2010

5th International Galliformes Symposium (November 7-10, 2010 : Chiang Mai, Thailand): Abstract Book

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5th International Galliformes Symposium

7 - 10 November 2010
Chiang Mai, Thailand

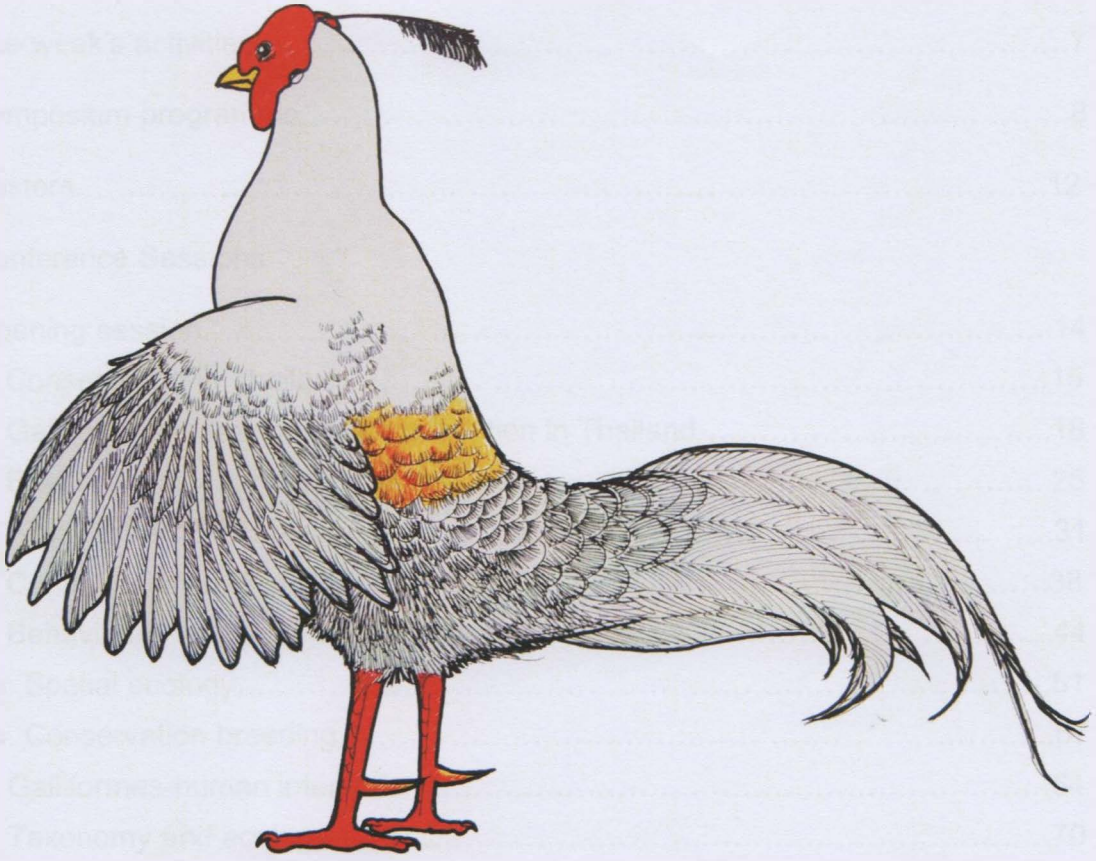
World Pheasant Association

IUCN-SSC/WPA Galliformes Specialist Group

Conservation Ecology Program
King Mongkut's University of Technology Thonburi

KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI

5th International Galliformes Symposium



7 – 10 November 2010
Chiang Mai
Thailand

Abstract book edited by:
Tommaso Savini
Simon Dowell
(Scientific Committee)

Contents

Welcome to Chiang Mai to the now regular World Pheasant Association gathering. It is almost 25 years ago to the day that we held our 3rd *International Pheasant Symposium* here in 1985 and welcomed for the first time a delegation from China. The delegation was led by Professor Zheng Guangmei, now our President. Much has happened since then and indeed much since the last meeting in Sichuan, China in 2007 and we will hear of this new research and new ways of doing conservation in the next few days. What is becoming clearer all the time is that we have to find ways of making our conservation work and resources have as big an impact as we can. The world is very different from that which WPA was born (or hatched!) into 35 years ago and we need to change to remain effective as conservation becomes an increasingly political issue.

However, looking at the programme ahead it is clear that WPA has a critical role to play. Not only are the Galliformes tremendously important to humans, for food, culture and livelihoods, but they are widely studied in many countries. This means that they are responsible for inspiring and providing the training for many young conservationists, who in due course become leading experts, not only for Galliformes, but for wildlife and conservation in general.

All of this is reflected in our programme in which there is cutting edge research and innovative management and including examples of pioneering studies on poorly known species to marvelous stories of conservation success. Much of this is being carried out by a wonderful (and increasing) variety of new young conservationists who are picking up the challenge of conserving these wonderful birds. There is also a sprinkling of experienced 'old hands' to provide guidance and a sense of continuity. It promises to be an exciting few days, and followed by a series of workshops where the way ahead can be discussed in some of key areas of work.

It never ceases to amaze me how far WPA has come since my wife and I hosted its first meeting in our garden in the south of England in 1975. Looking at the few days ahead I am sure that it will continue todevelop with the great flexibility it has always shown so that it is adapted to the changing world that we live in. The challenges ahead are certainly very significant if we are to stop the declining conservation status of our species, but looking at the talent that will be on show in the next three days, I am filled with hope. We can make a difference and you will.

Keith Howman

President Emeritus
World Pheasant Association

Conserving Galliformes: what we need to do

The world has changed a lot since the first of these symposia was held in 1979 in Kathmandu, Nepal. They are no longer concerned only with pheasants, but with all Galliformes; the programme is no longer dominated by westerners, but by those from countries where the species occur; and no longer do we talk only about field surveys and captive breeding programmes, but much more broadly about a whole range of conservation actions, including protected area management and community programmes. All of this means that we have a far better understanding of the status of Galliformes and the threats that they face and have a huge range of opportunities for achieving conservation benefits open to us. However, resources remain limited compared with what we need to achieve and so there is an urgent need to make wise choices about how we use the limited financial and human resources that we have. Achieving the right balance of detailed species work, broad scale habitat and community work and engaging with high level policy makers will be critical if we are to reduce the rate at which Galliformes populations are declining.

Philip J.K. McGowan

Director
World Pheasant Association

The Galliformes Specialist Group

The Galliformes Specialist Group is one of c.120 SGs constituted within the Species Survival Commission of IUCN. Our collective expertise and knowledge centres on the 286 species in this group of birds, with a special emphasis on the 73 species currently featuring on the IUCN Red List. Nearly half the members work on grouse biology in the Northern Hemisphere with a focus on how to sustain populations that are legally hunted. Our other members are actively working on our often-threatened species over the rest of the world. The GSG does not hold a budget, or own and fund projects. Rather it is a voluntary self-help network which endorses project proposals after peer-review, a process that improves projects, offers training, and increases the likelihood of external funding. GSG-endorsed projects remain the property and responsibility of the proposer/principle investigator. Red List re-assessments are the ultimate responsibility of BirdLife International as the Red List Authority for all birds, but both the GSG and WPA are fully involved in this annual process. It is also agreed that the GSG membership of c.250 people should be fully accessible to WPA to offer technical advice. By taking a global view, we are in a position to prioritise the work that needs to be done to save our species. We are expected to publicise all urgent cases for treatment in order to produce more action (and more birds!) on the ground: through studies of status and ecology, the nature and impact of threats, and the effectiveness of sound conservation management.

Peter Garson
Ilse Storch

Co-Chairs
IUCN-SSC/WPA Galliformes Specialist Group

School of Biology
Newcastle University
U.K.

Acknowledgments

I would like to acknowledge the help and generous support from King Mongkut's University of Technology Thonburi, KMUTT that greatly facilitated the organisation of this symposium. I am also grateful for the generous support provided by Rufford Small Grants for Nature, James Goodhart, Keith and Jean Howman and Keith Chalmers Watson, which has enabled over 50 conservationists from across Asia, and beyond, to attend the symposium. A grant from the Oriental Bird Club has also supported 15 people to attend the Scientist's Workshop being held after the symposium. I wish to thank Dr Stephen Browne for much of the organising of the symposium and Drs Simon Dowell and Tommaso Savini to compiling the scientific programme and also their employers, Fauna & Flora International, KMUTT and Liverpool John Moores University for allowing them to do this.

Philip J. K. McGowan

Director
World Pheasant Association

The Week's activities

Date	Event		Room
07 Nov 2010	Registration Opening Dinner		
08 Nov 2010	Symposium	Opening Session	Imperial Hall 1
		Session 1	Imperial Hall 1
		Session 2	Imperial Hall 1
		Session 3	Imperial Hall 1
09 Nov 2010	Symposium	Session 4	Imperial Hall 1
		Session 5	Imperial Hall 1
		Session 6	Imperial Hall 1
		Poster Session	
10 Nov 2010	Symposium	Session 7a	Imperial Hall 1
		Session 7b	Imperial Hall 2
		Session 8	Imperial Hall 1
		Session 9	Imperial Hall 1
		Closing up	Imperial Hall 1
	Closing Banquet		
11 Nov 2010	Visit to Chiang Mai Zoo one-one work		
12 Nov 2010	Visit to Doi Inthonon and Doi Suthep National Park Workshops		
13 Nov 2010	Visit to Doi Inthonon and Doi Suthep National Park Workshops		
14 Nov 2010	Depart		

Symposium programme

Sunday 7 November 2010

16:00 Registration open

19:00 Dinner

Monday 8 November 2010

08:30 Registration

Opening Session

Chair: Stephen Browne

09:00 **Sakarindr Bhumiratana**
Symposium opening speech

09:15 **Tommaso Savini and Simon Dowell**
Scientific Program Committee Chairmen's Introduction

09:25 **Philip J. K. McGowan**
Conserving Galliformes

09:45 **Peter J. Garson and Ilse Storch**
The Galliformes Specialist Group

10:00 Symposium Photograph

10:15 Coffee break

Session 1: Conservation in Thailand

Chair: Tommaso Savini

10:45 **Mattana Srikrajang**
Wildlife conservation status in Thailand: the elephant's case study

11:30 **Wina Meckvichai**
Galliformes study and research problems in Thailand

12:15 Lunch

Session 2: Galliformes research and conservation in Thailand

Chair: Wina Meckvichai

13:40 **Niti Sukumal, George A. Gale and Tommaso Savini**
Ranging ecology of Siamese fireback (*Lophura diardi*) in sub-montane forest

14:00 **Tiwa Ong-in, George A. Gale, Andrew J. Pierce, Philip D. Round, Stephen Browne and Tommaso Savini**
Nesting behaviour and nest site selection of scaly-breasted partridge in Mo Singto Research Plot, Thailand

