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ANNOUNCEMENT FOR

National Conference on
**CURRENT TRENDS IN PLANT SCIENCE AND
MOLECULAR BIOLOGY FOR FOOD SECURITY AND
CLIMATE RESILIENT AGRICULTURE (PSMB2018)**

Jointly organised by:

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, (M.P.)

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NATIONAL ENVIRONMENTAL SCIENCE ACADEMY (NESA)

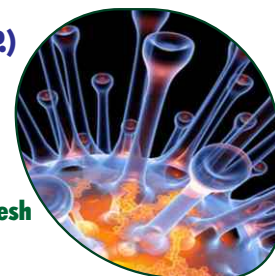
on

15-16, February, 2018

at Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh

Abstract Submission Deadline 04.02.2018

Last date of Registration 05.02.2018



CONFERENCE THEMES & SUB THEMES

PLANT BREEDING AND MOLECULAR BIOLOGY

Prebreeding for broadening the genetic base of crop varieties | Marker Assisted Breeding | Biotic and abiotic stress management in crops using Modern Plant Breeding Approaches | Anticipated Plant breeding or next generation breeding approaches

PLANT BIOTECHNOLOGY

Application of biotechnology in Crop Improvement | Omics Approaches (Genomics Proteomics, Metabolomics) | Genome editing | Bioinformatics | Transgenic and GMOs | Micro propagation and in-vitro culture.

AGRICULTURE SCIENCES

Plant genetic resources and conservation | Agri-biotechnology | Application of Organics | Inorganic Manuring in Agriculture | Plant Breeding in organic agriculture

CROP SCIENCE AND CROP PROTECTION

Agronomy for sustainable management of natural resources | Modern aspects of Agronomy and Horticulture | Plant Pathology: Mechanism of disease and their control | Plant Nutrition and Soil Sciences | Food Biotechnology | Medicinal Plants and their uses

BIOSAFETY AND STATISTICAL TOOLS FOR AGRICULTURAL DATA MANAGEMENT

Intellectual Property Protection for Plant Innovation | Environmental Impact on Science and Bio-safety issues | An introduction to Statistical tools for Agricultural Data Management

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Potential uses of the morning glory (Convolvulaceae) species for the purpose of beekeeping

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The family Convolvulaceae includes 1200 species in 55 genera worldwide, distributed in the tropics and temperate zones, its greatest diversity is found in America and Africa. Species of this family are characterized mainly by their funnel-shaped showy flowers; and for this reason they are commonly referred to as “bells” or “morning glories”. Furthermore, the plants can be easily identified by the lacticiferous plants; with simple and alternate leaves of variable shape (commonly heart shape). The fruits are capsules with one to four seeds or more.

The majority of its species are herbaceous climbers, although it also includes trees, shrubs and herbs. They grow mainly on secondary vegetation; and on the roadside on different types of vegetation. Therefore, they are considered as species of disturbed areas or mechanical parasitic plant due to competition for light. To stand up by themselves; they need support (tree or bush) for climbing up. Later the plants of Convolvulaceae cover the supporting plants and eventually die due to the absence of light. The (tree or bush), species have multiple potential uses, such as food (e.g. sweet potato, *Ipomoea batatas* (L.) Lam.), ornamental (several species of *Convolvulus*, *Ipomoea*, *Jacquemontia*, etc), medicinal (antispasmodic or anti-inflammatory, *Jacquemontia tannifolia* (L.) Griseb.), forage (*I. crinita* S. Moore, *I. nil* (L.) Roth) for handicrafts (*Merremia tuberosa* (L.) Rendle) and religious magic (*Turbina corymbosa* (L.) Raf.).

In addition, species of Convolvulaceae of the genera *Convolvulus*, *Ipomoea*, *Jacquemontia* and *Turbina* are also considered to be very useful for beekeeping, because in the tropics these species bloom mainly during the rainy season as well as in the dry season. Bee production depends on the availability of suitable food resources for the bees, in the form of nectar and pollen provided by the flowers. However, in certain parts of the year there is a scarcity of food for the bees, due to the limited availability of flowering plants that are found around the apiaries. This scarcity and absence of

flowers (nectar and pollen) occurs mainly during periods of rain, which limits the production and maintenance of bee populations; and therefore decreases their productive potential. Faced with this situation, a viable proposal is the incorporation of species of Convolvulaceae to sustain the populations of bees during the annual cycle; providing an improvement of the natural bee habitats and bee ecosystems adjacent to the local apiaries to enhance their productivity.

Preliminary data indicate that one of the botanical families with the highest number of species with apicultural potential in the Yucatan peninsula (YP), Mexico, is Convolvulaceae (43 of 76 species, 56%), only surpassed by the families Fabaceae (121 of 230, 52%), Asteraceae (84 of 147, 57%), Malvaceae (52 of 72, 72%) and Euphorbiaceae (62 of 113, 54%). These species of Convolvulaceae in the YP are characterized by climbing plants with numerous flowers; and with periods of flowering during major part of the year, growing mainly on roadsides and on disturbed vegetation. Therefore, Convolvulaceae species represent an important alternative as a stable source of nectar and pollen for bees during critical periods of flowering in the different types of natural ecosystems; where apiaries are established.

However, in tropical countries where the greatest diversity of Convolvulaceae is concentrated; beekeepers do not incorporate them around their apiaries, despite the fact that they have a high production of flowers and produce quality nectar. Therefore, it is necessary to carry out studies that evaluate the quality of the nectar and the protein content of the pollen of Convolvulaceae species, which allow reevaluation of their honey-bearing uses in beekeeping. In Mexico, the Instituto Tecnológico de Chiná has been carrying out important projects heavily focused on studying these target flower species. The project aims to evaluate the quality of the nectar and determine the protein content of pollen (Project ITCHN-CA-4); and to characterize the importance of native flora around the apiaries, as a strategy to increase the productivity of the honey bee colonies during critical periods of flowering.

Photo Credits: Authors (Projects PRODEP ITCHN-CA-4 and TecNM CHN-LGAC-03-14).

Acknowledgements: The authors sincerely thank PRODEP and TecNM for funding the projects “Evaluación de la calidad del néctar y determinación del contenido proteico del polen en especies de Convolvulaceae de importancia apícola en la península de Yucatán, México” and “Caracterización de la flora nativa de importancia apícola en Campeche: estrategia para incrementar la productividad en las colonias de abejas melíferas en periodos críticos de floración”, respectively.



