“Proceedings of the Annual Session”

WILDLANKA International Symposium 2017
“Climate Change and Conservation”

15th & 16th August 2017

ISSN 2465-5619

Department of Wildlife Conservation - Sri Lanka
WILDLANKA International Symposium – 2017
“Climate Change and Conservation”

Proceedings of the Annual Session
(15th & 16th August, 2017)

ABSTRACTS

Published by
Department of Wildlife Conservation, Sri Lanka

Department of Wildlife Conservation, Sri Lanka (DWCSL)
CONTENTS

1. Wildlife conservation at the crossroads in India: issues, challenges and way ahead
   V.B. Mathur

2. The great balancing act: Striving for optimal animal, human, and environmental health in a rapidly changing world
   T.R. Kelly

3. An assessment of human-monkey conflict between Labugama-Kalatuwawa and Indikada forest reserves in Colombo district, Sri Lanka
   P.A.B.G. Panagoda * and A V.P.A. Weerasinghe

4. Assessment of the environmental impacts of campsite use by visitors in selected national parks of dry zone, Sri Lanka
   S.T. Mallikage* and P.K.P. Perera

5. Assessment of genetic variability among six Guazumacrinita(bolainabanca) provences from the peruvian amazon using ISSR and AFLP markers
   L.L.T. Coral1, P. Hlásnáčepková2, Bohdanlojka2 and J.C. Weber3

6. Avifauna abundance and richness in an urbanized lake situated at Peralanda - Ragama, North Colombo - Sri Lanka
   E.I.P. Silva1*, M.C. Prabhat1 and A.R. Sumanaratne2

7. Avifaunal diversity in three selected habitats, within the eastern border of the faculty of applied sciences
   D. Bopearachchi* and S. Wickramasinghe

8. Biodiversity conservation as a strategy to reduce climate vulnerability
   E. Wikramanayake, C. Weerathunghe, M. Tissera, and D. Sathananthan*

9. Bird – plant associations along the edges of selected fragmented habitats in southern province, Sri Lanka

10. Climate change and their impact on silvicultural practices in western himalayan moist temperate forest of Pakistan
    J.I.K. Khattak1,2 and V. Podrázsky1

11. Dietary ecology of a community of amphibians in the North Central dry zone of Sri Lanka
    R.B.L.R. Sarathchandra*, R. Vandercone and K. D.B. Ukuwela,
12. Discovery of a large nesting colony of the blue-tailed bee eater (*Merops philippinus*) in Oluvil, Ampara
   D.K. Hewavithana*

13. Distribution of the Jungle Crow (*Corvus levaillantii* lesson, 1831) and their potential threats to biodiversity in tropical montane cloud forests of Horton plains national park, Sri Lanka
   P.H.S.P. Chandrasiri¹, W.D.S.C. Dharmarathne¹, S.B.R.Lakmal² and W.A.D. Mahaulpatha*¹

14. Diversity and morphometry of orb weaver spiders in rainforests in Sri Lanka
   D. Tharanga, T. Wijerathna and M.R. Wijesinghe

15. Early crop and farm animal domestication in South Asia based on ethnobotanical and archeological findings
   A.B. Damania

   M. Hussain*, M. Zouhar and P. Ryšánek

17. EFI rebuilding coral reefs – boosting climate change resilience
   D. Sathananthan

18. Evaluation of performance of environmental protection license of rice mills of the north central province
   G. N. Chandrasiri¹ and U. A. D. P. Gunawardena²

19. Evolutionary distinctiveness of sri lankan avifauna
   D.K. Abeyrama* and S.S. Seneviratne

20. Factors affecting the population size and the distribution of spot-billed pelican (*Pelecanus philippensis*) in Colombo district, Sri Lanka
   H.W.G.A.S. Weerasinghe* and U. P.K. Epa

21. Fashion of sustainability
   M. Ganeshan

22. Forest management of national park in Sri Lanka - a case study in Minneriya national park

23. Future prospects of quaternary climatic studiesof Sri Lanka; a review
   J. Katupotha
24. Habitat selection and burrow characterization of Indian pangolin (*Manis crassicaudata*) in a tropical lowland rainforest habitat in South-west Sri Lanka
   K.V.D.H.R. Karawita¹, P.K.P. Perera*¹ and N.P. Dayawansa²

25. Herpetofaunal abundance and diversity in Horagolla national park, Sri Lanka
   J.J.L. Jeewandara, P.D.R.S. Pethiyagoda and W.A.D. Mahaulpatha*

26. How to protect sea turtles effectively?
   H. Svobodová

27. Interaction of Coprophilous beetles with common native mammalian dung types in a dry zone forest, North Central Sri Lanka
   R.C. Priyadarshani* and R. Vandercone

28. Mangrove species distribution, diversity and present status in the North and East coast of Sri Lanka
   M.G.M. Prasanna¹, K.B. Ranawana², G. Jayasuriya³, P. Abeykoon¹ and M. Ranasinghe¹

29. Maturity stage categorization of endemic lizard (*Calotes nigrilabris*) in the grasslands of HPNP
   E.G.D.P. Jayasekara, M.C. Prabhath and W.A.D. Mahaulpatha*

   J.L. Jeewandara* and W.A.D. Mahaulpatha

31. Nest site characteristics @ nesting success of Sri Lankan Grey Hornbill (*Ocecerous gingalensis*) in Mihintale sanctuary
   I.L. Wijerathne, P. Panduwawala and S. Wickramasinghe

32. Perceptions of climate variability in the Indian community of the Hunikuinconta ethnicity in the Peruvian amazon
   L.M.P. Villacrez¹, L.I.T.C. Coral¹* and E.D. Zuñiga¹

33. Perceptions of farmers and crop raiding patterns by wildlife in and around the Kaludiyapokuna forest reserve in the dry zone of Sri Lanka
   M. Perera¹ and R. Vandercone¹

34. Preliminary study of chiropterans in the peripheral areas of the Maduruoya national park, Sri Lanka: insights for conservation and management
   G. Edirisinghe¹², D. Gabadage², M. Boteje²³, T. Surasinghe⁴, K. Perera²⁵ and S. Karunarathna⁶

   R. Godakanda
36. Protected area and its impact of climate changing to Kazakhstan
   Z. Bolatova and B. Makhamedova

37. Ranging pattern of a Dusky toque macaque troop (*Macaca sinica aurifrons*) inhabiting Peradeniya University land
   W.M.L.S. Weerasekara and K.B. Ranawana

38. Revision of spider family Oonopidae in Sri Lanka
   U. G. S. L. Ranasinghe, N. Athukorala and S. P. Benjamin

39. Seagrass of Sri Lanka: research priorities and conservation challenges
   W.D.S.C. Dharmarathne and W.A.D. Mahaulpatha

40. Species diversity and abundance of avifauna in and around an urbanized lake situated at Peralanda - Ragama, North Colombo - Sri Lanka
   E.I.P.Silva1,3, M.C.Prabhath1 and A.R.Sumanarathne2,3

41. Survey of numbers of buffaloes and cattle in the Udawalawe National Park
   B. V. Perera

42. Sustainability of Mangrove restoration and conservation in Kalpitiya.
   M.D.K.I.Gunathilaka

43. The impact of climate change on ecotourism sector Sri Lanka
   K.N. Kandewatta1 and A.N. Fernando2

44. The giant star tortoise (*Geochelone elegans*) of Lunugamwehera national park, Sri Lanka
   Anslem De Silva1, R. Wijeratne2, K. Rodrigo3, H.A.H.R. Hettiarachchi2 and G.A.T. Prasad4

45. Web based GIS dashboard for monitoring environmental issues by using mobile survey forms
   M. S. P. M. Sirirwardane

46. Archaeological artifacts depicting Amphibians and Reptiles in Sri Lanka
   Anslem de Silva

47. Managing a viable population of Indian pangolin (*Manis crassicaudata*) in Sri Lanka
   S. Jayakody

48. Unnoticed seaweeds containing Mangrove forests in Sri Lanka
   M.D.K.I. Gunathilaka

49. Mangroves in lagoon ecosystems: a neglected habitat in Sri Lanka
   K.N.J. Katupotha
50. Genetic diversity of *Punica granatum* (l.) germplasm in several major cultivation areas of Sri Lanka assessed with ISSR markers
   S.R.M.R. Attanayake¹*, W.A.P. Weerakkody², R.H.G. Ranil² and P.C.G. Bandaranayake¹

51. A comparison of floral and faunal diversity between two small, disturbed forest patches in Sri Lanka’s central highlands
   A.M. Kittle¹*, P.H.S.C. Kumara¹, D.G. Pathirathna², H.K.N. Sanjeeewani¹‡, H.T.J. Seneviratne²# and A.C. Watson¹

52. Avian fauna abundance and diversity in Horagolla National Park of Sri Lanka
   P.D.R.S. Pethiyagoda and W.A.D. Mahaulpatha*  

53. Seizure of the biggest illegal shipment of star tortoises (*Geochelone elegans*) by the Sri Lanka Navy
   D. Malsinghe¹, Anslem De Silva²*, H.A.A. Priyadarshani¹, D. Dassanayake¹, K. Rodrigo³, D.M.D. Kithsiri¹, D.G.B.D. Kulathunga³, V. Kumaratunga¹ and T. N. Jinadasa¹

54. Behavioral response of *Labeo fisheri* (cyprinidae) to reiverscape changes; linking river fish ecology and conservation
   R. R. A.R. Shirantha¹, K. S. Chandrathne², J. P. Kumara¹ and H.M.P. Krithsiri¹

55. Nutritional status of wild megaherbivores in Wilpattu National Park, Sri Lanka
   V. Silva¹, B.P.A. Jayaweera¹, G. Prathapasinghe¹ and S. Jayakody²*.  

56. Behaviours of mega herbivores and nutritional composition of fodder in Mailawewa reservoir of Wilpattu National Park, Sri Lanka
   I.A. Ranaraja¹, B.P.A. Jayaweera¹, G.K.A.W. Fernando², G. Prathapasinghe¹ and S. Jayakody²*.

57. Rapid assessment of flora, butterfly, dragonfly and avifauna to determine the baselines in Mailawewa reservoir of Wilpattu National Park, Sri Lanka
   B. Herath¹, G.K.A.W. Fernando¹, M.G. Arachchige², I.B.D.C. Senarathne³, S.C. Wilson¹, K. Yakandawala³, D. Yakandawala⁴, M. Amararathne¹ and S. Jayakody²*

57. Development of a wildlife manager friendly, rapid assessment protocol for reservoir restoration in protected areas
   S. Jayakody¹* and M.S.O.M. Amararathne²

58. True mangrove diversity in Muthurajawela and Negombo lagoon wetland complex in Western province, Sri Lanka
   T.G.S.L. Prakash¹,²,³, Aruna Weerasingha¹, P.W.A.B.M. Withanage¹,³ and T.G.T. Kusuminda³,⁴
59. Animal bone remains found at Welmalkema rock pool, Yala block i


60. Moths of national wildlife research and training centre, giritale, sri lanka

N.C. Jayawardana

61. Examining why raids conducted by wildlife field officers and subsequent court cases fail, while exploring solutions

U. Kumaratunga


Markétagrúňová, Pavlahejcmanová

63. By researching and Comparisioning on tuskers Living in yala national park, by using morphological and morphometric characters from year 2004 to year 2017

Saman Liyanagama

64. Reasons for visitor dissatisfaction in national parks based tourism in Sri Lanka

T.G.S.L. Prakash¹, P.K.P. Perera¹, D Newsome², & T.G.T. Kusuminda³,⁴
WILDLIFE CONSERVATION AT THE CROSSROADS IN INDIA: ISSUES, CHALLENGES AND WAY AHEAD

V.B. MATHUR

Director, Wildlife Institute of India, Dehradun

vbm@wii.gov.in

ABSTRACT

In response to the fast disappearing wildlife species and fragmentation/degradation/ loss of wildlife habitats, the Government of India in 1972 enacted the Wildlife (Protection) Act. This milestone legislation has helped in stemming the prevention of hundreds of species of plants and animals from extinction, and has set many on successful paths to recovery. But 45 years hence, the wildlife and its habitats are at the crossroads again and need urgent interventions to prevent the march towards extinction. The growing anthropogenic pressures on forests and wetland resources coupled with rapid and unplanned economic development are threatening to impair the ecological processes and life support systems. There is an urgent need to review the conservation paradigm of a top-down and exclusive management approach to a participatory and science-based one that seeks to promote incentivized conservation interventions.

The Ministry of Environment, Forest and Climate Change, Government of India is now taking special measures to effectively manage the landscape dependent species viz. elephant, tiger and snow leopard on the one hand and has also launched the Endangered Species Recovery Programme in respect of those species whose populations have severely declined in the wild, for example, Great Indian Bustard, Gangetic Dolphin, Dugong and Manipur Deer with technical support of Wildlife Institute of India (www.wii.gov.in).

‘Development with Design’ and ‘Development without Destruction’ will have to be the new mantra instead of ‘Development versus Conservation’. Mainstreaming of conservation into development sectors is the need of the hour. The paper discusses a range of science-based conservation efforts being undertaken in the country to ensure the march away from the one-way road to extinction.

KEY WORDS: wildlife, habitats, fragmentation, degradation, Climate Change, Endangered Species
THE GREAT BALANCING ACT: STRIVING FOR OPTIMAL ANIMAL, HUMAN, AND ENVIRONMENTAL HEALTH IN A RAPIDLY CHANGING WORLD

T.R. KELLY

One Health Institute, University of California, Davis, CA 95616, USA

trkelly@ucdavis.edu

ABSTRACT

We live in a rapidly changing and increasingly connected world. The global population is expected to surpass 9 billion people by 2050. Accelerated population growth can place enormous pressure on natural resources to meet demands, compromising communities’ capacities for sustainable growth. As our growing population competes for limited resources, we experience environmental degradation; wildlife habitat encroachment; decreased biodiversity; food insecurity; and threatened livelihoods, especially in communities lacking resilience, or the ability to adapt to rapid change, including climate change. These conditions lead to increased interactions between wildlife, domestic animals, and people. Greater convergence at the wildlife-livestock-human interface in the face of environmental change leads to novel and complex health threats for animals, humans, and their shared environment. For instance, the emergence and re-emergence of Severe Acute Respiratory Syndrome (SARS) coronavirus and H5N1 Highly Pathogenic Avian Influenza virus at this interface illustrates our vulnerability to emerging infectious diseases (EIDs). The majority of EIDs in humans are zoonotic and among these emerging zoonoses, almost ¾ have originated in wild animals. Further, environmental degradation and population growth create disturbances that promote noninfectious disease threats shared between people and animals. These changing dynamics underscore the critical need for an integrated, holistic, and more proactive approach taking into account the inextricable links between human, animal, and environmental health. This shift would present practical opportunities for tackling threats and fostering resilience in dynamic environments. Scientists and educators at the One Health Institute of the University of California, Davis, partner with governmental, academic, and private organizations around the world to address problems impacting health and conservation by applying integrated, holistic approaches in the institute’s research and training programs. Examples and implementation of these local, regional and global collaborative initiatives, along with success stories, and future opportunities will be discussed.

KEY WORDS: global population, environmental degradation, wildlife habitat, biodiversity, food insecurity
AN ASSESSMENT OF HUMAN-MONKEY CONFLICT BETWEEN LABUGAMA-KALATUWAWA AND INDIKADA FOREST RESERVES IN COLOMBO DISTRICT, SRI LANKA

P.A.B.G. PANAGODA* and A.V.P.A. WEERASINGHE

Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya.

*gayomini1@gmail.com

ABSTRACT

Human-Monkey Conflict (HMC) is a wide-spread issue across Sri Lanka. The wet western lowlands, which provide habitats for both endemics: the critically endangered Western Purple-faced Langur (Semnopithecusvetulusnestor) and the endangered Toque Macaque (Macacasinica), are also experiencing increasing issues of HMC. The study aimed to assess HMC in six villages between Labugama-Kalatuwawa and Indikada Forest Reserves in Colombo district.

A questionnaire survey was conducted, from April to June, 2016, in systematically selected 128 households in the area, with the sampling percentage of 19%, to determine the presence of monkeys in home gardens and their problem causing percentage, pattern and frequency of visiting, monkey group sizes, impacts to humans and threats to monkeys due to HMC and human responses upon monkey visitation, in order to achieve the aim of the study.

According to the results of the study, both species were present in 80.5% of home gardens whereas only S. v. nestor was recorded in 14.2% and only M. sinica in 2.5%. S. v. nestor caused problems in 82.5% of home gardens they visit whereas M. sinica caused problems in 93.4% of home gardens. Majority of both species visited home gardens more frequently (everyday, twice a week or once a week), all year round, without restricting to the fruiting season. S. v. nestor commonly occurred in groups with a size of <=5 individuals as M. sinica occurred in groups of 11-20 individuals.

When considering the impacts to humans, it was found that crop damage (93%) predominated the other types of damage where S. v. nestor was responsible for 78.1% and M. sinica for 62.5% of crop damages. Roof damage was the second common damage (48%) where S. v. nestor accounted for 72.8% of damage. Majority utilized firecrackers (35.3%) to chase the monkeys. Other methods such as throwing stones and shouting were also recorded. Electrocution was identified as a threat for both S. v. nestor (30.7%) and M. sinica (16.3%).

This study depicts that HMC is caused by both species, but impacts to humans and threats to monkeys are greater with S. v. nestor. It is recommended to enrich habitats and enhance canopy continuity between the two forests by placing a habitat corridor, in order to minimize HMC and to conserve these threatened species.

KEY WORDS: Human-Monkey Conflict (HMC), crop damage, conservation, habitat corridor, Labugama-Kalatuwawa Forest Reserve, Indikada Forest Reserve
ASSESSMENT OF THE ENVIRONMENTAL IMPACTS OF CAMPSITE USE BY VISITORS IN SELECTED NATIONAL PARKS OF DRY ZONE, SRI LANKA

S.T. MALLIKAGE* and P.K.P. PERERA

Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka

*shashinitara@yahoo.com

ABSTRACT

Camping is a popular nature based recreation activity in the contemporary nature-based tourism domain, and rapidly gaining momentum as a key recreational activity in Sri Lanka's National Parks. Recreational uses such as camping in natural areas can induce significant and often localized resource impacts that can affect soil, vegetation, wildlife, and water, with severity of such impacts tend to vary depending on the intensity of use. Hence, monitoring biophysical conditions of campsites has become an important component in reserve management agenda elsewhere, especially in developed countries. However, limited or no published researches have attempted to assess environmental impacts of campsite use in Sri Lankan context. Therefore, this study evaluated the current camp site conditions in selected dry zone National Parks using key biophysical attributes.

