



7th International Conference on

Biodiversity Conservation and Ecosystem Management

July 26-27, 2018 Melbourne, Australia

Scientific Tracks & Abstracts Day 1

7th International Conference on

BIODIVERSITY CONSERVATION AND ECOSYSTEM MANAGEMENT

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Exploration of land-cover changes using GlobeLand30 (2000-2010) at the national level in MexicoRafael Moreno-Sanchez¹, Juan Manuel Torres Rojo², Francisco Moreno Sanchez³, Daniel Carver¹, Lily Niknami¹ and Elizabeth Clay¹¹University of Colorado Denver, USA²Centro Investigación y Docencia Económicas, México³Instituto Nacional de Investigaciones Forestales y Agropecuarias, Mexico

This study explored the Land Cover (LC) and LC transitions at national level in Mexico using the GlobeLand30 (GL30) land cover 30 meter resolution data sets for the years 2000 and 2010. This information was contrasted against the results of previous national level Land Cover (LC)/LC Change (LCC) studies and land cover/use digital data sets. According to GL30, wetlands and barelands have had the largest decreases in their areas during the 2000-2010 period (-13.33% and -9.26%, respectively), while artificial surface and grasslands have had the largest increases (7.38% and 4.00%, respectively). Cultivated (1.88%), forest (-0.47%), shrublands (-1.04%) and water bodies (-1.21%) show low changes during the 2000-2010 period. From the GL30 estimates of LC extent and percent change, those for the forest and cultivated classes were the most similar to those estimates reported in previous studies. The estimates for other LC classes show low agreement with previous studies and with a set of aggregated LC classes created from official digital LC maps. Worth noticing is the small decreased found for the GL30 Forest land cover class during the 2000-2010 period. This suggests a change in processes that in previous decades were reducing the extent of the forest cover in Mexico. The general reduction in LC transitions observed in the 2000-2010 GL30 data supports reports that allocations for some land covers/uses in Mexico have reached maturity and are tending to stabilize. The results of this study points to several needs for further research, such as carrying out assessments of the locational and classification accuracy of the GL30 data sets for Mexico. More specifically, there is a need to closely analyze the extent and changes in the GL30 artificial surface and wetlands LC classes.

Biography

Rafael Moreno-Sanchez has received his Bachelor's degree in Forestry from the Chapingo Autonomous University in Mexico. He has received his PhD in Natural Resources Management from Colorado State University in the USA. He has research, teaching and administrative experience including: Researcher for the National Institute for Forest, Livestock and Agriculture Research (INIFAP) in Mexico, the Director of the National Center for Disciplinary Research in Conservation and Improvement of Forest Ecosystems INIFAP (Mexico), Post-Doctoral Fellow with the Organization of American States-SEMARNAP in collaboration with the University of Western Ontario, Canada. He has been teaching full time since 1996 in the areas of natural resources management, sustainable development and geographic information science and technology. He is currently an Associate Professor in the Department of Geography and Environmental Sciences at the University of Colorado Denver.

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Activity pattern of Asiatic black bear and its hibernation related to the climate change by analyzing the camera trapping dataXuehua Liu¹, Babar Zahoor¹, Wanlong Sun¹, Pengfen Wu¹, Xiaodong Jia¹, Zixin Lv¹, Xiangyu Zhao¹, Xiangbo He², Baishuo He³, Qiong Cai⁴ and Melissa Songer⁵¹Tsinghua University, China²Shaanxi Foping Nature Reserve, China³Shaanxi Changqing Nature Reserve, China⁴Shaanxi Guanyingshan Nature Reserve, China⁵Smithsonian Conservation Biology Institute, USA

Asiatic black bear (*Ursus thibetanus*) is a protected wildlife species with conservation rank of Grade II. Due to its dangerous characteristics, black bear has been hardly researched for its detailed activity pattern. Currently, the quick development of camera tracking technique has made this research gap possible to be filled. In addition, the gradually serious conflicts between human and black bear call for more information on this animal. The hibernation behavior of black bear also can be a good indicator of climate change. This study is aiming at using camera trapping technique to catch the photos of black bear, mining the detailed information from infrared camera photos and analyzing the activity pattern of the animal. The camera trapping has been applied in the southern slopes of the Qinling Mountains for more than 5 years. We obtained total 429 camera photos of black bear from 2013 to 2016 and about 1/3rd of them were used for this study after preprocessing the data set. Our results showed that black bears in the Qinling Mountains: (1) Greatly occur in the daytime, (2) are active in the daytime and (3) are definitely absent from the trapping in January and February, and occasionally appear in November, December and March, which means the black bears' hibernation duration is 5 months from November to March generally, (4) the black bears use the forest habitat in a various way among high and low elevation natural forests, secondary forests and man-made forests. All these results can benefit the conservation of Asiatic black bear.

Biography

Xuehua Liu has her expertise in wildlife conservation and habitat assessment. She has been focusing on the giant panda and its habitat research for a long period. During the recent 10 years, she expanded her interests on other biodiversity species by applying the camera trapping techniques. She used the minded information from the animal pictures recorded by the infrared cameras to analyze the wildlife diversity, animal behaviors and patterns, habitat use and so on.