Photocredits: (Projects PRODEP ITCHN-CA-4 and TecNM CHN-LGAC-03-14)

A REPORT OF NATIONAL CONFERENCE ON **IMPACT OF ENVIRONMENTAL CHANGES ON INDIAN ECOSYSTEMS (IEIE) 2017**



View of Inaugural session

The 30th Annual Conference of National Environmental Science Academy (NESA) and National Conference on Impact of Environmental Changes on Indian Ecosystems was held jointly with the Department of Environmental Sciences & Limnology & University Institute of Technology, Barkatullah University, Bhopal, Madhya Pradesh and National Environmental Science Academy (NESA), New Delhi at the Gyan Vigyan Auditorium, Barkatullah University, Bhopal, Madhya Pradesh from 23-24 December 2017.

The conference was inaugurated by the Chief Guest, Prof. Ram Prasad, IFS, former Vice Chancellor, Barkatullah University, Bhopal, (M.P.). He highlighted the importance of Environmental education and research in the current scenario during his address. The Chief Guest also presented his valuable views on changing the climatic conditions.



Prof. Javed Ahmad, President, NESA,



welcomed the Chief Guest and delegates and apprised them of various activities undertaken by the Academy. He also unfolded the theme of the conference.

Prof. Pramod Kumar Verma, Vice Chancellor, Barkatullah University also greeted the Chief Guest and delegates with utmost fervor.

The Guest of Honour Prof. Nelay Khare, Scientist F, Ministry of Environment Sciences, Govt. of India gave his useful inputs for improvement of our deteriorating environment.



Prof. TRC Sinha Life Time Achievement Award was conferred upon Prof. Pramod K. Verma, the Vice Chancellor, Barkatullah University on the first day of the conference. The award was presented by founder's son Mr. R.K. Sinha, Executive Secretary, NESA.



View of Inaugural session



FELLOWSHIP OF THE YEAR 2017 to Prof. V.L. Madhu Prasad
Directorate of Extension, UAS, Hebbal, Karnataka;



FELLOWSHIP OF THE YEAR 2017 was given to Dr. Ravinder Kaur
Principal Scientist & Former Director, WTC, IARI, New Delhi



BEST SCIENTIST OF THE YEAR 2017 was given to Dr. Sudhakar Reddy
Dept. of Physics, SKR Government Degree College for Women Kadapa, A.P.



View of Inaugural session with group photo
of NESA Awardees 2017 on the dias with dignitaries

Other important NESA awards e.g. **FELLOWSHIP OF THE YEAR 2017** were given to **Dr. Ravinder Kaur**, Principal Scientist & Former Director, Water Technology Centre, Indian Agricultural Research Institute, PUSA, New Delhi; **Dr. Dinesh Singh**, Principal Scientist, Indian Agricultural Research Institute, New Delhi; **Dr. Prof. V.L. Madhu Prasad**; Directorate of Extension, University of Agricultural Sciences, Hebbal, Karnataka; **Dr. M. David**, Department of Zoology, Karnatak University, Dharwad, Karnataka and **Dr. Shripad Kulkarni**, College of Forestry, Sirsi, Dharwad, Karnataka.

BEST SCIENTIST OF THE YEAR 2017 was given to **Dr. Sudhakar Reddy**, Department of Physics, SKR Government Degree College for Women (Autonomous) Kadapa, Andhra Pradesh.

EMINENT SCIENTIST OF THE YEAR 2017 were given to **Dr. C.T. Subbarayappa**, Department of Soil Science and Agriculture Chemistry, Bangaluru, Karnataka and **Dr. M. K. Das**, Deputy Director, National Institute of Malaria Research, ITI, Ranchi, Jharkhand.

ESPECIAL NESA AWARDS 2017 - EXCELLENCE IN RESEARCH AND TEACHING AWARDS were given to **Dr. Manoj Kumar Tripathi**, College of Agriculture, RVSKVV-Gwalior; **Prof. Tanu Jindal**, Amity Institute of Environmental Sciences, Amity University, Noida, U.P.; **Dr. Ashok Kumar**

Verma, Dept. of Zoology, Govt. PG College Saidabad-Allahabad (U.P.); **Prof. Narayan S. Mavarkar**, Department of Agronomy, Shivamogga, Karnataka and **Dr. Syed Shabih Hassan**, Department of Fisheries Resource Management, Guru Angad Dev, Ludhiana, Punjab.

EXCELLENCE IN RESEARCH AWARD was given to **Dr. Amolkumar U Solanke**, ICAR-NRC on Plant Biotechnology, Pusa Campus, New Delhi.

DISTINGUISHED TRADITIONAL THERAPY AWARD was given to **Dr. Chandra Prakash Dixit**, Rajkiya Ayurvedic Aushadhalaya, Bharatpur, Rajasthan.

DISTINGUISHED SCIENTIST AWARDS were given to **Dr. Sushma Tiwari**, College of Agriculture, Rajmata Vijayaraje Sciendia Krishi Vishwa Vidyalaya, Gwalior (M.P.); **Dr. Ram Sewak Singh Tomar**, IARI, Pusa Campus, New Delhi and **Dr. Krishna Kant Lawania**, Department of Zoology, Sarvodya College, Bharatpur, Rajasthan.

The vote of thanks was given by **Prof. Ashwani Wanganeo**, Director, University Institute of Technology (UIT), Barkatullah University who is also the convener of IEIE 2017.



The keynote address was given by **Dr. K.K. Vass**, *Ex Director, ICAR-CIFR* on *India's Food Security in Climate Change Scenario*. He emphasized the need to prioritize and focus on vulnerability hot spots of India, the prudent use of natural resources and capacity building. According to him more funds will be allocated in future for the more production of food crops and to combat the environmental pollution.

Dr. Susan Titus, from Naval Materials Research Laboratory (DRDO), Mumbai in her invited talk highlighted the *importance of biosurfactant for the bioremediation of floating oil to curb oil pollution*.

Dr. R.K. Langer, *Ex Senior Scientist, ICAR* talked on *integrated fish farming system where fish culture is integrated with live stock, poultry and crop production, multi-utilization of animal manure and waste produce on the farm*. It promotes optimum utilization of land, water, manpower and farm products.

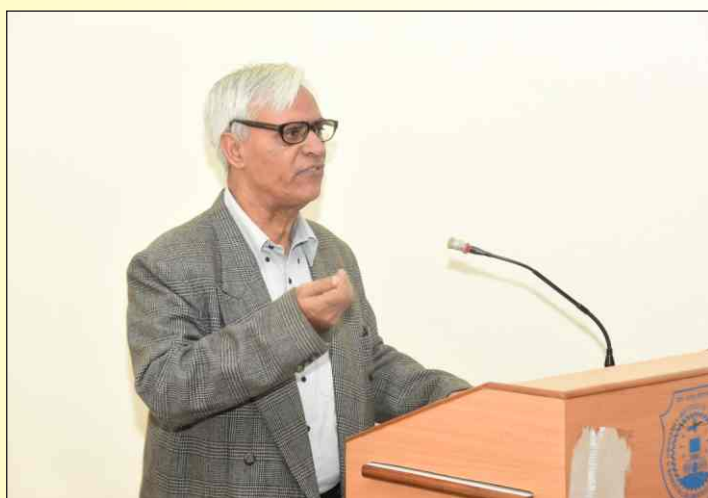
Dr. Sushil Kumar Singh, DRDO had thrown light on the *product of silk cocoon membrane (SCM) to sense the change in temperature and humidity of the surrounding environment which can be translated into electrical signals*. He has also elaborated upon the use of the SCM to hold electrical charge storage over a period of time like a battery or a capacitor.