14:20 **Jirapa Suwanrat, Taksin Artchawakom, Niti Sukumal, Dusit Ngoprasert, Tommaso Savini and Pongthep Suwanwaree**
Study of Siamese fireback (*Lophura diardi*) by using camera traps

14:40 **Tanwarat Pinthong and Wina Meckvichai**
Habitat utilization of green peafowl at Huai Tab Salou, Uthai Tani Province

15:00 **Amporn Wiwegweaw and Wina Meckvichai**
Genetic variation of captive green peafowl in Thailand base on D-loop sequences

15:20 **Tommaso Savini and Niti Sukumal**
Present and future of Galliformes research in Thailand: prioritizing the effort

15:40 Coffee break

Session 3: Effectiveness of protected areas — Chair: Sun Yue-hua

16:10 **Simon Dowell, Dai Bo, Roger Wilkinson, Chen Benping and Zhu Min**
Achieving long-term protection for Galliformes habitat: A case study from China

16:30 **Natalie Clark, Elizabeth Boakes, Richard Fuller, Georgina Mace and Philip J. K. McGowan**
Coverage of the Galliformes within South Asia's protected area

16:50 **Hem Sagar Baral**
Galliformes conservation in Nepal through the priority sites for conservation

17:10 **Edmund Leo B. Rico, Ronald Allan Altamirano, Neil Aldrin D. Mallari and Rachel Austin**
Enhancing the conservation and scope of Puerto Princesa subterranean River National Park

17:30 **N.A.D. Mallari, S.M. Marsden, J.Mendoza, J. Wenceslao, N.Puna, J.Bactol and P.J.K. McGowan**

Bringing protected areas beyond conservation rhetoric: a case study in Palawan, Philippines

17:50 Close

Tuesday 9 November 2010

Session 4: Field research techniques — Chair: Niti Sukumal

08:30 **John P. Carroll**
Science, conservation and abundance estimation in Galliformes

09:10 **George A. Gale, Tiwa Ong-in and Tommaso Savini**
A test of distance sampling to estimate the abundance of scaly-breasted partridge in a tropical evergreen forest

09:30 **Poudyal K., Bhattacharya T., Bashir T., Sathyakumar S. and Saha G.K.**
Abundance, population structure and occupancy based modeling of three pheasants in western part of Khangchendzonga Biosphere Reserve, Sikkim, India

09:50 **David Lee and Jeremy Lindsell**
Using camera traps to assess abundances and habitat associations of Galliformes in an Indonesian lowland forest

10:10 **Xingfeng Si and Ding Ping**
Monitoring population dynamics of threatened pheasants using camera trapping: a case study in Gutianshan National Nature Reserve

10:30 **Laxman Prasad Poudyal, Baburam Lamichhane, Heera B. Chhetri, Ramesh K. and Philip J. K. McGowan**
Distribution of pheasants and partridges in the upper Setikhola forests of Annapurna Conservation Area, Nepal

10:50 Coffee break

Session 5: Conservation status of Galliformes — Chair: Simon Dowell

11:20 **Le Trong Trai**
Emerging concerns about the status of Vietnam's Galliformes

11:40 **Rahul Kaul and S Sathyakumar**
Conservation of Galliformes in India: challenges and future needs

12:00 **Clive Bealey, Houssein Rayaleh, Zomo Fisher, Sam Cartwright, Geoff Welch and Philip J.K. McGowan**
Saving the critically endangered Djibouti francolin and its forest ecosystem: cause for optimism?

12:20 **Paras Bikram Singh and Laxman Poudyal**
Status, habitat and conservation of swamp francolin (Francolinus gularis) in Suklaphanta Wildlife Reserve

12:40 **Dahal Baghwan R.**
Re-assessment of population status, habitat use and threats to swamp francolin (*Francolinus gularis*) between 2004 and 2009 in Koshi Tappu Wildlife Reserve, Nepal

13:00 Lunch

Session 6: Behavioural and Population Ecology

Chair: Rahul Kaul

14:00 **Wu Yi-qun and Liu Nai-fa**
Diurnal behaviour of *Crossoptilon auritus* in winter in NW China

14:20 **Que Pinjia**
Habitat selection and group size change of Tibetan partridge in Daocheng, Sichuan, China.

14:40 **David Baines, Nicholas Aebischer and Allan MacLeod**
The roles of weather and predator abundance in determining breeding success of capercaillie in Scotland

15:00 **Susan N. Ellis-Felege, Jonathan S. Burnam, William E. Palmer, D. Clay Sisson, and John P. Carroll**
Parental decisions and predators: investment and risks to incubating Northern Bobwhites

15:20 **Ramesh N. and Sathyanarayana M.C.**
Breeding biology of gray junglefowl (*Gallus sonneratii*) in Theni Forest Division, Gudalur Range, Western Ghats, Tamilnadu, Southern India

15:40 **Kerrie T. Naranjit**
Reproductive ecology of the Trinidad piping-guan

16:00 Coffee break

16:30 Poster session

Coordinator: John P. Carroll

18:00 Close

Wednesday 10 November 2010

Session 7a: Spatial ecology

Chair: Zhang Zheng-wang

08:30 **Ji-Liang Xu, Xiao-Hui Zhang, Zheng-Wang Zhang, Guang-Mei Zheng and Yong Wang**
Spatial and temporal associations of male Reeves's pheasants to different forest edges in the Dabie Mountains of Central China

08:50 **Merwyn Fernandes, Mukesh, S. Sathyakumar and K. Ramesh**
Ecogeographical determinants of range limit and distribution pattern of red junglefowl and grey junglefowl in India

09:10 **Poudyal K., Bashir T., Bhattacharya T., Sathyakumar S. and Saha G.K.**
Habitat use and activity pattern of Galliformes in western part of Khangchendzonga Biosphere Reserve, Sikkim, India

09:30 **Nan Yang, Kai Zhang, Jianghong Ran, Huw Lloyd, Yu Xu, Bisong Yue and Ying Wang**
Territory size and overlap of buff-throated partridge in tree-line habitats, Pamuling Mountains, China

09:50 **Yao Xiao-gang, Zhou Wei, Xu Wan-ji, Deng Zhong-jian and Zhang Ren-gong**
Habitat suitability assessment for Hume's Pheasant (Syrmaticus humiae) in Nanhua part of Ailaoshan Nature Reserve

Session 7b: Conservation Breeding

Chair: Keith Howman

08:30 **John Corder**
Conservation breeding in WPA

08:50 **Alam Singh Chauhan and Sat Pal Dhiman**
Conservation breeding programme of western tragopan at Sarahan Pheasantry in Himachal Pradesh, India

09:10 **Zhang Jing, Zhang Jinguo and Liu Bin**
Introduction and breeding of blood pheasants in Beijing zoo

09:30 **Naim Akhtar and Shri B.S. Bonal**
Conservation breeding of pheasants in India: the Central Zoo Authority Perspective

09:50 **Sat Pal Dhiman**
Conservation breeding of cheer pheasants giving emphasis to enclosure designs in Himachal Pradesh, India

10:10 **Ashwanii Gulaati**
Taking next step forward in conservation breeding of pheasants in Himachal Pradesh,India

10:30 Coffee break

Session 8: Galliformes-human interaction

Chair: Brig Mukhtar Ahmed

11:00 **Lowell J. Mills and Peter J. Garson**
Logical conservation: applying the state-pressure-response model to prioritise work on the threatened

11:20 **Suman Sharma**
Present opportunities of ecotourism and its impact on Himalayan pheasants in Pipar Area, Nepal

11:40 **Jiang Chang, Ning Wang, De Chen and Zhengwang Zhang**
Genetic signature of anthropogenic population collapse in Reeves's pheasant (*Syrmaticus reevesii*)

12:00 **Wang Nan**
Grouping behaviour of white eared-pheasant

12:20 **David Baines, Philip Warren and Kathy Fletcher**
Factors limiting population size of gray partridge in upland agricultural landscapes in Northern England

12:40 Lunch

Session 9: Taxonomy and ecology

Chair: Natalie Clark

14:00 **Mukesh, M. Fernandes, S. Sathyakumar, R.S. Kalsi, Rahul Kaul and R.P. Mandhan**
Evaluation of genetic diversity and admixture analysis of red junglefowl with domestic chicken in India: preliminary finds

14:20 **Lu Dong, Yanyun Zhang, Gerald Heckel and Guangmei Zheng**
Taxonomic clarification in a plumage polymorphic species, silver pheasant

14:40 **Chang Lina and Zhou Wei**
The spatial variation of plant food for *Syrmaticus humiae* in spring at Dazhongshan, Yunnan

15:00 **Sathyanarayana M.C. and Ramesh N.**
Seasonal variation in the diet of gray junglefowl (*Gallus sonneratii*) in Theni Forest Division, Gudalur range, Western Ghats, Tamilnadu, Southern India

15:20 **Charles Santiapillai and Shanmugasundaram Wijeyamohan**
Observations on the Indian peafowl (*Pavo cristatus*) in the Mannar District, Sri Lanka

15:40 Coffee break

16:10 **Peter J. Garson**
Workshop: Future shape and role of the Galliformes Specialist Group

17:40 **John P. Carroll** Chair: Philip McGowan
Closing up

19:30 Banquet hosted by the World Pheasant Association

Posters

Sutipong Arsirapoj and Wina Meckvichai
Vocalization of red junglefowl (*Gallus gallus spadiceus*) in Huai Kha Khaeng Wildlife Breeding Station, Uthai Thani Province

Bhumesh Singh Bhadouria, V.B. Mathur, S. Sathyakumar and Rahul Kaul
Assessment of pesticide load on Indian peafowl (*Pavo cristatus*) in Keoladeo National Park, Bharatpur Rajasthan, India

G.W.H. Davison and Wang Nan
Diet, throughput and faecal analysis of blood pheasants at Daocheng, Sichuan, China

Ding Peng, Ma Ming, Zhang Tong and Chen Ying
Brief introduction of Galliformes and the distribution of Alectoris chukar in Xinjiang province, west China

Jonathon C Dunn
Declines and conservation of threatened Galliformes in the Himalayas

Zhou Fang, Yu Chengxin, Yang Gang, Lu Zhou and Li Dong
Niche separation between the seven pheasant species in Karst Mountains in southwest Guangxi province, China

Kai Zhang, Nan Yang, Yu Xu, Jianghong Ran, Huw Lloyd and Bisong Yue
Opportunistic shift in nesting strategy by buff-throated partridges in tree-line habitat, China

Kandpal V. and Sathyakumar S.
Distribution and relative abundance of pheasant in Pindari Valley, Nanda Devi Biosphere Reserve, India

Lalit Kumar Sharma, Samina Anim Charoo and S. Sathyakumar
Koklass (*Pucrasia macrolopha biddulphi*) relative abundance and habitat use at lower Dachugam National Park, Kashmir

Liankima Lailung and F.Laltanpuia
Conservation breeding of hume's pheadants

Li Li, Wenqing Li, Xiao Li, Anlin Wu and Jing Li
A novel PCR method for gender identification of *Tetraophasis szechenyii*