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Biodiversity conservation and enhanced medicinal properties in *Asparagus racemosus* Willd**Ashok Kumar and Parveen**

Forest Research Institute, India

The natural resources for medicinal plants have unscientifically been exploited forcing rapid depletion in their genetic diversity and biodiversity. Moreover, renewed global interest in herbal medicines may further deplete medicinal plant wealth, as about 95 % collection of medicinal plants for pharmaceutical preparation is being carried out from natural forests. *Asparagus racemosus* Willd, a member of family Liliaceae, is one of 32 plant species that have been priorities for cultivation and conservation by the National Medicinal Plant Board of Government of India. Extremely limited research has been carried out on genetic improvement and selection of desired types with higher root production and saponin content, a basic ingredient of medicinal value. The saponin not only improves defense mechanisms and controls diabetes but the roots of this species promote secretion of breast milk, improve lost body weight and considered as an aphrodisiac. It was emphasized to select desired genotypes with sufficient genetic diversity for important economic traits. The evaluation of 20 seed sources of *Asparagus racemosus* assembled different geographical locations of India revealed high degree of variability for traits of economic importance. The maximum genotypic and phenotypic variance was observed for shoot height among shoot related traits and root length among root related traits. The shoot height, genotypic variance, phenotypic variance, genotypic coefficient of variance, phenotypic coefficient of variance were recorded to be 231.80, 3924.80, 61.26 and 1037.32, respectively, where those for root length were 9.55, 16.80, 23.46 and 41.27, respectively. Maximum genetic advance and genetic gain were obtained for shoot height among shoot-related traits and root length among root-related traits. Index values were developed for all seed sources based on four most important traits and Pantnagar (Uttarakhand), Jodhpur (Rajasthan), Dehradun (Uttarakhand), Chandigarh (Punjab), Jammu (Jammu and Kashmir) and Solan (Himachal Pradesh) were found to be promising seed sources.

Biography

Ashok Kumar is a Scientist and Head of Genetics and Tree Propagation at Forest Research Institute, India. He has received numerous in-service awards/recognitions like Brandis Prize, Dr. Y S Rao Forestry Research Award in the national and international level. His research interests are forest genetics, agriculture, genetics and plant breeding.

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The role of protected areas in wildlife conservation of Republic Sakha (Yakutia)Vladimirtseva M V¹, Nikolai Ivanovich Germogenov¹, Solomonov N G¹, Okhlopkov I M¹ and Solomonov K S²¹Institute for Biological Problems of Cryolithozone-SB RAS, Russia²North-Eastern Federal University, Russia

The system of protected areas/PA in the northeastern Yakutia began its formation from the end of 60-70s of the XX century. Resource reserves Ygynnya in Upper Yana River basin, Chaigurgino in lower Kolyma River area and Jirkogo in the Middle Kolyma area. The Stolb Island in the Lena river delta and the sites Pokhodskaya Edoma and Rogovatka in lower Kolyma area as well as Berelekh Mammoth cemetery in Lower Indigirka basin were confirmed as nature memories. The greatest at that times reserve of Russia, Ust-Lensky State Nature Reserve, 12, 133 ha, was established in 1985. The PA different types intensification occurred in the middle 90s of the XX century in northeastern Yakutia. During the order by Yakutia President Michail E. Nikolaev realization, more than 20 PAs including nature parks, resource reserves and nature memorials were established and function from 2014 in Yakutia. In 1990-2000s, the largest resource reserves: Lena Delta, Terpei Tumus, Kytalyk, Kolyma Koren and Bear's Islands were arranged to protect endangered animal species. The analytical review of literature, found and own data let to evaluate PA role in the northeastern region in Yakutia in biodiversity of vertebrate fauna conservation. Own to protection regime of Ust-Lensky Reserve, the stabilization if marketable fish, birds and mammals population numbers are appeared in the last 35 years. The special importance of PAs had for the conservation, number restoration and range expansions of endangered bird and mammal species along the wall near-Arctic Yakutia territory (Siberian crane *Grus leucogeranus*, Brent goose *Branta bernicla*, Ross's gull *Rhodostethia rosea*, Spectacled *Somateria fischeri* and Steller's *Polysticta stelleri* eiders, Peregrine falcon *Falco peregrinus*, Gyrfalcon *Falco rusticolus*, Black-capped marmot *Marmota camtschatica*, Polar bear *Ursus maritimus*).

Biography

Vladimirtseva M V has completed her PhD in 2011 from North-East Federal University and postdoctoral studies from Institute for Biological Problem of Cryolithozone under Siberian Department of Russian Academy for Sciences. She is ornithologist-researcher in Laboratory of Mount and Subarctic System of this Institute. She has published 59 papers.

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Amphibian and reptiles of Yakutia, their distribution and biodiversity

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Four amphibian and three reptile species inhabit Yakutia, Amphibians: *Salamandrella keyserlingii*-Northern border of the species range runs along river valleys to Tit-Ary Island (River Lena), in Lower Yana and Indigirka Rivers - to 71° N. In 1970s, number of Siberian salamanders in summer period was 7-10 individuals for 1 m² in Lena Valley. At the last, the species number decreased and 1-3 individuals for 100 m of coastline were registered at the same region. *Rana arvalis* inhabits Lena valley and her tributaries. Northern border of the species range runs to 60° N, 124° E. The number is 1-15 individuals for 1/ha. *Rana chensinensis* is distributed in southern Yakutia by Aldan River and its tributaries valleys. The species goes to 60° N. The number is 15-20 individuals for 1 ha. All these three species are included to Yakutia Red Data Book. *Rana amurensis* is distributed on all Yakutia from West to East. It was discovered in north from 68° in valleys of rivers Lena, Yana, Indigirka and in the most northern point in Upper Yana region (71° N) and Reptiles: *Lacerta vivipara* is widely distributed in taiga zone of Yakutia. The northern border of the species range is 145° E in Indigirka basin. The number in Central Yakutia is low (single individuals were registered). *Vipera berus* by Lena valley, the species goes to 60° N. The number is 0.4 ind./ha. All mentioned reptiles included to Red Book of Yakutia. At the last years, *Gloydius halys* was registered regularly in mouth of Tokko River. Coming to Yakutia of this species is an important evidence of climate warming. Although the reptile and amphibian populations were stable in early 80s, up to date they are low and reducing, even in such mass to lately as *Rana amurensis*. *Rana arvalis*, *Rana chensinensis*, *Gloydius halys* go northward.

Biography

Victor Timopheevich Sedalischev is the Senior Science Researcher in Institute for Biological Problems of Cryolithozone under Siberian Department of Russian Academy for the Sciences. He is the leading Researcher of small mammals, amphibians and reptiles of Republic Sakha (Yakutia). He is the author of more than 200 scientific papers and is expert in herpetology and ecology.