Ten campsites from 3 highly visited National Parks were selected to assess biophysical impacts caused by camping activities. Field measurements recorded using fixed radial transect method included visual counts of litter, soil compaction measured by penetrometer, erosion potential measured by `the total exposed area (devoid of vegetation or debris), exposed roots, and human damages to trees. Other information recorded from the campsites included the total area of the campsite, loss of coarse woody debris and number of fire places/ burn marks on the ground. Results found a significant loss in coarse woody debris around campsites, indicating the potential negative impact of camping on ecological integrity of the area. High degree of soil compaction was observed in the activity area of campsites compared to periphery area and control plots. Field observations recorded multiple fireplaces inside a single campsite, affecting negatively on aesthetics. Severe root exposures of trees due to human activities were further evident in ‘activity’ or ‘core’ area of campsites and along social trails/footpaths. Non-biodegradable litter encounter rate was apparently higher than the biodegradable litter encounter rate at all examined campsites. Pearson’s correlation test for the litter encounter rate and days of occupancy of campsites found a positive significant relationship ($r=0.674$, $p=0.047$). The number of cases of vandalism and tree damages seems to be dependent on the behaviours of campsite users rather than on the occupancy level. Study results overall highlights the importance of managing biophysical impacts in campsites to provide a high quality visitor experience, while sustainably managing tourism activities in National Parks.

KEY WORDS: Sustainable tourism, camping, recreation ecology, biophysical impacts, ecotourism
ASSESSMENT OF GENETIC VARIABILITY AMONG SIX
Guazumacrinita (BOLAINABLANCA) PROVENANCES FROM THE PERUVIAN AMAZON
USING ISSR AND AFLP MARKERS

L.L. TUISIMACORAL1*, P. HLÁSNÁČEPKOVA2, BOHDANLOJKA2, J. C. WEBER3,

1*National University of Ucayali (UNU), Faculty of Forest and Environment Sciences, Carretera
Federico Basadre km 6.200, Pucallpa, Perú.
2Czech University of Life Sciences Prague, Faculty of Tropical AgriSciences, Kamýcká 129, 165 21, Prague 6-Suchdol, Czech Republic
3World Agroforestry Centre, Lima, Peru
4Instituto de Investigación de la Amazonía Peruana, Programa Pro Bosques. CFB Km.12.4
Margen derecho, Pucallpa-Peru

ltuisimal@gmail.com

ABSTRACT

Bolainablancas is a fast-growing timber species, considered for the Amazonian farmer as a priority tree species for domestication. The knowledge of genetic variability is important to suggest management and conservation strategies for any species. The objective of this research was to process and to analyze molecular records for 24 bolainablancas genotypes from two Amazonian river watersheds based on the analysis with dominant markers ISSR and AFLP. Several software were used to determine parameter of genetic diversity and population genetic structure. Both molecular markers amplified high number of polymorphic fragments. But the polymorphism was slightly higher with AFLP markers. Aguaytia watershed showed higher percentage of polymorphism but Pachitea watershed exhibited greater values of genetic variability. Curimana, Tahuayo-Stream and Puerto Inca provenances presented higher values in all parameters of genetic variability. In addition is was found a weak genetic structure and high value of gene flow, which were visualized in the cluster analysis and the analysis of principal coordinates. They even showed the close relationship between genotypes, provenances and watersheds, suggesting the absence of genetic isolation by geographic distance and they could have a common origin. The sampling represent an important source of genetic variation of Guazumacrinita. It is recommended in situ conservation for the provenances with greater values of genetic diversity in addition to circa and ex situ management and conservation in order to maintain higher variability levels to avoid genetic erosion.

KEY WORDS: bolainablancas, gene flow, genetic differentiation, genetic diversity, molecular markers.
AVIFAUNA ABUNDANCE AND RICHNESS IN AN URBANIZED LAKE SITUATED AT PERALANDA - RAGAMA, NORTH COLOMBO- SRI LANKA.

E.I.P.SILVA¹, M.C.PRABHATH¹ and A.R.SUMANARATHNE²

¹University of Sri Jayewardenepura, Gangodawila, Nugegoda, Sri Lanka
²The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka

*isurupriyaranga@gmail.com

ABSTRACT

Avifauna species abundance and richness of an urbanized lake called “Peralandawewa” were recorded using point transects techniques from January 2015 to December 2016. The lake is situated at North Colombo area adjacent to Ragama city in Gampaha District. Three Different habitat types were identified as Water body habitat, Terrestrial habitat adjacent to water body and Disturbed habitat. Bird census was performed on 25 sampling points with a radius of 25m which were fixed by using a global positioning system device (GPS) (Garmin e Trex). Each point was visited at least 3 times per month at different times of the day between 0700h to 1000h and 1500h to 1800h. Sixty-three species belonging thirty-eight families were recorded during the study. These include three globally near threatened species Spot-billed Pelican (Pelecanus philippensis), Oriental Darter (Anhinga melanogaster) and Black-headed Ibis (Threskiornismelanocephalus); two locally near threatened species, Cotton Pygmy-goose (Nettapus coromandelianus) and Oriental Honey-Buzzard (Pernisptilorhyncus); one critically endangered species, Blue-tailed Bee-eater (Merops philippinus); two endemic species, Sri Lanka SmallBarbet (Megalaimarubricapillus) and Sri LankanSwallow (Hirundohypothyra) and four migrant species, Barn Swallow (Hirundorustica), Asian Paradise Flycatcher (Terpsiphone paradise paradise), Blue-tailed Bee-eater (Meropsphilippinus), Forest Wagtail (Dendronanthusindicus). Highest species diversity was recorded in terrestrial habitat adjacent to the water body followed by Disturbed habitat while least species diversity was recorded in Water body habitat.

KEY WORDS: urbanized lake, avifauna, avian diversity, North Colombo, Ragama.
AVIFAUNAL DIVERSITY IN THREE SELECTED HABITATS, WITHIN THE EASTERN BOARDER OF THE FACULTY OF APPLIED SCIENCES

D. BOPEARACHCHI* and S. WICKRAMASINGHE
*dilinibopearachchi@yahoo.com

ABSTRACT

Sri Lanka’s avifauna is one of the richest taxa in the whole of Asia. There were many avifaunal researches conducted in both wet and dry zones of Sri Lanka. But these studies confined to protected areas. But major drawback in the dry zone is scarcity of information on the avifauna. Though the Mihintale Sanctuary provide habitats for large number of avifauna, few studies have been carried out yet. The faculty of applied science locates adjacent to the Mihintale Sanctuary and provides different habitats for different bird species. The present study aims to identify the species diversity and feeding ecology of bird species in three different habitat types namely semi-aquatic, grassland and forest edge within the Eastern border of the Faculty of Applied Sciences.

The current study was conducted in the morning and in the evening during the period from July to October 2014. Line transect method (200m × 50m) was used for sampling forest edge, while points counts (Bibbly et al., 2003) were used for sampling semi aquatic habitat and grassland. Three fixed points were selected in semi aquatic habitat and 30 minutes were spent during both the points and transect count methods. Vegetation analysis was done by using random quadrat sampling method (10m× 10m) along the line transect.

A total of 45 birds belonging to 21 families were recorded, including 42 breeding residents, 04 winter visitors, 04 endemic species. Out of 45 birds, 31 species were very common, 14 were common endemic and 03 nationally threatened species. The species diversity was significantly high (H’= 3.31, P=0.002) in semi aquatic than the edge (H’=2.91) and grassland (H’=2.67) habitats. According to the species composition of three habitats, 6, 5 and 12 bird species were confined to grassland, edge and semi aquatic area. *Ocyeros gingalensis, Pycnonotus scaber and Megalaima zeylanica* species were common to the three habitats. There was a diurnal variation in avifaunal diversity. Morning diversity was higher (H’= 2.97) than in evening (H’= 2.87). Among the seven major feeding categories observed, majority was insectivores (29.00%) and lowest was piscivores (4.00%).

The three different types of habitats in the study site provide suitable habitats for a variety of birds. Morning hours are more prefer time for the bird species than evenings. Variation in species richness may be due to the structural changes of vegetation, the availability of food resources and weather factors. Species distribution of this study area was change due to the human influences, and climatic conditions of the area. Burning of Grassland and waste disposal were the main threats. Hence, appropriate conservation methods should be applied to conserve all the taxa in this ecosystem.

**KEY WORDS**: avifauna, diversity, Mihinthale, species, conservation
BIODIVERSITY CONSERVATION AS A STRATEGY TO REDUCE CLIMATE VULNERABILITY

E. WIKRAMANAYAKE, C. WEERATHUNGHE, M. TISSERA, and D. SATHANANTHAN

*Environmental Foundation, Ltd
*dhiya@efl.lk

ABSTRACT

Global climate change has now emerged as a significant driver of ecological and social change. The ecological changes can have cascading effects on biodiversity, livelihoods, lives, human wellbeing, and economic development targets. Sri Lanka is not buffered from the impacts of climate change. Sri Lanka’s ecosystems and the biodiversity they harbor are shaped by two relatively predictable monsoons and the central massif that captures orographic rainfall from the monsoons. The forested watersheds then act as water towers that release water in a regulated and sustained way to supply most of the island. But climate change could change the timing and precipitation regimes; in fact long-term monitoring of rainfall and temperature already indicates an increasing trend in ambient temperature and changes in rainfall patterns. When combined with the extensive and continuing loss, degradation, and fragmentation of forested watersheds, these two drivers of ecological change can have significant impacts on a range of socio-ecological parameters. Here, we present the results of a spatial analysis of biodiversity conservation priorities that can also help to reduce vulnerabilities from climate change.

KEY WORDS: ecosystem, biodiversity
BIRD – PLANT ASSOCIATIONS ALONG THE EDGES OF SELECTED FRAGMENTED HABITATS IN SOUTHERN PROVINCE, SRI LANKA


Department of Zoology, Faculty of Science, University of Ruhuna, Matara 81000, Sri Lanka

* epschandana@gmail.com

ABSTRACT

Recent development projects taken place all over Sri Lanka seem to cause massive decline in available habitats, habitat fragmentation and edges. Habitat fragmentation and formation of edges threaten survival and reproduction of avifauna. However this has not been widely studied in Sri Lanka. Therefore, the objectives of the present study were to reveal the bird-plant associations in selected fragmented habitats to collect baseline data. Present study has selected edges located at the premises of University of Ruhuna (UP), Matara (5°56’N 80°34’E) and KiralaKele sanctuary (KK), Matara (5°58’N 80°32’E) and Baruthakanda (BK) a secondary dry zone bush land (6°13’N 81°04’E) situated in Hambantota. Birds, vegetation and bird – plant associations at the study sites were surveyed along transects and established plots (250 m × 25 m) from April- October 2016. Data were analyzed using diversity indices and sites were compared for bird density and plant density using non parametric statistics (Kruskal Wallis Test). Total number of bird species recorded at UP, KK and BK sites were 51, 60 and 59 respectively. Shannon – Wiener diversity was 4.30, 4.25 and 3.63 respectively. Highest mean bird density per unit area was 2101 was observed at BK. Bird and plant densities were significantly different among study sites. (Kruskal Wallis test value - 6.489, P = 0.039). As for the observations in this study, birds used plants mainly for feeding in UP, for nesting and roosting in KK and for resting and nesting in BK indicating the site specificity of the bird-plant associations. As for the comparison with the reference sites, edge specific bird species at UP i.e. Blue – faced Malkoha, Stork – Billed Kingfisher, Yellow – rumped Flycatcher and BK i.e. Bright Green Warbler, Cinereous Tit, Dusky Warbler were recorded.

These data further indicate the specificity of the study edges. Specific bird – plant associations were identified in each study site i.e. Asian Koel – Ahu plant in UP, Red – vented Bulbul and Acacia plant in KK and Purple – rumped Sunbird – KatuAndara plant in BK. These data might be useful in terms of the bird conservation especially in setting priorities.

KEY WORDS: fragmentation, bird – plant associations, avifauna, University of Ruhuna, KiralaKele, Baruthakanda
CLIMATE CHANGE AND THEIR IMPACT ON SILVICULTURAL PRACTICES IN WESTERN HIMALAYAN MOIST TEMPERATE FOREST OF PAKISTAN

J.I. KHAN KHATTAK*1,2, V. PODRÁZSKÝ1

1Department of Silviculture, Faculty of Forestry and Wood Sciences, Czech University of Life Sciences, Prague, Kamýcká 129, Prague-6, Suchdol 16500 Czech Republic
2Department of Forestry, Shaheed Benazir Bhutto University, Sheringal, Dir Upper, Khyber Pakhtunkhwa, Pakistan,

*iqbal@fld.czu.cz

ABSTRACT

Western Himalayan Moist Temperate forest of Pakistan has great bio-diversity and one of the productive ecological zones for timber production. In past twenty five years those mountainous forests were not managed under proper silvicultural system due to ban on green harvesting and other cultural and tending operation in 1991-93, only 3D’s (Dead, Dying and Diseased) trees removal were allowed during 1999. Present study is the part of Doctoral research to find effects of harvesting system on environmental, social and economic issues in the region. In this regard climate and Management of forest is considered for evaluation. Climate change issues were also highlighted during past few decades. They have great influence on these mountainous forests with increase in temperature, Uncertainty of precipitation, wind and storm pressure. Temperature fluctuation is about 2°C to 5°C varies with valleys, ridges, depression and pick of these mountains. That effects the natural regeneration and other plant growth activities, also enhanced the disturbance which leads to the vulnerability of the forest. Bio-diversity of the region were also shift from its natural zone, growth and time for the establishment for plants were also decreases and faster with short time 10 to 15 days. Growth altitude differences were up to ±150 meter, which change the ecological zonation and requirements of the plants for nourishment. Wind throne, snow damaged were also increased 15 to 20 % according to the local records from forest management plan. Silvicultural operations and management practices need to observe to reduce the damages and protect and conserve their mountainous forest for future generation.

KEY WORDS: Climate Change, Forest Management, Silvicultural system, Regeneration, Mountains, Moist temperate forest.
ABSTRACT

Understanding the conditions under which interacting species can persist in ecological communities is a fundamental problem in ecology. Currently there is very little information on the dietary ecology of the Sri Lankan amphibian communities. Hence, a study was conducted to examine the trophic relationships between sympatric amphibians in the north central dry zone of Sri Lanka.

Stomach flushing technique was used to examine the diet of amphibian specimens were collected from in and around the Mihinthale Sanctuary (North central Province). Pair wise dietary niche overlap and niche breadth were computed using Simplified Morisita and Levin’s standardized niche breadth indices respectively.

Seventeen different prey categories were identified from six species of amphibians in the community. The most frequently utilized prey category by all amphibians was hymenoptera. Highest prey diversity was detected in *Euphlyctiscyanophlyctis* (Levin’s standardized niche breadth = 0.228), while the lowest prey diversity was detected in *Uperodonvariegatus* (Levin’s standardized niche breadth = 0.000) indicating a high degree of specialization. The average niche overlap among the species in the community was 0.392 (range), indicating very low trophic niche overlap. The highest niche overlap was observed between *Uperodontaprobainicus* and *Uperodonvariegatus* (0.453), while the lowest was observed between *Euphlyctiscyanophlyctis* and *Uperodonvariegatus* (0.281).

This study indicates a very low level of dietary niche overlap in the amphibian community and hence, a high degree of dietary niche partitioning. The study also reveals a trend towards dietary specialization and possibly low level of competition for food in this amphibian community. Furthermore, the study offers valuable insights into the dietary ecology of these amphibians, which are invaluable for the formulation of strategies for their conservation.

**KEY WORDS:** niche overlap, niche breadth, resource partitioning, coexistence, sympatric
DISCOVERY OF A LARGE NESTING COLONY OF THE BLUE-TAILED BEE EATER
(Merops philippinus) IN OLUVIL, AMPARA

D.K. HEWAVITHANA1*, A.L.2, T.N. PERIES3 and M.R. WIJESINGHE4

1Environmental Foundation (Guarantee) Limited. 3A, 1st Lane, Kirulapone, Colombo 5
2No. 194, Pahala Biyanwala, Kadawatha
369/17 C, Templers Road, Mount Lavinia.
4Department of Zoology and Environment Sciences, University of Colombo

dishanehewavithana@gmail.com

ABSTRACT

This paper reports the discovery of a new breeding site of the Blue-tailed Bee-eater (Merops philippinus) in Sri Lanka located in Oluvil, Ampara district (7.278355° N, 81.863966° E). It is the largest nesting site of this migratory species recorded in the island so far. The Blue-tailed Bee-eaters nested colonially on an artificial coastal sand dune approximately 6 m in height and 18 m in length created as a result of piling of dredged sand from the Oluvil fishery harbour. A total of 125 birds were counted from the vicinity of the sparsely vegetated dune in March 2017. Borrows were made only on the compacted and stable vertical and bare surfaces of the dune avoiding areas along the gradual and unstable slopes. An average burrow density of 27.6 burrows per square meter was recorded at the site, while the estimated maximum and minimum heights of borrows were 5.60 and 3.03 m, respectively. This recent discovery is important given that the Blue-tailed Bee-eater is designated as Critically Endangered based on the restricted range of its breeding population within Sri Lanka. It would thus be of added importance to monitor the arrival and breeding of the Blue-tailed Bee-eaters at this site annually, prior to disturbance of the sand dune. The present record also emphasizes that developmental activities, if carefully planned, could benefit species that are currently facing threat.

