety Practices in DRDO.”

Thereafter, Prof. Jyoti K. Sharma, Professor & Head from Center for Environmental Sciences & Engineering (CESE), School of Natural Sciences (SoNS), Shiv Nadar University enlightened the participants with his talk on “Constructed wetland technology for the treatment of waste water.” He dwelled into basics of the

technology of constructed wetlands in water pollution control, performance expectations and research needs.

This technical session ended with a talk on “Elimination of Lymphatic Filariasis - Background, Progress, Impact On Human Health, Challenges And Way Forward” by Dr. Manoj Kumar DAS (Deputy Director, Scientist-E & Officer-In-Charge, ICMR - National Institute of Malaria Research (Formerly Malaria Research Center), Indian Council of Medical Research, Ministry of Health and Family Welfare Field Unit, Itki, Ranchi)

**Session 5** included some very interesting talks on topics relevant to the theme of the conference. Prof. Jyoti Sharma and Dr. Zayeed Ashraf served the role of chairpersons for this session.

Dr. Kalpana Bhargava, Scientist 'F', Additional Director from Defence Institute of Physiology and Allied Sciences (DIPAS), DRDO, Lucknow Road, Timarpur, Delhi delivered the first talk of this session on “Advances in Protein Chemistry for Health & Disease.”

The next interesting talk of this session was delivered on “Green Chemical Technology: An Innovative Concept, Theory and Practice” by Dr. Narendar Bhojak, Associate Professor from GCRC, P.G. Deptt. of Chemistry, Govt Dugar College, MGS University, Bikaner.

The last speaker of this session was Dr. Sayeed Ahmad (Assistant Professor, Department of Pharmacognosy and Phytochemistry Faculty, Jamia Hamdard) who spoke about “Metabolomic Analysis of Traditional Medicines for Scientific Validation of Traditional Claims.”

In **Session 6** Invited talks (IT 12- IT 15) & PARALLEL ORAL SESSION (OP 13-OP 33). Dr. Narendar Bhojak chaired the invited talk session held at the main hall, conference center while the Session Chairs for OP were Prof. R.V. Singh & Dr. P. Venkatesu.

This session began with the talk on Deconstructing pathogenesis of venous thrombosis at high- altitude by Dr. Mohammad Zahid Ashraf, FNASc, Professor from Department of Biotechnology, Jamia Millia Islamia.





The next speaker Dr. Ram Sagar Mishra, Associate Professor from Department of Chemistry, Institute of Science, Banaras Hindu University delivered his talk on “Regioselective Synthesis of Chirally Enriched Privileged Tetrahydrocarbazolones and Tetrahydrocarbazoles.”

Thereafter, Dr. Sushil Kumar Singh, Scientist 'F' and Additional Director, Solid State Physics Laboratory, DRDO, Lucknow Road, Timarpur presented a very interesting talk on Sustainable Green Technology: An Inspiration from Nature.

The last talk of this session was delivered by Dr. Raj Kumar Mishra an Associate Professor from Department of Chemistry, Institute of Sciences, Banaras Hindu University. The topic of his talk was “Theoretical and Experimental study on Eco-Friendly corrosion Inhibitors.”

A parallel oral session was held during this time at Room No. 5 Conference Hall which was chaired by Dr. R. V. Singh and Dr. P. Venkatesu. This session was also quite interesting as a number of young budding researchers presented their work.

In **Session 7** Again, it was the time to give a chance to the leading and emerging researchers. Therefore another oral session was conducted in the main hall which was chaired by Prof. R. Baskar from Guru Jambheshwar University, Hissar and Prof. Shrikant Kukreti from Department of Chemistry University of Delhi.

Finally, the time came to end CHHE 2018 on a pleasant note. Dr. Rajiv Sharma Director General, Amity Foundation for Science, Technology & Innovation Alliances & Sr Vice President, RBEF was the chief guest of this event and he was requested to grace the dias with his presence. Dr. Rakeshwar Bandichhor, Prof. Javed Ahmad, Prof. R. K. Sharma and Dr. Kshipra Mishra were the other distinguished members to accompany him on the dias. Dr. Rajiv was invited to share a few words with the audience right after which the names of the oral and poster awardees were announced. Dr. Ram Sagar Mishra and Dr. Kalpana Bhargava were requested to come on stage and declare the names of the poster awardees while Dr. P. Venkatesu was invited to announce the names of the oral award winners.