Lin Fang-Jun, Ping-Ping Jiang and Ping Ding
Genetic evidence for male-biased dispersal in Elliot's pheasant (Syrmaticus ellioti) in China

Wina Meckvichai and Sutipong Arsirapoj
Distribution of green peafowl (*Pavo muticus imperator*) after human disturbance and reintroduction at Mae Wong National Park, Kamphang Petch Province

Mukesh, S. Sathyakumar, R.S.Kalsi, R. K. Vijh, M. Fernandes and R.P.Mandhan
Assessment of genetic diversity of red junglefowl (*Gallus gallus*) population in Himachal Pradesh, India

Muhammad Naeem Awan
Conservation status of western tragopan (*Tragopan melanocephalus*) in Machiara National Park, Muzaffarabad, Azad Kashmir, Pakistan

Tiwa Ong-in, George Gale, Andrew Pierce, Philip Round, Stephen Browne and Tommaso Savini
Roost sites selection of scaly-breasted partridge in seasonally wet evergreen forest

Poudyal K., Sathyakumar S. and Subba J.B.
Distribution and relative abundances of Galliformes in Khangchendzonga Biosphere Reserve, Sikkim, India

Laxman Prasad Poudyal and Nandalal Joshi
Participatory survey of cheer pheasant through broadcasting a radio programme in far western Nepal

Paras B. Singh and Peter J. Garson
Status of cheer pheasant in Nepal

Bhumesh Singh Bhadouria, V.B. Mathur, S. Sathyakumar and Rahul Kaul
Assessment of pesticide load on Indian peafowl (*Pavo cristatus*) in Keoladeo National Park, Bharatpur Rajasthan, India

Wu Yi-qun and Liu Nai-fa
Diurnal behaviours of *Crossoptilon auritum* in northwestern China

Yang Meng, Liwei He, Ailin Wu, Zhenxin Fan, Jianghong Ran, Bisong Yue and Jing Li
Complete mitochondrial genome of *Tetraophasis szechenyii* Madarász, 1885 (aves: Galliformes: Phasianidae), and its genetic variation as inferred from the mitochondrial DNA CR

Lijin Zeng and Zheng-Wang Zhang
Cooperative breeding in the kalij pheasant (*Lophura leucomelanos*): basic ecology and the role of habitat saturation

Jing Zhang, Tonggai Zhou, Liying Wang and Jing Li
Comparison of artificial breeding methods of *Crossoptilon harmani*

Zhaofeng Liu, Liwei He, Honggang Yuan, Bisong Yue and Jing Li
Phylogenetic study on Phasianidae species based on CR1 retrotransposable elements

Chunfa Zhou and Zhengwang Zhang
Habitat evaluation for Reeves's pheasant (*Syrmaticus reevisii*)

OPENING SESSION

Monday 8 November 2010
9:00 – 10:00

Chair

Stephen Browne

Fauna & Flora International

Speakers

Sakarindr Bhumiratana

King Mongkut's University of Technology Thonburi

Tommaso Savini and Simon Dowell

Scientific Programme Committee Co-Chairs

Philip J. K. McGowan

World Pheasant Association

Peter J. Garson and Ilse Storch

IUCN-SSC/WPA Galliformes Specialist Group Co-Chairs

SESSION 1

Monday 8 November 2010
10:45 – 12:15

Conservation in Thailand

Chair

Tommaso Savini
Conservation Ecology Program
King Mongkut's University of Technology Thonburi
Thailand

Wildlife conservation status in Thailand: the elephant's case study

Mattana Srikrajang

Wildlife Research Division, Wildlife Conservation Office, Department of National Park, Wildlife and Plant Conservation, 61 Phaholyothin Road, Chatuchak, Bangkok 10900, Thailand

Throughout history, Thai culture has given particular importance to wildlife (e.g. elephants) which played an important role in royal institutions, economy, culture, history, politics and religion. However, in recent times, the rapid development of the country's economy has put the human / wildlife balance at risk. Extensive deforestation for agricultural purposes has seen the disappearance of several endemic species (e.g. white eye river martin and Schomburgk's *deer*). Although in recent years natural forests are well defined and preserved, as a result of a royal decree in 1989 which banned legal logging in the kingdom as a consequence of devastating floods in southern Thailand. Wildlife is declining at a high rate due to large scale habitat fragmentation, encroachment, illegal hunting and mismanagement. There are about 3,000 wild elephants in at least 68 protected areas in the country, in a total area of about 55,000 km^2. However, this is not represented by a single geographical unit. Wild elephants often live in small fragmented and isolated areas, which in some cases can support fewer than 100 animals. For several endangered species however, such details on the status of their population is still unknown and it is only the largest protected areas that have an effective monitoring system. This limits our understanding of their distribution and prevents us from planning efficient management. Forest encroachment from plantations and livestock grazing is still found in the country, resulting in the movements of large mammals outside of protected areas (e.g. elephants, gaur and tigers) which generates serious human wildlife conflict. Habitat encroachment and human disturbance inside protected areas have increased human-elephant conflict incidents (e.g. crop raiding) in 10 wildlife sanctuaries and 14 national parks. The King of Thailand initiated projects for habitat improvement in former plantations by constructing water holes (1998), restoring grasslands by removing exotic plants not consumed by elephants (2008) and creating artificial mineral licks. These strategies have benefited wild elephants and led to a decline in crop raiding, from 332 incidents in 2006 to 160 in 2009, and have become models for other areas. A long-term strategy to promote a harmonious coexistence between people and elephants can be conducted by bringing local stakeholders to participate in research and education programs associated with elephants. Captive breeding of animals such as elephants and crocodiles for economical purposes and future farming of protected species such as tigers and Galliformes are considered a potential risk for the conservation of protected wild species. Currently Thailand has a domestic elephant population of 4,000 animals. Despite a rapid decline in the past this population has been increasing since 1997 due to an increase in birth rates. This is as a result of mobile veterinarian clinics and of the introduction of young animals from the Thai-Myanmar border. The Ministry of Interior and the Ministry of Agriculture and Co-operatives register and monitor demographics for the management of elephants.

The Galliformes studies and research problems in Thailand

Wina Meckvichai

Department of Biology, Faculty of Science, Chulalongkorn University, Phatumwan, Bangkok, Thailand 10330

After a decade, Galliformes research in Thailand reveal that 60% have been studied, while the other 40% are still untouched. Most of the research has been conducted on red junglefowl and green peafowl. Four species of pheasant, the Siamese fireback, great argus, silver and Hume's pheasant were studied in some locations and other species, kalij pheasant, crested fireback, grey peacock-pheasant and Malayan peacock-pheasant have not yet been studied. The main areas of research have concentrated on basic biology (e.g. nutrition and morphology), ecology (e.g. distribution and population density), management, conservation, and few genetic studies. Out of 102 projects on vertebrates, only 18 were granted funding for Galliformes research in the year 2009. The main sources of grants are from the National Research Council of Thailand, the Biodiversity Research and Training Programme , Thailand Reach Fund , and others. Research is mostly conducted by the government sectors, such as universities, Department of Forestry, and the Office of Natural Resources and Environmental Policy and Planning , while very few are conducted by private sectors. Some of the encountered problems in Galliformes research are: (a) lack of field researchers, (b) application procedures for acquiring permission to work in reserved areas are often complicated and require a large amount of time, (c) lack of knowledge and programmes necessary for data analyses, (d) lack of research continuity, and (e) lack of communication among researchers resulting in repetitions and overlapping of similar research

SESSION 2

Monday 8 November 2010
13:40 – 15:40

Galliformes research and conservation in Thailand

Chair
Wina Meckvichai
Faculty of Science
Chulalongkorn University
Thailand

Ranging ecology of Siamese fireback (*Lophura diardi*) in sub-montane forest

Niti Sukumal, George A. Gale and Tommaso Savini

Conservation Ecology Program, School of Bioresources & Technology, King Mongkut's University of Technology Thonburi, 83 Moo. 8 Thakham, Bangkhuntien, Bangkok. 10150. Thailand

A recent observation found that a lowland species, Siamese fireback (*Lophura diardi*) expanded its range to a high elevation in sub-montane forest of Khao Yai National Park, Thailand and were now occurring in sympatry with the resident montane species of silver pheasant (*Lophura nycthemera*). This study was conducted on a basis question of how Siamese fireback adapts to use on their new sub-montane habitat. The results, on radio-collared birds, show that Siamese fireback population groups tended to use topographically flat areas, similar to the topography found in the lowlands, with the exception of nest site locations, which were found on steeper slopes. The birds also selected areas with greater under-story cover during the mating season and moved to areas with higher ground vegetation density while rearing young chicks. The results also indicate differences in topography use between two pheasant species, with Siamese fireback in areas of gentle topography while silver pheasant were found mainly on steeper slopes. As a possible consequence of non-homogeneous topography on sub-montane habitat, Siamese fireback found at a higher elevation show larger home range sizes than has been reported for similar lowland *Lophura* species. The conclusion of this study demonstrated that Siamese fireback can adapt to use sub-montane habitat. Nevertheless, it remains largely unclear which specific aspects of either the sub-montane habitats and/or the lowland habitats are being altered and cause elevation range shift by this lowland species.

Nesting behaviour and nest site selection of scaly-breasted partridge in Mo Singto Research Plot, Thailand

Tiwa Ong-in[1], George Gale[1], Andrew Pierce[1], Philip Round[2], Stephen Browne[3], and Tommaso Savini[1]

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Nesting behaviour and nest site selection of scaly-breasted partridge (*Arborophila chloropus*) were studied in seasonally wet evergreen forest at the 30 ha Mo Singto Research Plot , Khao Yai National Park, central Thailand, during 2 years (2008 – 2009). A total of seven nests were found of which four were monitored with video camera in order to record nesting behaviour. Habitat selection was defined by comparing the vegetation cover between nest and random sites. Laying occurred from mid May to early July. All 7 nests were placed within tree buttress gaps that opened and followed a slope down. The degree of slope range was between11.0 to 31.0 degree. Diameter at breast height of trees, which provided buttresses for nesting, was between 27.8 and 87.8 cm. Data collected with video camera on three nests showed that eggs were laid in the afternoon, with one egg laid every 2 days until the clutch was completed Incubation period lasted 18 days. Between 4-7 days the female was observed leaving the nest for the first time, but left only once per day, until days 15-16 days females were observed leaving twice per day (once in the morning and afternoon). Hatching time varied between 20-41 mins (mean = 29 mins) and fledging time following hatching ranged between 17-47 mins (mean = 29 mins). Several species of mammal were recorded disturbing the nests when the adults were present or absent. Four chicks successfully hatched from each of three nests, a further three nests were predated by pig-tailed macaques (*Macaca nemestrina*), and one nest was predated by an unidentified predator. Selection of partridge nesting habitat occurred closer to streams and dominate by large buttressed trees.