Dr. Rishi Kumar Saxena, Bundelkhand University highlighted the importance of *toxicity testing in waste water treatment plants* and the usage of bacterial and enzymatic assays for the same.

Dr. Mohammad Iqbal Khan, Bundelkhand University had talked about the *cultivation of various types of fishes like Talapa, Silvera Carp, Common Carp and Bighead Carp*. The advantages as well disadvantages associated with fish cultivation were discussed at great length.

Prof. M.K. Das, *Dy. Director, NIMR, Ranchi* had delivered his special talk on the *peculiar type of malaria in the primitive tribes of Andaman and Nicobar Islands of India, the Jarwas and Nicrobarese*. He had emphasized on the relatively low level of polymorphism in the *Plasmodium falciparum* parasite infecting the Jarwas as compared to other people as revealed by genetic diversity studies.

In all, near about **15 oral presentations** were given in **5 technical sessions**. **Forty poster presentations** were included on the first and second day of the conference. The posters presented were of two types, **hand-made drawings** and **flex posters**. The **four best oral presentations** were awarded and **three awards** each were given for



Dr. R.K. Langer giving an invited talk during the conference.



Dr. Sushil Kumar Singh giving an invited talk during the conference.



Oral presentation during the conference.



Dr. Balwant Singh Rawat acted as Chairperson during the session.



Dr. M. Ghorai giving his oral presentation during the conference



Oral presentation during the conference



Dr. Arjun Shukla giving his oral presentation during the conference



Dr. M.K. Das giving his special talk during the conference



Dr. Kishore Kumar receiving the Memento from Dr. Maryam Sarwat for chairing the session



Dr. Rishi Kumar Saxena receiving Memento for Invited Talk from Prof. Javed Ahmad and Dr. AK Verma during the conference



Dr. M.K. Das receiving the Memento from Prof. Javed Ahmad for his Special talk



Dr. A.K. Verma receiving the Memento from Prof. Javed Ahmad for chairing the session



Prof. Shukla, Registrar, Barkatullah University welcoming Chief Guest Dr. Rajiv Sharma, Secretary, SERB, (DST) Govt. of India.



Prof. Ashwani Wanganeo, Convener, IEIE 2017 welcoming Prof. Shukla, Registrar, BU during the valedictory session.



Prof. Ashwani Wanganeo, Convener, IEIE 2017 receiving a Memento from Prof. Javed Ahmad, President, NESA.



Prof. Shukla, Registrar, Barkatullah University, Bhopal presenting Memento to Dr. Rajiv Sharma, Secretary, SERB, (DST) Govt. of India during the valedictory session.

hand-made and flex posters. The best full length papers will be compiled in the journals published by NESA.

The AGM of NESA 2017 also held at 6:00 PM at Gyan Vigyan Auditorium, Barkatullah University, Bhopal. The delegates and officials of the NESA participated in the meeting. The views of the delegates were recorded. Dr. Kishore Kumar, Treasurer, NESA put the exhaustive report based on scientific, administrative and financial matters before the house. In the last the President thanked the delegates for active participation and for raising the funds for NESA.

The valedictory session was held on 24th December 2017. The Chief Guest of the occasion was Dr. Rajiv Sharma, Secretary, SERB (DST), Govt. of India who had highlighted the various funding opportunities available for Indian Scientists and young researchers.

Prof. U. N. Shukla, Registrar, Barkatullah University gave his views on the importance of ethics and culture to protect the human environment.

Prof. Javed Ahmad, President NESA had later given a summarized view of various important events of the conference and highlighted the points of the key note addresses, invited and special talks.

Various NESA awardees e.g. **SCIENTISTS OF THE YEAR 2017** were given to **Dr. Reeta Singh**, Department of Home Science, Rohtas, Bihar; **Dr. Pramesh D.**, Raichur, Karnataka; **Dr. Prabhu Nayaka**, Navsari Agricultural University, Navsari, Gujarat; **Dr. Kinjal Kumar A. Shah**, Navsari Agriculture University; Navsari, Gujarat; **Dr. Anand S.R.**, Kanakagiri, Gangavathi, Karnataka; **Dr. Krishnamurthy S.L.**, Central Soil Salinity Research Institute, Karnal, Haryana; **Dr. K. Chitra**, Anbil Dharmalingam Agricultural College, Navalurkottapattu, Tiruchirappalli, Tamil Nadu; **Dr. Santa Kumar Dibedi**, Orissa University of Agricultural and Technology, Odissa; **Dr. Boyina Rupini**, Department of Environmental Science; IGNOU, Maidan Garhi, New Delhi; **Dr. R. Patil**, USA, Raichur, Karnataka; **Dr. Balwant Singh Rawat**, Graphic Era Hill University, Dehradun, Uttarakhand; **Dr. Seema Singh**, Kashmir University Srinager, Jammu & Kashmir; **Dr. Vinit Kumar**, Bundelkhand University, Jhansi, U.P.; **Dr. Amjad Masood Husain**, Sher-e-Kashmir University of Agricultural Science and Technology of Kashmir, Jammu & Kashmir; **Dr. Suhaib Ahmad Bandh**, Environmental Sciences, S.P. College, Srinagar, Jammu & Kashmir; **Dr. Naser Aziz Anjum**, Department of Botany, Aligarh Muslim University, Aligarh, Uttar Pradesh; **Dr. I. Shanker Goud**,

University of Agriculture Sciences; Raichur, Karnataka; **Dr. Vinay S. P. Sinha**, Department of Natural Resources, Teri University, New Delhi; **Prof. M. Jagannadha Rao**, Andhra University, Visakhapatnam, Andhra Pradesh; **Dr. Padmanabha B.**, Post Graduate Dept. of Applied Zoology, Maharani's Science College for Woman, Mysore, Karnataka; **Dr. Tapas Ranjan Das**, IARI, PUSA, District Samastipur, Bihar and **Dr. Mrinmay Ghorai**, Department of Zoology, Puurba Medinapur, West Bengal.

ENVIRONMENTALIST OF THE YEAR 2017 was given to **Dr. Jitendra Kumar Nagar**, Department of Environmental Sciences, Dr. Bhim Rao Ambedkar College, University of Delhi, Delhi.