# NESA Award 2019 Notification No. 1

## APPLICATIONS ARE INVITED

FOR THE NESA AWARDS 2019

LAST DATE **31<sup>st</sup> MAY 2019**

### (1) NESA FELLOWSHIP AWARD

**AGE**

45 and above.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal, and can suffix F.N.E.S.A. after their names.

### (2) NESA EMINENT SCIENTIST AWARD

**AGE**

40 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

### (3) NESA SCIENTIST OF THE YEAR AWARD

Any award / recognition at National level.

**AGE**

35 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

### (4) NESA ENVIRONMENTALIST AWARD

**AGE**

Up to 35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

### (5) NESA GREEN TECHNOLOGY INNOVATIVE AWARD

**AGE**

35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

### (6) NESA YOUNG SCIENTIST AWARD

**AGE : Up to 35.**

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

#### PREScribed APPLICATION FORMS

The application forms could be downloaded from [www.nesa-india.org](http://www.nesa-india.org)  
Separate application form should be submitted for separate awards.

The application forms are non-transferable and it can also be obtained by sending a bank draft of Rs. 1000-00 only (per form). Drawn in favour of NATIONAL ENVIRONMENTAL SCIENCE ACADEMY payable at NEW DELHI.

EXECUTIVE SECRETARY  
NATIONAL ENVIRONMENTAL SCIENCE ACADEMY  
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E-mail: [nesapub@yahoo.co.in](mailto:nesapub@yahoo.co.in); [nesapublications@gmail.com](mailto:nesapublications@gmail.com)

Website: [www.nesa-india.org](http://www.nesa-india.org)

## ELECTION NOTICE (2019-2022)

Applications on Nomination Form are invited from the Life Members of the Academy for different posts of office bearers of the Academy for the year 2019 to 2022. The last date of the receipt of the Nomination Forms is 15<sup>th</sup> March 2019:

Sl. No.	Name of the posts	Nos.	Last Date
1.	President	1	15.03.2019
2.	Vice Presidents	4	15.03.2019
3.	General Secretary	1	15.03.2019
4.	Joint Secretary (Treasurer) Local	1	15.03.2019
5.	Joint Secretaries (1 should be local)	4	15.03.2019
6.	Member of the Executive Committee	8	15.03.2019
7.	Member of the Executive Council	8	15.03.2019

The application forms should be sent to:

The Executive Secretary  
National Environmental Science Academy (NESA),  
206, Raj Tower-1, Alaknanda Comm. Centre, New Delhi-110 019

#### TERM AND CONDITIONS

According to the Academy bye-laws, the General Secretary will report to the President in decisions taken by him for smooth functioning of the Academy. The person to be elected as General Secretary must fulfill the following conditions:

1. An active life member of the Academy.
2. Physically fit and not more than 70 years.
3. A resident of Delhi / NCR.
4. Proven academic record with Ph.D. and minimum (20) years experience in teaching/higher research, not less than the grade of Professor/Director.
5. Willingness to devote time for the working at NESA Office at least twice a week.
6. The post is purely honorary and travelling allowance is not permissible on monthly basis.
7. The Life members may download the NOMINATION FORM from the Academy's website: [www.nesa-india.org](http://www.nesa-india.org)