KEY WORDS: Blue-tailed Bee-eater (Merops philippinus), migrant, nesting, sand dunes
ABSTRACT

Distribution of the Jungle Crow (*Corvus levaillantii* Lesson, 1831) and their potential threats to biodiversity was studied at the Montane Cloud Forests of Horton Plains National Park, of Nuwara Eliya District at the Central Highlands of Sri Lanka, from September 2015 to March 2017. This species is distributed in every terrestrial habitat throughout Sri Lanka. To study distribution of the crow, three main habitats were identified as Forest habitat, Grassland habitat, and Human-induced habitat. Three, 100 m fixed line transacts were marked in each of the habitats using a global positioning system device (GPS). Field observations were conducted on three consecutive days each month, while travelling along transacts, from 0600h to 1800h. Birds were observed directly or through a 10x50 binocular. Meanwhile, number of visitors walked through transects was counted. Opportunistic observations were carried out, to investigate threats for the other animals. Maximum population of *C. levaillantii* was present at Human-induced habitat, 45.95±18.59 (Mean ± Standard deviation). Minimum population was recorded from Grassland habitat 30.26 ± 16.93(M ± SD). Population of *C. levaillantii* recorded at Human-induced habitat, positively correlated with the number of visitors per hour (Pearson correlation= 0.887, p-value < 0.05). Though there were sign boards and garbage bins, crows always inhabited in Human-induced habitat. Endemic lizards; *Calotes nigrilabris, Ceratophora stoddartii* and *Cophotis ceylanica* are highly attacked and endemic birds such as *Gallus lafayettii, Eumyias sordidus* and *Pycnonotus penicillatus* were harmed by *C. levaillantii* in high numbers. Raptor birds such as *Haliastur indus, Circus macrourus, Pernis pitiorhynchus* and *Falco tinnunculus*, were attacked by the crow. According to present findings it can be concluded, that the Horton Plains National Park is invaded by Jungle Crow. Large number of crows is a major threat to endemic animals. Increased number of crows is an indicator of pollution, because they are scavengers in the food chain. To establish the protection of fauna in this important Montane Cloud Forest, admissible methods to control the number of *C. levaillantii* are needed.

KEY WORDS:*Corvus levaillantii*, distribution, Horton plains national park, tropical montane cloud forest
DIVERSITY AND MORPHOMETRY OF ORB WEAVER SPIDERS IN RAINFORESTS IN SRI LANKA

D. THARANGA*, T. WIJERATHNA and M.R. WIJESINGHE

Department of Zoology and Environment Sciences, University of Colombo, Colombo 03.

*dilinitharanga.dt@gmail.com

ABSTRACT

Web building spiders in Sri Lanka are a poorly studied group of arachnids. Documenting spider communities assume importance in the view of current threats of habitat loss and degradation of the southwestern rainforests. Here we report the findings of a survey of orb web spiders inhabiting selected low to mid elevation rainforests in Sri Lanka. The study was carried out in seven reserves, namely Kanneliya, Kombala-Kottawa, Yagirala, Meethirigala, Runakanda, Bodhinagala and IndikadaMukalana, each located within one of four districts, Galle, Kalutara, Colombo and Gampaha. The study was conducted over the period February to December, 2016. A total of 150 transects, each 100 m in length, were surveyed in core areas and in the fringes of these forests.

The recorded 232 orb weaver spiders belonged to eleven genera in three families. A total of nine species and seven possible morpho-species were identified: Family Araneidae - seven species and three morpho-species in seven genera, Family Nephilidae - one species and Family Tetragnathidae – one species and four morpho-species in three genera. All recorded species were native with none being endemic. The confirmed species were Argiopeaemula, A. aetherea, Cyclosa bifida, Eriovixialaglaizei, Gasteracanthageminata, Neogeanocticolor, Parawixiadehaani, Nephilapilipes and Opadometafastigata while the morpho-species were of the genera Neoscona, TetragnathaandTylorida. Neogeanocticolor is a critically endangered species while Nephilapilipes is a near threatened species. Some species (N. pilpes and O. fastigata) were relatively abundant while E. laglaizei, Neogeanoticolorand P. dehani recorded only a single individual. Occurrence patterns differed between species some being restricted to single forests. The IndikadaMukalana forest was seen to be the richest in terms of species. The encountered orb weavers varied remarkably in their morphometry with the largest spider Nephilapilipes having a body length (i.e. cephalothorax length + abdomen length) of 20.4 mm, whilst the smallest Neoscona Sp.1being only 4.1 mm in length.

This study has generated preliminary information on abundance and distribution of the orb web spiders in rainforest habitats that would allow better assessments of the conservation status of this sparsely studied group of arachnids.

KEY WORDS: orb weave spiders, rainforests, Nephilapilipes, morphometry
EARLY CROP AND FARM ANIMAL DOMESTICATION IN SOUTH ASIA
BASED ON ETHNOBOTANICAL AND ARCHEOLOGICAL FINDINGS

A.B. DAMANIA

University of California, Davis

abdamania@ucdavis.edu

ABSTRACT

The greatest difference in the archaeological study of plants and animals is that in plants the selective pressures introduced under domestication operate directly on morphological traits, whereas in animals they operate on behavioral attributes. There has been significant work done in excavating specific archaeological sites specifically for ethnobotanical and animal remains in South Asia. Some of these sites are in the Indus Valley, the Northern Gangetic Plain, and the Southern Provinces. Due to paucity of finds of actual specimens, archeobotanists have been relying on written records and evidence from the use of languages. The writings of ancient Greek philosophers, like Socrates, Theophrastus, and Plato, as regards domesticated plants and animals were not always accurate. The main mammals domesticated to serve man for transport and labor are the horse, donkey, camel and the elephant. These animals have served South Asian agriculture for over 6000 years, and in some areas still do, before mechanical tools and machines overtook them. Agriculture originated in the “Fertile Crescent” and a great majority of South Asian farm animals came from elsewhere. However, considerable more archaeological and ethnobotanical work needs to be done in South Asia in order that a clearer picture of farm animal and crop domestication emerges. Farming could have begun in South Asia earlier than what is mentioned in the current literature.

KEY WORDS: ethnobotanical, domestication
EFFECT OF SOME NEMATOPHAGOUS FUNGI ON REPRODUCTION OF A NEMATODE PEST, HETERODERA SCHACHTII AND GROWTH OF SUGAR BEET.

M. HUSSAIN*, M. ZOUHAR and P. RYŠÁNEK

Department of Plant Protection, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences, Prague, Czech Republic

*hussain@af.czu.cz

ABSTRACT

*Heterodeschachtii* is a globally important and often marginalized pest of sugar beet, cabbage, broccoli and radish, among other crops. It is a cyst-forming nematode that affects plant growth and yield. We report on studies aimed to evaluate the effects of five nematophagous fungi on the population dynamics of this pest in sugar beets in laboratory and greenhouse trials. The fungi chosen were *Arthrobotrysoligospora, Dactylellaoviparasitica, Clonostachysrosea, Strophariarugosoannulata,* and *Lecanicilliummuscarium.* In the laboratory experiment, *S. rugosoannulata* proved to be the most efficient biocontrol agent by parasitizing the maximum number of eggs, whereas *D. oviparasitica* appeared to be the least efficient after 72 hours. The greatest numbers of cysts and eggs were found to be colonized with *L. muscarium* during microscopic observations. In the greenhouse experiment, *L. muscarium* had significant effects in reducing the nematode population in soil compared to the other treatments. In regard to the growth parameters, root and shoot growth (cm) were enhanced after the application of *L. muscarium,* followed by *D. oviparasitica* and *S. rugosoannulata.* The reproductive rate (Rf = Pf/Pi) of nematodes was much higher in the non-treated plants than those that were treated. The root quality of the fungus-treated plants was significantly improved. All fungi conclusively proved to be effective against *H. schachtii* and need to be further investigated at the molecular level.

KEYWORDS:*Heteroderaschachtii,* Nematophagous fungi, Sugar beet, Lecanicilliummuscarium, *Strophariarugosoannulata*
Sri Lanka’s coastal zone is changing rapidly due to coastal development and climate change. In the next few decades, Sri Lanka will be greatly affected by coastal flooding due to projected sea level rise and associated increases in wave action and surges. The risks of economic loss associated with floods and tropical cyclones are increasing across the world. Governments and businesses are increasingly interested in identifying nature based solutions that can be used cost-effectively as part of the strategy for coastal defense. Coral reefs are known to provide a number of benefits, including protecting coasts from damage during severe weather events, and reducing erosion. A meta-analysis quantified this effect, showing that reefs have significant potential to reduce wave heights by 70%. Examples from the Maldives, Egypt and Indonesia show that where reefs have been damaged following extensive coral mining or land reclamation, investments in artificial defenses have increased. Furthermore, studies show that, under the right conditions, reef restoration projects can be a highly cost effective alternative to man made coastal defenses. Hence, coral reef restoration has the potential to reduce costs of engineering for coastal protection. Additional benefits of coral reef restoration include increased biodiversity, fish production, and opportunity for recreation and tourism. In the past, reef management methods focused on reducing reef degradation. However, scientists have now developed cost effective techniques for rearing and transplanting coral which offer great potential for Sri Lanka’s coastal defense. Here, we present a strategy to restore Sri Lanka’s coral reefs to reduce vulnerability of the coastal zone from the impacts of climate change.

KEY WORDS: increase, nature based solutions, degradation

---


EVALUATION OF PERFORMANCE OF ENVIRONMENTAL PROTECTION LICENSE OF RICE MILLS OF THE NORTH CENTRAL PROVINCE

G.N. CHANDRASIRI\(^1\) and U.A.D.P. GUNAWARDENA\(^2\)

\(^1\)Central Environmental Authority, Sri Lanka
\(^2\)Department of Forestry and Environmental Sciences, University of Sri Jayewardenepura, SL

ABSTRACT

Improper management of industrial pollution can result in serious damage to the environment and as well as to human health. Environmental Protection License (EPL) is a regulatory tool under the NEA to control the discharge of effluent, emission and deposits of solid waste. Present study was carried out to assess the effectiveness of EPL of rice processing industry in the North Central province and to investigate the factors affecting adoption of pollution control by the industries. Data were collected from 100 rice mills from two divisional secretariats (Thamankaduwa and Hingurakgoda) from Polonnaruwa district and three divisional secretariats (Kekirawa, Nachchaduwa and Thalawa) from Anuradhapura representing different scales of the industry. Information on production capacity, milling technology, management of solid waste, waste water and emissions, adoption of EPL, expenditure on pollution control were collected using a pretested questionnaire.

Results indicate that production capacity of rice mills varied from 0.3 to 150 metric tons per day for type A and B industries. Total waste management cost varied from LKR 165 million to 12,000. Although majority of the mills had modern mills, most common waste water treatment method was open discharge. Fly ash control was done mainly with ash rooms. Only 60% of the operating industries (of A and B categories) have obtained EPLs. A multiple regression analysis indicates that total waste management cost was mainly influenced by the factors such as treatment method, production capacity, land extent and the type of mill.

It was identified that information gaps regarding best available technologies act as barriers of adoption of pollution control which could be mitigated by supportive consultation services and close monitoring.

KEY WORDS: effluent, milling technology
EVOLUTIONARY DISTINCTIVENESS OF SRI LANKAN AVIFAUNA

D. ABEYRAMA and S. S. SENEVIRATNE

Avian Evolution Node, Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo, Colombo 03, Sri Lanka

sam@sci.cmb.ac.lk

ABSTRACT

The evolutionary history of a phylogenetically distinct group of organisms (a clade) can be traced by using a phylogenetic tree. Such phylogenetic trees can also be used to measure the amount of evolutionary history captured by each member species (node) in the tree. Evolutionary Distinctness (ED) and Evolutionary Distinct and Globally Endangered Score (EDGE) are two such vital parameters that could elucidate the phylogenetic history captured in member species. Birds evolved from a lineage led by dinosaurs over a period of ~100 million years and today the class Aves is a highly specious lineage with over 10,000 extant species. About 5% of the global avian diversity is represented in Sri Lanka with 34 endemic species. Here we quantify the evolutionary distinctness of Sri Lankan avifauna using a phylogenetic tree constructed for all the 342 bird species that are found in 71 Important Bird Areas (IBAs) of Sri Lanka. We constructed the tree from DNA sequence archives at www.birdtree.org using bioinformatics tools and higher-order phylogenetic backbones. ED and EDGE scores of all 342 birds were calculated in R Package. Batrachostomusmoniliger (Ceylon Frogmouth) is the most evolutionary distinct (ED) species in Sri Lanka, while Otusthilohoffmanni (Serendib Scops-owl) is the most evolutionary distinct endangered lineage (EDGE) of the country. Harpactesfasciatus (Malabar Trogon), Pittabrachyura (Indian Pitta), Phoenicopterusroseus (Greater Flamingo) and Tachybaptusruficollis (Little Grebe) are the rest of the top 5 species with highest ED. Centropuschlororhynchus (Green-billed Coucal), Myophonusblighi (Ceylon Whistling-thrush), Leptoptilosjavanicus (Lesser Adjutant) and Pelecanusphilippensis (Spot-billed Pelican) are the rest of the highest EDGE species in Sri Lanka. Members of order Charadriiformes (shorebirds, terns and gulls) in general have the lowest ED values. The species that have evolved recently and have sister or closely related species have relatively low ED. A species that has a high EDGE score is an isolated node in the phylogenetic tree and a globally threatened species. We believe that these parameters will give a novel evolutionary perspective for both wildlife managers and birders on avifauna of Sri Lanka.

KEY WORDS: Avifauna, Birds, Evolutionary Distinctness, Evolutionary Distinct and Globally Endangered Score, Phylogeny, Sri Lanka
FACTORS AFFECTING THE POPULATION SIZE AND THE DISTRIBUTION OF SPOT-BILLED PELICAN (*Pelecanus philippensis*) IN COLOMBO DISTRICT, SRI LANKA

H.W.G.A.S. WEERASINGHE* and U.P. K. EPA

Department of Zoology and Environmental Management
University of Kelaniya

*ayomaweerasinghe@gmail.com

ABSTRACT

Spot-billed Pelican (*Pelecanus philippensis*), is a near threatened, one of the eight pelican species in the world, restricted to South and Southeast Asia. In Sri Lanka, it is naturally occurring in the dry zone and the wet zone holds a naturalized population, released from the National Zoological gardens, Dehiwala. *P. philippensis* thrive in highly urbanized Colombo district, even though their population is slowly declining, in other parts of the world. Irrespective to its importance in urban wildlife, very few studies have been carried out, on *P. philippensis*. Therefore, the present study was conducted to estimate the population size and to study factors affecting the distribution of *P. philippensis* in Colombo district.

Measurements of environmental variables and bird survey were carried out in 15 selected lentic water bodies in Colombo district during April to December 2016. Size, Chlorophyll a content (indirect measurement of fish productivity), water quality parameters (i.e. pH, conductivity, Total Dissolved Solids, salinity and Dissolved Oxygen), surface vegetation cover of the water body, distance to the roosting sites and the land-use percentages around the water body were selected as the environmental variables for the study. A roosting count was taken to estimate the population size of *P. philippensis*. The distribution map of the species was created using ArcGIS 10.2.2 software.

The abundance of *P. philippensis* in Colombo district was positively and significantly related to the Chlorophyll a content (indirect measurement of fish productivity) of the water body (p<0.05, R²=0.719) while it was negatively and significantly associated with the distance to the roosting sites (p<0.05, R²= 0.449). Size, water quality parameters, surface vegetation cover of the water body and the land-use percentages around the water body did not significantly affect the abundance of *P. philippensis* (p>0.05). However, surface vegetation cover of the water body was found to be negatively related with the abundance while the water quality parameters were found to be positively related with the abundance. Based on the roosting count, the estimated minimum number of *P. philippensis* in Colombo district was 193 individuals. The population distributed in 14 lentic water bodies in Colombo district. Pelicans have expanded their distribution up to 15 kilometers away from the National Zoological Gardens, where they were first released into the natural environment.

Further studies on population changes, and ecological impacts of pelicans are warranted.

KEY WORDS: Spot-billed Pelican, Colombo, Population, Distribution, Lentic water bodies
Sustainability, seems like a word that ensures that we use resources resourcefully. But, there is a bigger meaning to sustainability than that. It is quite difficult to explain for a person that what sustainability is all about and how this particular concept that was popularized at the Brundtland Commission Report in 1987 can actually be the future of the planet. It has already started to regenerate its impulses in the world.

Many think that money is everything, that money can buy anything and everything within our vicinity. If trees don’t produce oxygen to breathe and forests doesn’t make rainfall and springs to rise, there will be no life on this planet. We need to understand the true meaning to life, true value of our planet, because everything is there for a reason. Unless we do not identify these qualities of the environment and try live synchronizing with the natural balance, it’ll be the end of us. Man as the bible says are the protector of this amazing creativity. If you take Lord Buddha’s life, every incident has a part of nature, his teachings are the natural way of living. Every religion talks about nature, or nature is part of the religion. We are interlinked, we cannot live without it. But the nature can live without us.

Governments, non-governmental organizations, individuals have risen against the polluting and deforesting community, to make a difference in protecting our natural world. It is amazing how the corporate world, the big giants are concentrating on their efforts in making the world greener, making their products greener, supply chain more in compliance to the environment, creating a market where consumers are intending in buying eco-friendlier products. Why? Because they have understood that without the natural resources, without saving for the future, businesses will not succeed. Basically there will be no future for business. Many businesses in the world has a sustainable approach to their business strategies. As building a business sustainably has become something important, a must do. While many manufacturing companies are looking for more eco-materials and recycled materials, they are also following in calculating their footprints in water, energy, waste…etc. in identifying ways and means of reducing consumption and reducing raw material use.

MAS Holdings as a group is taking the next step in their process, where they have embraced sustainability and trying to make a difference in how they inbuilt their business and process. The management has understood how it can play a significant role in the fashion market today. Linea Aqua (Pvt) Ltd is an exemption when it comes to sustainability initiatives in the corporate, a swimwear manufacturing company moving towards a sustainable aim. This creates a long term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments. The companies have identified to be best equipped to the global sustainability trends.

**KEY WORDS**: synchronizing, products greener,
ABSTRACT

Forest cover change can be identified as both combining with natural influence and also the anthropogenic activities. Sustainable forest management addresses forest degradation and deforestation while increasing direct benefits to people and the environment. Minneriya is one of the National park in Sri Lanka where with the forest management. This research mainly depended on secondary data of land use maps. Mainly considered land use map in 2000-2014. By using 2000 land sat data and 2014 Google map it created a map by the georeferencing. By the supervise classification and digitization it could create the land use map 2000 and 2014. By overlaying of these two maps it could be identified the changes of forest cover within the fourteen year period. According to the results in 2000 forest cover was 42.67 km². But there was reduction forest area in 2014, it was the 36.65 km². Scrub area were changed and it can be identified as it was in 2000 21.2 km². In 2014 it was 27.83 km². That means the scrub areas are increased during the last fourteen year period of the time. When it compares with the forest areas scrubland has been increased. In Minneriya National park can be identified as the place sustainable forest management area.