Study of Siamese fireback (*Lophura* diardi) by using camera traps

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The Siamese fireback is an elusive bird, difficult to survey with classic methods. In this presentation we assessed the effectiveness of camera traps used to monitor the population and distribution of Siamese fireback in Sakaerat Biosphere Reserve, Thailand. We estimated the site occupancy with a single-season occupancy model with environmental covariates as well as the abundance with the Royle count data model and the Royle and Nichols model. After a survey period between February and April 2010, during which camera-traps were located at 46 survey points, 700 m apart, spread over 18 km^2 of study area. Camera traps were left at each location for 14 days. In total, we surveyed for 84 days and we obtained 86 independent detections of Siamese firebacks. Our study species was recorded in 25 camera trap locations. The majority of photos were taken in late afternoon. We obtained a naïve estimate of occupancy of 0.56 and estimate of occupancy of 0.69 (±0.10) while the probability of detection is 0.29 (±0.05). The Royle - Nichols model presented the average abundance/sample unit of 1.48 (±0.62) with the total abundance of 68.20 (±28.41). The Royle count data model presented the average abundance/sample unit of 2.39 (±0.0.40) with the total abundance of 110.16 (±18.60). Those population estimates have been used to determine habitat selection within the study area.

Habitat utilization of green peafowl *Pavo muticus* and their behaviour in breeding season at Huai Tab Saloa, Huai Kha Khaeng Wildlife Sanctuary, Uthai Thani Province

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The habitat utilization of green peafowl was studied in November 2008 to February 2009 at Huai Tab Saloa river basin, Huai Kha Khaeng Wildlife Sanctuary and Uthai Thani Province. The objectives were to investigate habitat characteristics (foraging, dusting, roosting, breeding, and nesting) and behaviour of green peafowl. Results showed green peafowl used four habitat types consisting of mixed deciduous forest, secondary forest, dry dipterocarp forest and bamboo forest near permanent riverine with a sand bar. The characteristics of foraging areas were low tree density, high ground cover and medium canopy cover. The characteristics of dust bathing areas was a loamy sand soil type, low density of trees and understory, medium canopy cover and highlight intensities (748 lux). The characteristics of roosting habitat were tall and wide trees, medium canopy cover and close to river. The characteristics of mating areas were sparse canopy cover, low understory structure and density and low tree density. The characteristics of nesting areas showed high understory vegetation structure and canopy cover. The defensive behaviour of peafowl in breeding season was classified into three types: (1) if peafowl's territories are close or overlap t, they will rival by calling and displaying, (2) if the intruder is another peafowl or similar sized animal, they will be chased out and (3) if the intruder is bigger than the peafowl, the peafowl will declare it's territory by standing on the boundary.

Genetic variation of captive green peafowl in Thailand based on D-loop sequences

Amporn Wiwegweaw and Wina Meckvichai

Department of Biology, Faculty of Science, Chulalongkorn University, Phatumwan, Bangkok, Thailand 10330

The natural populations of green peafowl (*Pava muticus*) in northern and western Thailand are decreasing dramatically due to human exploitation and habitat disturbance. Therefore, a breeding programme in captivity has been established to increase numbers before reintroduction to the wild to avoid inbreeding depression in captive populations. This study assessed genetic diversity of captive breeding of green peafowl in Thailand. Feathers were collected from five locations in Doi Thung Wildlife Breeding Station (DT; n = 5), Chian Mai Zoo (CM, n = 2), Khao Khew Open Zoo (KK: n = 4), Khao Soi Dow Breeding Station (SD, n = 33) and Huai Hong Khrai Royal Development Study Center (HK, n = 5). The nucleotide sequences of D-loop region 309 bps were sequenced and analyzed. Eighteen unique haplotypes based on 36 (11.8%) variable sites were detected from the sequences. There was one haplotype shared by DT, CM and HK. This suggests that those samples possibly came from the same resource in the north. On average, the haplotype diversities were high (0.901) whereas the nucleotide diversities were low. The haplotype diversities at HK (1.00) and SD (0.818) were the highest and second highest, respectively. We suggest that green peafowl from these breeding stations may come from various sources and such high haplotype diversity could be suitable for breeding programmes. However, for reintroduction programmes the genetic data of captive breeding is needed to compare with wild samples in order to avoid genetic contamination with the wild populations.

Present and future of Galliformes research in Thailand: prioritizing the effort

Tommaso Savini and Niti Sukumal

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Past and current research on Galliformes in Thailand suggests a bias both in the species studied and in the topic of focus. Primarily only the larger Galliformes (peafowl and pheasants) were reported in the literature mainly as notes on their presence in specific study areas originating from byproducts of other ongoing research. In contrast, all the less conspicuous species (partridge and quails) were rarely observed and rarely reported in the literature. In recent years Thailand like the rest of Southeast Asia, is facing a drastic decline in its biodiversity as a consequence of habitat deterioration and fragmentation and, particularly for smaller species (i.e. partridge and quail), hunting. Species of Galliformes, like other wildlife species, react differently to this deterioration. It is therefore essential to start investigating both their current status within the country's protected areas in addition to their habitat selection patterns in both pristine and disturbed environments. In addition, information on their current status will be fundamental to assess potential future recovery of these species after conservation actions are undertaken. In this talk we will try to prioritize which 1) Galliformes species and which 2) research topics urgently need investigating.

SESSION 3

Monday 8 November 2010
16:10 – 17:50

Effectiveness of protected areas

Chair
Sun Yue-hua
Institute of Zoology
Chinese Academy of Sciences
China

Achieving long-term protection for Galliformes habitat: A case study from China

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4. Laojunshan Nature Reserve, Pingshan County, Sichuan Province, People's Republic of China

Laojunshan Nature Reserve in Sichuan Province, China was established as a provincial level reserve in 2000 with the specific purpose of protecting broadleaf forest habitat for the Sichuan Partridge (*Arborophila rufipectus)*, following WPA supported research on this endangered species. In 2002, the reserve became part of a network of protected areas in the Liang Shan region supported by Chester Zoo's conservation outreach programme in China. This support, both technical and financial, has enabled the infrastructure of the reserve to be developed and has allowed reserve staff to be trained in management techniques such as effective patrols, wildlife monitoring and local community engagement. Problems such as firewood collection are being tackled through the provision of biogas as an alternative fuel supply and this has been tied into agreements with local people who now help patrol the area in order to reduce human disturbance of wildlife. Following training in the use of systematic techniques, regular monitoring of Galliformes now takes place annually to gauge the effectiveness of management and these have revealed a population density of the Sichuan Partridge of between 1.6 and 6.7 calling males km^{-2}, higher than previously recorded. The sound management at this site has been recognised by the National Government who have recently conferred the status of National Nature Reserve on Laojunshan, thus securing its long-term future. The reserve is now regarded as a model for nature reserve development in Sichuan.

Coverage of the Galliformes within South Asia's protected area

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Protected areas are one of our most valuable conservation tools yet although much attention has been placed on their strategic positioning and current effectiveness there has been little assessment of the historical development of entire protected networks or of their long-term maintenance of biodiversity. Beginning from its inception in the 1880s, we analyse the effectiveness of the protected area network in South Asia, with regard to its coverage of the Galliformes and its effect on land conversion. In South Asia, Galliformes are becoming more restricted to protected areas, although this may partly be due to increased sampling effort. Until 1970, the majority of Galliformes records were from land outside of the current protected area system. Since then, more than two-thirds of records come from within protected areas. In total, 42 (91%) of the species included in the study have been observed at least once inside the protected area system, indicating excellent coverage. However, protected areas are not immune to habitat clearance in the region. Irrespective of the date of protected area establishment, land clearing in South Asia only began to abate in the 1970s, slowing across the whole region. There is no sign that protected area designation alone has caused a decrease in the rate of land clearance, although absolute levels of cleared habitat are lower inside protected areas. There is an urgent need for better enforcement of land clearance abatement within protected areas as biodiversity becomes increasingly restricted to these special places.

Galliformes conservation in Nepal through the priority sites for conservation

Hem Sagar Baral

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To date Nepal has set up 19 protected areas covering nearly one fifth of the country's land mass. In addition to these, 12 Important Bird Areas lie scattered in the country and are in need of some formal recognition for their exceptional biodiversity value. Most of these 31 priority conservation sites showed a presence of Galliformes, smaller ones had the least number of Galliformes especially if the site was outside the protected area network. Annapurna Conservation Area showed the highest species richness in terms of Galliforms; black francolin (*Francolinus francolinus*) and kalij pheasant (*Lophura leucomelanos*) being the most widely occurring species. Larger size and vertical north-south gradient were important for Galliforme species richness. Mountain protected areas stand out as more important for the diverse assemblages of Galliformes they shelter compared to the lowland sites. Hunting regulation and research on lesser known species are seen the key priorities for conservation of Galliformes in Nepal.

Enhancing the conservation and scope of Puerto Princesa Subterranean River National Park (PPSRNP) Palawan, Phillipines

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Puerto Princesa Subterranean River National Park (PPSRNP) in Palawan, Philippines is a World Heritage Site, a key biodiversity area and sanctuary to the endemic Palawan peacock pheasant (*Polyplectron napoleonis*), an IUCN Vulnerable species. Straddling 210 km^2 of various vegetation types including lowland Dipterocarp, Molave forests, karst forest, riverine systems, mangroves, coastal marine areas and active cultivation. PPSRNP and its surroundings are the ancestral lands of the Batak and Tagbanua peoples whilst the rest are settlements of lowland migrants. Current practices of logging, road widening, quarrying, swidden agriculture, conversion of mangrove into fish pond and forests to agricultural lands are causing severe forest depletion, which increases pressure and threats on biodiversity and ecosystem integrity. Unsustainable land-use practices, insufficient park management and lack of integrating biodiversity concerns into the management planning processes increase the vulnerability of PPSRNP to such threats, as extreme weather variability due to climate change and soil erosion damage in watershed areas. Community-based and community-led habitat protection, restoration, and rehabilitation, coupled with more effective protected area management have the potential to reverse these trends. The aim of this project is to establish a buffering network of Community Conserved Areas (CCAs) outside the boundaries of the park, whilst collaborating with park authorities and local government to strengthen the efficiency of the park from within. This dual approach will enhance the sustainability of the protected area and help secure the livelihoods of marine and coastal dependent communities who live in and around it.