# BEE APP COULD BE THE NEXT BEST THING FOR FACILITATING GLOBAL INSECT POLLINATOR CONSERVATION

S. K. Basu  
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 Email: saikat.basu@alumni.uleth.ca

## Insect pollinators in peril

Anthropogenic factors are leaving big footprints in our natural ecosystems and environments around the planet negatively impacting global biodiversity. One of the worst impacted species around the planet with serious long term consequences for agriculture, forestry and apiculture are the honey bees and native (indigenous) bees. Researchers around the planet have identified numerous anthropogenic factors that are responsible directly or indirectly for the demise of pollinator insects with the worse impacted group recognized being different bee species like honeybees and native bee species. Among some of the most commonly reported anthropogenic factors responsible for rapid and alarming decline of global bee populations being non-judicious, over application of agri-chemicals, environmental pollution, changes in land use patterns, various parasitic diseases, Colony Collapse Disorder (CCD), rapid rate of pollinator habitat loss and habitat fragmentation, lack of suitable melliferous flora (bee foraging or pollinator friendly plant species) with adequate supply of pollen and nectar across the varying seasons, Climate Change and Global warming to name only a handful. Hence conservation of such eco-friendly or environment friendly pollinator insect species are important for securing the future of our agriculture, forestry and apiculture industries; since a vast number of flowering plants serving as food and industrial crops are dependent on natural insect pollinators for securing cross pollination for the purpose of reproduction.

## Challenges towards successful insect pollinator/bee conservation



1. Lack of education and awareness among the public regarding the need and importance of pollinator conservation
2. Lack of communication and networking between ordinary citizens and various stakeholders associated with pollinator (bee) conservation such as distinguished researchers and scientists, primary, secondary and tertiary level students, nature journalists, environmental lawyers, local administrators and politicians, technical and administrative personnel associated with relevant industries such as farmers and crop producers, agronomists, agronomists, apiculturists, entomologists, foresters, environmentalists, ecologists and conservators.

## Why do we need a bee app?

It is therefore important to develop an app for our targeted communities or stakeholders associated with bee/pollinator conservation by connecting them via a simple, communicative global platform technology affordable and accessible by all. It should be as simple as possible and can be comfortably downloaded on smart and android phones, desktops, laptops, tabs and related communication based electronic accessories that can serve as information highway for exchanging pollinator insect/bee related data and information easily. Some examples are like taking images of bees and other insect pollinators around the globe, processing and identifying them and finally storing them into a registered, accessible and highly secure online database/archive for public education and research purposes. Such an app could help in the exchange of pollinator insects/bee related research data, facilitate positive communication and discussion among stakeholders to promote necessary education and awareness among public, academia, media, politicians, parliamentarians, administrators and policy makers to adopt necessary actions and formulate important policies to help in successful insect pollinator conservation like our bees.