KEY WORDS: forest management, Minneriyanational park, Geographic Information System, remote sensing
The Quaternary Research Working Group (QRWG) of Sri Lanka was set up at the 11th AGM of Geological Society of Sri Lanka (GSSL) in 1995 to encourage the researchers who are keen on Quaternary Studies of Sri Lanka. For this purpose, the QRWS successfully completed two field visits in the southern and northwestern coastal zones to observe the Quaternary and Holocene formations of Sri Lanka, although, we failed to organize an International Conference or proposed a one-day awareness Workshop/Seminar due to lack of funding. Hence, the Quaternary Research in Sri Lanka comes into view as a neglected field. However, the Group compiled a bibliography including twenty-six (26) subject categories relating to the Sri Lankan Quaternary. However, it is very difficult to fulfill the research gaps in relation to Quaternary Geography, Quaternary Climatology and Quaternary Ecology in detail.

The Quaternary studies of Sri Lanka emerged since 1908, and pioneer scientists were British, Canadians, Germans, Indians and Sri Lankans. They described the Palaeolithic stone tools, cannibalistic Balangoda Man, the fossils of extinct animals and past climatic phases of Sri Lanka. Stratigraphic sequences, constituent material, locations and some age determinations on Quaternary formations have been completed by a few scientists. These scientists are undertaking Quaternary studies emphasizing different disciplines with limited facilities and funding. Also, the lack of age determination facilities in Sri Lanka is the main obstacle for the Quaternary studies of Sri Lanka.

**KEY WORDS:** Quaternary studies, Quaternary climate, Older and Younger formations, Age determination, future prospects
Also known as the thick-tailed pangolin, *M. crassicaudata* is a medium-sized mammal that is largely fossorial and myrmecophagous. At present, it is mainly confined to India, Nepal, Pakistan and Sri Lanka, and believed to be extirpated or occurring in very low numbers in Bangladesh and China. The species is under threat due to hunting for local consumption and illegal trafficking of scales, flesh and skins. The dearth of scientific studies on the ecology of the Indian pangolin has impared the accurate assessment of its conservation needs. Hence, this study investigated the habitat preference, utilization and burrow characteristics of Indian pangolins in the Yagirala Forest Reserve: a tropical lowland rainforest in Southwest Sri Lanka. A total of 75 burrows (54 feeding burrows and 21 living burrows) of Indian pangolins in four different habitat types i.e. Secondary forest, Pine-dominated forest, Rubber cultivations and Tea-dominated home gardens bordering the forest were observed using fixed-width transects for the characterization of living and feeding burrows. Burrow features of depth, burrow opening width, burrow opening height, midday temperature and relative humidity inside the burrow, as well as habitat features such as % canopy cover, slope, % undergrowth, distance to the closest human habitation, and distance to the closest water source were evaluated to distinguish feeding and living burrows. Highest density of living burrows was recorded from the Secondary forest (4ha⁻¹), followed by Rubber cultivations (2.5ha⁻¹) while no living burrows were recorded from Pine-dominated forest and Tea-dominated home gardens. In contrast, feeding burrows were more abundant in Pine-dominated forest (5.7ha⁻¹), followed by Rubber cultivations (2.5ha⁻¹), Secondary forest (2.3ha⁻¹) and Tea-dominated home gardens (2ha⁻¹). The features; burrow depth (*t*=13.53, *p*<0.05) burrow opening height (*t*=6.40, *p*<0.05) and burrow opening width (*t*=4.97, *p*<0.05) were significantly higher compared to those of feeding burrows. Living burrows were located in higher elevations(75-100m) with moderately high slopes(45⁰-60⁰), dense canopy cover(>75%) and away from human habitations (200-400m). Feeding burrows showed a greater variability in terms of associated environmental features with feeding burrows locating even in home gardens. The study further revealed that Indian pangolins exclusively prefer areas with rock boulders to dig living burrows while location of feeding burrows largely overlapping with the distribution of the prey species.

**KEY WORDS:** Indian Pangolin, Habitat preference, Burrows, Yagirala, Sri Lanka
Horagolla National Park is a low country evergreen forest in Gampaha district. The species abundance and diversity of herpetofauna in Horagolla National Park (HNP) were studied during the study. Four habitat types were selected as Sandy Soil Forest Habitat (SSFH), Muddy Soil Forest Habitat (MSFH), Stream Adjacent Forest Habitat (SAFH) and Grassland (G) in the national park. Data were collected using four, hundred meter line transects with the help of a global positioning system device (GPS) and possible microhabitats were searched by using quadrat sampling method from August 2012 to July 2013 and from January 2015 to December 2015, for the period of two years, once a month both during day & night. Sixteen species of reptiles belonging to nine families and seven species of amphibians belonging to five families were recorded during the study. Shannon's diversity index (H) & Relative Abundance (RA) were used to calculate the richness & abundance of recorded species. The Dicroglossidae, Rachophoridae, Agamidae & Natricidae were the dominant families of herpetofauna in terms of richness, and species such as *Otocryptis wiegmanni* (RA=0.268) was followed by *Aspiduraguentheri* (RA=0.246). *Cylindrophismaculatus, Boigatrigonata* and *Pseudophilautuscuspis* were rare and patchy in their distribution, not only inhabiting undisturbed forest, but also the human conquered area. This study revealed that Horagolla National Park is a preferred habitat for reptiles & amphibians.

**KEY WORDS:** Abundance, Diversity, Herpetofauna, Sri Lanka
HOW TO PROTECT SEA TURTLES EFFECTIVELY?

HANA SVOBODOVÁ

ZOO Hodonín, Czech Republic; Association for Protection of Marine Life in Berau, Indonesia

ABSTRACT

Although, sea turtles are protected by international law, their populations have been dwindling steeply since the last few decades. The rise in sea level due to climatic change and nests are more often inundated by floodtide along with the most common predators such as man-introduced dogs and rats have been primarily few important factors that have been chiefly responsible for this decline in sea turtle populations. Some other factors including unplanned coastal developments and tourism activities that cause destruction and fragmentation of sensitive beach areas. Further, affected by artificial lighting from the adjacent urban areas are avoided by female turtles for laying eggs and light pollution disorients hatchlings searching for the way to ocean. Apart from these collecting eggs and killing females for meat on beaches still represent one of the most serious problems in many areas. Adult hawksbills are hunted for their shell, and juvenile animals are stuffed to be sold as souvenirs. Situation of sea turtle populations are better in Atlantic Ocean, however, all populations exponentially decline in Pacific Ocean, and mainly in Indian Ocean, where the sea turtles are already extinct in many areas.

In some places people are already aware that turtles need to be protected for the fine ecological balance but not all methods adopted are effective. What is the effect of head starting? How ecotourism can help turtles survive? We demonstrate the role of education and community development in sea turtle conservation and present effective principles of direct protection on beaches.

KEY WORDS: cause destruction, fragmentation, juvenile animals
Dung beetles play important ecological roles in terrestrial ecosystems such as secondary seed dispersal, nutrient cycling and bioturbation. Due to their ecology, dung beetles are dependent on vertebrate dung as food and hence, the loss of large vertebrates and the associated changes in habitat can result in the decline of dung beetles with consequences for ecosystem processes. Yet, our understanding of the interaction between dung of common native vertebrate species and dung beetle communities is at its infancy, as relatively few studies have addressed this issue. Hence, the objective this of this study was to examine the interaction of the dung beetle community with dung of common native mammals found in a dry forest in the north central dry zone of Sri Lanka. The study was carried out from January to March 2017 in Mihintale Sanctuary, in the north central dry zone of Sri Lanka. Elephant, porcupine, sambur deer, spotted deer, gray langur and macaque feces were used simultaneously to bait traps, which were placed 50 m apart from each other along transects that traversed grassland, forest edge and forest habitats. The traps along one transect were not baited and acted as a control. Traps were baited twice a week with fresh dung. A trapping session was 24 hours and each trap was examined at 6.00 AM and 6.00 PM during which, all specimens collected in the traps were removed for identification. A total of 1025 individuals belonging to 21 species were identified. Of the recorded species, 18 were from the Family Scarabidae belonging to the genera, Onthophagus, Sisyphus, Copris and Catharsius. Ten species were recorded from the forest and 16 and 17 from the forest edge and grassland respectively. Sorensen index values for forest (0.769), edge (0.741) and grassland (0.727) suggests that there was considerable overlap in species between habitat types. A Friedman’s ANOVA indicates that the variation in species diversity between habitats was not statistically significant ($\chi^2(3 =3.000, n=6, P\leq0.311$). The specialization of dung beetles on dung types ($d_i^j$) ranged from 0.000 to 0.426 with the species belonging to the family Hydrophilidae(0.426)being the most specialized. Species strength of dung beetles on dung type ranged from 0.002 to 1.677 with Onthophagus turatus (1.677) having the highest species strength as a result of interacting frequently with all dung types. When dung types are considered, species strength of dung type on beetles ranged from 0.066 to 9.482 with porcupine (9.482) showing the highest species strength, followed by gray langur (4.538) and macaque (3.889) feces. This suggests that porcupine, gray langur and macaque feces were the most frequently visited dung types by dung beetles. Our study shows that dung beetles varied in their level of specialization on mammalian dung types, some being more specialized than others. Hence, retaining medium and large mammalian diversity may be critical towards conserving dung beetle communities in dry forest in Sri Lanka. Of the mammal dung types used, porcupine, gray languor and macaque were the most frequently visited and hence may be important from the point of view of maintaining dung beetle diversity in dry zone forests of Sri Lanka.

**KEY WORDS:** Dung beetles, Diversity, Abundance, Specialists, Generalist
MANGROVE SPECIES DISTRIBUTION, DIVERSITY AND PRESENT STATUS IN THE NORTH AND EAST COAST OF SRI LANKA

M. G. M. PRASANNA1*, K.B.RANAWANA2, GEHAN JAYASURIYA3, PATHMA ABHEYKOON1, MADAWA RANASINGHE1

Ministry of Mahaweli Development and Environment, 82, Rajamalwaththa Rd, Baththaramulla, 2. Department of Zoology, University of Peradeniya, 3. Department of Botany, University of Peradeniya,

*mprasanna74@yahoo.com

ABSTRACT

Mangroves have unique characteristics to survive in intertidal environments in tropical and subtropical countries and it consist verity of associated faunal and floral community. They often exhibits striking zonation pattern of tree species across the intertidal zone. Mangroves are considered to have originated after the first angiosperms, around 114 million years ago. Mangroves have some unique characteristics to survive in hard environmental conditions in intertidal zones in mostly in tropical countries. This study was conducted out from June, 2012 to June, 2015 along the coastal zone of the Eastern Province and Northern Province from Okanda to ModaraganAru the Southern boundary of Mannar District. Approximate length of the study area was 786 km. The total study area was completely in the dry zone of the country and covered seven administrative districts namely; Ampra, Baticaloa, Trincomalee, Mullathiv, Jaffna, Kilinochchi and Mannar. According to the Department of Forest Conservation Sri Lanka, the mangrove area of North and Eastern province is 11,866 ha. Highest extent of mangroves were found in the Jaffna district (2,505 ha) and the lowest was recorded in the Ampara District (618 ha). The study area included 76% of the total mangrove area along the 753 km of the coastal belt in the North and Eastern Provinces. Eighteen out of 21 true mangrove species had been recorded from the study area during this survey. This represent ~86% of total mangrove species recorded in Sri Lanka. Majority of mangroves (86%) are representing in the dry zone of the country. Four species are more common and seven species were very rarely recorded in dry zone including one critically endangered species. Three species were confined only wet zone or the intermediate zone of the country. According to the findings some species of mangroves shows geographically isolation due to climatic variations.

The accurate species composition of the country is still uncertain as even one new mangrove species has been recently recorded. Also, the mangrove species present at each mangrove patch also need to be assessed in order to support future conservation and management plans. Distribution of very common, common, rare and very rare mangrove species around the country also unknown and this has affected formulating special management plans.

KEY WORDS: mangrove, abundance, distribution
MATURITY STAGE CATEGORIZATION OF ENDEMIC LIZARD (*Calotes nigrilabris*) IN THE GRASSLANDS OF HPNP

E.G.D.P. JAYASEKARA, M.C. PRABHATH and W.A.D. MAHAULPATHA*

DEPARTMENT OF ZOOLOGY, UNIVERSITY OF SRI JAYEWARDENEPURA

*mahaulpatha@sjp.ac.lk

ABSTRACT

Morph metric parameters of endemic endangered highland lizard *Calotes nigrilabris* were obtained utilizing three fixed length 200m line transects in the grassland habitat of Horton Plains National Park (HPNP). The PCA analysis of morph metric data revealed five discrete clusters which were categorized into five maturity stages as Adult male, Adult Female, Sub-adult Male, Sub-adult Female and Juvenile. Furthermore, principal component 1 (PC1) axis was representing a high percentage of variance (91.3%) with negative values for all the parameters indicating that if one morph metric parameter of an individual lizard increases, all the other parameters also increase. SVL was identified as the morph metric parameter with the highest PC1 value (-0.422), yet it wasn’t significantly affecting the PC1 axis. SVL was used as a base for easy categorization of maturity stages. Adult Males recorded the highest values for all the parameters considered. Results of the present study indicate that morph metric data can be used as a successful tool for the categorization of maturity stage of this agamid species.

KEY WORDS: maturity stage categorization, *Calotes nigrilabris*, endemic lizard, Horton plains national park
OBSERVATIONS ON MORPHOMETRY AND EGG SIZE OF ENDEMIC GÜNThER'S ROUGH-SIDED SNAKE (*Aspidura guentheri*) IN HORAGOLLA NATIONAL PARK, SRI LANKA.

J.J.L JEEWANDARA* AND W.A.D. MAHAULPATHA

*Jeewandarajayasanka@gmail.com

ABSTRACT

The body size of an organism determines many aspects of its biology. Many species of reptiles exhibit complex interrelationships among maternal body size, clutch size, and offspring size. The head scalation & general habitus easily distinguish the snake *Aspidura guentheri* from all other *Aspidura* sp. in Sri Lanka. This endemic relict burrowing species is extremely sub-fossorial. The study was carried out from January 2015 to December 2015 in Sandy Soil Forest Habitats (SSFH) & Muddy Soil Forest Habitats (MSFH) in Horagolla National Park. Patch sampling and quadrat sampling methods were used for the survey. Ten, 5m ×5m quadrats were marked across each of the selected habitat types and the snakes and their eggs were observed within the marked quadrats. For each specimen, snout-vent length (SVL), tail length (TVL) and egg length (to the nearest 1 mm) were measured. The smallest individual examined measured 49.8 mm SVL. Newborn individuals (SVL<80mm) averaged 64.8±9.4 mm SVL & 10.8±4.8 mm TVL (n=11). SVL of *A. guentheri* adults (SVL>111mm) were between 111.0-153.2 mm & 15.7±3.4 mm TVL averaged (n=22). According to the results, adult females are capable of laying 1-2 clutches within a given time interval. The length of collected eggs were measured 14.2 ± 1.2 mm length (n=3). This study will provide valuable insight to conservation of this endemic species in Sri Lanka.

KEY WORDS: Snakes, Allometry, Clutch size, Egg size, Oviparity
NEST SITE CHARACTERISTICS @ NESTING SUCCESS OF SRI LANKAN GREY HORNBILL (OCECEROUS GINGALENSIS) IN MIHINTALE SANCTUARY

I.L.WIJERATHNE, P.PANDUWAWALAND S. WICKRAMASINGHE*

Department of Biological sciences, Faculty of Applied sciences, Rajarata University Mihintale, Sri Lanka

*sriwick@gmail.com

ABSTRACT

Hornbills (Bucerotidae) are one of the most recognizable groups of birds in the Old World tropics which utilize the tree cavities for the nesting. Study was conducted to full fill the research gap of endemic birds for conservation purposes. The characteristics of nest sites, nest trees and nest holes were documented for Sri Lankan Grey hornbills in Mihintale Sanctuary within the breeding season during 2014-2016 period. Nearly 07 SLGh cavities in the trunk of at least 04 different genera of living trees were identified within 4km2 area. Nesting started early in March and ended in late June. Nest sealing materials used include the hornbill’s own feces, mud, cattle dung and tree bark. Most nests were in the tall live trees and were formed primarily by heart rot where a branch had broken. Nesting success 57.1±14.35 for observed three years. The majority (71%) of nests were in Manilkara hexandra making it the most preferred nest-tree species. The nest tree dimensions (DBH 76±19.56cm, tree height 12±61m, nest height 4.41±2.06m, Depth of the cavity 41.0±0.1cm, Diameter of the opening 22.5±cm) indicate the average requirements of SLGh for a suitable nest site and oval elongated cavities are most preferable. Conservation of GHB depends on protection of trees and tree cavities as an important ecological niche.

KEY WORDS: Sri Lankan Grey hornbill, nest cavities, conservation
PERCEPTIONS OF CLIMATE VARIABILITY IN THE INDIAN COMMUNITY OF THE HUNIKUINCONTA ETHNICITY IN THE PERUVIAN AMAZON

LUCIA MILAGROS PEREA VILLACREZ\textsuperscript{1}, LADYLAURA TUISIMACORAL\textsuperscript{1A}, EDGAR DÍAZ ZUÑIGA\textsuperscript{1}

Universidad Nacional de Ucayali-Peru, Km 6.200 Federico Basadre road

ltuisimal@gmail.com

ABSTRACT

Severe climatic changes are occurring in the Amazon basin and the Peruvian part of the Amazon is the focus of this paper, as this area encompasses a wide range of the current and potential types of climate change and variability phenomena. Generally, very little information is available on how indigenous peoples in the Peruvian Amazon perceive and react to climate change and variability. This study was based on primary information obtain through field surveys across HunukuinConta community (74 people, older than 30 years old) to investigate how individuals perceive and respond to climate change and variability comparing this with meteorological data. Surveys results indicated that indigenous people (87\%) got good knowledge on climate changes as they are able to describe them, their causes and the impacts within their community. Informants interviewed note the annual cycle of variation in the temperature but in the last 10 years they have noticed that the weather has become hotter and this perception agrees with local meteorological data. They also have experienced extreme events such as drought, forest fire, flooding and hailstorm. The study also indicates that these changes have direct effects on human health (digestive and respiratory diseases), in addition to crop failures and loses of biodiversity in flora and fauna. However indigenous people recognize some biological, astronomic and ancestral indicators of the climate events that might be used to adapt to these changes.