Bringing protected areas beyond conservation rhetoric: A case study in Palawan, Philippines

N.A.D. Mallari, S.M. Marsden, J.Mendoza, J. Wenceslao, N.Puna, J.Bactol and P.J.K. McGowan

There is a very strong legal framework and institutional support mechanism for Puerto Princesa Subterranean River National Park (PPSRNP) in Palawan, Philippines. However, the management plan does take into account science-based conservation planning and this clearly undermines the efficacy of PPSRNP. This is attributable to a number of factors: (a) national and local natural resources statutes that lack a scientific basis; (b) limitations in technical capacity; and (c) over-simplistic data requirements for management planning prescribed by law. The weakness of PPSRNP's management plan lies in its failure to incorporate the importance of the quality and extent of lowland forests where most of the threatened species are found: key lowland habitats and key species in PPSRNP are under enormous anthropogenic pressures of habitat loss and degradation as well as direct exploitation. The current management regime at PPSRNP (including management zoning) was found to be inadequate in securing these key lowland habitats and species since these key habitats have lower protection status (buffer zones) than high-elevation forest (core zone) and there is an absence of a clear conservation programme and biodiversity monitoring protocol. At the invitation of (and in partnership with) the PPSRNP Protected Area Management Board (PAMB) we are now working to revise the management plan so that it fully incorporates our robust scientific data (e.g. population density estimates of focal species per habitat type), adopts concrete conservation targets and identifies management zones and activities that reflect the needs of the threatened, restricted range and economically important species.

SESSION 4

Tuesday 9 November 2010
8:30 – 10:30

Field research techniques

Chair
Niti Sukumal
Conservation Ecology Program
King Mongkut's University of Technology Thonburi
Thailand

Science, conservation, and abundance estimation of Galliformes

John P. Carroll

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We often think of conservation as a science based endeavour, however, over the past 30 years we have seen significant disconnects between the implementation of conservation management and the science foundation truly required to undertake management in a proper and cost effective way. Recent discussions of this disconnect by a number of authors reminds us that research, monitoring, and management must be truly linked and not in competition for limited resources. I use distribution and abundance estimation as a model for demonstrating the evolution of the science available to those of us undertaking Galliformes conservation. I will review some important techniques such as occupancy analysis, distance sampling, and mark-recapture. However, more importantly technical issues of detectability and indices have plagued our research since the beginning and I believe we have only just begun to address the methodological issues required to provide conservation decision makers crucial data. We must create a system of conservation science for Galliformes that recognises the value of good data over poor and the fact that poor data can be worse than no data. They key to this is improvement of efficiency. Efficient data supporting efficient conservation management to stretch limited conservation funding as far as possible.

A test of distance sampling to estimate the abundance of scaly-breasted partridge in a tropical evergreen forest

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As many species of Galliformes are now threatened with extinction, a key component of conservation and recovery is to monitor populations. Distance sampling has become a particularly popular method of estimating abundance because it estimates the probability of detection, which is typically lacking in standard strip transects or fixed-radius point counts for example. However, tests of the accuracy of such methods are rarely performed in the field against a known population typically because of the time constraints required for intensive territory mapping. Here we used the common scaly-breasted partridge (*Arborophila chloropus*) to examine estimates obtained by line transect and variable circular plot (VCP) distance sampling with those obtained from intensive territory mapping derived from radio collaring on a 30 ha long-term study plot in tropical evergreen forest in central Thailand. Both estimates from distance sampling significantly underestimated partridge abundance compared to estimates from intensive mapping and radio collaring, although line transects appeared to perform better perhaps because of the greater number of detections per unit time. The removal of a waiting period prior to the start of the VCP is likely to increase the efficiency of the VCPs. In general, distance sampling is likely to underestimate abundance for all but the most conspicuous Galliformes, and therefore methods that employ estimates of availability (the probability of being available to be detected) or mixture models (e.g. Royle & Nichols 2003) should be tested under similar conditions as alternatives.

Abundance, population structure and occupancy based modeling of three pheasants in the western part of Khangchendzonga Biosphere Reserve, Sikkim, India

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We assessed the abundance, sex ratios and proportion of site occupancies of blood pheasant (*Ithaganis creuntus*), Himalayan monal (*Lophophorus impejanus*) and satyr tragopan (*Tragopan satyra*) in Prek Chu catchment (182 km^2) of Khangchendzonga Biosphere Reserve, from February 2008 to April 2010. We used line transect, trail sampling (n = 22) and camera trapping (n = 20) methods. We also laid 10 × 10 m plots (n = 365) along transects/trails and camera locations to record habitat parameters. Site occupancy, detection probability, encounter rates and density was estimated. Himalayan monal occupied the highest proportion of the sites (0.73± 0.06) and blood pheasant had the highest detection probability (0.52±0.05). Density (#/km^2) and encounter rates (#/km^2) of these three Galliformes in the study area decreased as follows: blood pheasant (13.64±2.79; 6.99±0.91) > Himalayan monal (1.39±0.45; 2.82±0.22) > satyr tragopan (1.02±0.44; 2.72±0.62). Photo capture rate (#of Photos/100days) of these pheasants also decreased in the same order: blood pheasant (3.43±1.28) > Himalayan monal (1.5±0.57) > satyr tragopan (0.51±0.27). Mean cluster size (7.65±1.20) of blood pheasant was larger than that of Himalayan monal (1.9±0.29) and satyr tragopan (2.28±0.52). Sex ratios were calculated for blood pheasant (1M: 1.11F and 1Y: 7.33F), Himalayan monal (1M: 1.29F), and satyr tragopan (1M: 1.47F and 1Y: 1.19F). Occupancy based model showed elevation, vegetation cover and distance to water source were the most important factors for change in site occupancy of blood pheasant [AIC wt = 0.95, Probability of test statistics = 0.32]. Presence of snares and traps and domestic dogs in the subalpine forests are the main concerns for Galliformes survival.

Using camera traps to assess abundances and habitat associations of Galliformes in an Indonesian lowland forest

David Lee and Jeremy Lindsell

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Camera traps have been used extensively to survey cryptic and rare species, including some Galliformes. They have been particularly useful in estimating habitat occupancy and also densities of species that are individually identifiable based on capture-recapture modeling. Recently it has been shown that density estimation of species without individual identification is possible providing estimates of animal movement rate and camera detection area accompany the camera trap photo rates. We used camera traps to assess abundances and habitat associations of Galliformes in a previously logged dry lowland forest site in southern Sumatra, from September 2009 to August 2010. Reconyx digital cameras were positioned 1.8 km apart with unbiased placement following a systematic sampling design across the site. Cameras were set to record 24 hours/day and deployed for approximately 30 days/location. Habitat data were collected within a 25 m radius around each camera. We present abundance and habitat data for a number of Galliformes captured on camera, including the globally threatened crestless fireback (*Lophura erythrophthalma*). For species with known day ranges, we use this as an independent estimate of movement rate and estimate camera detection area by modeling the decay rate in species detection distances from cameras to estimate density. The viability of this approach is assessed using data collected from point transects in the same areas as camera traps. Attempts are made to associate differences in underlying abundance with broad scale habitat features. The impacts of positive forest management are considered for the conservation of these species.

Monitoring population dynamics of threatened pheasants using camera trapping: a case study in Gutianshan National Nature Reserve

Xingfeng Si and Ding Ping

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Between January 2009 and August 2010, camera trapping was used to estimate the abundances of Elliot's pheasant (*Syrmaticus ellioti*) and silver pheasant (*Lophura nycthemera*) in Gutianshan National Nature Reserve, one of most important national nature reserves for Elliot's pheasant. Using this data, we developed robust population monitoring methodology to monitor population dynamics of threatened pheasants in the key protected areas. We set 38 cameras (21 cameras in a 24 ha plot and 17 cameras in a 41 ha plot of different habitats) to take pictures 24 hours per day. We recorded 181 independent photographs of silver pheasant and 17 independent photographs of Elliot's pheasant in 8,984 camera trap-days. Camera trapping rates for each species were 2.01 /100 camera-days and 0.189 /100 camera-days respectively. Analysis of sampling precision, based on coefficient of variation, showed that trapping effort of more than 1,000 camera days for both silver pheasant and Elliot's pheasant was required. It suggests that trapping effort is an important factor affecting the reliability of results from camera trapping and more trapping effort is needed especially for threatened species. Further analysis using a gas model to estimate population density, showed that the density of silver pheasant was 38.52 individuals /km^2 in the reserve and the density of Elliot's pheasant was about 5.18 individuals/km^2 in the 24-ha plot. The densities of silver pheasant varied ranging from 26.35 to 151.31 individuals /km^2 among habitats.

Distribution of pheasants and partridges in the upper Setikhola forests of Annapurna Conservation Area, Nepal

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4. Wildlife Institute of India, Chandrabani, Dehradun, India
5. World Pheasant Association, Newcastle University Biology Field Station, Close House Estate, Heddon on the Wall, Newcastle upon Tyne, NE15 0HT, UK

A study was carried out in the upper Setikhola forests of Annapurna Conservation Area in Nepal in winter and spring of 2008 to estimate the abundance of Galliformes and map their habitat suitability at a landscape level. Dawn call counts for hill partridge (*Arborophila torqueola*), satyr tragopan (*Tragopan satyra*) and koklass pheasant (*Pucrasia macrolopha*), and trail walks for other Galliform species were carried out at the altitudinal range of 1600 m to 4000 m. Visual estimation of canopy cover, shrub cover and herb cover were made in the plots to assess the habitat condition. Hill partridge, satyr tragopan, koklass pheasant, blood pheasant (*Ithaganis creuntus*) and Himalayan monal (*Lophophorus impejanus)* were seen in winter and spring whereas snow partridge (*Lerwa lerwa*) was seen only in spring. Kalij pheasant (*Lophura leucomelanos*) and rufous-throated partridge (*Arborophila rufogularis*) were seen in winter only. Himalayan monal (*Lophophorus impejanus*) was the most frequently encountered Galliform species during trail walks (6.74 bird/km) followed by hill partridge (0.81), blood pheasant (0.81), satyr tragopan (0.42) and kalij pheasant (0.36). Rufous-throated partridge, snow partridge and koklass pheasant were observed only once each. The detection rate per listening station was 3.64 males for satyr tragopan followed by hill partridge (2.99) and koklass pheasant (1.37). The number of Galliform species heard differed significantly between listening stations. A comparison across the seven surveys since 1979 indicated that the area had a stable population of satyr tragopan and koklass pheasant. A Habitat Suitability Index Model suggested that more habitat is suitable for Himalayan monal (5.55 to 15.08 percentage of the area of study) followed by satyr tragopan (2.83 to 7.55%), hill partridge (2.79 to 9.27%) and koklass pheasant (2.65 to 6.35%). It would be worth exploring the predicted habitats for these species so that a comprehensive conservation action plan could be developed.