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Monitoring of land use change characteristics in coastal zone in China from 2000 to 2015 by remote sensing techniques**Xiyong Hou, Wan Hou and Yubin Liu**

Yantai Institute of Coastal Zone Research-Chinese Academy of Sciences, China

Statement of the Problem: Both the climate change and human activities have driven macro changes of land use in coastal zone in China during the past decades. Therefore, more and more attentions have been paid to the spatial-temporal characters of land use change in China's coastal zone. However, most of these researches concerned with local or regional scales and therefore, were lack of comparable land use hierarchies and mapping standards, which restricted the sharability of land use data and the comparability of case studies. The purpose of this study is to reveal the spatial-temporal characteristics of coastal land use in China in the early 21st century and to put forward proposals for coastal zone management.

Methodology: Landsat images captured in 2000, 2005, 2010 and 2015, respectively have been collected and visual interpretation method had been adopted for land use mapping in China's coastal zone. In addition, a land use hierarchy contains 8 first-class and 24 sub-class has been put forward.

Findings: Farmland, forest and coastal wetland have been the most widely distributed land use type, whose area ratio came to 31.25%, 28.61% and 22.93%, respectively in 2015. From 2000 to 2015, built-up and manmade wetland have increased greatly, whose growth rate came to 41.73% and 39.04%, respectively, while farmland, forest, grassland, inland freshwaters, coastal saltwater and unused have been witnessed significant decrease, whose growth rate came to -5.15%, -0.54%, -3.77%, -3.00%, -2.72% and -14.55%, respectively. Also, significant spatial-temporal differences of coastal land use change have been observed.

Conclusion & Significance: Urbanization and industrialization have been the fundamental driving forces of coastal land use change, as the result, lots of farmland have been occupied by urban growth and massive coastal saltwater have been reclaimed. Recommendations are made for the coastal zone management to protect the farmland, forest and coastal saltwater.

Biography

Xiyong Hou has his expertise in remote sensing of coastal changes (mainly focus on land use and land cover change, shoreline change), spatial analysis and spatial modeling, ecosystem assessment and vulnerability assessment in coastal zone. His research group has developed multiple temporal shoreline data of mainland China and revealed the dynamic characters of mainland shoreline since the early 1940s in China.

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Pathila concept: Ten traditional leafy vegetables from South Indian wild flora**Mini N Vijayan**

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Indigenous communities are resourceful in relation to eco-centric knowledge base which is acquired through life experiences in their struggle for survival. Oral transmission of such treasured lessons will be lost forever if not documented and preserved for the posterity. The science behind ancient cultures is now being studied with more urgency as the modern world is getting to understand the need to codify the same. Ethnobotany in part deals with the knowledge about local plants, their uses and their cultural values and one such study is done in this paper, documenting ten species of leafy vegetables which grow in and around homesteads and backyards during the monsoon season in Kerala (South India). The book written in Malayalam language by Late Smt. Parvathy Antherjanam- 'Antherjanangalude aacharanushtanangal' (Customary rituals and religious rites observed by women of Brahmin community, 2002) has helped the author to know the local names of the species so that the scientific documentation could be done of the same. Pathila (Pathu means ten and Ila means leaf) is a group of ten wild plants which come up in abundance effortlessly in accordance with the torrential southwest monsoons, which are cooked together as a side dish. In this paper, all ten species are documented, nutritional and medicinal values are reviewed. All of them have great nutritious value and some among them can even reduce hyperglycemia. *Sauropus androgynus* is an example in this regard. In this era of modern food preferences involving expensive exotic ingredients, awareness regarding indigenous edible species and their valuable properties which come to the doorsteps of humanity at no cost, can boost conservation, sustainable utilization and a sustainable economy.

Biography

Mini N Vijayan is an Associate Professor from the Department of Botany, Carmel College for Women, Goa, India. She has a Doctorate degree in Plant Anatomy and a Postgraduate Diploma in Ecology and Environment. She is passionate about biodiversity concerns and is presently documenting plant diversity in cultural practices of a specific indigenous community of Indian Peninsula.

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Altitudinal diversity of birds in Panchase protected forest, Nepal**Rishi Baral**

National Trust for Nature Conservation, Annapurna Conservation Area Project, Nepal

Though Panchase Protected Forest is proposed as protected area (PPFCA), its biodiversity is less explored. This study focused on species richness and composition of birds in different land use types, elevation gradients and aspects in different seasons. Point count method within 8 land use plots starting from 1200 m to 2517 m at the interval of 200 m was used. Sorenson similarity index was used for species and habitat used and Microsoft Excel was used to perform all the statistical analysis. Altogether, 152 species of birds belonging to 10 order and 26 families with the total number 2722 were recorded. Sorenson (1948) similarity index shows that the species diversity were found more in exploited forest and cultivated land (1.25) followed by cultivated land and natural forest (0.5), natural forest and meadow (0.85), cultivated forest and meadow (0.85), exploited forest and meadow (0.29). Natural forest and exploited forest was found nil. Higher species richness of birds were recorded natural forest, followed by exploited forest, cultivated land and least in meadow, which accepted the intermediate disturbance hypothesis. The species richness was higher in pre-monsoon and lowest in monsoon season. Overall result showed that natural forest and cultivated land were consisted more species of birds which was considered as important environmental variables to structure the composition of birds. Lack of awareness, deforestation and hunting were main threats to the avian community. Further research should be conducted to find out more interesting relation between birds and its habitat throughout the gradients of PPFCA.

Biography

Rishi Baral has his expertise on research in tree cavity, birds and wildlife. His research on characteristics of cavities in Sal *Shorea robusta* forest describe the role of cavity and the uses of cavity by primary and secondary cavity nesting organism in South Asia. He is currently working in National Trust for Nature Conservation (NTNC)-Annapurna Conservation Area Project (ACAP), Hariyo Kharka, Pokhara as Conservation Officer. He has completed his Master's degree from Tribhuvan University, Central Department of Zoology in speciation with Ecology and Environment.