**Tentative target features of the App:**

1. Our goal through this app development is integrating ecology and environment together as one cannot move forward with the help and support of the other. Ecology and economy needs to be integrated in a comprehensive manner so that ordinary citizens can enjoy the stability of the economy and at the same time become sensitive towards environmental conservation by developing green economy
2. Any pollinator insect could be photographed and processed through the app for quick identification. These could be honey bees, native bees, flies, beetles and other insect pollinators. This will help farmers, researchers and other stakeholders involved bee/pollinator conservation via quick and authentic identification to take appropriate measures in protecting them
3. It could act as source of information highway and connectivity between various stakeholders like agricultural companies, crop producers, retailers, distributors, apiculturists, researchers and academics, conservationists, journalists, students, lawyers and ordinary citizens; as well as various related government and non-government organizations
4. This could be a mode of communication like very popular apps like WhatsApp, Yammer and other related apps and services and help in building connections among various stakeholders across different countries and continents
5. Establishing knowledge chain and knowledge networks among different stakeholders involved in bee and pollinator conservation. This could be easily connected to challenges of environmental pollution such as Climate Change and Global Warming, low agricultural productivity due to decline in pollinator populations across the globe
6. Could serve as an important connectivity pathway related to bee conservation across US and Canada through citizen participation, blog writing, snap chat facilities like exchanging data, images and videos among stakeholders with end to end encryption; so that no 3rd party could access any valuable information and research data exchanged between 2 or more participants
7. App should facilitate exchange of different photos, videos, files, texts, messages for high level communication among two or more individuals and/or dedicated groups.
8. Facilities for posting general messages, contents, text and images for fast and integrative communication
9. Additional applications:
  - a. Prediction of future changes in dynamics of pollinator population based on research information accumulated through numerous app users
  - b. App will be tagging every image captured by any app user via in built GPS & GIS technology to record precise location, date & time of individual images
  - c. Developing latest distribution maps for individual pollinator species captured and processed by the app by using available data
- d. App predicting possible impact on agriculture, forestry & apiculture industries based on economic impact of different pollinator species across different agro-climatic zones using app based models
- e. App could act as a pivotal tool in connecting primary, secondary and tertiary levels of education in US and Canada and making them more aware regarding bee/pollinator conservation, environmental pollution, Global Warming and Climate Change, sustainable agriculture, supporting nationwide forestry, supporting farmers and apiculturists and helping in establishing bee, bird, fish in establishing integrated habitats
- f. Making administration of local cities, towns, municipalities, district headquarters aware about pollinator conservation through establishment of pollinator habitats and establishing small ecological niches for protecting and securing the environment
- g. Protection and conservation of global biodiversity
- h. Promoting chemical free organic agriculture, sustainable farming system and eco-friendly farming practices and throughout the planet cutting across the socio-economic and socio-cultural divisions of the developed, developing and under developed nations in northern and southern hemispheres
- i. Creating a platform for people to share, exchange, discuss, collect and retrieve information related to bee and pollinator conservation, sustainable agriculture, chemical free agriculture, eco-friendly farming practices, establishing pollinator or bee habitats across various agro-climatic zones or ecological zones
- j. Education and awareness of the general public across different countries and continents
- k. Creative app with dynamic parameters to draw more participants enthusiastic in bee and/or pollinator conservation and in conserving nature and environment
- l. Building awareness and education regarding bee and/or pollinator conservation among researchers, farmers, students, lawyers, justice system, administration, industry and general public representing ordinary citizens at various works of life
- m. Establishing direct and indirect communication links and channels among all stakeholders interested in bee and/or pollinator conservation.

**Future directions:**

- Reaching out to target users for getting an insight into what they would like to use the bee app for.
- Increase our research capabilities and our ability to cater to the needs of target users/customers in developing a highly efficient and secure multi-use bee app.
- Learn from our experiences and advance our knowledge to cater to the target users by developing necessary partnership with interested stakeholders and similar minded institutes and organizations for shared growth and serve as industry leaders. Photo credit - **S.K. Basu**





## IMPACT OF ZEOLITE AS SUPER NATURAL ABSORBENT AND NITROGEN AMENDMENT ON QUALITATIVE AND QUANTITATIVE TRAITS OF RAPESEED GROWN UNDER VARYING WATERING REGIMES

A.H. Shirani Rad<sup>1</sup>, K. Mozdzeń<sup>2</sup>, P. Zandi<sup>3\*</sup>,  
S. K. Basu<sup>4</sup> and P. Prathomya<sup>5</sup>

<sup>1</sup>SPII, AREEO, Karaj, Iran; <sup>2</sup>Kraków, Poland; <sup>3</sup>IESDA, CAAS, Beijing, China; <sup>4</sup>PS, Lethbridge, AB Canada;

<sup>5</sup>MRUBI, AHFRCG, Guangzhou, China;

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Acting as a natural wetting/nourishing agent, zeolite (a natural super porous mineral) is an excellent amendment for holding both water and nutrients in the root zone for plants to release when required. In order to examine the effect of zeolite (kind of natural superabsorbent) and nitrogen supply on the qualitative and