JUNIOR SCIENTIST OF THE YEAR AWARDS 2017 were given to **Mrs. Ramya**, Bharathiar University, Coimbatore, Tamilnadu; **Dr. Basavarajeshwari R. Mathapati**, Bangalore, Karnataka; **Dr. Jayasima G. T.**, Faridabad, Haryana; **Mr. Arjun Shukla**, Department of Zoology, Jabalpur, Madhya Pradesh; **Dr. Santanu Mukherjee**, University of Georgia, AIKEN, Sought Carolina; **Dr. Poornima**, Dept. of Agricultural Entomology, College of Agriculture, UAS, Raichur, Karnataka; **Dr. D. Raja Rajan**, Adhiyamaan College of Agriculture and Research, Tamil Nadu; **Dr. Gangadharan S.**, Adhiyamaan College of Agricultural, Tamil Nadu; **Dr. Anjan Kumar Naik**, Department of Entomology,

University of Agricultural, Dharwad, Karnataka; **Dr. Praveen Kumar. D. Agasimani**, Agriculture Extension Education Center, UAS, Dharwad, Karnataka; **Dr. P. Lakshmana Kumar**, Adhiyamaan College of Agriculture and Research, Tamil Nadu; **Dr. Raja**, Aland Road, Kalaburagi, Karnataka; **Dr. Abdulkhadar H. Birdar**, Center, Mudhol, Karnataka; **Dr. Amit Kumar Mandal**, Department of Sericulture, Raiganj University, Uttar Dinajpur, West Bengal; **Dr. Kinkar Biswas**, Department of Chemistry; Raiganj University, West Bengal; **Dr. Shilpa Malaghan**, Department of Plant Breeding; UAHS, Shimoga, Mudigeri, Karnataka; **Mr. Ashok Kumar Dhakad**, Department of Forestry; Punjab Agricultural University, Ludhiana, Punjab; **Mr. Vikas Kumar**; Kerala Agricultural University, Thrissur, Kerala; **Dr. Nandini**, Department of Entomology, College of Agriculture, Raichur, Karnataka; **Dr. Raghavendra**, Dept. of Agricultural Entomology, College of Agriculture, UAS, Raichur, Karnataka; **Dr. Shrikant**, College of Agriculture, UAS, Raichur, Karnataka; **Dr. Mullikarjan**, Dept. of Agricultural Entomology; UAS Raichur, Karnataka; **Dr. Shivanna B.**, Shimoga, Karnataka; **Dr. Madhu G.**, College of Agriculture, Navile, UAHS, Shivamogga, Karnataka; **Dr. Pallavi M.S.**, Pesticide Residue and Food Quality Analysis Laboratory, University of Agriculture Science, Raichur, Karnataka; **Mr. Vivesh Kumar**, IARI, PUSA, New Delhi; **Mr. Chandan Kumar Singh**, IARI, PUSA, New Delhi; **Mr. Rama Krishna Chopperla**, Indian Institute of Rice Research, Hyderabad, Telangana;



SCIENTIST OF THE YEAR 2017 was presented to **Dr. Padmanabha B.**, Mysore, Karnataka; by **Dr. Rajiv Sharma**, Secretary, SERB, (DST) Govt. of India, during the valedictory function



ENVIRONMENTALIST OF THE YEAR 2017 was presented by **Prof. Shukla**, Registrar, BU to **Dr. Jitendra Kumar Nagar**, **Dr. BR Ambedkar College, Delhi**



Dr. Sushma Tiwari receiving **DISTINGUISHED SCIENTIST AWARD 2017** from **Dr. Rajiv Sharma**, Secretary, SERB, (DST) Govt. of India



Dr. R.S. Tomar receiving **DISTINGUISHED SCIENTIST AWARD 2017** from **Dr. Rajiv Sharma**, Secretary, SERB, (DST) Govt. of India

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Pet/animal assisted therapy

S. K. Basu

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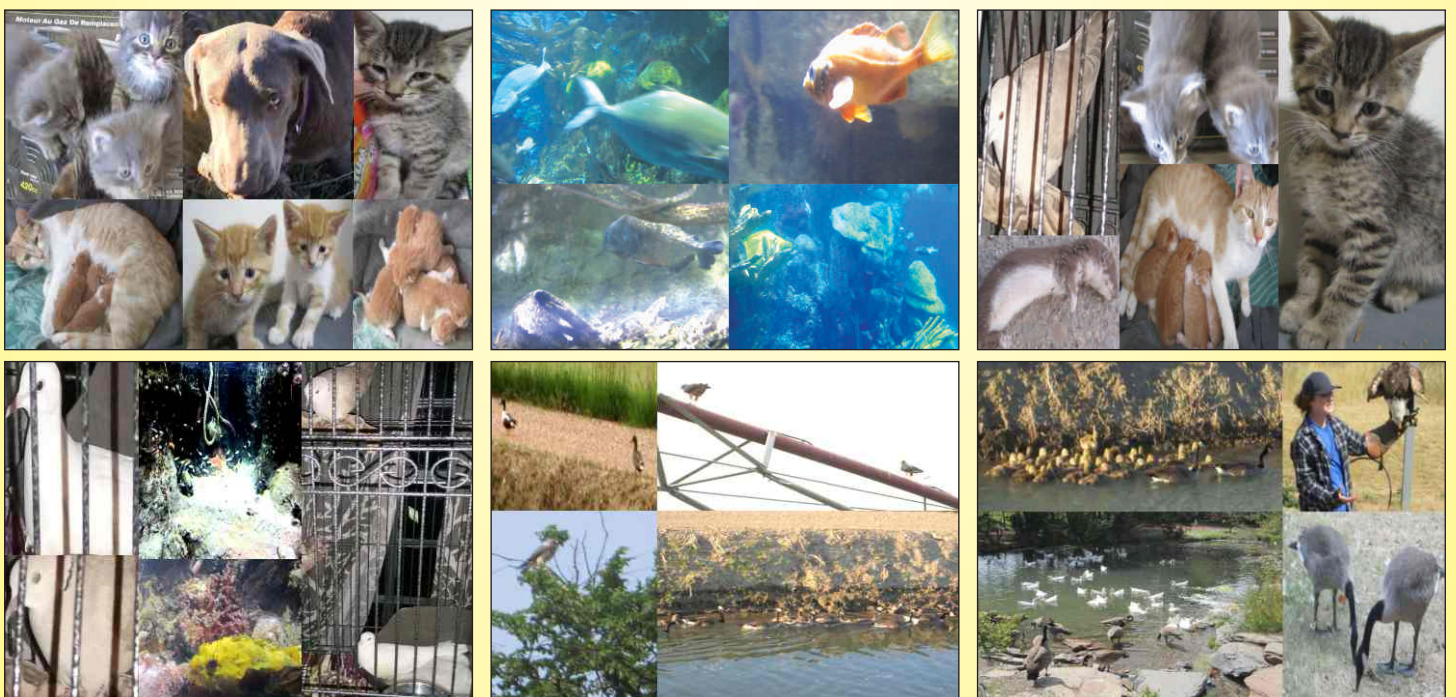
Pet/animal assisted therapy is slowly getting world wide recognition and can be considered as an innovative and holistic medicine approach that can have significant positive impacts on patient care, treatment and recovery. The animal assisted therapy has been found to be greatly successful in treating children as well as senior citizens with critical mental trauma, terminal diseases, neurological disorders, serious physical disabilities, depression related disorders, life threatening medical conditions, cancer, Alzheimer's disease to name only a handful. Even children under treatment with serious family based abuse and violence, institutional trauma, sexual violence or abuses; or even marginalized people or refugees or soldiers or war victims with serious mental trauma, post trauma stress syndrome, victims of verbal, physical and sexual abuses all have been reported to have recovered quite successfully through pet/animal assisted therapy in conjunction with medication and other necessary advanced medical treatments.