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Day 1

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Biodiversity of Manukau mangroves; What's really in there?**Amrit Melissa Dencer Brown**

Auckland University of Technology, New Zealand

Introduction: The accelerated seaward growth of the mangrove *Avicennia marina* subsp. *australasica* over the last century has altered the ecology of estuarine and coastal ecosystems throughout North Island, New Zealand. Expansion has created a myriad of real and perceived social-ecological issues regarding the future of the local communities who live in these areas and potential impacts to New Zealand biodiversity. As a result, there have been many applications submitted to regional councils for their removal. However, the social-ecological issues and related impacts are not yet well understood and there are significant knowledge gaps. Further research is necessary for making informed and evidence-based decision-making around the removal and preservation of these mangrove systems. Whilst there has been a strong effort to quantify benthic community compositional change following mangrove establishment and subsequent removal, there is a lack of long-term monitoring of other groups of organisms, particularly terrestrial vertebrate and invertebrate species. This research presents the findings of integrated biodiversity surveys collected at four sites in mangroves of Manukau Harbour (March-Apr 2018).

Aim: To investigate what biodiversity of species exists at fragmented mangrove sites in Auckland.

Methods: A range of different non-invasive techniques were employed to record presence/absence data of reptiles, mammals, fish and birds utilizing mangroves. Insects and spiders were captured and preserved for identification and future research.

Results: All groups of organisms were found with the exception of reptiles; skink was observed at the marsh-mangrove edges. The most fragmented patch of mangrove had the most species in terms of insects and spiders and bird species. The threatened bird the Banded Rail was present at 50% of the sites. There were significant differences between the sites potentially driven by the proximity and connectivity to nearby forested habitats.

Conclusion: Sites differ in terms of biodiversity and so each site needs to be monitored long-term before any removal. The highly fragmented site should be preserved and protected due to its healthy and high ecological functioning, including habitat for short-finned eels and juvenile yellow-eyed mullet. The results of these assessments have the potential to be implemented in policy for mangrove biodiversity monitoring which may be applied across New Zealand and to mangroves internationally.

Biography

Amrit Melissa Dencer Brown is a Commonwealth Scholar from the UK in the final year of her PhD. Her work focuses on social-ecological trade-offs in mangrove conservation in New Zealand. She has previously worked in tropical mangroves for her Masters research and has co-authored a book chapter on tropical mangrove ecosystem services and an article on blue carbon between salt marshes, mangroves and seagrasses.

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Sustainable harvesting, conservation and analysis of genetic diversity in *Polygonatum verticillatum* (Linn.)**Anchal Rana**

Forest Research Institute, India

Indian Himalayas with their diverse climatic conditions are home to rare and endangered medicinal flora. One such species is *Polygonatum verticillatum* Linn., popularly known as Solomon's Seal. Its mention as an incredible medicinal herb comes from 5000 years ago in Indian Materia Medica as a component of Ashtakavarga, a poly-herbal formulation comprising of eight herbs illustrated as world's first ever rejuvenating nutraceutical food, which is now commercialized in the name Chyawanprash. It is an erect tall (60 to 120 cm) perennial herb with sessile linear leaves and white pendulous flowers. The species grows well in altitudes ranging from 1600 to 3600 m AMSL and propagates mostly through rhizomes. The rhizomes are potential source for significant phytochemicals like flavonoids, phenolics, lectins, terpenoids, allantoin, diosgenin, β -sitosterol and quinine. Having profound concentrations of macro and micro nutrients, species has fine prospects of being used as a diet supplement. However due to unscientific and gregarious uprooting, it has been assigned status of 'vulnerable' and 'endangered' according to IUCN red-list criteria. Further, destructive harvesting, land use disturbances, heavy livestock grazing, climatic changes and habitat fragmentation have substantially contributed towards anomaly of species. It therefore became imperative to conserve diversity of the species and make judicious use in future research. A Gene Bank was therefore established at high altitude herbal garden of Forest Research Institute, Dehradun, India situated at Chakrata (30°42'52.99"N, 77°51'36.77"E, 2205 m AMSL) consisting 149 accessions collected from 31 geographical locations spread over three Himalayan States of Jammu and Kashmir, Himachal Pradesh and Uttarakhand. The present investigations purport towards sampling and collection of divergent germplasm followed by planting and cultivation techniques. The ultimate aim is thereby focused on analyzing genetic diversity of the species, and capturing promising genotypes for carrying out further genetic improvement program so to contribute towards sustainable development.

Biography

Anchal Rana is a Research Fellow at Forest Research Institute, India. Her research interests are forestry, climate change, forest genetics and agriculture.

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Integration of agricultural education and biodiversity: Introducing synecoculture into elementary school in TaiwanKai-Yuan Lin¹, Tsai-Ching Yeh² and Masatoshi Funabashi³¹University of Tokyo, Japan²Taiwan University, Taiwan³Sony Computer Science Laboratories, Taiwan

As food safety incidents happen continually, people put more concern on food, therefore “Food and agricultural education” become a trend. Food and agricultural education are divided into two parts, one is food education that combines nutrition, safety and culture, the other is agriculture education that focuses on food source, farming and environment. Currently, teachers teach the nutrition, biology which is written on the textbook, but without the practical and in-field experience, the agriculture education is insufficient in Taiwan. Our project combines agriculture education and synecoculture, in collaboration with Sony CSL in Japan. Synecoculture is an open-field crop cultivation method, which eliminates the use of tillage, fertilizer, pesticide, herbicide and totally relies on the productivity based on biodiversity. There are three reasons to introduce synecoculture to the elementary school: (1) Less field labor which makes easier access for elementary school students to experience and understand, (2) It includes both knowledge and practice: Learning on biodiversity and the training of farming skills and (3) Elementary school is the primary education that makes an important influence in one’s life. Our primary object of introducing this system into elementary school is to raise future educators and students’ confidence and familiarity to farming. Inspire their concern about biodiversity, and rethinking the origin of food. The first step is to build teachers’ know-how and skill of synecoculture. After teachers would become more familiar with field working and acquire farming skill, the next step is to realize and fuse the agriculture education into the courses and work with students. This research proposes method and design of biodiversity knowledge building in agricultural education, step by step overcoming the difficulty and to design a series of courses for students in a practical way. In addition, within the agriculture education, the data on plant growth will be collected and analyzed with statistical tools.