quantitative traits of rapeseed under different moisture regimes, a field experiment was conducted in a randomized complete block design at a factorial layout with four replications during 2014-2015 cropping season. Irrigation factor consisted of normal irrigation and halt in irrigation started from flowering stage. Moreover, three levels of zeolite (0, 5 and 10 t ha<sup>-1</sup>) along with nitrogen rates of 0, 75 and 150 kg ha<sup>-1</sup> were employed. Results indicated that the simple effects (irrigation, nitrogen and zeolite) and interaction of irrigation × nitrogen, irrigation × zeolite, and nitrogen × zeolite, were highly significant on the Grain yield and Oil yield ( $p < 0.01$ ). Normal irrigation by consumption of 150 kg N ha<sup>-1</sup> and 10 t zeolite ha<sup>-1</sup> had the highest grain (5278 kg ha<sup>-1</sup>) and oil yield (2258 kg ha<sup>-1</sup>). Water deficit stress as ceased irrigation from the flowering stage together with zero application of nitrogen and zeolite resulted in the lowest grain (599 kg ha<sup>-1</sup>) and oil yield (219 kg ha<sup>-1</sup>). Totally, consumption of 150 kg N ha<sup>-1</sup> together with applying 10 t zeolite ha<sup>-1</sup> (under normal irrigation) and consumption of 75 kg N ha<sup>-1</sup> with applying 10 t zeolite ha<sup>-1</sup> (under ceased irrigation from the flowering stage) produced the highest grain and oil yield. **Photo credit: S.K. Basu**



## WEED DIVERSITY FROM SOUTHERN ALBERTA, CANADA

S. K. Basu

PS, Lethbridge, AB Canada;

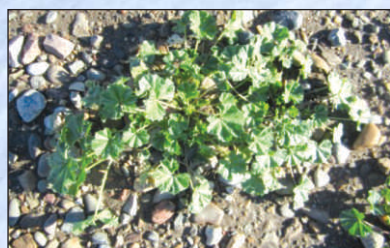
Email: saikat.basu@alumni.uleth.ca



**Tall Buttercup** (*Ranunculus acris* L.) is a perennial weed belonging to the buttercup family (Ranunculaceae). Also known as Meadow buttercup, Giant buttercup or as Common buttercup. This weed grows to a height between 40-80 cm above ground bearing shiny,

metallic yellow coloured, cup-shaped flowers varying between 15-20 cm in diameter. Each flower has five overlapping petals above five green sepals giving the characteristic cup-shaped appearance. Each flower has numerous stamens inserted below the ovary. Stems are erect, hairy, leaves compound with three lobed leaflets. This is an introduced species and a problem in lawns and gardens, overgrazed pastures, roadsides and waste areas.

**Canada thistle** [*Cirsium arvense* (L.) Scop.] is a creeping perennial belonging to the sunflower family (Asteraceae); and is widely seen in both brown and black soil zone areas of Southern AB. Commonly found in unattended fields, along farm perimeters, irrigation canals and road side, in rangeland and waste areas, irrigated lands, reduced and conventional tillage areas. The weed is characterized by strong fibrous root system bearing numerous flower heads in clusters. The disc florets are pink or purple in color. Canada thistle has male (globe-shaped) and female flowers (flask-shaped) located on separate plants. It is an extremely aggressive weed and is known to impact crop yield if not controlled in due time.

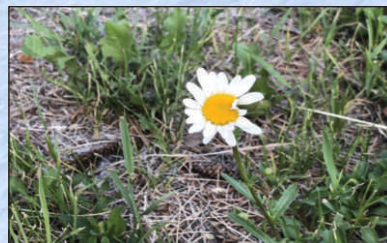
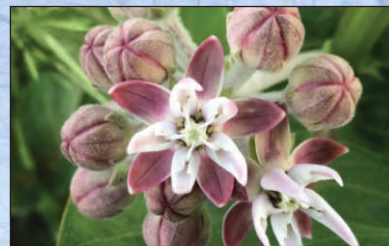


**Round leaf mallow** (*Malva rotundifolia* L.) is an annual low spreading plant belonging to the Hibiscus family (Malvaceae) having extensively branched, hairy stems with five lobed leaves and conspicuous toothed leaf margin. Tiny white or faint whitish blue flowers

are located in axillary clusters of 1-3. Each flower producing circular, slightly raised disc-shaped fruits within which brownish seeds are placed in a circular arrangement. Commonly seen along roadsides, rangelands, waste areas, irrigation canals, unattended parts of the field and in reduced tillage areas.