KEY WORDS: climate variability, indigenous people, meteorological variables, perception
PERCEPTIONS OF FARMERS AND CROP RAISING PATTERNS BY WILDLIFE IN AND AROUND THE KALUDIYAPOKUNA FOREST RESERVE IN THE DRY ZONE OF SRI LANKA

MAHESHA PERERA¹ AND RAJNISH VANDERCOME¹

¹ Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale.

maheshaper89@gmail.com

ABSTRACT

Human population growth and the ensuing expansion of agriculture has led to greater interaction between humans and wildlife. Crop-raiding is an outcome of both natural resources becoming less accessible and the nutritional benefits of cultivated foods becoming increasingly known to wildlife. With the growing demand for resources and access to land, it is clear that the intensity of crop raiding will continue rise. Crop raiding can result in significant financial losses to farmers and hence, local farming communities may intolerant and unsympathetic towards wildlife which can impede conservation efforts. However, in order to mitigate this form of human–wildlife conflict, it is first necessary to understand current perceptions regarding crop raiding and the temporal nature of crop raiding by different animal species as they are fundamental towards developing cost effective guarding strategies. Over 14 months, we identified perceived and actual crop pests, and their patterns of crop raiding from 36 farms around the Kaludiya Pokuna Forest Reserve, Sri Lanka. Farmers named Pavocristatus (38%), Elephas maximus (27%), Semnopithecuspriam (21%) and Macacasinica (14%) as the most destructive crop pests. From 8012 crop raids by eight species of animals, most raids were indeed made by the Pavocristatus (59%) and Semnopithecuspriam (28%). There is a positive statistically significant relationship between the perceived and actual crop raiding (r=0.725, p=0.042). The average monthly relative frequency of crop raiding was 0.07 (range 0.02-0.27). The highest monthly relative frequency was recorded in August. Only the monthly relative frequency of crop raiding by M. sinicawas positively and statistically significantly correlated (r=0.725, p= 0.09) with monthly rainfall. When cropping systems were considered, 64% of the crop raiding incidents were recorded from monoculture farms, while only 36% were recorded from polyculture farms. Our study demonstrates that animals differ in their crop raiding behavior and also that certain species show temporal variation in crop raiding patterns. Hence, mitigation strategies need to be tailored based on crop raiding behavior. In addition, cropping systems also appear to be linked to crop raiding preferences of wildlife. The perceptions of farmers also appear to be influenced by actual crop raiding events. Our study provides an important starting point for future studies investigating temporal factors predicting crop raiding by wildlife.

KEY WORDS: Conflict, Agriculture, Wildlife
ABSTRACT

There are 30 species of Chiropterans inhabiting the tropical Indian Oceanic Island of Sri Lanka, many of which are nationally threatened. These 30 species consist of four Megachiropterans and 26 Microchiropterans. Interestingly, despite geographical isolation, Sri Lanka does not possess any endemic Chiropterans. There is a paucity of long-term studies on roosting site selection of bats. We conducted a 2 years-long survey for bats in the peripheral habitats of Maduruoya National Park. Our objectives were to (1) document species richness of bats in our study area and (2) document their roosting site selection. We surveyed 72 field sites during both day (0800-1400 hrs) and night (1900-0100 hrs). Throughout the survey, we recorded a total of 15 species of Chiropterans including 03 megachiropterans and 12 microchiropterans representing six families. These species accounted for 75% and 42% of Sri Lankan megachiropterans and microchiropterans, respectively. Among all the species we recorded, Rhinolophus rouxi was the most abundant per roosting site (~200) whereas Kerivoula picta were the least abundant (~1). Bats occupied a variety of roosting sites: large trees, tree cavities, abandoned buildings, caves of various sizes, underside of bridges, and banana shrubs. Only one species occupied a given roosting site except for a underside of a bridge where two species shared the site simultaneously. We recorded one Endangered and five Vulnerable Chiropteran species. The peripheral areas of Maduruoya National Park are undergoing numerous changes in the habitat structure and transformations of land-use and land-cover types. In addition, extensive and excessive use of agro-chemicals, particular broad-spectrum pesticides, have led to decline in invertebrate populations that serve as the key prey-base for microchiropterans. Further, loss of mature large trees, which provide roosting sites, can be detrimental for Megachiropterans. Moreover, loss of tree cover can also impact foraging and other movements of Chiropterans.

KEY WORDS: Megachiropterans, Microchiropterans, species richness, roosting site selection, dry zone and threats.
ABSTRACT

In this study, preliminary survey and conservation status of flora in this neglected area of KFR, were investigated. Floristic data were collected mainly in two vegetation types: Sub-montane and Grassland along the Gomare - Bambaragala Nature trail on the west facing slopes during December, 2016- January, 2017. Voucher specimens were collected from all the individuals and identified using standard keys, Flora and by comparing with those in the National Herbarium, Peradeniya (PDN). The trees are low in stature (< 10m), gnarled and covered with lichens, mosses and epiphytic ferns including few invasive plants. These plants represent the life forms; trees, shrubs, herbs, creepers/ lianas. The dominant families in submontane vegetation are Myrtaceae (*Syzygium* sp.), Rutaceae (*Toddalia* sp.), Clusiaceae (*Calophyllum* sp.), Orchidaceae (*Eria bicolour*) and Liliaceae (*Asparagus* sp.) Lauraceae, Euphorbiaceae, Symplcaceae, Acanthaceae. The total number of species observed exceed 35. The dominant families in grassland are Poaceae, Asteraceae, Rubiaceae, and Melastomataceae. A high percentage endemism of plant species and out of many either globally or nationally threatened was revealed in this site. This neglected Gomara- bambaraella nature trail is a unique area of KFR in Sri Lanka, because of its high floristic endemism and their endangered conservation status. There are more plant and animal species, especially endemic flora yet to be identified. The area faces the threat of periodic fires triggered by people. Moreover, nature trail experiences the problem of garbage. Therefore, the bio diversity of this unique area has to be conserved using Ecotourism principles for future generations.

**KEY WORDS:** Bambarella, Knuckles Forest Range, Floristic richness, Conservation status, Ecotourism
IMPACT OF CLIMATE CHANGE ON PROTECTED AREAS OF KAZAKHSTAN

Z. BOLATOVÁ¹ and P.A.C.N.B.SURAWEERA²*

¹International department, Almaty, Kazakhstan
²Department of Wildlife Conservation

*channasuraweera@yahoo.com

ABSTRACT

Kazakhstan is a ninth largest country in the world, located at the center of the Eurasian continent. During the last decades, global warming has led to a raise of the surface temperature. Warming rates observed since 1936 show that the climate of Kazakhstan is becoming warmer; the average annual air temperature increased by 0.31°C temperature difference reaches 20 – 30°C. Average increase in air temperature in the winter months is stronger than in other seasons. Landslides, mudflows and flooding were also effect to the many part of the country. Precipitation changes and rising of temperature are affecting to biodiversity of Protected Areas, agriculture, and the economy of the country.

At present Kazakhstan protected land area is 3 % and it is managing 10 - state reserves, 66 - nature reserves, 8 - national parks and more than 24 - natural monuments. More than 80% of the country is covered by the largest desert.

Change of climate is increasingly becoming a major factor defining the future conditions of the ecosystems of Protected Areas of Kazakhstan. Droughts, a more arid climate and the reduction of water flow in the rivers strongly affect aquatic and Tugai floodplain forest ecosystems. Also climate change is likely to impact on endangered animal’s habitats such as snow leopard habitat too.

KEY WORDS: protected areas, climate change, temperature,
ABSTRACT

Genus *Macaca* has the widest geographical range among non-human primates. *Macaca sinica* is the smallest of all 22 extant macaque species being endemic to Sri Lanka. There are three subspecies: *M. s. sinica*, *M. s. aurifrons* and *M. s. opisthomelas*. Behavioral ecology of a certain species and its vulnerability to extinction depend on its ranging pattern. Thus, this study focused on three objectives: to construct the total home range, to evaluate home range usage and to evaluate how monthly average temperature affects mean daily path lengths (MDPLs) of the study troop.

The study was conducted from February to June 2016 in lower Hanthana area in Peradeniya University land (7°15′24.63″ N 80°36′08.21″ E). One troop was observed as the study troop and their movement patterns were recorded using a GPS recorder. Temperature data was obtained from the Department of Geography, University of Peradeniya. Home ranges were constructed using 100% minimum convex polygon method. Kernel density estimation was done to analyze the home range usage. Cumulative area usage of home range was graphed against months to determine the growth of home range. Home range and MDPLs were constructed using ArcGIS 10.3 software package.

Movement pattern of a troop comprising of 32 individuals were recorded at 575 locations. Total home range size of the study troop was calculated as 0.64 km². Highly used areas were found as main resting/ sleeping sites comprising a total of 0.03 km² areas from the total home range. Resting/ sleeping sites were concentrated into the inner areas of the home range. The cumulative area used by the study troop throughout the sampling period did not reach equilibrium level when ending the sampling, as their home range size showed an increasing trend. Mean daily path length of the observed *Macaca* troop, obtained as 1.32 ± 0.16 km. Monthly average temperature was negatively correlated with monthly home range (MHR) sizes (r = -0.836 p = 0.038) and MDPL (r = -0.987 p = 0.001).

Kernel density estimation suggested habitat quality was one of the major factors to be selected as a safe resting/ sleeping site. Habitat qualities were found to be including: canopy coverage, number of trees present, branching pattern of trees, easy access to nearby food sources and free from potential predators. Month to month, MHR was shifted occupying different areas depending on their requirements: to seek seasonal fruiting trees, to avoid rivals attack and thereby to optimize their energy budget. Since, primate ranging is considered to be a trade-off between energy obtained and energy consumed in the foraging process. The study found that MHR and MDPL were reduced to compensate the thermoregulatory cost in terms of energy. Thus, study suggests that *M. s. aurifrons* is useful as an indicator organism to assess environmental changes such as temperature alterations. Finally, these quantitative findings are valuable for conservational purposes, since *Macaca sinica* is considered as endangered primate.

KEY WORDS: *Macaca sinica aurifrons*, home range, mean daily path length, Temperature effect
Dwarf hunting spiders or goblin spiders (Family: Oonopidae) are a diverse spider family with over 1747 described species in 114 genera worldwide. However, no specific extensive study has been done for them in Sri Lanka. Only twenty-three species in eight genera have been recorded from the country. The main objective of this study was to do a taxonomic revision of goblin spiders of Sri Lanka based on morphological characters.

Specimens were collected from all major climatic-physiographic zones of Sri Lanka i.e. Central Mountain Range, Knuckles Range, Low Country wet zone and the dry zone. Collected specimens were examined using an Olympus SZX7 stereomicroscope and illustrated with the aid of an Olympus BX51 compound microscope attached with a drawing tube. Digital images of the specimens were taken with a Leica MC170 HD camera mounted on a Leica M205C stereomicroscope using the software package Leica Application Suite. Acquired image stacks of different depths were assembled using Helicon Focus software. The specimens were identified using recently published work. Each adult specimen was numbered and catalogued.

Four new species of Brignolia: B. carlmulleri Ranasinghe and Benjamin, 2016, B. meemure Ranasinghe and Benjamin, 2016, B. ondaatjei Ranasinghe and Benjamin, 2016 and B. shyami Ranasinghe and Benjamin, 2016, three new species of Xestaspis: X. nuwaraeliya Ranasinghe and Benjamin, 2016, X. padaviya Ranasinghe and Benjamin, 2016 and X. pophami Ranasinghe and Benjamin, 2016, and three new species of Aprusia: Aprusia sp. A., Aprusia sp. B. and Aprusia sp. C. are described based on both sexes. Ten species from the genus Brignolia, six and seven species from Xestaspis and Aprusia respectively, are now known from Sri Lanka. Further, two species from Ischnothyreus and one species from Opopaea are reported in addition to their three known species. Pelicinus marmoratus and Xyphinus baehrae are reported for the first time in Sri Lanka. The study revealed the presence of 43 Oonopidae species (38 endemics) belonging to twelve genera in Sri Lanka, highlighting the diversity of the family in forests of the island. Further, the study doubled the diversity of the family in the island.

Funding provided by the National Institute of Fundamental Studies, Sri Lanka is acknowledged.

KEYWORDS: Oonopidae, Aranea, Sri Lanka, Goblin spiders
Seagrass meadows of Sri Lanka are still not completely documented and many information gaps exist as a result. The studies of seagrasses in Northern, North-western and North-Eastern coasts where sea grass meadows are extensive are sparse due to the prevailed three decade civil conflict. Therefore, available information on seagrass is restricted to few marine and brackish water habitats. To address those research gaps, authors were conducted research on seagrass distribution around Sri Lankan waters including lagoon environments such as Puttalam lagoon (2007-2008 & 2011-2013) and Negombo estuary (2003 -2007). There were 12 true seagrasses species identified from nine genera as; Enhalusacoroides, Halophilabeccarii, Halophiladecipiens, Halophilaovata, Halophila ovata, Thalassiahemprichii, Cymodocearotundata, Cymodoceaserrulata, Haloduleuninervis, Halodulepinifolia, Ruppiamaritima and Syringodiumisoetifolium. Among them, Halophilabeccarii categorized as ‘Vulnerable’ while others categorized as ‘Least Concerned’ according to the 2011 Global Risk Assessment. Our findings revealed that the pressure due to anthropogenic activities on seagrass such as inputs of nutrients, discharge of industrial and other wastes, fishing activities with destructive fishing gears, sedimentation due to unplanned development activities is in an increased trend, resulting rapid decline of habitat and species loss. A natural cause of seagrass decline includes climate change impacts and El Niño effects, which are data deficient areas in Sri Lankan context. Research surveys are an important component of seagrass management and lack of sea competencies such as swimming and diving among interest persons would be one of the drawbacks. Lack of sea competencies in swimming and diving among interested persons also can be highlighted. A detailed survey and research studies on the extents, diversity, climate change impacts, environment functions and services, conservation and managements are vital, aiming to establish a well elaborated temporal database with a common platform to all sea grass scientists to exchange their views in a common forum. Hence, Long-term monitoring of seagrass beds in Sri Lanka should be essential, and a national seagrass monitoring network should established in order to develop the conservation plans with marine protected areas. Further, establishment of legislation for seagrass conservation and include some ecologically-significant seagrass beds as reserves for future are also important. Ultimately, seagrass conservation strategies positively affect the rate and extent of impacts should be coupled with resilience-building adaptation strategies in Sri Lanka along with development of a coherent and sustained regional monitoring and evaluation network support to integrated decision support system.

**KEY WORDS:** Sri Lanka, Seagrass, Conservation, Management
SEASONAL DISTRIBUTION OF SRI LANKA DULL-BLUE FLYCATCHER
(*Eumyiassordidus*) IN THE HORTON PLAINS NATIONAL PARK

W.D.S.C. DHARMARATHNE and W.A.D.MAHARLPATHA*

*Department of Zoology, University of Sri Jayewardenepura

*mahaulpatha@sjp.ac.lk

ABSTRACT

Seasonal distribution of endemic, Sri Lanka Dull-blue Flycatcher (*Eumyiassordidus*) was studied at Horton Plains National Park, situated in the highland plateau of the Nuwara Eliya District, during January 2016 to December 2016. Three main habitats were selected as Cloud Forest habitat, Cloud Forest Die-back habitat and Grassland habitat. Three, 100m fixed line transacts were marked in each of the habitats using a Global Positioning System (GPS) device. Population of *E. sordidus* was recorded on three consecutive days in each month while travelling along the transacts, from 0530h to 1030h. Individuals were observed through a 10x50 binocular. Kestrel TM 4000 weather tracker was used to obtain environmental parameters. Highest abundance, 15.27 ± 11.05 (Mean ± Standard deviation) was recorded during South-west monsoon season from May to September. Abundance of *E. sordidus* did not differ significantly among other climatic seasons (Kruskal-Wallis Test, p>0.05). During the South-west monsoon season the environmental temperature was 17.48±3.77°C (M±SD), relative humidity was 83.20±10.62% (M±SD), wind speed was 14.29±12.80Kmh-1 (M±SD) and rainfall was 143.5±137.3mm (M±SD). There was a positively correlation between relative humidity and *E. sordidus* abundance (Pearson correlation r = 0.991, P < 0.05. Relationship between the wind speed and *E.sordidus* abundance too was positive (Pearson correlation r = 1.000, P < 0.05). Present study revealed that *E. sordidus* preferred high humid and low temperature environmental conditions.

KEY WORDS: Sri Lanka Dull-blue Flycatcher, endemic birds, Horton plains, seasonal distribution, tropical montane cloud forest.
Avifauna species diversity and abundance in and around of an urbanized lake called Peralanda Lake were recorded using point transect technique from January 2015 to December 2016. The lake is situated at North Colombo area adjacent to Ragama city in Gampaha District. Three Different habitat types were identified as Water body habitat, Terrestrial habitat adjacent to the water body and Disturbed habitat. Bird census was performed on 20 sampling points with a radius of 25m which were fixed by using a Global Positioning System device (GPS) (Garmin e Trex). Each point was visited 3 times per month at different times of the day between 0600h to 1000h and 1500h to 1900h. Sixty-two species belonging fourteen orders and thirty-seven families were recorded during the study. These include three globally near threatened species Spot-billed Pelican (*Pelecanus philippensis*), Oriental Darter (*Anhinga melanogaster*) and Black-headed Ibis (*Threskiornis melanopcephalus*); three locally near threatened species, Cotton Pygmy-goose (*Nettapus coromandelianus*), Oriental Honey-Buzzard (*Pernis ptilorhynchus*) and Black Eagle (*Ictinaetus malayensis*); one critically endangered species, Blue-tailed Bee-eater (*Merops philippinus*); two endemic species, Sri Lanka Small Barbet (*Megalaima rubricapilla*) and Sri Lanka Swallow (*Hirundo hyperythra*) and four migrant species, Barn Swallow (*Hirundo rustica*), Asian Paradise Flycatcher (*Terpsiphone paradise paradisi*), Blue-tailed Bee-eater (*Merops philippinus*) and Forest Wagtail (*Dendronanthus indicus*). Highest species diversity was recorded in terrestrial habitat adjacent to the water body followed by Disturbed habitat while least species diversity was recorded in Water body habitat.