Biography

Kai-Yuan Lin has his expertise in industrial design as well as system design and passion in improving the food safety and agricultural education. He had educational experience from Imperial College, London and Pratt Institute, New York which made him able to integrate the advantage of Europe and US in agriculture field. He is the Engineer and Designer, focus on complex system toward the important social issue. He collaborates with Masatoshi Funabashi in Sony CSL on the Synecoculture project in Taiwan.

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Impact of anthropogenic disturbance on anurans habitat and species diversity in Silago, southern Leyte, Philippines**Wilbert A Aureo**

Bohol Island State University, Philippines

Statement of the Problem: The combinations of natural and anthropogenic factors such as climate, geographic ranges and vegetation types are considered to have a significant influence on species distributions and diversity. The pattern of increase in habitat heterogeneity on the structure and composition of vegetation becomes complex if the niche diversity and species diversity increases. Moreover, several species of forest anurans are correlated with the quantity and quality of woody debris, litter depth and overstorey canopy closure. The Philippines is one of the few countries in the world that is covered by rain forest. It is also considered as one of the world's mega diverse countries that host a large share of endemic flora and fauna. However, due to the conversion of forests to marginal agriculture, commercial agriculture and timber plantations, these forest resources are disappearing at an alarming rate. Filipino farmers who are poor and lack employment opportunities in the lowland migrate to the upland areas where they cut down secondary forest and practice slash and burn farming.

Methodology & Theoretical Orientation: Establishment of plots followed the method of Williams (2004). Anurans collection was done at early morning 6:00-9:00 am and evening at 7:00-10:00 pm. Herbaceous layer, understory, canopy vegetation were identified (genus level) and counted. Each CWD was rated on its degree of decomposition ranging from 1 (sound, intact, no rot) to 5 (no structural integrity, soft, powdery). Temperature, rainfall and relative humidity were measured using thermometer, improvised rain gauge and psychro-dyne respectively. PROC univariate test for data normality and heterogeneity was done using statistical analysis system version 9.1 (SAS, 2003). PROC GLM was also used to check effect for the anthropogenic disturbance with habitat condition parameters and species richness and diversity. Finally, Duncan Multiple Range Test (DMRT) was employed to test the factors.

Findings: Both the species richness and diversity in the primary forest is significantly ($p \leq 0.05$) different from slash-and-burn cultivation. Frog population increases steadily during natural succession, attaining similar characteristics to those from mature forest after regeneration following slash-and-burn cultivation. Meanwhile, when the habitat starts to stabilize its condition (that is conducive to anurans), the frog species starts to increase dramatically. The study also showed that microclimatic parameters, microhabitat and vegetation structures appear to be the factors influencing habitat condition of anurans which significantly ($p \leq 0.05$) affect anurans species richness and diversity.

Conclusion & Significance: The results of the study affirm that anthropogenic disturbance alters anurans habitat condition, thereby affecting its species richness and diversity. It is worth mentioning that there was a considerable reduction ($p \leq 0.05$) of anurans species richness and diversity in the primary forest, secondary forest and slash-and-burn cultivation. Moreover, the study suggests that microclimatic parameters, microhabitat and vegetation structures appear to be the factors influencing habitat condition of anurans which significantly ($p \leq 0.05$) affect anurans species richness and diversity.

Biography

Wilbert A Aureo is a Faculty of Forestry and Environmental Science Department, Bohol Island State University, Philippines. He has received his first degree from Visayas State University, Philippines in 2013 and was awarded with Bachelor of Science in Environmental Management. He has obtained his Master of Science degree in Tropical Ecology from Visayas State University, Philippines in 2016 with major in Terrestrial Ecosystems Management and Conservation. His previous works were on soil erosion of a watershed and anurans species as bio-indicator. Currently his research focuses on natural resource management in a karst landscape.

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Dynamic of consecutive dry-wet days in the coastal area of China during 1961-2017**Xiaoli Wang**

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Coastal Area of China (CAC) is of high ecological vulnerability and extremely sensitive to the adverse effects of climate change. Based on the daily precipitation dataset of 156 surface meteorological station records, Consecutive Dry Days (CDD) and Consecutive Wet Days (CWD) on meteorological station scale in the CAC were calculated by RCLimDex model. And a set of statistical methods, including trend analysis, Pettitt test, Mann-Kendall test and Accumulative anomaly analysis were employed to investigate the dynamics of CDD and CWD in the CAC. Results showed that annual average of CDD and CWD presented the opposite spatial patterns of north-high south-low and north-low south-high, respectively and annual average of CDD is generally more than that of CWD, especially in the Hebei province and western of Liaoning province. The continuous dry situation is most prominent in Shandong, Guangdong and Guangxi and the consecutive wet condition is more obvious on the border of Jiangsu and Zhejiang, especially in the Yangtze estuary. However, the dry-wet conditions are more uncertain in Liaoning, Hebei and Jiangsu, where the dry and humid climate change is more complicated. The mutation of CDD and CWD mainly occurred between 1970s and 1990s and the mutations in CDD were slightly earlier than those in CWD. This study is beneficial to raise awareness of extreme climate change in the coastal area of China and provide scientific basis and support for climate change mitigation and adaptation as well as climate change risk management at the regional scale, which is an important supplement to the study of regional responses to global climate change.

Biography

Xiaoli Wang is dedicated to assessing and predicting climate change as well as risk management of meteorological disasters, especially focusing on such a region with high climate vulnerability in the coastal area of China. She has used a set of mathematical and statistical methods and models to conduct a thorough research on extreme temperature events and extreme precipitation events in the coastal area of China. Her expert research provides a reference for understanding of regional climate change in-depth and a technical support for mitigation and adaptation of climate change.