**Showy milkweed** (*Asclepias speciosa* Torr.) is a hairy, erect, perennial produces one of the most spectacularly beautiful pale or purple pinkish flowers in dense umbellate cymes belonging to the family Asclepiadaceae. Stem produces white latex. The central

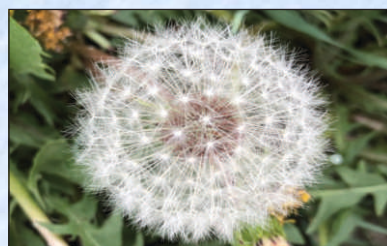
flower parts, with five hoods having prominent hooks constitute a star shaped form. Fruits are big and rough loaded with flat, successful dispersal. Commonly found along roadside ditches and adjacent to water oval



**Scentless chamomile** [*Tripleurospermum inodorum* (L.) Sch.Bip.] is an annual/perennial weed about 1 m tall with elaborate fibrous roots belonging to sunflower family, Asteraceae. Stems repeatedly branched; and leaves alternate, divided

into numerous, narrow-branched segments. Scentless chamomile produces numerous showy, white flower heads with yellow disk florets and white ray florets producing viable seeds with three characteristic ridges.

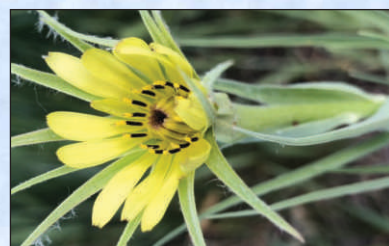
**Wild mustard** (*Sinapsis arvensis* L.) is an annual/winter annual crop plant; but, when it volunteers in planted crop it is considered a serious weed. Wild mustard with bright yellow coloured flowers is related to canola and belongs to the same plant family Brassicaceae. In addition to the strong competition it poses to the crop with respect to various agronomic parameters, wild mustard serve as host to a number of diseases and insects (like flea beetle) that attacks the planted crop; and reduces the yield and negatively impacts harvested crop quality.



**Dandelion** (*Taraxacum officinale* F. H. Wigg.) is an obnoxious weed belonging to the sunflower family, Asteraceae. This weed is characterized by long branched tap root, basal rosette leaves with irregular lobes and teeth; and a conspicuous bright yellow

solitary flower head borne at the tip of a hollow leafless stalk. Dandelion is a traditional weed associated predominantly with lawns and turfs. This weed occurs recurrently unless controlled and is a problem under reduced tillage.

**Goat's beard** (*Tragopon dubius* Scop.) is another common Prairie weed belonging to the sunflower family, Asteraceae. Long linear grass-like leaves, gradually tapering, smooth and fleshy arranged in alternate manner with one



leaf per node. Flower heads large, pale lemon-yellow and showy 4-6 cm across, borne singly at ends of stems and branches.



**Field bindweed** (*Convolvulus arvensis* L.) is perennial weed belonging to the morning glory family, Convolvulaceae. This weed grows prostrate in the field with characteristic linear to arrow-head shaped leaves bearing cone-shaped pale white or

radially striped brighter pink flowers. Two sub species are known with either narrow or broad leaves. This is an obnoxious weed and very difficult to eradicate once it gets well established in the field.

**Flixweed** [*Descurainia sophia* (L.) Webb ex Prantl] is an aggressive weed of the of the dark brown and black Prairie soils region of southern AB belonging to the canola family (Brassicaceae). This weed is characterized by the presence of tiny, four-petalled yellow flowers in racemes at the top of narrow stems with finely dissected, greyish green narrow leaves. It produces short-stalked seedpods containing numerous small brownish to blackish seeds on maturity that are dispersed by bursting the seed pods on maturity. Usually grow in large numbers at a stretch if not controlled and commonly seen around irrigated areas, rangelands, waste areas, roadsides and farm perimeters.



**Volunteer alfalfa** (*Medicago sativa* L.) is a perennial legume belonging to the Fabaceae family. Volunteer crop plants pose similar production challenges for crop producers like any other traditional weed. Stems much branched with trifoliate leaves. Flowers vary in colour from pink, purple, blue, yellow or white. Volunteer alfalfa aggressively competes with the target crops for nutrients, moisture, space and light; and if not controlled in due time reduces crop yield significantly.