**KEY WORDS:** urbanized lake, avifauna, avian diversity, North Colombo, Ragama, Sri Lanka.
SURVEY OF NUMBERS OF BUFFALOES AND CATTLE IN THE UDAWALAWE NATIONAL PARK

B. V. PERERA

Elephant Transit Home, Department of Wildlife Conservation, Uda Walawe, Sri Lanka
vijithawildlife@gmail.com

ABSTRACT

There are about 172 million water buffaloes (Bubalis bubalis) in the world. The number of buffaloes in Sri Lanka is estimated at 0.32 million and 70% of them live in the dry zone. Buffaloes are present in almost all of the wildlife protected areas (PAs) of the country; however, there are no reliable figures of their numbers. The buffaloes present in the PAs are generally categorized into three groups based on morphological and behavioral characteristics, as domestic, feral and wild buffaloes. Some early writings suggest that wild buffaloes in Sri Lanka may be a distinct species similar to the Indian wild buffalo (Bubalus arnee), but more recent authors believe that such animals are unlikely to remain pure and might be crosses with domestic buffaloes. This study was conducted to determine the number of buffaloes and cattle in the sixth largest wildlife park in Sri Lanka, Uda Walawe National Park, which has an extent of 30,825ha.

The direct observations of buffaloes were done on 48 days during the period June 2016 to March 2017, along the motorable road network and the tank beds in the park. Number of individuals and their category, behavioral activities, and herd compositions were recorded. In addition, video and photo recordings also were done. The small-holder farms along the park boundary that had cattle and buffaloes and the number of animals in each were recorded, as well as the places where domestic buffalo and cattle frequently enter the park.

About 50% of the land area of the park was surveyed in this study. It was found that buffaloes and cattle were associated with the main water bodies in the park. The total number of buffaloes and cattle recorded were 2,675 and 391, respectively. Among the buffaloes there were 1,565 domestic buffaloes, 1,062 feral buffaloes and 48 adult male wild buffaloes. The highest number of buffaloes and cattle were found associated with the Uda Walawe reservoir (1,387 buffaloes and 302 cattle) and Mau Ara reservoir (688 buffaloes and 55 cattle). There were 45 small-holder farms with 2,834 buffaloes and 230 cattle along the border of the park. It was possible to identify 28 places that were used by domestic buffaloes and cattle for entering into the park.

The numbers of cattle and buffaloes recorded in this study are significantly lower than the numbers reported in the previous estimates made in 2005 (12000 buffaloes and 3000 cattle). Mammalian herbivores, whether wild or domesticated, are significant components of natural and agricultural ecosystems. Globally domestic and feral buffaloes impact on wildlife conservation, and are generally described as being negative, except in the case of management of some natural wetlands. The park management of UNP believes that presence of domestic buffaloes and their movement through electric fences as well as associated human activities bring negative impacts to wildlife conservation in the park. However, there is an urgent need to conduct scientific research to assess how the presence of buffaloes and cattle influence the distribution patterns and numbers of plant and animal species, and the associated impacts on the ecosystem.

KEY WORDS: domestic and feral buffaloes feral buffaloes
Mangrove ecosystems are inevitably threatened by the rapid increase of coastal population. Kalpitiya peninsula is located in Puttalam lagoon area where the largest extent of mangrove forest have been recorded. Due to diverse socio-economic and natural consequences mangroves in Kalpitiya have been degraded. The aim of the research is to evaluate the sustainability of mangrove restoration and conservation in Kalpitiya. Non-structured interviews and 5m X 5m quadrant sampling method for vegetation sampling was used collect primary data. Arc GIS 10.1 version and MS excel 2013 version was applied to perform mapping and data analysis. 99 % of Rhizophora species are used for restoration attempts. Due to this the diversity of restored mangroves have been reduced. Mudflat surfaces in Daluwa and Mampuriya areas have been failed to conserve and restore mangroves. 90% of restored mangroves in Anaiwasala are survived while recently planted mangroves have been threatened due to socio-economic consequences in the area. More than 60% of Kalpitiya restored mangroves are survived while 80% of restored mangroves are survived in Kurugnampitiya and Amma Thottam. Rare and very rare species particular to this area have been marginalized in too few locations. 90% of residents in Kalpitiya depend on mangrove ecosystem and have identified the importance of mangroves for fishery activities. Minimum five year period spend for the success of mangrove restoration while the destruction of mangroves is faster than restoration. Considering the vulnerability of mangroves new conservation and restoration measures have to be implemented.

**KEY WORDS:** diversity, Kalpitiya, mangrove, restoration, sustainability
ABSTRACT

The climate, unlike any other factor has a predominant impact on Ecotourism; because the vanguard force of ecotourism is the nature and its distinct features. These distinct features directly depend on the climate and its characteristics. The historical evidence shows that there is a tendency of climate to change over the time. However, it is evident that the irresponsible human activities have increased the speed of the climate changing process over the years. On the other hand, in the context of Sri Lanka; after the passing of the dark clouds which hindered the country’s progress for about 30 years due to a war that pushed away the tourism sector, has now seen a rapid growth in tourist arrivals. The sector has successfully generated and recorded a massive income to the country’s economy and is a promising foundation in income generation. As a country which has breath-taking landscapes and natural beauties, the tourism industry has intensively sectored around the nature and related areas in Sri Lanka. Therefore, it is important to find out the impact of climate change on Sri Lanka especially in the wild life and nature related areas so that the impact of the deterioration of such areas on ecotourism industry in Sri Lanka can be accounted. Thereby, the paper seeks to investigate the sensitivity of ecotourism in Sri Lanka, to varying climatic conditions, by analyzing the impact on wildlife and biodiversity of such climate sensitive areas.

KEY WORDS: ecotourism, climate change, wildlife, biodiversity, tourism sector, economy
THE GIANT STAR TORTOISE (Geochelone elegans) OF LUNUGAMWEHERA NATIONAL PARK, SRI LANKA

ANSLEM DE SILVA¹*, R. WIJERATNE², K. RODRIGO³, H.A.H.R. HETTIARACHCHI² AND G.A.T. PRASAD⁴

¹15/1 Dolosbage road, Gampola, Sri Lanka.
³Chandler Arizona, USA.

kalds@slt.net.lk

ABSTRACT

Geochelone elegans, is a terrestrial testudine that inhabit in scrub forests, grasslands and agricultural lands in India, eastern Pakistan and Sri Lanka. Its carapace is dome shaped usually with humps. The scutes on the carapace and plastron are brightly coloured with yellowish-cream and black-streaked markings. They are largely herbivorous, feeding on various grasses, herbs, fallen flowers and also known to scavenge on animal matter. They drink water. The average curved carapace length is generally 250-350 mm and weighs 2-4 kg. Females have large bodies and weigh more than males. A large female weighing 6.6 kg was reported from Hambantota in mid 1990’s. Few additional large females were reported from India weighing 8.960 kg and 7.0 kg. Here we report an exceptionally large Geochelone elegans which weighed 14 kg that was recently observed and investigated in the Lunugamwehera National Park, Southeast, Sri Lanka.

KEY WORDS: Star tortoise, herbivorous, threats, shell rot, largest tortoise, Lunugamwehera National Park.
WEB BASED GIS DASHBOARD FOR MONSTERING ENVIRONMENTAL ISSUES BY USING MOBILE SURVEY FORMS

M.S.P.M. SIRIRWARDANE

GIS Solutions (Pvt.) Ltd,
Galle Road, Colombo 03, Sri Lanka

supunsiriwardane@gmail.com

ABSTRACT

GIS can be identified as a unique technology which has a powerful ability to visualize field based information for the decision support activities. With the development of technology GIS has become a common technology which can be go through many platforms and devices. As a result of the smart devices which enabled with GPS technology, many new application domain has been opened for the GIS community. The main objective of the study is to develop a mechanism for data collecting and monitoring related to the environment issues. In this study, smart form technology and GIS based monitoring dashboards are used as a data collection method for reporting environment issues. The forms has been created using a tool called “Survey123” which based on XLS form specifications and the dashboard has been created using the operations dashboard powered by ArcGIS Online. The form consisting fields which can be altered according to the survey which needs to be completed. As per the local requirement this has been created using local language as well as English to have more user friendly interface. After designing the forms, and they have been polished into the ArcGIS Online platform and the layers were hosted as feature layers with point geometry. Each form can be accessed using a mobile app called, “Survey123” which supports for multiple platforms such as Android, iOS and widows. Default. As per the preliminary study of the research a questionnaire form has been redesigned into a smart form with the different types of question types. Open ended, closed ended, multiple choice and single choice questions are integrated as traditional methods. As the modern fields, image uploads, GPS location detection and digital signature input has been used. The logical constrains, and data validation ability has been also included with these forms. The data collection app usually works in an offline methods and base map can be accessed online or offline methods for selected portions. According to the study, it was identified that the form centric data collection has a great ability to data collection and minimizing data entering efforts which comes after the traditional paper based data collection process.

KEY WORDS: Smart forms, monitoring dashboards, web GIS
Sri Lanka possess a diversity of archaeological artifacts depicting amphibians and reptiles, some originating from the 3rd century BCE. These artifacts suggest that our ancestors have carefully observed amphibians and reptiles, and also understood their importance in agriculture and nature. These artifacts are made from gold, silver, bronze, lead and some from precious gem stones.

**KEY WORDS:** archaeological artifacts, amphibians, reptiles, Akurugoda lead coins, Sri Lanka.
Of the eight species of living pangolins, *Manis crassicaudata* is found in Sri Lanka. This species was once a common inhabitant of both the wet and dry zones of the country. However, their numbers have gradually declined due to multiple threats including hunting, wildlife trade, habitat destruction and deterioration. Similarly, the elusive nature of this species has prevented detailed studies of the species thus, biological aspects of this species are not well established. Hence, this letter to editor details the current threats and proposes a five-year plan for the conservation of *M. crassicaudata* in Sri Lanka with the goals of restoring their populations and habitats with public awareness.

**KEY WORDS:** conservation, Indian pangolin, threats
Seaweeds are marine macroscopic, photosynthetic eukaryotic organisms also identify as any marine plants but especially the red (*Rhodophyta*) brown (*Phaeophyceae*) and green (*Chlorophyta*) algae living in or by the sea. The aim of this paper is to ascertain the unnoticed seaweed ecosystems containing mangrove forests in Sri Lanka and the extremely importance of seaweeds as primary producers along the shore. Past published and un-published written sources and other related to seaweeds and mangrove ecosystem were used for this study and a literature based review has been performed to identify the specific seaweeds in mangrove ecosystems in Sri Lanka.

Three main communities that containing seaweeds have identified in Sri Lanka: seaweed vegetation, seagrass beds and mangrove forests. (Eric Coppejans *et al*) Mangrove forests mainly occur around lagoons and in estuaries. Some macro algae (*Caulerpa* spp) developed in the mangrove tide channels, some are in the silty pools in the mangrove vegetation (*Chaetomorpha* spp, *Ulva* species) others on the aerial roots and basis of the tree trunks. (*Species of Laurencia, Caloglossa, Murrayella*). These algae are rather small and covered by sediment layer they often go unnoticed. Based on data from the literature, Silva *et al*. (1996) mention 455 taxa belonging to 410 species and 161 genera for Sri Lanka. When concerning the importance of seaweeds ecosystem and association of mangrove ecosystem in Sri Lanka it is timely important to ascertain and identify specific seaweeds containing in mangrove ecosystem.

**KEY WORDS:** algae, ecosystem, mangrove, primary producer, seaweeds
ASSESSMENT OF Lantana camara (L) DISTRIBUTION IN UDAWALawe NATIONAL PARK, SRI LANKA, USING REMOTE SENSING TECHNIQUES

P.A.C.N.B. SURaweERA1,2*, N. KODIPpILI3, G.M.T.S. FERNANDO3 and B.H.G.K. KUMARI2

1Czech University of Life Sciences Prague, Kamýcká 961/129,165 21 Praha 6-Suchdol, Czech Republic.
2Department of wildlife Conservation, 811A, Jayanthipura road, Battaramulla, Sri Lanka.
3University of Sri Jayewardenepura Gangodawila, Nugeogoda, Sri Lanka.

*channasuraweera@yahoo.com

ABSTRACT

The Invasive Alien Species (IAS) is spreading rapidly by disturbing other living organisms which are native to a particular area. Especially, this topic has been discussed often with the environmental disturbances arising due to climate changes and anthropogenic activities. Mainly, IAS is spreading rapidly with the environmental disturbances such as fire, land clearing, landslides, flooding, cattle grassing, etc. Lantana camara is a destructive invasive plant which is spreading rapidly in tropical countries by destroying natural habitats. Udawalawe National Park in Sri Lanka is one of the world famous national parks for Asian elephants that is located in the dry zone of the country. Elephants in this national park are often found to be suffering from malnutrition due to drought impacts and the situation has worsened due to the rapid spreading of the L. camara. Elephants do not eat L. camara and this rapid spreading does not allow the growth of other palatable species in disturbed areas. Thus, food production of the Udawalawe National Park has been decreasing rapidly making elephants more vulnerable. This study was planned to find out an inexpensive method to identify the distribution of L. camara in Udawalawe National Park to make a better plan for the habitat improvement purposes.

Landsat 08 satellite images were used for this study which can be downloaded free of charge from the USGS (United State Geological Survey) website. Resolution of this satellite image is 30m x 30m. Thus, one pixel represents the 900 m2 in ground level. But according to the field observation, most of the affected sites of L. camara could be identified as very big patches. Therefore, the resolution of the image does not make a huge impact for this study. Garmin accuracy +/-3 m three handheld Global Positioning System (GPS) devices were used to obtain the accurate locations of 25 sample points in selected sites. ArcGIS 10.4 software was used for the supervised classification to identify the distribution of L. camara with reflectance values. As well as reflectance patterns of the Blue, Green, Red and Near Infrared bands were considered after the classification using MS Excel statistical methods. Further verifications were done by observing selected locations on field visits.

Total land extent of the Udawalawe National Park is 31,067 ha. According to the result, L. camara has been invading the extent of 2,650 ha highly dense and 910 ha mixed dense of the national park. Most of these areas were identified as often disturbing areas besides the road network in the national park. Some lands are Teak (Tectona grandis) cleared sites and after the clearance, L. camara has been rapidly spreading. Output of this study is very important to identify the invaded extent of the L. camara in the National Park. Distribution map of the L. camara is very useful to develop a better habitat improving mechanism to control this major IAS distribution within the National Park. Thus, the remote sensing technique is an expensive method, findings of this study are really applicable for developing countries like Sri Lanka, which cannot use more expensive high resolution satellite images for analysis.

KEY WORDS: invasive alien species, ArcGIS, classification. Lantana camara (L.), Udawalawe
MANGROVES IN LAGOON ECOSYSTEMS: A NEGLECTED HABITAT IN SRI LANKA

K.N.J. KATUPOTH

Department of Geography, University of Sri Jayewardenepura, Nugegoda 10250, Sri Lanka.

katupotha@sjp.ac.lk

ABSTRACT

Mangroves are limited to the coastal ecosystem and are associated with lagoons and estuaries due to high salinity, low oxygen levels, high light intensity, strong winds and periodic inundation by tidal water. Many lagoons, out of 82 lagoons in Sri Lanka, mangroves play an important role on microscopic and mesoscopic fauna and also for coastal inhabitants in the country. The micro relief of the mangrove habitats produces food and shelter, and provides nursery grounds for the birds, fish, reptiles and other crustaceans. Further, they help to preserve the balance of nature.

Different research groups viz., individual scientists and institutional researches provide different figures on the extension of mangrove vegetation in Sri Lanka. However, there is no conformity on total figure. In this study, we try to calculate the exact extent of mangrove vegetation in 82 lagoons with their availability and identified threats. Mangroves in the lagoons of Sri Lanka have been damaged by anthropogenic activities and have also been degraded by (a) changes in freshwater run-off, salinity regime and tidal flow patterns; (b) excessive siltation and discharge of toxic substances; and (c) flowing of polluted water into lagoons, lakes, estuaries and tidal creeks. The depletion and degradation of mangroves have directly and indirectly influence the livelihood of the people, economy of the country and survival of the wildlife. Therefore, an increased public awareness is of utmost importance to promote management and conservation of mangrove habitats for posterity in Sri Lanka.

KEY WORDS: mangrove ecosystem, lagoons, tidal water, overexploitation, coastal inhabitants, degradation, public awareness.
ABSTRACT

*pradeepag@pdn.ac.lk

Punica granatum (L.) has been introduced to Sri Lanka long time ago and several introductions are possible. While it is now considered as a naturalized species, knowing genetic diversity is essential for crop improvement programs. In this study, we used inter-simple sequence repeats (ISSRs) regions to assess genetic diversity among randomly selected pomegranate accessions grown in several major pomegranates growing areas of Sri Lanka. Sixty-nine accessions collected were analyzed using fifteen ISSR primers. The percentage of polymorphic bands per primer varies from 93-27% with the average of about 52%. This suggests that comparatively higher degree of diversity exists among accessions. In the UPGMA dendrogram, about 65% of the samples collected from the Northern area clustered together, while the rest of those clustered mainly with samples collected from North Eastern region. These results imply some genetic similarity among those samples. However, analysis of molecular variance showed higher variation among samples collected from North and North Eastern region than between those and samples collected from Uva, Sothern and North Central areas. This information will be important in future germplasm conservation and breeding efforts.

KEY WORDS: Punica granatum (L.), ISSR, genetic diversity, Sri Lanka
A COMPARISON OF FLORAL AND FAUNAL DIVERSITY BETWEEN TWO SMALL, DISTURBED FOREST PATCHES IN SRI LANKA’S CENTRAL HIGHLANDS

A.M. KITTLE1*, P.H.S.C. KUMARA1, D.G. PATHIRATHNA2, H.K.N. SANJEEWANI1‡, H.T.J. SENEVIRATNE2# and A.C. WATSON1

1The Wilderness & Wildlife Conservation Trust, Colombo 04, Sri Lanka
2Department of Natural Resources, Faculty of Applied Science, Sabaragamuwa University of Sri Lanka, Belihuloya, 70140, Sri Lanka

‡Current address: Department of Biological Science, Faculty of Applied Science, University of Jaffna, Vavuniya Campus, Park Road, Vavuniya, Sri Lanka
#Current address: Environmental Studies and Services Division, National Building Research Organization, 99/1 Jawatte Road, Colombo 05, Sri Lanka

*akittle@wwct.org

ABSTRACT

Forest fragmentation is one of the leading global causes of biodiversity decline and species loss. The degree of threat to remaining forest patches in heavily fragmented regions is partially a function of their size and distance from larger, intact wilderness areas. To understand biodiversity loss in fragmented landscapes it is necessary to have baseline data with which future comparisons can be made. Here we conducted a number of taxa-specific biodiversity surveys and measured species richness, evenness and endemism in two patch forests in the Central Highlands of Sri Lanka that differ in terms of their relative size and distance from larger forest tracts. Results show that diversity indices were relatively low in both sites, consistent with their disturbed nature, but that no one site was consistently more diverse than the other. Bird and butterfly diversity was higher in the larger, more isolated patch but floristic diversity higher in the smaller, less remote patch. This suggests that size and distance alone are insufficient to determine patch forest diversity and that other factors impact species diversity. Current and historic land use practices are important to consider as is the specific siting of each patch. This last point is exemplified by the high level of species endemism in Duckwari which is in close proximity to the Knuckles Conservation Forest, an area of the country particularly rich in endemic species. Overall, small patch forests form an important component of Sri Lanka’s natural heritage and continue to act as reservoirs for future biodiversity preservation.