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Dramatic morphological changes caused by intensive coastal development: A case study in the Longkou Bay, China**Dong Li, Cheng Tang, Xiyong Hou and Hua Zhang**

Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences, China

Tracing the evolution of subaqueous topography in coastal water enables us to understand the effects of intensive coastal development on bays and estuaries. Analysis of a series of historical bathymetric acoustic surveys has revealed large changes in morphology from 1960s to 2010s in Longkou Bay, China. Water depths were extracted from digitized admiralty charts to explore the accretion-erosion characteristics in a geographical information system (GIS) environment, providing quantitative estimates of morphological changes. Multi-Beam Echo-Sounders (MBES) were used to map and analyze the geomorphologic features caused by the construction of artificial islands. Results illustrated that the shoreline and bathymetry of Longkou Bay changed dramatically in recent decades. The subaqueous area decreased by about 15%, while land area increased by more than 13 km² in the study area during the last 50 years. From 1960s to 1990s, the evolution of Longkou Bay was mainly governed by natural processes with a patchy distribution of deposition and erosion and there were few signs of being related to large-scale human activities. During the period of 1990s to 2010s, intensive coastal developments including large port engineering projects, channel dredging and artificial islands construction became the main processes affecting morphological changes in the Longkou Bay. The high-resolution bathymetric results near the artificial island showed that the seafloor was dredged at many sites, leaving large areas of borrow pits. The sudden change of the underwater topography will lead to the destruction of local benthic habitat and effective measures need to be taken to protect and remediate heavily disturbed subaqueous environment.

Biography

Dong Li has his expertise in acoustic data processing and submarine sediment classification. He is familiar with basic knowledge and principle of acoustic seabed detection, skillful in operating multi-beam equipment and post-processing software and able to explore data mining to solve some scientific issues. He devised a technical approach to characterize, classify and map shallow coastal areas with artificial reefs using a multi-beam echo-sounder.

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Reproductive ecology of *Humboldtia decurrens* Bedd. ex Oliver: An endemic legume of the Western Ghats, India**A K Sreekala and M Jayalakshmi**

Jawaharlal Nehru Tropical Botanic Garden and Research Institute, India

Humboldtia decurrens Bedd. ex Oliver belongs to the family Fabaceae, is restricted to the evergreen forests of Kerala and Tamilnadu in the southern Western Ghats. The plant favors much shady, riparian and undisturbed environment at an altitude of 200-900 m ASL with severely fragmented population. The study on reproductive ecology was conducted in the natural habitat to understand its phenology, floral biology, pollination mechanism, fruit set and seed germination. The phenological study reveals that leaf flushing takes place from August to October, flower bud initiation commences in November and flowering period extends up to March. The plant possess cauliflorous, racemose inflorescence with 12-15 flowers and varied sepal coloration from white to pink, but petal remains white. Pollen grains are spherical and 52.25 µm in diameter. Pollen-ovule ratio was calculated as 1062:1. Maximum pollen viability was noticed on the day of anthesis itself which get decreased on consecutive days after anthesis. The species imparts various pollination traits including flower shape, color, reward type and amount, nectar composition and timing of flowering. Occurrence of versatile anthers illustrate a proof for anemophilous pollination but species display a more support towards melittophily by rewarding subsequent amount of floral as well as extra floral nectaries. Bees and butterflies are the major pollinators. Breeding experiments confirmed that the species permits both geitonogamy and xenogamy. The fruitification will take about a month after the drooping of flowers and continues till the next vegetative phase. The scarcity of pollinators, low insect visitation rates and infestation of fruits by insects affect the fruit production and thereby decreases the seed set. Natural factors along with anthropogenic activities adversely affect its population growth and its establishment in the wild.

Biography

A K Sreekala has completed her PhD from Kerala University in 1998 with specialization of Plant Reproductive Biology. She has published more than 80 papers in reputed journals, chapters in books and presented her research in national and international meetings.

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Assessing changes of habitat quality for shorebirds in stopover site: A case study in Yellow River Delta, ChinaXiaowei Li¹, Xiyong Hou¹, YangSong¹, Kai Shan², ShuyuZhu², Xiubo Yu² and Xunqiang Mo³¹Chinese Academy of Sciences, China²The Yellow River Delta Nature Reserve Bureau, China³Tianjin Normal University, China

The population of shorebirds in the East Asian-Australasian Flyway (EAAF) is on a severe, long-term decline. One of the reasons is low survival during stopover sites in Yellow Sea Ecoregion due to habitat degradation. In this paper, we focused on the shorebird habitat quality in Yellow River Delta (YRD), which is a representative shorebirds stopover site in the Yellow Sea Ecoregion on EAAF. We adapt the habitat quality model of the InVEST for the assessment of shorebirds habitat quality change in YRD during 2000-2015 and future, considering the effects of anthropogenic threats on shorebirds habitat. In our results, the abundance of 11 species of shorebirds had significant downward trends (70-97% reduction) during 1999-2015. The most prominent land use changes in the YRD during 2000-2015 are the shrinkage of estuarine delta and dense-grass, along with the expansion of city, saltern and mariculture. The area of estuarine delta, unused land, tidal flats and sparse grass reduced 30214, 21792, 6510, 6166 ha, respectively during the 15 years. There was high spatial heterogeneity in modeled habitat quality in the YRD. Tidal flats areas in the nature reserve (part 2) had higher habitat quality than areas in the northwestern (part 1) and eastern (part 4) parts of the study area, where the major mariculture occurs. Mean habitat quality in the part 1 and part 4 was 26% and 44% lower than mean habitat quality in part 2, respectively. The mean habitat quality in part 1 and part 4 decreased 27% and 31% during 2000-2015, respectively. Optimal habitat in YRD declined from 1433 km² in 2000 to 1154 km² in 2015. The habitat quality shows a significant downward trend in the southeast and northeast of YRD during 2015-2020. The results would help decision makers avoid inefficiencies in land use management.

Biography

Xiaowei Li has completed BSc degree from the Ocean University of China in 2005 and then served as a Visiting Doctoral Researcher in Land and Water at CSIRO, Australia (2008-2009) and received her PhD from IGSNRR in 2012. She was a Postdoctoral Researcher at IGSNRR (2012-2014). Her areas of specialization include ecosystem-based management and adaptation and ecosystem monitoring and assessment. More recently, she has been interested in assessment and valuation of coastal ecosystem services, recognizing the trade-offs between migratory bird protection, human well-being and social-economic development. She brings her experience with spatial valuation of coastal wetlands to the study of coastal mudflats and migratory bird habitat in particular.