**Oxeye daisy** (*Leucanthemum vulgare* Lam.) is a perennial weed about 1-3 ft tall belonging to the sunflower family, Asteraceae. The weed is characterised by unbranched stem and stretches sideways with rhizomatous rootstock; and

a conspicuous bright yellow solitary flower head borne at the tip of a hollow leafless stalk. The weed produces large showy, flower heads with shiny yellow disk florets and around 18-20 bright white ray florets surrounding the yellow disc florets. It produces profuse flat seeds (without pappus) that remain viable in the soil for up to three years. The weed propagates vegetatively via rhizomes.

*Photo credit: S. K. Basu*

## BIG WILD CATS CONSERVATION CHALLENGES

**S. K. Basu**

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In 2018, WWF has released an outstanding poster depicting the sad demise of big wild cats around the planet. The WWF poster is indeed informative and provides a collage of images and texts depicting in brief the pathetic situation of global big wild cats like lions, tigers, leopards, snow leopards, cheetahs, pumas and jaguars. Unfortunately, we as humans carry a serious responsibility and a debt on our back for the serious damage we have done to the natural environment and ecosystems as well as to the natural hunting, breeding and foraging habitats of these helpless wild cats around the planet. Most species and sub species of big wild cats are located in developing and under developing countries with huge unbalanced human populations accompanied by slow or poor economies in the continents of Asia, Africa and Latin America. Hence, the damages to the natural habitats of the wild cats are even more detrimental and negative with very little chances of recovery of decimated wild populations.

Lions are currently restricted to the continents of Africa and Asia. The species have been wiped out across Asia with the only exception of a small population restricted to the Gir Sanctuary in the Western Indian state of Gujarat. Even the majestic lion has been pushed to extinction in several African countries due to habitat loss heavy poaching pressures as well as human-animal conflicts. The case of wild cheetahs has also not quite promising. Similar to Lions teachers are restricted to the continent of Asia and Africa. While the

defenceless species is still kicking in some countries of the African continent; the Asiatic sub species of cheetah have been pushed words extinction and is currently restricted to only a handful wildlife reserves in Easton Iran. The factors contributing to their demise in Africa have been strong competition with other major predators like lions in the savanna, human-animal conflict as well as poaching and habitat loss. The reason for their near extinction in Asia has been due to over hunting and over exploitation by humans across several decades beyond the threshold point of natural recovery. Cheetahs in Asia are knocking at the door of complete extinction in the next five decades as their current wild populations are estimated to be even less than 100.

No wildlife species, particularly the big cats have been exposed to so much human-animal conflict as the unfortunate leopards in the continents of Asia and Africa! Leopards in both continents have become extremely visible due to habitat loss and have it at fragmentation as well as heavy poaching pressures. The indiscriminate loss of leopard habitats in both continents has been unfortunately bringing this opportunistic wild predator in direct conflict with their human neighbours. It is possibly the worst persecuted wild big cat species of the world that is regularly undergoing decimation in front of our eyes with no credible action being taken to protect them for our future generations. Asiatic leopards represent several sub species across this vast continent. However, other than the South Asian (Indian) leopards, very little or almost no credible information is available for other Asiatic sub species from West Asia, Central Asia, China and South East Asia. Similarly, tigers sub species around Russia, China, South East Asia has been demonstrating steady decline with unconfirmed and unofficial reports of tiger extinction in China, Vietnam, Cambodia and Laos; and serious threats of endangerment in Myanmar,

Bangladesh, Indonesia and Malaysia. Only the tigers in South Asian countries such as India, Nepal and Bhutan as well as Thailand in South East Asia have been showing some recovery. Poaching, habitat loss and wildlife trafficking of tiger body parts and organs to illegal wildlife markets of China, Hong Kong and pockets of South East Asia are the most common anthropogenic factors responsible for their steady demise. Another species of wild cat that is also being threatened by both anthropogenic and natural factors such as habitat loss, human-animal conflict, poaching, Global Warming and Climate Change have been the majestic snow leopards that inhabits snow clad high altitude mountains of Eurasia, Central Asia, Mongolia, China, Afghanistan, Pakistan, India, Nepal and Bhutan. Lack of suitable prey base in their disturbed natural habitats is pushing this shy predatory mammal to move to lower altitudes for hunting on cattle and livestock. This is making snow leopards extremely vulnerable to poachers, hunters, farmers and villagers heavily dependent on their animal resources for their meagre survival.