SESSION 5

Tuesday 9 November 2010
11:20 – 13:00

Conservation status of Galliformes

Chair
Simon Dowell
Faculty of Science
Liverpool J.M.U.
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Emerging concerns about the status of Vietnam's Galliformes

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Vietnam has long been important for Galliformes conservation. There are 22 species of pheasant, partridge and quail currently listed from the country. Of these three are listed as globally Endangered and six as Near-threatened. Although Vietnam comprises a small part of the global range for species such as Temminck's tragopan (*Tragopan temminckí*), common pheasant (*Phasianus colchicus*) and Chinese francolin (*Francolinus pintadeanus),* the country is critical for the global survival of six species. Orange-necked hill-partridge (*Arborophila davidi*), Edwards's pheasant (*Lophura edwardsi*) and Vietnamese pheasant (*Lophura hatinhensis*) are endemic and the country holds globally important populations of Germain's peacock-pheasant (*Polyplectron germaini*), crested argus (*Rheinardia ocellata*) and probably green peafowl (*Pavo muticus*). There was a considerable amount of survey work during the late 1980s and early 1990s that informed subsequent bird conservation strategy and now it is time to for a reassessment of needs and priorities. For example, following on from research that demonstrated that the Imperial pheasant was in fact a naturally occurring hybrid, it is time to determine conclusively if the Vietnamese pheasant is a valid species or not. Furthermore, populations of edwards's pheasant and green peafowl need reassessing and the status of the crested argus may well have deteriorated significantly in areas where it was previously heard calling during the 1990s.

Conservation of Galliformes in India: challenges and future needs

Rahul Kaul[1] and S Sathyakumar[2]

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There is little reason to believe that populations of most Galliforme species in India have declined significantly over the last two decades. Knowledge of current status is poor because of a lack of monitoring, but forest cover in India has remained largely unchanged in the last two decades, but hunting is still a major threat. Conservation in India has traditionally concentrated on charismatic mammals and recently, the Govt. of India has prepared a list of threatened species for which recovery plans need to be prepared. This indicates that the government is looking beyond the 'big three' species, but it does not contain any Galliformes. Recently governmental initiatives include banning trade in Indian peafowl feathers and plans for a nation-wide population assessment of the species and the Central Zoo Authority's plans for conservation breeding of some pheasant species. States such as Himachal Pradesh have taken a lead on pheasant conservation within their state but overall there appears that there is no conservation policy or strategy specifically for the Galliformes in India. There is a need for a comprehensive scientific assessment of the status of Galliformes species and their habitats to develop a national conservation strategy for Galliformes. Certainly, northeast India needs conservation efforts because a lot of forest area is under private or community ownership and working with communities is urgently needed. In the western Himalaya, periodic monitoring of key sites should reveal how species are doing and appropriate steps may be taken to ameliorate threats identified.

Saving the critically endangered Djibouti francolin and its forest ecosystem: cause for optimism?

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The Djibouti francolin (*Francolinus ochropectus*) is Critically Endangered due to a rapid population decline thought to be in excess of 90% over the last 20 years. It is endemic to Djibouti and exists in only two areas,the Forêt du Day in the Goda massif and in the Mabla region to the north-east. The current population is estimated at less than 1,000 birds and its habitat in its core population area, the Forêt du Day, is highly degraded with nearly all of the juniper trees having died in the last ten years. The biology and ecology of the francolin was very poorly known until recently. WPA, Djibouti Nature and the Djiboutian Government have been developing a project which aims to 1. research the biology and ecological requirements of the francolin, 2. build capacity in the local/regional conservation movement, 3. raise public awareness of this and wider environmental issues in Djibouti, 4. train Djiboutian scientists and practitioners in conservation methods. Recent research has provided baseline population data and vital information on the francolin's habitat useage. This paper gives a review of the situation regarding the francolin's conservation status and also gives an update on current action and plans for a concerted series of actions to conserve the bird and its ecosystem.

Status, habitat and conservation of swamp francolin (*Francolinus gularis*) in Suklaphanta Wildlife Reserve

Paras Bikram Singh[1] and Laxman Poudyal[2]

1. National Trust For Nature Conservation, Annapurna Conservation Area Project, Pokhara, Nepal
2. Department of National Park and Wildlife Conservation, Chitwan National Park,Chitwan, Nepal

Swamp Francolin (*Francolinus gularis*) is a globally threatened bird. The species is endemic to South Asia and it is found only in Koshi Tappu Wildlife Reserve (KTWR) and Suklaphanta Wildlife Reserve (SWR) in Nepal. Many seminal studies have been conducted from KTWR whereas few partial studies have been conducted from some grasslands of SWR. Furthermore, the population of the birds in SWR are very important for its survival in Nepal as the habitat of the bird in KTWR has been flooded extensively by Koshi River each year. Therefore, the study was conducted in SWR from September 2009 to May 2010 to generate a detailed database on swamp francolin using the dawn call count method and habitat parameters such as species, height and density of grasses, were measured using sample plots. The main aims of the study were to determine population status, habitat use and conservation of swamp francolin. The study revealed that 12 pairs of swamp francolin per square kilometre were thriving in SWR and 9.75 km^2 habitat was suitable for the bird. Hence, the total population of the bird at 95% CI was estimated 121 to 128 pairs of birds. The bird is a grassland specialist found inhabiting wet tall grassland where *Narenga prophyrocoma*, *Phragmites karka* and *Saccharum spontaneum* were dominant. Shrinkage and destruction of swampy grassland through grass cutting, burning and overgrazing were observed threats in SWR for the bird. Burning of grassland each year during December is the only method adopted to curtail succession changes of grassland.

Re-assessment of population status, habitat use and threats to swamp francolin (*Francolinus* gularis) between 2004 and 2009 in Koshi Tappu Wildlife Reserve, Nepal

Dahal Baghwan R.

The Mountain Institute, Baluwatar, Kathmandu, Nepal.

A re-assessment survey of swamp francolin (*Francolinus gularis*), an endemic species to the Indian sub-continent was undertaken in between February to June 2009 at Koshi Tappu Wildlife Reserve (Koshi Tappu), Nepal. This study investigated distribution, habitat use and threat to the species to see if there are any changes after the flood occurred in the Koshi River in 2008. The survey method described by McGowan et al. (1996) was adopted in order to meet the objectives stated in the proposal. The abundance of the species in 2009 sharply declined compared to previous surveys in 2004. A total of 25 calling birds were recorded this year while in the same amount of time period, a high total of 71 calling birds were recorded. The number of calling birds record decreased by more than 70%. The same trend of decrement was also found in individual sightings in comparison to the previous survey. It was mainly due to the sweeping out of the potential habitat of swamp francolin and a heavy disturbance during construction of bleached embankment. The survey did not find any specific habitat preferences as birds were under extreme pressure and so used the habitat wherever safe. The survey team counted a total of 530 people, 568 livestock and 78 vehicles. We conclude that the restoration of grassland habitat through intervention of grassland management policy, reduction of the exploitation of excessive resources and control of illegal poaching are the key points to revive swamp francolin habitat at the Koshi Tappu.

SESSION 6

Tuesday 9 November 2010
14:00- 16:00

Behavioural and population ecology

Chair
Rahul Kaul
Wildlife Trust of India
India

Diurnal behaviour of *Crossoptilon auritus* in winter in north west China

Wu Yi-qun[1] *and Liu Nai-fa*[2]

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2. School of Life Science, Lanzhou University, Lanzhou 730000, China

The blue-eared pheasant (*Crossoptilon auritum*) is endemic to China and is mainly found in the east and northeast Qinghai Province, northwest and south Gansu Province, northwest Sichuan Province, and west Ningxia Autonomous Region. From 1st December 2007 to 10th January 2008, the diurnal behaviour of *Crossoptilon auritum* was studied by scan sampling in Zecha forest, northwest China. In behaviour time budgets, feeding proportion was highest (40.62%), followed by resting (28.01%), moving (19.17%), guarding (12.55%). Moving percentage in different habitats was significantly different (χ^2 =13.994, d.f.=3, P $<$0.01), as well as resting percentage (χ^2=15.899, d.f.=3, P$<$0.01). In behaviour rhythm, the foraging behaviour of blue-eared pheasant focuses on 9:00-11:00 and 15:00-17:00. The moving behaviour concentrates on 9:00-10:00 and 18:00-19:00. The resting behaviour commonly appears at 11:00-13:00. In different habitats, the foraging and guarding time in farmland habitat were higher than those in the others, and the resting time in stream belt and shrub habitat were highest.

Habitat selection and group size change of Tibetan partridge in Daocheng, Sichuan, China

Que Pinjia

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Habitat selection by Tibetan partridge was studied in an area of 22.62 km^2 (8.7 km × 2.6 km) in Daocheng County, Sichuan Province, from January 2010 to May 2010. According to the terrain and distribution of the vegetation in the study area, 28 transect lines, 308 sampling points and 270 200 × 300 m grid squares were designed. Playback techniques were used to detect Tibetan partridges. Tibetan partridge flocks were observed 53 times in total; their trails were found 7 times in our survey in winter, and 131 times in spring, which included 117 birds and 12 trails. Tibetan partridges prefer to forage in the sparse shrub and meadow in the valley. The night-roosting habitat of Tibetan partridge is located in dense shrub and dominated by Rhododendron species and *Quercus* species on the slope close to the valley. During the winter, Tibetan partridges stay in flock, with about 6 to 24 birds in one flock. As the season progressed, Tibetan partridge pairs formed the flocks, then the pairs left the coveys and occupied terrains. Pairs appeared from April to July and then the bird appeared in singles. Chicks appeared in August and the birds concentrated in groups.

The roles of weather and predator abundance in determining breeding success of capercaillie in Scotland

David Baines[1], Nicholas Aebischer[2] and Allan MacLeod[3]

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3. GWCT, Drumochter Lodge, Dalwhinnie, Inverness-shire PH19 1AF, UK

Capercaillie numbers have declined in Scotland since the mid 1970s. The rapid decline has been linked with poor breeding success associated with both changes in weather patterns and with increases in generalist predators that may predate eggs and chicks. Annual measures of breeding success and hen density between 1991 and 2009 showed a significant decline over time in proportion of hens rearing chicks, especially towards the edge of the range. This analysis confirmed the influence of weather on breeding success, which was highest in years of delayed April warming and when temperatures at chick hatch were higher. Pine marten and fox indices had increased since similar surveys 15 years earlier and capercaillie breeding success varied negatively with mean April temperature and both marten and crow indices of abundance. High indices of foxes were significantly related to the decline in hen densities. Increases in mammalian predators in Scottish forests, together with the continued presence of crows, provides an additional hypothesis to that of climate change in explaining the reductions in capercaillie breeding success and the continued population decline. Successful conservation of capercaillie in Scotland may depend on better management of predators, including licensed removal of martens in key capercaillie areas, pending longer-term forest restoration.