It is important to note our lives across the globe whether in developed or developing and under developed nations are becoming more difficult or critical with the use and integration of advanced technology in our lives. People are getting addicted to internet surfing, visiting porn sites, social network platforms, selfies and several other aspects of modern life that is only making our life more challenging and extremely complicated. We do not sleep well and are constantly on our android or smart phones all through the day, addicted to television soap operas and in consuming fast foods due to paucity of time. Our working conditions are also getting more challenged and high pressured; and we are using ourselves in social rat races that are making us isolated from the community or family in which we reside without even knowing it.

The kids and children are the worst victims of the process together with senior citizens as they are transformed into social outcasts as we do not have much time for them to share and care. Busy parents depend on Daycares for raising their children. We are putting our ailing parents and close relatives in Senior Citizens Assistance Program in Senior Citizen Homes; as we do not want to take any responsibility and we have extra money to afford that. Our cities are being transformed into concrete jungles with open spaces becoming a rare privilege. Our air is choked with pollutants making normal breathing difficult. It is going to impact the meaning and quality of our life. We are seriously going to be more prone to several diseases and disorders that we were not so exposed a few decades back like unrestricted rise in cases of mental depression, diabetes, cancer, obesity, hearing related issues. Most important of all, we do not have time for anyone including ourselves; that is the most important and alarming challenge of our modern human life.

Nature has an important place in our life that helps to cope with the regular stresses that we face in our everyday life and even under challenging conditions like diseases and disorders. Pet/animal therapy thus has an integral part in our treatment process; as pets have been associated with human civilizations from time immemorial. Since the birth of human civilizations, humans have been associated with animals as pets that have changed and reshaped our life. Be an assistant in the hunting process or a pure companion, pets have rejuvenated our lives from prehistoric dates to modern city life. Hence the positive therapeutic impact of pets in medical treatment for having positive psychological impact cannot be ignored.

Dogs, cats, farm animals, birds, aquarium fishes, caged reptiles and amphibians all have been found to have positive therapeutic effects on humans particularly kids and senior citizens. Display of big aquariums are now being recommended in major western nation hospitals as it has been found to have a very positive calming effect on disturbed and anxious minds on people visiting hospitals for various treatments. Pets have always served as great companion for humans; hence their use for therapeutic purposes has huge



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Turf grass industry: A big economic opportunity for India

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The turf grass business is a billion dollar global industry; and several western nations across EU, North America (predominantly USA), Australia and New Zealand are among the leaders of this big industry. Various turf grasses and their mixes or blends cater to lawn and garden development and maintenance for big corporate businesses, multi-national companies, stadiums, golf courses, city boulevards, parks and gardens in developed nations. Different turf mixtures are available in the global market varying from full sun to various moderate and lighter shades, salt and draught tolerant cultivars to highly resistant varieties to extensive and repeated soil disturbances and heavy traffic on the grasses. Turf grasses are also suitable for use in both domestic and corporate lawns, in urban and rural landscaping, beautification of towns and cities; and well as in commercial and amateur sports ground that need grasses for their surface. Some turf grasses have also been developed for successful phytoremediation purposes too. The turf grass industry looks into genotypes that can provide durable and economic mixture featuring fast germination and rapid ground establishment that can keep weeds at bay, helps in soil binding and reduces the dust level generated from turf disturbances and high traffic conditions.

Such grasses are specially reared and selected for fast and successful germination once broadcasted into the soil, deep penetrating root system for quick and robust establishment, tolerance to heavy traffic and soil disturbances, durability, density, uniformity, annual/perennial performance, ability to regenerate

and quickly colonize open spaces, strong weed competition, disease resistance, low maintenance requirements, high water use efficiency; as well as summer (heat) and winter (cold) tolerance depending upon the geographical locations. Special selections are made for desirable turf grasses under highly monitored, multi-locational field trials for high salt and draught tolerance, low fertility requirements, fast germination, fast establishment, stand quality, stand growth, disease resistance and rapid regeneration ability subjected to heavy traffic and soil disturbances. Separate trials are conducted for warm and cool season grasses to cater to specific customer needs and requirements depending upon latitudinal variations in agronomic and micro-climate parameters; particularly for southern latitudes and transition zone climate areas.

Seed technology has rapidly advanced in the turf grass industry with both uncoated and coated seeds available depending upon specific customer requirements. Seed coating has emerged as one of the biggest technological innovation in both turf and forage grass industry across the western world for its multiple benefits. Berenburg USA is one of the leading companies in US that successfully developed premier and unique, commercially successful Enhanced and Yellow Jacket seed coating technologies for different turf grasses like Kentucky Blue Grass, Annual Ryegrass, Perennial Ryegrass, Bermuda grass, Tall Fescue, Fine Fescue to name only a handful. The following tables highlight the unique features of the turf grasses developed by Barenburg as an example of the diversity of the products and their multiple uses. Several other companies across USA, Canada, EU, Australia and New Zealand also have wide diversity of products and highly advanced technology for rapid germination, stand establishment and ground coverage under various challenging conditions.

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potential of only a very small portion of positive benefits have been explored till date. However, it is important to note that such animals particularly dogs that are extensively used in the therapeutic process have to be trained very well and be gentle and love being hold tight by patients or comfortable in presence of all kinds of people like kids, seniors. Even making patient visiting farms or nature areas in close proximity of animal and birds have also been found to have very significant positive therapeutic effects. Pet/animals assisted therapy therefore has a bright future; and need to be explored further for curing people. Several other animal species as indicated in the accompanying images are being studied now for their potential to develop into newer models of pet/animal assisted therapy in the not so distant future.