KEY WORDS: biodiversity, endemic species, fragmentation, species evenness, species richness
AVIAN FAUNA ABUNDANCE AND DIVERSITY IN HORAGOLLA NATIONAL PARK OF SRI LANKA

P.D.R.S. PETHIYAGODA and W.A.D.MAHAULPATHA*

University of Sri Jayewardenepura, Gangodawila, Nugegoda, Sri Lanka.

*mahaulpatha@yahoo.com

ABSTRACT

Avifaunal species richness and the species diversity of the Horagolla National park of Sri Lanka was recorded using line and point transects techniques from September 2012 to August 2013. Three different habitat types inside the Horagolla National Park were identified as, the Terrestrial habitat along the water body, the Forest habitat and the Disturbed habitat. Five hundred meter transects, which provided maximum visibility was marked along in each of these habitats with the help of a global positioning system device (GPS) (Garmin e Trex). The bird species seen and heard were recorded on both sides of the transects from 8.00am to 11.00 am three times each month. Thirty eight species of birds belonging to ten orders and twenty three families were recorded during the study. This includes three winter visitors and one endemic species. These included three winter visitors, Asian Paradise Flycatcher (Mscicapadaurica), Indian Pitta (Pitta brachyuran) and Oriental Honey Buzzard (Pernisptilorhynchus). Rose Ring Parakeet (Psittaculakrameri) and the Common Kingfisher (Alcedoatthis) were the most common bird species recorded and Plain Prinia (Priniaornata), Brown Fish Owl (Bubo zeylonensis) and Black-Backed Kingfisher (Ceyxerithacus) were the least common bird species recorded. Terrestrial habitat along the water body had the highest species diversity.

KEY WORDS: tropical forest, avian diversity, Sri Lanka
SEIZURE OF THE BIGGEST ILLEGAL SHIPMENT OF STAR TORTOISES (*Geochelone elegans*) BY THE SRI LANKA NAVY


1Department of National Zoological Gardens, Dehiwala, Sri Lanka.  
215/1, Dolosbage Road, Gampola, Sri Lanka.  
3Chandler, Arizona, USA.  
4306/4, Sausiri place, Rathmalgoda, Poruwadanda, Horana.  

* kalds@sltnet.lk

ABSTRACT

Two thousand eighty nine live star tortoises (*Geochelone elegans*) packed inside seven traveling bags were apprehended by the Sri Lankan Navy officers about five nautical miles from Kalpitiya at 19:30 hours on 17th June, 2017. Subsequently, the seized animals were handed over to the Sri Lankan Customs Department, Colombo on 18th June, who in turn handed the animals over to the Department of National Zoological Gardens on 19th June, 2017. Six tortoises were found dead when the zoo received the animals at the Gonapola, Horana animal holding facility of the Department of National Zoological Gardens. The tortoises were in a highly stressed, dehydrated and malnourished condition and additionally, some had upper respiratory tract infection and eye infections. Thus, within a span of 36 days from the receipt, 479 animals were found dead, at an average of 13 animals per day.

KEY WORDS: star tortoise, smuggling mafia, pet trade, animal trafficking, management.
ABSTRACT

River landscape ecology provides a picture of patterns in physiological and biological phenomena in river fishes. Yet, driving mechanisms of such phenomena in river fish of Sri Lanka are poorly identified. In 2014, we studied the swimming, diving, feeding behaviors as well as migration and disperse of *L. fisheri* in three Mahaweli sub rivers through direct visual observation, underwater videography and snorkeling. Our objective was to study response of *L. fisheri* to river landscape modification. Present study revealed that disperse of *L. fisheri* is highly associated with presence of turbulent water of oxygen content >5.0 mg/l, flow rate >5m/s, and rocky crevices of good periphytic cover. It also revealed that *L. fisheri* fond to hide in dark crevices in deep rocky pools (>10m depth) during the daytimes and moves into shallow areas in dusk seeking food. Our observation confirmed fondness of *L. fisheri* to feed on Podostemaceae plants. Their capability to take rapid dive was identified as a defense mechanism but it sometimes failure as local fisher people use wooden picket to collect them in such crevices. On set of rainy season (March to May) the sexually matured individuals (>20 cm TL) were observed to start their upstream spawning migration in dawn. We could also observe unsuccessful attempts to cross a barrage in Heen Ganga and the *Diya-beduma* anicut at Anga-medilla. The frequency of attempts varied from 1-3/minutes and, was ended with exhausting. During the dry period (June to August) *L. fisheri* inhabits the dam areas showed non-spawning upstream migration for temporarily settlement in water logged areas due to degrading and presence of low water level in their downstream preferable habitats. This well exemplified an adaptive approach of river fish to river landscape changes. But some individuals were failed to cross dams and are being killed for food. This leads to further population decline in *L. fisheri*. Therefore, proper transformation in all irrigation weirs with properly erected fish passages is needed. In addition, proper research on captive breeding as well as supply of steady flow with adequate enough water are logical factors to concern. Declaration of at least two free swimming areas viz. Kalu Ganga river reach from Buduruwayaya to Wasgomuwa National Park and Heen Ganga river reach from Meemure to Heen Ganga confluence is proposed as a long-term conservation measure.

KEY WORDS: *Labeo fisheri*, Mahaweli sub rivers, river dam, migration, free swimming area.
ABSTRACT

Nutritional status of animals reveals the quality of the ecosystem that they live in. Hence, estimates on nutritional status can be a good indicator that can be used for pre and post monitoring of any ecosystem, after a management intervention. Restoration of degraded aquatic systems are currently considered for Wilpattu National Park, Sri Lanka, where both natural villus and human-made reservoirs are key water sources in addition to two bordering rivers. However, no procedures are present to determine the body condition of mega herbivores and omnivores, through rapid assessments, which should be a prerequisite prior to any form of restoration. We therefore studied the nutritional status of selected wild mega herbivores in Wilpattu National Park from March to July 2017 when the park was undergoing drought conditions. Sri Lankan elephant (Elephas maximus maximus), spotted deer (Axis axis), barking deer (Muntiacusmuntjak), sambar deer (Rusa unicolor unicolor) and wild buffalo(Bubalusarnee) were studied. We investigated both adultmale and female animals, while excluding pregnant. A total of 247 A. axis, 20 R. unicolor unicolor, 17E.maximusmaximus, 15 B. arnee, were sampled. Nutritional status of E.maximusmaximus and B. arneewere analyzed using an already existing body condition scoring system. Fordeer, a new scoring systemwas developed based upon the evaluation of the degree of fattiness where the main emphasis was given to the prominence of bones, such as the spine, rib cage, hip bone, etc. After synthesizing the scoring system, animals were visually observed with the aid of a binocular and photographs were taken wherever possible. Resultssuggested that 73 % of the sampled deer and sambar population had an average, or above average body condition and 30 % of them were in good or excellent body condition. Also 46 % of the elephants and 60 % of the wild buffaloes had a good body condition and 13 % of them were in very good condition. The new scoring system for ungulates can be used by wildlife officers to collect day to day information on nutritional condition through visual clues. Hence, it has a great potential to be used under field conditions. Results also suggested that despite the ongoing drought, megaherbivores appeared to be in good condition. However, restoration of degraded aquatic systems in Wilpattu National Park is timely. Body condition score has the potential of being an indicator and the results of this study could form the baseline values.

KEY WORDS: Body Condition Score, Herbivores, Wild animal nutrition, Wilpattu National Park
Animal behaviours reveal the use of a given habitat. Amongst different animal groups, mega herbivores are a good indicator group that can provide information on status of producers and predators, as they are affected by both. In dry zone forests, aquatic systems create several habitats and mega herbivores tend to associate them. Restoration of degraded aquatic systems requires establishing baselines of key indicators before interventions. Pre and post comparisons of such interventions can be understood with behaviour data and food preferences. Therefore, a study was conducted in Wilpattu National Park, Sri Lanka. Behaviours of selected mega herbivores were recorded using a standard Ethogram. Groups of *Axis axis* (Spotted deer), *Muntiacus muntjak* (Barking Deer), *Rusa unicolor unicolor* (Sambar deer), *Sus scrofa* (Wild boar) and *Bubalus arnee* (Wild buffalo) and were observed and video recorded or 15 minutes, using scan sampling between 5.30 a.m. to 6.30 p.m. from March to July 2017 in and around reservoirs and villus. In parallel rapid assessment of behaviour, a qualitative assessment of their diet was conducted. Pasture and fodder with evidence of consumption were identified around Mailawewa, a seasonal reservoir, and its vicinity, and they were chemically analysed according to the AOAC (1996) method to obtain their moisture, ether extract, crude fibre, crude protein and ash content. Results revealed that *A. Axis* were grazing (70%), walking (15%) and vigilant (9%) near villus and reservoirs. Whereas, 61% of *S. scrofa* displayed grazing, 18% walking whilst 12% were resting. *R. unicolor* comparatively grazed less (37%) but most were walking (25%), vigilant (23%) or were drinking (12%). In the case of *B. arnee*, 57% were grazing, 20% walking and 12% were vigilant. Most *M. muntjac* was grazing (40%) followed by drinking (22%) walking (17%) and vigilant (13%). Grazing was identified as the key behaviour and all animals were vigilant when in open grounds of aquatic systems. Proximate analysis revealed that *Eleocharis dulcis cypracea* (S: Boru pan) had the highest protein content (17.75%), while, young *Cyperus compressus* (S: Thunassa) had the highest energy content (2987.76 kcal/kg). Seven potential browse species (*Merdeniya* spp., *Mikaniamicrantha*, *Zizyphusoenoplia*, *Indigoferatictoria*, *Centiallaasiatica*, *Maytenusemarginata*, *Syzygiumcumini*) were identified and among them *Syzygium cumini* (S: Madan) had the highest protein content (16.39%) and the highest energy content (866.19 kcal/kg). Results revealed that reservoirs and villus provide key habitats for mega herbivores to perform their behaviours. It is also concluded that conservation of preferred pasture and browse species during any restoration attempt is a necessity.

**KEY WORDS:** diet, mega herbivore, behaviours, ethogram, proximate analysis
RAPID ASSESSMENT OF FLORA, BUTTERFLY, DRAGONFLY AND AVIFAUNA TO DETERMINE THE BASELINES IN MAILAWEWA RESERVOIR OF WILPATTU NATIONAL PARK, SRI LANKA

B. Herath¹, G.K.A.W. Fernando², M.G. Arachchige², I.B.D.C. Senarathne¹, S.C. Wilson², K. Yakandawala³, D. Yakandawala⁴, M. Amararathne¹ and S. Jayakody²*

¹Department of Wildlife Conservation, Jayanthipura, Battaramulla, Sri Lanka
²Department of Aquaculture and Fisheries, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura, Sri Lanka
³Department of Horticulture and Landscape Gardening, Faculty of Agriculture and Plantation Mgt, Wayamba University of Sri Lanka, Makandura, Gonawila, Department of Botany, Faculty of Science, University of Peradeniya, Sri Lanka

*sevvandi_jayakody@yahoo.com

ABSTRACT

Wildlife managers need to adapt to global climatic changes, especially to fluctuations in rainfall and weather extremities such as droughts. In Sri Lanka, a large proportion of protected areas are found in dry, semi-arid and arid zones of the country. Provision of water and managing right level of water for these ecosystems need to be evaluated carefully. It is known that water can change landscapes hence, species distributions. Thus, there is an urgent need for scientific management water in protected areas. One option for increasing the amount of water with least disturbance to ecosystems is to restore abandoned reservoirs. Several cascades are present within protected areas and most of them have lost the connectivity and sinks of many cascades are now fully silted. The functional reservoirs, even if they are under performing, are home to numerous flora and fauna. Hence, for evidence based management, developing quick, reliable, easily executable rapid assessments for establishing floral and faunal diversity is important to collect baseline data before restoration. A study was conducted in Mailawewareservoir of Wilpattu National park to develop such a protocol. Several standard data collection methods were tested for flora, butterflies, dragonflies and birds. The selected ranger-friendly methodologies are outlined. Belt transects of 2m width from the edge of the water to forest crossing the grasslands, scrublands and reservoir embankment emerged as the most reliable method. Recording the length of each habitat type allowed stratification during data analysis. This was supplemented by random quadrats (0.5*0.5m) in inundated areas to obtain the emergent and submerged flora. A final checklist of herbaceous plants obtained between 6AM to 10AM provided samples with flowers enabling identification. Collected data can be deduced into diversity indices, abundances and checklists. In the case of butterflies and dragonflies recording the presence of adults as well larval stages through line transects laid in mid-morning and late afternoon resulted in the best counts. Results confirmed the importance of recording dragonfly larval stages in water. The most reliable and quick assessment for birds was hourly counts from two non-overlapping vantage points from 6 AM to 6 PM. These selected methods were capable of providing current status of the system. Though the results may not reflect seasonal fluctuations and true diversity, conducting rapid assessment prior to a management intervention allows setting baselines. It is recommended such protocols are applied in the field to monitor pre and post intervention changes.

KEY WORDS: climatic changes, herbaceous plants, Wilpattu National, butterfly, dragonfly, avifauna
DEVELOPMENT OF A WILDLIFE MANAGER FRIENDLY, RAPID ASSESSMENT PROTOCOL FOR RESERVOIR RESTORATION IN PROTECTED AREAS

S. JAYAKODY\textsuperscript{1,*} and M.S.O.M. AMARARATHNE\textsuperscript{2}

\textsuperscript{1}Department of Aquaculture and Fisheries, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura, Gonawila 60170, Sri Lanka; \textsuperscript{2}Department of Wildlife Conservation, Jayanthipura, Battaramulla, Sri Lanka

*sevvandi_jayakody@yahoo.com

ABSTRACT

Taking evidence based, scientifically backed decisions for water management in protected areas has become a timely need. In dry, semi-arid and arid zones of Sri Lanka, landscape was altered several thousand years ago by construction of seasonal and perennial reservoirs. Most of these reservoirs are cascades, and a large number of them are within the protected areas in dilapidate condition. At present they have naturalised and are important aquatic ecosystems for fauna and flora. They provide an opportunity to improve water resources within protected areas with minimal disturbance. At present selection of reservoirs for restoration is arbitrary, and no formally adopted mechanism is present with wildlife managers for decision making. Hence, a new protocol was tested at Mailawewa reservoir of Wilpattu National Park. The developed protocol was tested for its applicability at field level. Data were collected for determining the source, connectivity, physical condition and physico-chemical parameters of water, diversity and abundance of flora and selected fauna, behaviour of herbivores near aquatic systems and nutritional condition of herbivores. Parameters that cannot be tested under field conditions were excluded. The decision tree consists of four main categories; (a) leave the system as it is (b) improve the connectivity and natural water flow only (b) restore the surrounding and reservoir bund only (b) restore the reservoir and surrounding landscape. Key indicators that can be used for monitoring and evaluation were also established. The pilot project resulted in preparation of a checklist that can be used at field level to take decisions in selecting reservoirs for restoration. Ground thruthing at more locations and training of wildlife managers is recommend before formal adoption.

KEY WORDS: Protected areas, reservoir, restoration
TRUE MANGROVE DIVERSITY IN MUTHURAJAWELA AND NEGOMBO LAGOON WETLAND COMPLEX IN WESTERN PROVINCE, SRI LANKA

T.G. SUPUN LAHIRU PRAKASH\textsuperscript{1,2,3,*}, ARUNA WEERASINGHA\textsuperscript{1}, P.W.A.B.M. WITHANAGE\textsuperscript{1,3} AND T.G.T. KUSUMINDA\textsuperscript{3,4}

\textsuperscript{1} Muthurajawela and Negombo Lagoon Development Foundation, Pamunugama, Sri Lanka.
\textsuperscript{2} Department of Forestry and Environmental Science, University of Sri Jayewardenepura,
\textsuperscript{3} Biodiversity Conservation and Research Circle of Sri Lanka, No: 50/1, Paranakanda, Wattala,
\textsuperscript{4} Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Sri Lanka.

* prakashtgsl@gmail.com

ABSTRACT

Sri Lanka is an island nation in Indian Ocean has wide array of coastal wetland ecosystems that harbors significant mangrove diversity. The species diversity in mangroves is comparatively higher in Sri Lanka and total number of 21 true mangrove species reported from the island is almost one third of the global diversity of true mangroves in the world. However, estimated 76% of mangrove forests were disappeared from Sri Lanka over the past 100 years and remains only about 8,800 hectares of Mangrove forests island wide. The Muthurajawela and Negombo lagoon wetland complex is a diverse mangrove ecosystem located in rapidly developing urban area near Economic capital of Sri Lanka. This study attempted to document the true mangrove diversity of this wetland complex, their direct uses, and conservation problems in order to emphasize the importance for conservation. It involved sampling of mangrove flora in five sampling sites and information on direct uses and conservation problems with regard to mangrove flora in the site was collected by interviewing the stakeholders (n=78). According to the study the Muthurajawela and Negombo Lagoon wetland complex is an important habitat for mangroves in Sri Lanka where 16 mangrove species were recorded belongs to nine families including three Nationally Endangered mangrove species. This mangrove ecosystem can be utilized in a sustainable manner for providing the economical and ecological benefits to the nation. However, at present this is extremely vulnerable ecosystem and need rapid and strong interventions for the conservation and sustainable use.