Parental decisions and predators: investment and risks to incubating northern bobwhites

Susan N. Ellis-Felege[1], Jonathan S. Burnam[1], William E. Palmer[2], D. Clay Sisson[2], and John P. Carroll[1]

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Patterns of nest defence against predators by attending adults of many ground-nesting bird species are poorly understood, largely due to a historical inability to directly monitor nests. Most nest defence studies observed responses elicited from model predators or human observers presented to birds and generally have not attempted to present these events in the context of predator-prey relationships. Generally, these studies have focused only on decision-making by the incubating parent (e.g. theories of parental investment, future opportunities, etc.) with little or no consideration given to predator species or behaviour (e.g. threat level of particular predator species to the adult). During 1999 to2006 we monitored all predation events (n=241) from 790 video-monitored northern bobwhite (*Colinus virginianus*) nests. We evaluated parental, predator, daily, and seasonal correlates contributing to patterns of nest defence by bobwhites using a model selection approach. Models including predator type (PRED), and clutch age (DOI), and parent (AGE) were the most influential factor in determining nest defence, including PRED+AGE (w=0.356), PRED+AGE+DOI (w=0.161), and PRED+SEX+AGE (w=0.139). However, model weights of individual parameters suggest that predator type is the most important individual parameter. We propose that nest defence decisions in the northern bobwhite are a hierarchical process, with the threat posed by the particular predator to the attending adult being the primary cue. Parental decisions related to many of the commonly proposed hypotheses for nest defence may serve a secondary role in decision making by the attending adult.

Breeding biology of grey junglefowl (*Gallus sonneratii*) in Theni Forest Division, Gudalur Range, western Ghats, Tamilnadu, Southern India

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A total of 23 breeding pairs of grey junglefowl (*Gallus sonneratii*) was recorded in the Gudalur Range, Theni forest division, Tamilnadu, India. Eleven nests were located on ground and one nest was located in atree's cavity. The nests were located at the base of four plant species of *Schleichera oleosa, Ixora arborea, Lantana camara* and *Ageratina adenophora*. A single nest was located in the cavity of the tree species *Celtis philippensis*. Grey junglefowl showed a high preference for *L. camara* which supported six nests. 21 species of plant materials were used for nesting by the grey junglefowl. The overall clutch size ranged from 1 to 5 eggs per nest with a mean of 3.4 ± 0.3. The overall hatching success varied from 0% to 100% with a mean success of 47% ± 13%. One clutch was observed continuously for intensive study from 06.00 to 17.00 hours for 22 days. A total of 278 hours were observed in 22 days during the daytime only (06.00 to 18.00). Of 278 hours the female spent 171.46 hours (62 %) incubating and 106.53 hours (38 %) on other activities outside of the nest. A significant difference was observed in the duration of incubation on different days and haul out time duration. The total duration spent on incubation ranged from 4 to 13 hours per day with a mean of 7.7 ± 0.39 hours per day. The female spent 0 to 7.8 hours per day with a mean of 4.8 ± 0.42 hours per day outside the nest. The Mann-Whitney U-test revealed that the nest site differed from the random site in canopy cover, ground cover, shrub cover, litter cover, litter depth and distance to human foot path. Based on the results of the logistic regression the three variables, shrub cover, litter cover and litter depth were the most useful in discriminating between nest site and random sites.

Reproductive ecology of the Trinidad piping-guan

Kerrie T. Naranjit

Department of Life Sciences, The University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies

The Trinidad piping-guan or pawi (*Pipile pipile*), is a critically endangered New World cracid endemic to Trinidad. Due to habitat loss and hunting, it is considered the second most threatened cracid worldwide and an "immediate conservation priority" by the IUCN/BirdLife/WPA Cracid Specialist Group. This paper presents the findings of a two-year field study that assessed the reproductive ecology of the pawi. Pawi presence was recorded for 26% of the 762 field hours and 73% of the 304 field sessions. Group size ranged from 1 to 8 with an average group size of 1.3 birds. The phenology of behaviour suggests that the pawi have an extended breeding season as chicks were first observed in February and mating and courtship were still observed in July. The courtship display involved attacking and fleeing behaviours, using vocalisations similar to aggressive territorial display. A significant difference in the occurrence of wing drumming and long piping vocalisations was found between the dry and rainy seasons, and suggests that these behaviours are related to reproduction. Two or three large white eggs were laid in shallow nest platforms built about 2 m above the ground with materials from the nest tree. Chicks were precocial, undergoing several moulting phases before achieving adult plumage. Both parents remained with the chicks until they attained adult size.

SESSION 7a

Wednesday 10 November 2010
8:30 – 10:10

Spatial ecology

Chair
Zhang Zheng-wang
College of Life Sciences
Beijing Normal University
China

Spatial and temporal associations of male Reeves's pheasants to different forest edges in the Dabie Mountains of central China

Ji-Liang Xu[1], Xiao-Hui Zhang[2], Zheng-Wang Zhang[2], Guang-Mei Zheng[2] and Yong Wang[3]

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3. Centre of Forestry, Ecology, and Wildlife, Alabama A&M University, Alabama, 35762, USA

We studied how Reeves's pheasants (*Syrmaticus reevesii*) responded to different forest edges in a fragmented forest landscape in central China using radio-telemetry. Fieldwork was carried out from April 2000 to August 2003 in Dongzhai National Nature Reserve in the Dabie Mountains. We identified four major types of forest edge: shrub, farmland, road, and residential. The associations of male pheasants with different forest edges were non-random. Shrub edges were preferred over other three types of edges. Reeves's pheasant hardly moved more than 150 m away from shrub edge They were associated with habitats far from farmland edges and within 100 m from the nearest road edges. Edge associations by male Reeves's pheasants also varied by seasons, with a significant difference between winter and the other three seasons. Shrub edges were preferred by the birds during all seasons, whereas the birds were also more often associated with road edges in winter. Our data showed the habitat association patterns in relation to edge effects on this species. The results indicated that landscape configuration should be incorporated into management and conservation practices. The simple assessment or management framework for assessing habitat fragmentation and restoration for this pheasant could overlook key points for improving conservation strategies.

Ecogeographical determinants of range limit and distribution pattern of red junglefowl and grey junglefowl in India

Merwyn Fernandes[1], Mukesh[1,2], S. Sathyakumar[1] and K. Ramesh[1]

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2. Department of Biotechnology, Kurukshetra University, Kurukshetra- 136119, Haryana, India

Patterns of species distribution and range limits attract considerable interest in biogeography, ecology and conservation biology. Frequently, presence-only models are used to detect the ecological and geographical correlates that govern range boundary and variation in distribution within the species range. We developed presence-only models to determine range boundary and distribution pattern of red junglefowl (*Gallus gallus*) (RJF) and grey junglefowl (*Gallus sonneratii*) (GJF). Data on distribution records were compiled from extensive field surveys and from gleaning of literature containing such records. Thematic layers on habitat features and environment regime were created using relatively high resolution satellite images and topographic maps. Ecological Niche Models using Biomapper, MaxEnt and Diva-GIS were developed to identify the ecological and environmental correlates, and best fitting models were used for mapping the species distribution. Independent validation of model prediction was carried out based on a sub-set of the field data used in the model building and also based on questionnaire surveys targeting forest managers and field biologists. The Satpura-Maikal Range in Central India is the borderline for both the species, and there was high variation in the distribution pattern within the species distribution boundary, largely following the existing forest cover that is highly fragmented in India. Forests along the Himalayan foothills and forest complex representing dry-deciduous mixed forest in the Western Ghats appear to be optimal for RJF and GJF respectively. Conservation implications from the model prediction point to fragmented landscape, and if viewed in the context of severe disturbance to ground cover, is the result of anthropogenic factors such as livestock grazing, fuel wood extraction, and forest fire. The populations are not secure in small fragments, which will require conservation action. The problem is compounded by the inter-mixing of gene flow from domestic fowls to wild populations; a potential threat that still needs to be substantiated by robust investigations. The results will be discussed.

Habitat use and activity pattern of Galliformes in the western part of Khangchendzonga Biosphere Reserve, Sikkim, India

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We assessed the habitat use and daily activity pattern of Galliformes in the Prek Chu catchment (182 km^2) of Khangchendzonga Biosphere Reserve, from February 2008 to April 2010. We used line transect, trail sampling (n = 22) and camera trapping (n = 20) methods. We also laid 10 × 10 m plots (n = 365) along transects/trails and in camera locations to record habitat parameters. We confirmed the presence of lood pheasant (*Ithaganis creuntus*), Himalayan monal (*Lophophorus impejanus*), satyr tragopan (*Tragopan satyra*), snow partridge (*Lerwa lerwa*), hill partridge (*Arborophila torqueola*) and kalij pheasant (*Lophura leucomelanos*) and the presence of chestnut-breasted partridge (*Arborophila mandellii*) through camera traps only. Bonferroni confidence intervals (significance level maintained at 0.05) showed the Himalayan monal and blood pheasant used 3001 to 4000 m elevation and above, satyr tragopan used both 3001 to 4000 m and 2001 to 3000 m elevation categories. Kalij and hill partridge used the 2001 to 3000 m elevation category in the study area. Snow partridge was encountered only above 4000 m elevation. Galliformes used all the available aspects and slope categories according to the proportion availability. Kalij and hill partridge were present in wet-temperate habitat and snow partridge was present only in alpine-scrub habitat. Satyr tragopan used wet-temperate, fir-birch-rhododendron and rhododendron-scrub habitats according to the availability. Blood pheasant preferred fir-birch-rhododendron dominated subalpine habitat whereas the Himalayan monal showed preference for Juniper and rhododendron dwarf scrub habitat. The daily activity patterns for blood pheasant, Himalayan monal, satyr tragopan and snow partridge were assessed from the time / date stamps on the photographs. A significant difference ($\chi 2=104.92$, df= 21, $p<0.001$) was found among the daily activity pattern of these four sympatric Galliformes in the study area.

Territory size and overlap of buff-throated partridge in tree-line habitats, Pamuling Mountains, China

Nan Yang[1], Kai Zhang[1], Jianghong Ran[1], Huw Lloyd[2], Yu Xu[1], Bisong Yue[1] and Ying Wang[3]

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2. World Pheasant Association, Close House Estate, Heddon on the Wall, Newcastle upon Tyne, NE15 0HT, United Kingdom
3. Department of Life Sciences, National Taiwan Normal University, Taipei, China Taiwan

Detailed quantitative analysis of an organism's territory size can provide important insight into the patterns of habitat use, spatial segregation and foraging behaviour by species. Few data exist regarding the territorial behaviour of montane Galliformes in China. We described the territorial behaviour of a habituated subpopulation of buff-throated partridge (*Tetraophasis szechenyii*) in tree-line habitats, western China, using direct tracking of colour-marked individuals. Territories were occupied by stable family groups, and were largely centred on the interface of two or three different tree-line habitat types. Mean annual territory size was 14.4 ± 0.5 ha (SE), and the portion of the territory used during non-breeding season (9.7-16.7 ha) was larger than in the breeding season (5.8-10.7 ha). There was noticeable variation in the mean proportions of territory overlap between family units, overlap in mean annual territory size was 21.2 ± 15.4%, and the portion of overlap was larger during the non-breeding season (21.3 ± 12.6%) than the breeding season (12.8 ± 8.3%). We suggest that studies of habituated wild subpopulations of Galliformes can provide an important baseline for studying threatened subpopulations of wild tree-line Galliformes, and stress the importance of Tibetan attitudes and religious culture for successful tree-line conservation management.