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Pattern of genetic variation in endangered medicinal Himalayan herb, *Picrorhiza kurroa*, assessed using DNA markers, implication for genetic enhancement and *ex situ* conservationAvinash Kumar¹, Amita Kumari¹, Vijay Rani Rajpal² and S N Raina³¹Vinoba Bhave University, India²University of Delhi, India³Amity University, India

Picrorhiza kurroa (family Scrophulariaceae) is a well-known medicinal herb in the Ayurvedic system of medicine used for centuries to treat disorders of the liver and upper respiratory tract, jaundice, fever, dyspepsia, chronic diarrhea and scorpion sting. Commonly known as kutki, it grows in moist areas of Himalayan regions of India at elevations of 3000-5000 m. Due to intensive harvesting from its natural habitat, it is now classified as an endangered species. In order to meet the ever increasing demand of the species, it is essential to genetically improve the species for not only meeting obvious goals for conservation and improvement but it is important also to bring it to the status where it can be cultivated in larger areas other than the condition where it is at presently growing in wild. To obtain the desired objectives as above, the first requisite beyond doubt is to compartmentalize the nature, extent and form of variations at DNA sequence level of the germplasm and levels of gene flow between populations, of this over exploited plant species. In the present study, we employed RAPD, ISSR and AFLP markers to determine the nature and extent of genetic diversity of *P. kurroa* germplasm resources of representative 91 genotypes belonging to 10 populations, collected from different parts of the Himalayas. The RAPD, ISSR and AFLP fingerprints with 22 and 15 primers and 7 primer combinations, respectively, revealed 83.5%, 80.6% and 72.1% polymorphism among 140, 88 and 327 genetic loci amplified from the 91 genotypes, respectively. The AMOVA analysis indicated more variation existed in differences in genotypes within population than between population within a region and between regions, respectively. The results obtained are very interesting and informative with regard to not only genetic diversity diagnostics but also from the point of view of utilization for its genetic enhancement as above.

Biography

Avinash Kumar is an Assistant Professor in the Department of Botany, Vinoba Bhave University, Jharkhand, India. During his PhD, he has worked extensively on the assessment of genetic diversity of endangered medicinal plant species growing in the extremes of Himalayan regions of India, as well as the genetic diversity study of few endemic tree species.

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From the cultural desk of India: Expressions of agro-biodiversity in a festival called Thiruvathira**Mini N Vijayan**

Carmel College of Arts, Science & Commerce for Women, India

The Brahmin community in Kerala has a ritualistic culture and each and every customary ritual is eco-friendly and largely makes use of the local plant biodiversity. Written documentations in this regard are very rare and if at all recorded are ancient and thereby inaccessible to the common man due to linguistic barriers. In the backdrop of this scenario, the author who herself is a member of this community felt the necessity for a scientific documentation, largely because the traditions followed by the community ingrained within it the ancient wisdom of living in unison with nature. The book written in Malayalam language by Late Smt. Parvathy Antherjanam- 'Antherjanangalude aacharanushtanangal' (Customary rituals and religious rites observed by women of Brahmin community, 2002); the only one of its kind and discussions with the elders in the community have formed the basis of this research. The research paper brings forth some expressions of traditional agro-biodiversity in connection with a religious festival celebrated in the state called Thiruvathira. Ettangadi is a customary edible preparation made during the festival which makes use of six types of tubers and a few other agricultural products. The ethno agro diversity in Ettangadi preparation is discussed and the eight species are scientifically documented. A review on the food value and nutritional and therapeutic aspects of the plants are also recorded in the study. Documenting, tapping such indigenous knowledge go a long way not only in opening new vistas in food security but also in conserving biodiversity of a region.

Biography

Mini N Vijayan is an Associate Professor from the Department of Botany, Carmel College for Women, Goa, India. She has a Doctorate degree in Plant Anatomy and a Postgraduate Diploma in Ecology and Environment. She is passionate about biodiversity concerns and is presently documenting plant diversity in cultural practices of a specific indigenous community of Indian Peninsula.

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Forest fires and soil loss: A threat to biodiversity**Jaime Senabre**

University of Alicante, Spain

Society doesn't seem to be aware of the negative effects that forest fires have on the soil, whose degradation can become irreversible in many cases. The soil is one of the fundamental elements for life on Earth and that isn't given due attention. In the same way, in the studies on forest fires the action of the natural risks in territories affected by forest fires and the influence of these in the loss of soil are little taken into account. A determining factor of plant productivity is the quality of the soil, a limited resource that is easily destroyed, not only by the incidence of fires, but by the climatic and meteorological conditions to which the area affected by fire can be subjected: Torrential rains, floods, droughts, extreme temperatures, strong winds that can accentuate the loss of nutrients and erosion. According to data obtained from a survey on the perception of risk by natural phenomena carried out with the Spanish population (n=1223), 67.54% of the respondents think that they live in an area threatened by some natural phenomenon and 73.02% indicate that at some moment in his life, some natural disaster has occurred that has damaged the community in which he lives. In this line, another study conducted by our research group provides us with relevant data on the frequency perception of forest fires in Spain (n=1068), where 58.52% of the population declare to suffer the impact of forest fires each year, 5.34% every 10 years or more and 3.46% never. Given these findings on risk perception and based on actual incidence data, it is possible to prepare, not only forest fire risk maps, but also risk maps of natural hazards to relate them, in order to establish the potential risk of loss of soil and the possible threat to biodiversity, based, mainly, on the observed changes in fire and natural disaster regimes.