KEY WORDS: biodiversity, coastline, mangrove, muthurajawela, Negombo lagoon
ANIMAL BONE REMAINS FOUND AT WELMALKEMA ROCK POOL, YALA BLOCK I

PROFESSOR GAMINI ADIKARI¹, KELUM NALINDA MANAMENDRA-ARACHCHI¹, SHYAMAL IROSHANA¹, SONALI RANGIKA PREMARATHNE¹, W.A.P.P.D. WEERARATHNE¹, A.A.C.J. AMARATHUNGA², H.M.D.P. VIDYARATHNA², P.M.S.Y. HATHARASINGHE²*, K.C. WANIGATHUNGA², S.A.U.S. DISSANAYAKA², N.M.C. BANDARA², P.V.U. CHANAKA², J.M.A.G.G.S. KARUNARATHNA², P.D.C.U. PERERA², H.S.K. PEIRIS², K.N. DHARMAWARDHANA², HATANGALAMEDHAHANDA THERO², C.D. AMBAGAHAGE², D.D.M. PILLAI², G.M.R. PERERA², M.S. CHANADANA², A.S.M.L. RATHNAYAKA², W.K.N. DHANANJANI², R.D.P.S. HETTIYAKANDA², R.M.T.P. RATHNAYAKA², W.M.D.L. PUSHPAKUMARA², K.P.M. WEERARATHNA²

¹Postgraduate Institute of Archaeology, Colombo 07.
²Diploma in Palaeobiodiversity- 2015/2016 Batch, Postgraduate Institute of Archaeology
* sakunihathasinghe@gmail.com

ABSTRACT

In August 2016 the Palaeobiodiversity Diploma students of Postgraduate Institute of Archaeology (University of Kelaniya) examined the wild animal bones removed from WelmalKema at Yala National Park. Approximately 20-30% of those animal bones were fossilized. This research was conducted with the patronage of the Minister of the Wildlife Conservation and Sustainable Development, Hon. Gamini Jayawickrama Perera, the Advisor to the Ministry, Professor Emeritus Sarath Kotagama and with the assistance of the officers of the Department of Wildlife Conservation led by the Director General.

The research team sorted through a large number of bones in the vicinity of the Kema and a part of the curation was conducted on site. A certain part of the collection of the bones was handed over to Yala National Park and the rest was deposited at the collection of bones at Postgraduate Institute of Archaeology.

Elephant (Elephas maximus), wild buffalo (Bubalus arnee), water buffalo (Bubalus bubalis), sambur (Rusa unicolor), spotted deer (Axis axis), wild boar (Sus scrofa), pangolin (Manis crassicaudata), land monitor (Varanus bengalensis), black turtle (Melanochelys trijuga), crocodile (Crocodylus sp.) and snakes were identified from the examined bones and teeth. The majority of the bones belonged to the wild buffalo.

Bones from WelmalKema should be further studied using scientific methods. Subjecting bones to dating is very important. It will facilitate the collection of data about the environmental conditions that existed in the ancient times.

KEY WORDS: Palaeobiodiversity, Animal Bones, Rock Pool, Wild Buffalo, Environmental Conditions
MOTHS OF NATIONAL WILDLIFE RESEARCH AND TRAINING CENTRE, 
GIRITALE, SRI LANKA

N.C.JAYAWARDANA

National Wildlife Research and Training Center, Department of Wildlife Conservation, Elahera rd, Giritale, Sri Lanka

chathuranga.nuwan.ka@gmail.com

ABSTRACT

The study on the moth fauna of NWRTC was investigated during November 2015 to April 2017. Aim of this study was to describe species diversity of moths of NWRTC. Light traps were operated in several locations covering different habitats. A total of 174 species belonging to 25 families were recorded. The highest number of species belongs to Erebidae, followed by Crambidae and Geometridae. As there was no previous comprehensive study on the moth diversity of NWTRC, all the species recorded could be regarded as new records from the area.

KEY WORDS: Lepidoptera, Moths, NWTRC, Diversity,
EXAMINING WHY RAIDS CONDUCTED BY WILDLIFE FIELD OFFICERS AND SUBSEQUENT COURT CASES FAIL, WHILE EXPLORING SOLUTIONS

U. KUMARATUNGA

Department of Wildlife Conservation

ABSTRACT

The Department of Wildlife Conservation is the only main state institution tasked with safeguarding and conserving the biological diversity of Sri Lanka. The main objective of the Wildlife Conservation Department is to conserve the wildlife heritage and maintain them through sustainable development for the future generation.

The main task and responsibility of the Wildlife Conservation Department is the long-term preservation of endemic animal and plant species. The Wildlife Policy and the Flora and Fauna Protection Ordinance provide the legal provisions for this task. The minister of Wildlife is empowered to declare wildlife sanctuaries while officials appointed under the relevant Act including the Wildlife Conservation Director General are vested with management powers. Officials of the Wildlife Department are empowered to execute the Wildlife Policy and the Flora and Fauna Protection Ordinance. Accordingly, this Act has been amended since the late 19th century, (during the years 1891, 1893, 1894, 1902, 1905, 1906, 1909, 1937, 1942, 1944, 1945, 1945, 1964, 1970, 1993 and 2009). At the present, this Act has been strengthened to safeguard the wildlife heritage to the fullest extent.

This proposal will chiefly examine why raids conducted by Wildlife field officers and subsequent court cases filed have failed while exploring possible solutions to rectify this issue.

For this research proposal, the Minneriya National Park and the Polonnaruwa forest range located in the Polonnaruwa Assistant Directorial Zone have been used as service stations. The recent raids conducted within these two service stations as well as the subsequent court cases which were successfully / unsuccessfully concluded, have been analysed.

KEY WORDS: Wildlife Heritage, Wildlife Policy, Flora and Fauna Protection Ordinance
A MORPHOLOGICAL AND PHYTOCHEMICAL STUDY OF THE ENDEMIC SPECIES MEMECYLON URCEOLATUM COGN. IN DC. (MELASTOMATACEAE JUSS.) IN SRI LANKA

T.M.S.D. KARUNARATHNE¹, I.U. KARIYAWASAM¹, C. PADUMADASA²

¹Department of Botany, Faculty of Applied Sciences, University of Sri Jayewardenepura,
²Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura,

ABSTRACT

Sri Lanka is considered as "a biodiversity hotspot" along with the Western Ghats of India. Memecylon L. is a paleotropical genus with approximately 350 species. It comprises small understory trees or woody shrubs distributed throughout the dry, wet and montane zones in Sri Lanka. According to the Revised Flora of Ceylon, the genus Memecylon (commonly known as “Kora Kaha”) comprises 32 different species and among them 28 species are endemic to the island.

Memecylon species have a great importance in traditional medicinal practices in Sri Lanka and India. The main objective of this preliminary study is to investigate the comparative morphology, anatomy and phytochemistry of the endemic species Memecylonurceolatum.

Plant material was collected from the nursery of the Bandaranayake Memorial Ayurvedic Research Institute, Nawinna. Free-hand sectioning, microtomy, light microscopy and powder microscopy were employed for a thorough investigation. New vegetative and reproductive morphological characters not reported in the local flora treatments such as stomatal arrangements, foliar sclereids, and wood anatomy were recorded.

Qualitative screening for phytochemicals showed the presence of polyphenols, flavonoids, tannins, triterpenes, unsaturated sterols and saponins in 80% aqueous methanolic extract of leaves. The profiles of phytochemicals present were further studied using Thin Layer Chromatography (TLC). Antioxidant activity of the 80% aqueous methanol extract (IC₅₀ = 1.8974 ± 0.1429 mg/mL) was studied using 2,2-Diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay and was found to be significantly lower than that of the standard(IC₅₀ = 0.0030 ± 0.0006 mg/mL) Gallic acid used.

This is the first chemotaxonomic report on M.urceolatum and further chemical characterization especially the study of flavonoid distribution in flowers and fruits is recommended to investigate medicinally important phytochemicals for the next generation of drug discovery.

KEYWORDS: Memecylon urceolatum, Melastomataceae, Endemic, Morphology, Phytochemistry
ENVIRONMENTAL EDUCATION PROGRAMMES WITHIN WESTERN DERBY ELAND (TAUROTRAGUS DERBIANUS DERBIANUS) CONSERVATION IN SENEGAL.

MARKÉTAGRÚŇOVÁ, PAVLA HEJCMANOVÁ

Czech University of Life Sciences Prague, Czech Republic

ABSTRACT

The Western Derby eland (Taurotragus derbianus derbianus) is a critically endangered mammalian species with its only confirmed wild viable population known to only occur in Senegal. In 2000, the translocation of nine animals from their only and insufficiently protected natural habitat in the Niokolo Koba National Park in southern Senegal to managed Bandia wildlife reserve 60 km south-east from Dakar was organised. Six of these individuals formed the foundation of semi-captive population, which were established first in Bandia and later, in 2006 in Fathala reserve in south-west Senegal. The primary condition to be fulfilled before successful “Back home” operation of their descendants into the wild is to ensure sustainable protection of their natural habitat and respect of local communities towards protected area regulations. However, there is an increasing pressure on natural resources in Senegal as the country’s population increased from 10 million in 2010, to 15 million inhabitants in 2015. Against this recent evolution, the way Senegalese approach nature conservation either as inhabitants of protected areas peripheries or as policy makers in cities, becomes increasingly important. Knowing the attitudes towards nature conservation and how to measure the effectiveness of environmental education programmes is a prerequisite for successful educational and conservation actions. As a response to this need, we have, in the first phase conducted the questionnaire research to examine the validity of New Environmental Paradigm scale, the most used measure for assessments of environmental attitudes in Western countries. In total 765 Senegalese children for pupils (average age 13 years) from 19 schools and three regions participated in a survey. In the second phase we have designed and performed two-day environmental education programmes. We targeted the specific environmental knowledge of the pupils together with aim to positively change children’s general and specific attitudes towards the nature protection. In total 297 Senegalese children from 5 urban and 5 rural schools participated in programmes; 102 children in in-class programme, 195 visited a natural reserve. The preliminary results showed: a) NEP scale for children not to be valid for Senegalese cultural and philosophical background; b) strong tendency of children to explain the human-nature relationship through their perception of power of God; c) after the education programme, we recorded a significant increase in awareness questions‘point s; d) no significant difference in results of children from classroom group and excursion group in most of the questions; and e) little effect of programme on environmental attitudes seemed from western point of view. Based on our experience, contacts and passion shared with a bunch of Senegalese people, we have created the association Les Amis de l’El and de Derby who provide interactive environmental education programme with complete education kit based on previous experience, including a preparatory course, an outdoor excursion and a feedback session.

KEYWORDS: endangered mammalian species, environmental attitudes, natural habitat, protected areas
Tuskers are a minority in the Sri Lankan elephant population, varying from area to area, with the highest proportion being in the Southern region and the lowest in the North eastern (Mahaweli) region. The smaller population of tuskers is one of the reasons for identifying the Sri Lankan population as a distinct sub-species. In the extensive survey carried out by the DWC in 1993 covering most parts of the island, the proportion of tuskers among the adult males was estimated to be 9.42% (Hendavitharana et al., 1994). Although very limited tuskers live in Sri Lanka, the number of tuskers in Yala National Park is somewhat crucial at any time. At least 15 adult tuskers have been recorded in the block 1 of RNP (de Silva et al., 1997), but at any given time, only a proportion of this number is present in the area.

Furthermore, in this survey, we could observe 14 number of adult tuskers in year 2004 at Yala NP (block 1) and after thirteen years, that number is changed in to 21 in year 2017. Although the number has been increase in 7, all tuskers lived in 2004 has not been survive at this year 2017. Because we could observe died tuskers and tusks at Yala NP within past few years and some are disappeared. In this survey, by using morphological and morphometric characters I prepared identification manuals for each and every tusker and coded under given name, because individual identification is a best practice for large animal counting in world wide. However, as a result 21 tuskers recorded in this year 2017 for whole, only 5 tuskers has been remain after thirteen years which were observed in 2004 as 14 in number. Within the past thirteen years 6 adult tuskers have been died and 3 tuskers are missing or disappearing which were identified in year 2004. However, 16 new tuskers are present at Yala NP with comparisoning after thirteen years and the majority of them are young. These results we can use for the wildlife management in Yala NP and if we can do these researches collaborating with genetic characters that will be useful and important for the future conservation and management in Sri Lanka.

**KEY WORDS:** morphological and morphometric characters, genetic characters
REASONS FOR VISITOR DISSATISFACTION IN NATIONAL PARKS BASED TOURISM IN SRI LANKA

T.G.S.L. PRAKASH¹, ⁴, P.K.P. PERERA¹, D. NEWSOME², & T.G.T. KUSUMINDA³, ⁴

¹Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka
²School of Veterinary and Life Sciences, Murdoch University, Perth, WA, Australia
³Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Sri Lanka
⁴Biodiversity Conservation and Research Circle of Sri Lanka, No: 50/1, Paranakanda, Enderamulla, Wattala, Sri Lanka

prakashtgsl@gmail.com

ABSTRACT

National Parks (NPs) based wildlife tourism is a significant component of Sri Lanka’s tourism industry with foreign visitations accounting for the larger share of income of NPs. However, current wildlife tourism practices based on NPs seem to be unsustainable, and cause bad tourism experiences, especially in the case of foreign visitors. This study examined the major causes of visitor dissatisfaction during wildlife tourism experiences at five highly visited NPs in Sri Lanka using reviews posted in the travel website Trip Advisor. Analysis found 15 major causes of visitor dissatisfaction with nearly 75% of negative reviews linking to park management related issues, while the rest stressing on tour-operator related issues. Heavy traffic congestion inside NPs, lack of opportunities to observe diverse wildlife, unreasonable entrance fees, poor implementation of visitor guidelines/policies by the park management, park management’s lack of concern about environment and wildlife, poor maintenance of nature trails and lack of quality personal interpretation services were the key park management-related issues highlighted in negative reviews. The major tour-operator related issues include reckless/poor driving by safari vehicle drivers, poor condition of safari vehicles, expensive safari vehicle fees, and dishonest practices of tour operators.

KEY WORDS: national parks, overcrowding, satisfaction, trip advisor, wildlife tourism
INSTRUCTIONS FOR THE SUBMISSION OF MANUSCRIPTS

1. An abstract of the work should be submitted prior to the submission of full paper.

2. Papers should be written in English.

3. Abstract and manuscripts formatted according to the instructions given below.

4. The manuscript should be typed single-spaced on A4 papers with following page setup: Margins: left 1.5", right 1", top 1", bottom 1", header 1", footer 0.5". Font: Times New Roman. Pages should be numbered in sequence, starting from the title page, at the top right corner.

5. The manuscript should be arranged in the following order: Title (including name of Author/s and Affiliation), Abstract (maximum 250 words), Introduction, Materials and Methods, Results, Discussion, Conclusions, Acknowledgements and References. The results and discussion could be combined if desired. Tables, figures etc. should be clearly drawn with captions. Photographs, if any, should be used only if they are essential to explain the results.

6. The format to be used is as follows:

<table>
<thead>
<tr>
<th>Section</th>
<th>Type style</th>
<th>Alignment</th>
<th>Font Size</th>
<th>Type Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Bold</td>
<td>Center</td>
<td>12</td>
<td>Upper</td>
</tr>
<tr>
<td>Author’s Name</td>
<td>Normal</td>
<td>Center</td>
<td>11</td>
<td>Upper</td>
</tr>
<tr>
<td>Author’s Address</td>
<td>Normal and Italic</td>
<td>Center</td>
<td>11</td>
<td>Title</td>
</tr>
<tr>
<td>Abstract</td>
<td>Normal</td>
<td>Center</td>
<td>12</td>
<td>Upper</td>
</tr>
<tr>
<td>Abstract Text</td>
<td>Bold</td>
<td>Justify</td>
<td>10</td>
<td>Sentence</td>
</tr>
<tr>
<td>Key Words</td>
<td>Bold</td>
<td>Left tab-1</td>
<td>10</td>
<td>Upper</td>
</tr>
<tr>
<td>Key word Text</td>
<td>Normal</td>
<td>Justify</td>
<td>10</td>
<td>Sentence</td>
</tr>
<tr>
<td>Introduction</td>
<td>Normal</td>
<td>Center</td>
<td>12</td>
<td>Upper</td>
</tr>
<tr>
<td>Introduction Text</td>
<td>Normal</td>
<td>Justify</td>
<td>12</td>
<td>Sentence</td>
</tr>
<tr>
<td>Materials and Methods</td>
<td>Normal</td>
<td>Center</td>
<td>12</td>
<td>Upper</td>
</tr>
<tr>
<td>Materials and Methods Text</td>
<td>Normal</td>
<td>Justify</td>
<td>12</td>
<td>Sentence</td>
</tr>
<tr>
<td>Sub Title</td>
<td>Bold</td>
<td>Left</td>
<td>12</td>
<td>Sentence</td>
</tr>
<tr>
<td>Table and Figure titles</td>
<td>Bold</td>
<td>Justify</td>
<td>10</td>
<td>Sentence</td>
</tr>
<tr>
<td>Table Headings</td>
<td>Normal and Italic</td>
<td>Justify</td>
<td>10</td>
<td>Sentence</td>
</tr>
<tr>
<td>References</td>
<td>Normal</td>
<td>Center</td>
<td>12</td>
<td>Upper</td>
</tr>
<tr>
<td>Reference Text</td>
<td>Normal</td>
<td>Justify</td>
<td>10</td>
<td>Sentence</td>
</tr>
</tbody>
</table>
- All non-English and technical terms should be underlined or in \textit{italics}.
  (eg. \textit{et al.}, \textit{viz.}, etc.)
- All units, dimensions, terms, symbols, abbreviations, etc., should be presented as recommended by the
  Systeme International d'Unites (SI).

7. Tables and figures with captions should be inserted in the typed text where appropriate. They should be
  numbered in the order of appearance in the text (eg. Table 1, Figure 1). All the tables and figures should be
  cited in the text and data presented in tables or figures should not be repeated in the text.

8. The graphs drawn in the MS XL program are preferable.

9. Colour photographs are acceptable and they should be of good contrast and intensity.

10. The references should be arranged alphabetically. In the text, refer to author/s name (without initials) and
    year of publication.
    Example;
    Elephant \textit{Elephas maximus} L. in the Ruhuna National Park, Sri Lanka. \textit{Biological Conservation}.
    29: 47-61.

11. If reference is made in the text to a publication by 3 or more authors, the name of the first author should be
    used, followed by 'et al.'.

12. Papers not formatted according the instructions given or sent after the deadlines will not be accepted.
    For further details, visit http://journals.dwc.gov.lk/index.php/wildlanka/index

ADDRESS FOR CORRESPONDANCE
R.M.R. Nilanthi Rajapakse
The Chief Editor, \textit{WILDLANKA} Journal
Department of Wildlife Conservation
No. 811/A, Jayanthipura Road,
Battramulla,
Sri Lanka.

Telephone: +94-11-2888585
Fax: +94-11-2883355
Email: wildlanka@dwc.gov.lk/journaldwc@gmail.com
(+94-71-4877303)