Photo credit: S. K. Basu



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Table 1: RPR (Regenerating Perennial Ryegrass)

| Feature | Advantage | Benefit |
|--|--|--|
| RPR (Regenerating Perennial Ryegrass) | <ol style="list-style-type: none"> 1. Excellent turf quality 2. High traffic tolerance 3. Early establishment | <ol style="list-style-type: none"> 1. Thick, uniform turf/lawn 2. Better regeneration rate, quick recovery and easy maintenance 3. Better germination and higher emergence rate 4. Highly suitable for sport and recreation turf facilities, golf courses and home lawns 5. Competes well when over-seeded into existing turf 6. Cold hardy & salt tolerant |
| RPR (Regenerating Perennial Ryegrass) | Plants characterized by determinate stolons allowing regeneration in all directions | <ol style="list-style-type: none"> 1. High traffic tolerance including extreme traffic pressures or persistent traffic pressures 2. Turf of choice for high traffic perennial ryegrass areas including sports turf, parks, school ground and golf courses 3. High endophyte content for improved stress tolerance and strong transition zone performance 4. Higher disease resistance and insect tolerance |
| RPR with Yellow Jacket (Enhanced Seed Coating) available | Enhanced Seed Coating | Better germination, emergence, high disease resistance, easier establishment, low water use |

RPR Varieties: **Barbetta, Bargamma** and **Barlibro** with RPR Technology available in several mixes

RPR 100% available both uncoated or with Yellow Jacket Technology

Turf Star RPR - 65% RPR + 35% Traditional Perennial Ryegrass available both uncoated or with Yellow Jacket Technology

Turf Blue RPR/Turf Blue HGT: 20% RPR Technology for superior improved traffic tolerance and faster recovery

SOS Maxx + RPR: Finest turf Annual Ryegrass + RPR for superior improved traffic tolerance and faster recovery

Perennial Ryegrass available varieties: **Pinnacle II, Pinnacle III, Barlennium, Bargold, Peak, Premier II & Piroutte II;** **Annual Ryegrass available varieties:** **Panterra**

Table 2: HGT (Healthy Grass Technology) Kentucky bluegrass engineered for turf health

| Feature | Advantage | Benefit |
|---|---|--|
| Barenburg HGT mix of Kentucky bluegrass | Hardy, disease resistant with high traffic resilience along with rapid recovery and better tensile strength | <ol style="list-style-type: none"> 1. Quick germination and rapid establishment 2. Easy maintenance 3. Higher percent of ground covered 4. Better turf quality 5. Safe, natural and green protection |
| Barenburg HGT mix of Kentucky bluegrass | Exceptionally strong Spring green up | <ol style="list-style-type: none"> 1. Allow Turf Blue HGT blend to come back early 2. Strong when spring play is needed and field regrowth is required |
| Barenburg HGT mix of Kentucky bluegrass | High resistance to summer patch and rust | <ol style="list-style-type: none"> 1. Uniform, thick turf 2. Less chances of having open/barren disease impacted parts of lawn/turf 3. High summer patch tolerance under various growing conditions 4. Better cost-efficient maintenance |

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| | | |
|---|-----------------------|---|
| Yellow Jacket Technology available with HGT mix of Kentucky bluegrass | Enhanced Seed Coating | Better germination, emergence, high disease resistance, easier establishment, low water use |
|---|-----------------------|---|

Varieties available: Barvette HGT

Kentucky bluegrass available varieties: Barimpala, Barrari, Barduke, Barrister, Baron

Tall Fescue available varieties: Barlexas II, Barrobusto, Barvado, Barington II, Bearcat

Fine Fescue available varieties: Barcrown II, Bridgeport II, Hardtop, Contender (Strong Creeping Red Fescue) & Barok (Sheep fescue)

Table 3. RTF (Rhizomatous Tall Fescue) Turf Saver

| Feature | Advantage | Benefit |
|--|--|--|
| Rhizome are horizontal plant stem found in grasses | Rhizome send out new roots and shoots | Allowing new plants to propagate at a distance from the mother plant |
| | Turf Saver's rhizome roots fill in bare spots in a thinning lawn | |
| Turf Saver RTF Technology | Turf Saver's rhizome roots fill in bare spots in a thinning lawn | 1. Thick, even, lush, soft-to- touch turf 2. Better and uniform propagation 3. Better establishment and coverage |
| Turf Saver RTF Technology | Promotes deep rooting plants, roots traveling down to 6 ft tapping into water normally not available | 1. Greater tolerance to heat and dry conditions 2. Saves over-seeding costs of damaged turf 3. Saves irrigation equipment and reduce water use |
| Turf Saver RTF Technology | Draught tolerant than other species | 1. Reduced cost of maintenance 2. Water conservation |

Table 4: Yellow Jacket Technology (Enhanced Seed Coating)

| Feature | Advantage | Benefit |
|---|---|--|
| Yellow Jacket Technology includes super-absorbent technology, advanced nutrient packaging, seedling disease protection and Aquatrol Seed Enhancement Technology (SET) | Enhanced Seed Coating | 1. Better germination, emergence, high disease resistance, easier establishment, low water use 2. Ideal for less than optimal weather conditions 3. Ideal when conditions of use and play does not allow normal parameters of seed establishment |
| Yellow Jacket Super Absorbent Technology | Better absorbent seed coating | 1. Better establishment and low use of water 2. Reduced cost of establishment |
| Yellow Jacket has Zeba® (a superabsorbent technology) | Zeba® can hold 600 times its own weight of water | 1. Yellow jacketed seed thrives and establishes faster 2. Use less water |
| Zeba® can both hold and absorb fungicides | Protect and minimize seedling damages for 3 weeks post seeding | Better establishment, vigour and disease resistance |
| Yellow Jacket Technology also includes APRON® XL (Mefenoxam) | Mefonaxam is systemic fungicide protecting against <i>Phythium</i> sp. causing seedling disease | Seed treated with fungicide only quickly see protection move off and away from the seed and root hairs, significantly reducing fungicidal effectiveness |
| Yellow Jacketed Technology | Available for all Barenburg bentgrass varieties and premium turf bands including Turf Blue, Turf Blue HGT, RPR, RTF and Dunes mix of Fine Fescues | All the above |
| Yellow Jacket + Aquatrol Seed Enhancement Technology | Doubling the Seed Enhancement Technology (SET) with world class Surfactant Technology (ST) for higher benefits in raising turf grasses | Added benefit of improved water use efficiency under various growing parameters |
| When rainfall or irrigation is applied, Aquatrol's soil surfactant coating washes off the seed, creating hydrophilic conduit beneath the seed | Conduit serves as bridge between soil surface and subsoil moisture below, making water immediately available to the seed upon germination | 1. Faster plant establishment 2. Increased root and shoot mass production |