Biography

Jaime Senabre is a Psychologist and Environmental Consultant, completed his Doctoral studies in the Department of Personality, Evaluation and Psychological Treatment of the UNED. He is the Chief of Brigade in a Forest Fire Service with more than 20 years of experience. He collaborates with several companies and institutions in the area of training in psychology in emergencies and human resources. He is a Professor at the University of Valencia in masters in intervention and operational coordination in emergencies and catastrophes and other postgraduate courses on emergencies. He has published articles on forest fires, stress, psychosocial risks and emotional trauma, mainly in relation to emergency services and natural disasters. Currently, he is assigned to the Research Group on Climate and Territorial Planning at University of Alicante, where he researches on the social perception of forest fire risk and behavior in the event of possible disasters.

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Colombiabeto Program

Colciencias
Colombia

Colombia Bio is a series of documentaries on the scientific expeditions carried out under a Colciencias project by the same name. The project intends to document the biodiversity of regions that have remained so far unexplored for several reasons, mostly related to the country's armed conflict. Every chapter will record a journey, of high scientific value, aimed at completing the rich inventory that ranks Colombia as second most bio diverse country in the world. A group of passionate researchers will enter these inhospitable and hard to reach territories, to document their fauna, flora and microorganisms, and even more so, to discover any new species that may inhabit them. Meanwhile, we will observe the local communities, their historical background, their participation in the expeditions, and the impact of them in their lives. The series is highly cinematographic, and therefore, is in the hands of several Colombian filmmakers and movie directors, each of whom will be responsible for one episode. Based on their expertise, they will be free to tell the stories as they choose, granting priority to the researchers' discipline and to the expedition as an occasion to discuss the country and its communities, beyond the territory. All these elements should be fundamental to complete their conceptual proposals. The Colombia Bio documentary series is one of the actions for the promotion of science, technology, and innovation of Colciencias' Mentality and Culture Division. Its purpose is to foster and strengthen a culture that values and administers knowledge, by developing contents and experiences that improve the perception of Colombians about scientific matters.

Biography

Colciencias It's the Administrative Department of Science, Technology and innovation that depends on the presidency and leads the national System of Science, Technology and innovation (SNCTI). The entity focuses its efforts in four specific areas.

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Behaviors of endangered Malayan tapir (*Tapirus indicus*) in relation to ecological, climatic and anthropogenic factors: Implications for captive management and conservationKalai Arasi Arumugam¹, Wan Norhamidah Wan Ibrahim¹, Christina D Buesching² and Geetha Annavi¹¹Universiti Putra Malaysia, Malaysia²University of Oxford, UK

Changes in the living environment such as restricted space, continuous stream of visitors and being under the management of humans have been shown in many other wild animals to cause significant changes in their natural behaviors that can result in stress, breeding difficulties, poor health and repetitive stereotypic behaviors. However, it is still unknown whether the above factors can also affect the Malayan tapir (*Tapirus indicus*). Therefore, we undertook a study to investigate the potential stressors in both male and female captive Malayan tapirs by evaluating the effect of enclosure type, enclosure size, climatic and human factors on behaviors that were quantified through direct and indirect observations. Analysing our data using Generalised linear mixed-effects model, glmer, we found that enclosure type had a significant effect on feeding behavior where tapirs in semi-wild enclosures fed more frequently than tapirs in captivity. We noticed significant adverse effects from visitors and background noises that caused increases in vigilance behavior and reduced the time spent on resting in captivity. We also observed stereotypic behaviors in captivity such as frequent pacing and sleeping under water while holding their breath for over one minute at a time. From this study, we conclude that the enclosure with improper enrichments and surroundings with loud sound exposure are potential stressors that will affect the welfare of Malayan tapir.

Biography

Kalai Arasi Arumugam is a Master in Science graduate in Wildlife Ecology and Management. Her great passion towards animals had aspired her to work towards conserving wildlife and understanding their needs and welfare through behavioral study. Her current research focused on the behavior of endangered Malayan tapir and their ex-situ management in captivity. In the future, she is looking forward to studying more wildlife in both captive and wild via ex-situ and in-situ conservation.

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Metabarcoding and culturing to investigate the diverse fungi associated with cabbage in and their bio-control potential**Michal Kuchár**

Bio-Protection Research Centre, New Zealand

Statement of the Problem: Agricultural crops such as cabbage (*Brassica oleracea* var. *capitata*) are vulnerable to a plethora of pests and diseases. Endophytic fungi are increasingly used in biological control against these pests and diseases as agricultural producers attempt to reduce their environmental footprint.

Methodology & Theoretical Orientation: In this study, putative endophytic fungi were isolated from cabbage grown in three regions in New Zealand in order to identify isolates with potential to assist crop production. Selected fungal isolates were tested in bioassays to determine their potential for biological control of a fungal disease caused by *Sclerotinia sclerotiorum* and an insect pest of cabbage - Diamondback moth (*Plutella xylostella*). In addition to isolation from plants, patterns in fungal communities were also described using metabarcoding data acquired by high-throughput sequencing and compared with data on direct isolation through culturing.

Findings: Over 100 species were identified using culturing approaches, while metabarcoding approaches suggest the number of fungal species associated with cabbage tissues could be over 200. Fungal communities differ in above and belowground parts of cabbage. There does not seem to be a significant difference between fungal communities in different regions of New Zealand. Increased mortality of Diamondback moth larvae feeding on cabbage leaves treated with spore suspensions of several isolates of *Lecanicillium* sp. was observed. None of the tested isolates used as seed inoculants significantly reduced disease symptoms caused by *Sclerotinia sclerotiorum* in a bioassay on cabbage seedlings.

Conclusion & Significance: In this study several isolates were identified as promising biological control agents of an insect pest of cabbage. However, these isolates are members of a large consortium of fungi. The uncovered patterns in the fungal communities underline the importance of understanding of the microbial communities associated with agricultural crop for us to improve it.

Biography

Michal Kuchár has completed his BSc in Biology and MSc in Plant Physiology from the Charles University in Prague in Czech Republic. His PhD at the Bio-Protection Research Centre is aligned to the Next-Generation Biopesticides program and is focusing on fungal endophytes in *Brassica* species and their potential use as bioprotection agents. He is isolating fungal endophytes from plants under different environmental and agricultural growth conditions and assessing the factors that shape composition of fungal endophytic communities using next-generation sequencing techniques.

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