Pumas or mountain lions are another big wild cat that inhabits the Americas in a number of widely divergent habitats from Rockies in the North to the South American Andes. Habitat encroachment, poaching as well as recreational hunting pressures are impacting their wild populations similar to that of jaguars dominating in every tropical and sub tropical ecosystems of Latin America from Central

to South America. These two big cats of the majestic American wild spread across two vast continents are showing signs of decline also due to numerous reported events of human-animal conflicts.

Virgin forests across North and South America are being ruthlessly exploited with little or no respect for local wildlife and biodiversity. As a consequence, reduced habitat size is pushing major wild cat predators like pumas and jaguars to venture into human domains making them extremely vulnerable to human exploitations. Recently, with increased footprints of Chinese infrastructural companies operating in various Central and South American nations the poaching pressures on jaguars have increased several folds. Like tigers in Asia; jaguars in Central and South America are being harvested for skin, bones, nails, body organs for illegal wildlife markets of China in Asia. With increasing footsteps of Chinese companies in Central and South America, the threat to the jaguars has been increasing every day. Reports of organized poaching gangs with Chinese support are being reported across the Latin American realm threatening local wildlife and biodiversity.

Unless serious and comprehensive conservative efforts are initiated across the globe; saving big wild cats may remain only a distant dream. It is important that we realize as

**World Wildlife Day 2018**  
**Big Cats**  
under threat

- 3,900** tigers left in the world  
We've lost **95%** of wild tigers since the beginning of 20th century.  
Tigers no longer live in **96%** of their historic range  
Endangered IUCN Red List Status
- 4,500 – 10,000** snow leopards left in the wild  
**60%** of Snow Leopard habitat is in China  
Vulnerable IUCN Red List Status
- 7,100** cheetahs left in the wild  
Africa's most threatened big cat.  
Vulnerable IUCN Red List Status  
Cheetahs keep the antelope population in check. Without this hunting, the herd will grow rapidly and wipe out their food supply.
- 20,000** lions left in the wild  
A century ago there were over **200,000** wild Lions in Africa  
Extinct in **26** African countries and have disappeared from over **90%** of their historic range
- Puma**  
In some countries it is still legal to hunt Puma  
Habitat loss is one of their main threats  
Only found in **50%** of their original range in North America
- Jaguars are near threatened**  
In the mid 20th century, as many as **18,000** jaguar skins were sold per year
- Leopards are extinct in 6 countries** where they once roamed  
Vulnerable IUCN Red List Status
- Some threats to Big Cats**
  - Loss of their natural habitat from human development and increase of land usage for agriculture

To, \_\_\_\_\_  
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humans we have a serious responsibility to her it's protecting this helpless species across Asia, Africa and Latin America. Unless we act today with zeal enthusiasm and sincerity, it may be too late to see big wild cats dominating their wild natural habitats and ecosystems in the next five decades. Countries like China need to take responsible measures in reducing the inward flow of wildlife body parts and organs from around the globe into China to constantly fuel the need of the Chinese Traditional Medicine. We need to work together on a common platform to protect the last remnant populations and sub populations of big wild cats around the globe, before it is too late!

**APPEAL TO LIFE MEMBERS**

NESA Life Members are requested to submit short articles for the NESA e-Newsletter that are consistent with NESA's objectives to improve environment. The articles should focus on topics related to environment and facilitate communication and discussion among researchers, academicians and students. The articles for December edition can be submitted to [nesapublications@gmail.com](mailto:nesapublications@gmail.com) before **20th January, 2019**.

Dr. Shefali Gola, Editor, NESA E-newsletter