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Table 5. Supercharged bentgrass (With Yellow Jacket Enhanced Seed Coating)

| Feature | Advantage | Benefit |
|---|---|--|
| First ever combination of top-rated bentgrass | It has the Barenburg revolutionary Yellow Jacket Enhanced Seed Coating | <ol style="list-style-type: none"> 1. Significant improvement over germination and establishment 2. Reduced water consumption 3. Lower establishment cost |
| Yellow Jacket Technology is like having absorbent sponge around individual seed | Once water is applied yellow jacket hold both water and nutrients around the seed | <ol style="list-style-type: none"> 1. Higher germination 2. Better emergence and establishment 3. Lower establishment cost |
| Yellow jacketed seed has increased density and size | It helps in improved, uniform and accurate spreading of bentgrass seed | <ol style="list-style-type: none"> 1. Coated seed stays in place 2. When over seeded, seed quickly move s through turf canopy to soil |
| Yellow Jacket has Zeba® (a superabsorbent technology) | Zeba® can hold 600 times its own weight of water | <ol style="list-style-type: none"> 1. Yellow jacketed seed thrives and establishes faster 2. Use less water |
| Zeba® can both hold and absorb fungicides | Protect and minimize seedling damages for 3 weeks post seeding | Better establishment, vigour and disease resistance |
| Yellow Jacket Technology also includes APRON® XL (Mefenoxam) | Mefonaxam is systemic fungicide protecting against <i>Phythium</i> sp. causing seedling disease | Seed treated with fungicide only quickly see protection move off and away from the seed and root hairs, significantly reducing fungicidal effectiveness |



India has been rapidly developing into an economically emergent global super power. The next two decades are expected to be an opportunity for exponential growth in Indian economy; as projected by most international financial institutions. India needs to become part of this global turf grass industry and occupy a niche within the industry to capture highly demanding international customers and cater to their specific needs. The advantage for India is her cheap and vibrant labour force, highly skilled English speaking technological and innovation support staff, good governance and management. Furthermore, India has varied agro-climatic conditions from north to south; another added advantage for conducting several multi-locational trials within the country to selected and identify several genotypes under varying environmental conditions. Other emergent economies and BRICS member nations like China, South Africa and Brazil are also showing active interest in developing their turf grass industry for international customers. India cannot wait too long and loose the market to her future competitors. Sky is the limit with opportunities profit returns very high to boost the agricultural sector and in earning foreign currency. *Photo credit: S. K. Basu*

A Year Named to Planets!

Aayush Anand

Modern Delhi Public School
Faridabad, HR



The cosmos is full of mysteries. The expanding universe has no limitations. Each day some new object is coming into notice whether it is a star, galaxy or an exoplanet. An exoplanet or also known as an extrasolar planet is any planet outside our solar system that orbits a star. They form a considerable part of the astronomical discoveries from as early as 1917 (but not recognized as such). However, the first scientific detection of an exoplanet was in 1988 while the first confirmed detection came on 9th January 1992 when radio astronomers Aleksander Wolszczan and Dale Frail announced the discovery of two planets orbiting the pulsar PSR 1257+12. This is generally considered to be the first definitive detection of exoplanets. As on 1st January 2018, 3726 planets in 2792 systems have been found with 622 systems having more than one planet. HARPS (High Accuracy Radial Velocity Planet Searcher) has discovered about a hundred exoplanets (since 2004) while the Kepler Space Telescope has found more than two thousand (since 2009). The astronomers have a particular interest towards those planets which orbit in a star's habitable zone as they may have a possibility of liquid water on its surface essential for the existence of life on its surface even though the study of planetary habitability notes a large range of other factors in determining the suitability of a planet for providing life. 2017 was one such year which gave the opportunity for the discovery of many exoplanets, among who two were the most promising and important. "This has been a remarkable year for exoplanet discoveries," concluded co-authors Dr. Xavier Delfosse and Dr. Xavier Bonfils, both at the CNRS and IPAG in Grenoble, France.

Trappist-1 Planetary System

This planetary system revolves around an ultra-cool red dwarf star 'TRAPPIST-1' or 2MASS J23062928-0502285 located at a distance of about 39.6 light years away from the Sun in the constellation Aquarius. The planetary system consists of seven temperate and terrestrial planets (which is a larger number as compared to that of any other exoplanetary system) as discovered on February 22, 2017 among which five (b, c, e, f, g) are of the size similar to earth while the rest two (d, h) lie intermediate between Mars and Earth in size. The beneficial point is that three of them namely e, f and g lie in the habitable zone.

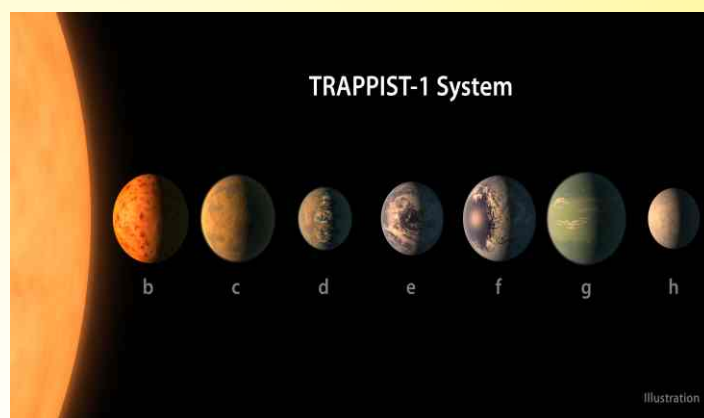
Discovery

A team led by Michael Gillon at the University of Liege in Belgium first discovered three earth-sized planets in 2015 using transit photometry with the Transiting Planets and Planetesimals Small

Telescope (TRAPPIST) at the La Silla Observatory in Chile. NASA Spitzer Space Telescope and the Very Large Telescope at the Paranal reported four additional exoplanets around TRAPPIST-1 among whom three were found habitable. "Our results really help constrain the evolution of the TRAPPIST-1 system, because the system has to have persisted for billions of years," said Professor Adam Burgasser, an astronomer at the University of California, San Diego.

Formation

A research team says, "The TRAPPIST-1 planetary system – a compact system of at least seven exoplanets with sizes similar to Earth – formed between 5.4 and 9.8 billion years ago. This is up to twice as old as our own Solar System."



The Amsterdam researchers come up with a model where pebbles migrate instead of complete planets. "The model begins with pebbles that are floating from outside regions to the star. Such pebbles consist largely of ice. When the pebbles arrive near the so-called ice line, the point where it is warm enough for liquid water, they get an additional portion of water vapor to process. As a result, they clot together into a proto-planet. Then the proto-planet moves a little closer to the star. On its way it sweeps up more pebbles like a vacuum cleaner, until it reaches the size of the Earth. The planet then moves in a little further and makes room for the formation of the next planet. The crux, according to the researchers, is in the clotting of pebbles near the ice line. By crossing the ice line, pebbles lose their water ice. But that water is re-used by the following load of pebbles that is drifting from the outer regions of the dust disk. At Trappist-1, this process repeated until seven planets were formed." The research leader Chris Ormel at the University of Amsterdam said "For us, Trappist-1 with its seven planets came as a welcome surprise. We have been working on pebble aggregation and sweepup by planets for a long time and were also developing a new ice-line model."

Comparison

| TRAPPIST-1 Planetary System | | | | | |
|--------------------------------|-----------------------|---------------------------|-----------------------|----------------------|-------------------------|
| Companion (in order from star) | Mass (M_{\oplus}) | Semi-major Axis (AU) | Orbital Period (Days) | Inclination (Degree) | Radius (R_{\oplus}) |
| b | 0.79 | 0.01111 (1.66 million km) | 1.51 | 89.65 | 1.086 |
| c | 1.63 | 0.01522 (2.28 million km) | 2.42 | 89.67 | 1.056 |
| d | 0.33 | 0.02145 (3.21 million km) | 4.049 | 89.75 | 0.772 |
| e | 0.24 | 0.02818 (4.22 million km) | 6.099 | 89.86 | 0.918 |
| f | 0.36 | 0.0371 (5.55 million km) | 9.206 | 89.68 | 1.045 |
| g | 0.566 | 0.0451 (6.75 million km) | 12.352 | 89.71 | 1.127 |
| h | 0.086 | 0.0596 (8.92 million km) | 18.766 | 89.8 | 0.715 |



All planets are possibly tidally locked, i.e. their one side is permanently turned towards the star which makes life more difficult on these planets as the differences between the permanently lit day sides and permanently dark night sides producing highly strong winds revolving the planet. On the other hand, tidal heating is supposed to be important. All planets except f and h are expected to have a tidal heat flux greater than earth's total heat flux.

"This is the most exciting exoplanet I've seen in the past decade," said Dr. Jason Dittmann, an astronomer at the Harvard-Smithsonian Centre for Astrophysics and lead author of the Nature paper.

"A simple structural mode consisting of a dense iron core surrounded by a magnesium silicate mantle can explain the observed mass and diameter. We conclude that LHS 1140b is a rocky planet without a substantial gas envelope," Dr. Dittmann and his colleagues explained.



Super Earth LHS 1140 b

The planet was discovered in 2017 by the MEarth Project while its radial velocities were measured by High Accuracy Radial Velocity Planet Searcher. 'LHS' refers to the Luyten Half-Second Catalogue of stars with proper motions exceeding half a second of arc annually.

"When red dwarf stars are young, they are known to emit radiation that can be damaging for the atmospheres of the planets that orbit them. In this case, LHS 1140b's large size means that a magma ocean could have existed on its surface for millions of years. This seething ocean of lava could feed steam into the atmosphere long after the star has calmed to its current, steady glow, replenishing the planet with water. The present conditions of the red dwarf are particularly favourable – LHS 1140 spins more slowly and emits less high-energy radiation than other similar low-mass stars," added co-author Dr. Nicola Astudillo-Defru, an astronomer at Geneva Observatory in Switzerland.

LHS 1140 b is a rocky planet also present in a habitable zone of LHS 1140, the red dwarf it orbits in the constellation of Cetus. The system is at a distance of about 41 light years from the Sun. It probably gives an opportunity for the study of its atmosphere along with its orbiting star.

"The LHS 1140 system might prove to be an even more important target for the future characterization of planets in the habitable zone than Proxima b or TRAPPIST-1," concluded co-authors Dr. Xavier Delfosse and Dr. Xavier Bonfils, both at the CNRS and IPAG in Grenoble, France.

- Mass: 6.65 M \oplus
- Semi-major axis: 0.0875 AU (nearly circular)
- Orbital period: 24.7 days
- Inclination: 89.912 degrees
- Radius: 1.43 R \oplus
- Density: 12.5 g/cm³
- What the Astronomers Say?

But this is not the end. Each new day is coming up with new opportunities for the discoveries in the space with the numbers exceeding the last year's records. No doubt our world is advancing towards this adventurous journey of digging out the secrets of the universe and knowing more about it.

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Dr. Shantamma, Department of Plant Pathology, UAS, GKVK, Bengaluru; **Mr. Sourab Karwa**, IARI, PUSA, New Delhi; **Md. Iqbal Raja Khan**; International Rice Research Institute, Philippines; **Dr. Janesha A.C.**, CSIR-CIMP, Research, BODUPPAL, Hyderabad; **Dr. Asim Masood**, Department of Botany; Aligarh Muslim University, Aligarh, Uttar Pradesh; **Dr. Pradeep Kumar**; Department of Zoology, Muhammadabad Gohana, Mau, Uttar Pradesh; **Dr. Harischandra Naik R.**, Pesticide Residue and Food Quality Analysis Laboratory, University of Agriculture Science, Raichur, Karnataka; **Dr. Sangeeta Singh**, National Research Centre on Plant Biotechnology, IARI, PUSA, New Delhi and **Dr. Chandrasekar A.**, Department of Crop Physiology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu in the valedictory session on **24th December 2017**.

The conference ended by vote of thanks from **Dr. Maryam Sarwat**, Senior Assistant Professor, Amity University, Noida and Organizing Secretary of the Conference.

Funding agencies were also acknowledged by her during vote of thanks including **SERB (DST), Govt. of India**, and **DRDO, Delhi Govt. of India**. M.P. State Biodiversity Board was also gratefully acknowledged for the financial support.

Sponsorships from **ONGC (Vasant Kunj, New Delhi)**, **REX Pharmaceuticals (G.T. Karnal Road)** and **BUSINESS AND EMPLOYMENT BUREAU, Hamdard Building, Asaf Ali Road, Delhi** were also appreciated by the Academy.

Services rendered by the administrative staff of **UIT, Barkatullah University** and **NESA, New Delhi** were commendable.

The conference was declared closed after the feedback from the delegates at 6:00 p.m. on 24th December 2017.

RECOMMENDATIONS OF THE CONFERENCE

1. The Government budget 2018 should be agriculture centric and should promote agricultural activities.
2. Certain agri-district centres should be opened by the government for creating awareness amongst farmers to check the health of the soil for selection of particular crops.
3. Discounted raw material should be available to farmers for the economic cultivation.
4. Seeds for better quality crops (e.g. rice, wheat) should be made available by the agri-district centers to the farmers for increasing crop yield.
5. Crop waste burning should be banned to minimize the environmental degradation.
6. Tribal people should be involved in the conservation practices of forests.
7. Integrated fish farming system should be introduced where fish culture is integrated with live stock, poultry and crop production to improve pisciculture.
8. Production of safe energy should be increased and be supplied to the farmers on regular basis by the government.
9. Conservation plan for water bodies be taken up by the government on priority in the coming years.
10. Mitigation plan be initiated by the government to get rid of the effect of climate change by 2025



National Anthem during closing ceremony



To,

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