Habitat suitability assessment for Hume's pheasant (*Syrmaticus humiae*) in the Nanhua part of Ailaoshan Nature Reserve

Yao Xiao-gang[1], Zhou Wei[1], Xu Wan-ji[1], Deng Zhong-jian[1] and Zhang Ren-gong[2]

1. Faculty of Conservation Biology in Southwest Forestry University, and Key Laboratory of Forest Disaster Warning and Control in Yunnan Province, Kunming 650224, China
2. Nature Reserve Management Bureau of Chuxiong Prefecture, Chuxiong 675000, China

Habitat assessment can provide essential information for the population decline of wildlife. We investigated the habitat of Hume's pheasant (*Syrmaticus humiae*) in the Nanhua part of Ailaoshan National Nature Reserve by the method of used and available plots during 2008 and 2009. Based on the field investigations, we assessed habitat suitability of Hume's pheasant using GIS. The procedure of wildlife habitat assessment includes analysis of species' habitat requirement; identification of the restricting or leading factors that influence the population and their distribution, establishment of evaluation criteria for each factor and the completion of a suitability assessment for single factors and a synthesis of the habitat analysis and evaluation in light of criteria. The result showed that, without human disturbances, the suitable habitat was 1023.12 km^2, 4.04% of the total area; the less suitable habitat was 2276.82 km^2, 8.99% of the total area; rarely suitable habitat was 1355.07 m^2, 53.52% of the total area; the unsuitable habitat was 8470.98 km^2, 33.45% of the total area. Influenced by human activities, less suitable habitat and suitable habitat decreased by 0.85% and 2.40%, respectively, while the area of rarely suitable habitat increased by 3.25%. Residential areas and roads have a strong impact on the habitat of Hume's pheasant, if confronted with habitat loss, isolation and fragmentation, which is very unfavourable for survival.

SESSION 7b

Wednesday 10 November 2010
8:30 – 10:30

Conservation breeding

Chair
Keith Howman
World Pheasant Association
U.K.

Conservation Breeding in WPA

John Corder

WPA, Newcastle University Biology Field Station, Close House Estate, Heddon-on the Wall, Newcastle upon Tyne, NE15 0HT UK

The European Conservation Breeding Group (ECBG) was founded five years ago and is WPA's only formal committee. Each of the WPA European Chapters in Austria, Benelux, France, Germany, Portugal and the UK elect three representatives to form the Group, which meets twice a year. The presentation will indicate how ECBG functions, what it has achieved and what is planned for the future. It will also demonstrate the close relationship between European Zoos and WPA, and how a number of conservation projects have been developed for Galliformes. DNA research has been instigated to support the reintroduction of the extirpated Green peafowl in Malaysia, and to determine the relatedness of the European cheer pheasant population. International and European studbooks are supported by the collection of data and by funding. Groups of specialists in particular species of captive Galliformes are monitored and report through ECBG. Data collection of captive Galliformes in Europe is conducted annually. To meet the challenges of new legislation, ECBG has developed a series of teaching modules, which are used to help WPA members gain certification for keeping captive collections of Galliformes. These modules are also used to raise standards in conservation projects, particularly in India, China and Malaysia, where ECBG works closely with government bodies to develop in-situ and ex-situ programmes. Funding for key individuals within these projects has allowed them to report their findings to WPA members at national and international meetings.

Conservation breeding programme of western tragopan at Sarahan Pheasantry in Himachal Pradesh, India

Alam Singh Chauhan[1] and Sat Pal Dhiman[2]

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2. Nodal Officer, Pheasant Conservation Breeding Programmes, Office of Principal Chief Conservator of Forests(Wildlife)-cum- Chief Wildlife Warden, Talland, Shimla, Himachal Pradesh, 171001 India

Himachal Pradesh provides one of the most important refuges for the western tragopan (*Tragopan melanocephalus*) throughout its restricted distribution range in the Western Himalayas. The western tragopan is listed as `Vulnerable` in the IUCN Red Data Book. Little is known about its population abundance and it is reportedly found as scattered sub-populations. Owing to its vulnerability to extinction, the western tragopan has been targeted for conservation breeding at Sarahan Pheasantry by the Himachal Pradesh Government and the Central Zoo Authority of India. Sarahan Pheasantry, as far as is known, is the only place in the world where this species has been kept successfully in captivity. A rare feat has been achieved by keeping wild birds alive and successfully breeding them, given that little was known about the wild behaviour and breeding biology of this species. Presently there are 19 birds (10 males; 9 females) at Sarahan Pheasantry and 2 males at Himalayan Nature Park Kufri. Nine birds (5 males, 4 females) of wild origin are contributing to the breeding programme. This paper discusses the valuable knowledge gained in breeding this species and details the breeding results for more than five years. It also discusses the progress made in establishing new aviaries, which will help address the behavioural needs of western Tragopans. Conservation breeding ultimately aims to produce robust stocks to return to the wild if the need is identified, or to act as insurance for the future. Important information on breeding has been gathered for the conservation of this species.

Introduction and breeding of blood pheasants in Beijing Zoo

Zhang Jing, Zhang Jinguo and Liu Bin

Beijing Zoo, Xi Zhi Men Wai St. 137#, 100044 Beijing, China

Little is known of the in- and ex-situ incubation of blood pheasant eggs. Beijing Zoo has introduced blood pheasants (*Ithaginis cruentus sinensis*) from Qin Ling Chang Qing Nature Reserve in Shan Xi province in China each year since 2007. The presentation includes data gained by monitoring wild nests with electronic sensors placed within artificial eggs. We also show how eggs were collected and transported to Beijing Zoo for incubation. Chicks have been raised in the zoo's breeding centre using several methods. We also describe some problems we have encountered during these four breeding seasons.

Conservation breeding of pheasants in India: the Central Zoo Authority perspective

Naim Akhtar and Shri B.S. Bonal

Central Zoo Authority, Annex VI, Bikaner House, Shajahan Road, New Delhi- 110 011, India

The Central Zoo Authority (CZA) is the statutory body under the Ministry of Environment & Forests, Government of India to oversee the functioning of all the zoos in India. Apart from its other functions, the CZA is identifying endangered species of wild animals (including birds) for the purposes of captive breeding and assigning responsibility in this regard to concerned zoos and coordinating the acquisition, exchange and loaning of animals for breeding purpose and ensuring maintenance of studbooks of endangered species of wild animals. The CZA is also coordinating research on captive breeding in zoos as well as identifying 73 wild animal species for coordinated conservation breeding in zoos. Of these 73, 13 are pheasant species. Seven of the 13 pheasant species have been prioritized for beginning their conservation breeding programmes. Off-display conservation breeding centres for cheer pheasant, Himalayan monal and western tragopan have been established in Himachal Pradesh from the CZA's grant. The Central Zoo Authority is quite optimistic to have behaviourally, physically and genetically healthy populations of pheasants in zoos through conservation breeding programmes and these may be used in reintroduction of the species if the need arises.

Conservation breeding of cheer pheasants giving emphasis to enclosure designs in Himachal Pradesh, India

Sat Pal Dhiman

Nodal Officer, Pheasant Conservation Breeding Programmes, Office of Principal Chief Conservator of Forests(Wildlife)-cum- Chief Wildlife Warden, Talland, Shimla, Himachal Pradesh,171001 India

Cheer pheasant (*Catreus wallichi*), listed as `Vulnerable`(IUCN Red Data Book), is a restricted range species endemic to the western Himalayan region. India's north western Himalayan state, Himachal Pradesh, is a global stronghold for this species. The population declined during the twentieth century and most populations are reportedly isolated and very small, thus more vulnerable to extinction. The Central Zoo Authority of India and the State of Himachal Pradesh have targeted this species for conservation breeding. The aim is to have a viable population, which is scientifically bred and physically, genetically and behaviourally robust for returning to the wild if the need is identified, acting as a safety net population for the future. Expertise has already been developed to breed this species successfully at Chail Pheasantry using inbred stocks. Now a successful attempt has been made to collect eggs from wild nests and to use the captive population as surrogates to raise new bloodlines and to establish founder stocks of wild origin. This paper discusses initiatives being undertaken for conservation breeding of this species with a specific focus on enclosure design. It further details how natural environs have been created within the newly built enclosures at Chail, which greatly help the species to breed successfully and rear their own young naturally. New enclosures are now ready to house the founder pairs with their young chicks hatched this year. These species-specific enclosures should facilitate the conservation breeding programme to establish a viable population and ultimately benefit the conservation of this species.

Taking the next step forward in conservation breeding of pheasants in Himachal Pradesh, India

Ashwanii Gulaati

Principal Chief Conservator of Forests (Wildlife)-cum- Chief Wildlife Warden, Wildlife Wing,Himachal Pradesh Forest Department, Talland, Shimla, 171001 India

Himachal Pradesh, a north western Himalayan State is a global stronghold for seven pheasant species including 'Vulnerable' cheer pheasant and western tragopan which are endemic to the Western Himalayan region. The vision of the Wildlife Wing is to make Himachal Pradesh a "Pheasant State" of India. The state has already made pioneering efforts in conservation breeding of western tragopan and cheer pheasant which began in 2005. Two composite conservation breeding centres have already been set up at Sarahan and Chail for western tragopan and cheer pheasant respectively. Valuable experiences have already been gained in the past five years in breeding and parent rearing of these two pheasant species. The Wildlife Wing has initiated the next steps forward and adopted a scientific approach in these conservation breeding programmes. These aim to have genetically robust captive and behaviourally competent captive stocks of these species as future insurance as well as releasing them back in the wild to build wild populations. However, conservation of western tragopan and cheer pheasant remain the main focussed programmes at present but red jungle fowl and Himalayan monal are also potential species for future conservation. This paper discusses the overall strategy for the future conservation of these species. It discusses the proposed breeding behaviour studies, pathological investigations, DNA analysis, re-introduction strategies including in-situ future release sites studies etc., and further expanding of conservation breeding programmes to other pheasant species, such as Himalayan monal and red jungle fowl.

LaCones = LABORATORY FOR THE CONSERVATION OF ENDANGERED SPECIES

SESSION 8

Wednesday 10 November 2010
11:00 – 12:40

Galliformes-human interaction

Chair
Brig Mukhtar Ahmed
World Pheasant Association
Pakistan

Logical conservation: applying the state-pressure-response model to prioritise work on the threatened Galliformes species

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The IUCN-SSC Strategic Plan (2009-12) is framed using the 'State-Pressure-Response (SPR)' model for planning appropriate conservation action (R) as a logical outcome from any knowledge of species' status (S) and impact of threats (P). We have applied the same logic to current information of all 110 threatened (NT to CR) Galliformes species, using the summary texts from the IUCN Red List and BirdLife International's World Bird Database as our sources. Our first objective was to observe how effectively existing data on the plight of species (i.e. S and P) are being used to specify R that seems likely to reduce the level of threat. We identified significant departures from the expected pattern which were then reviewed in detail. For instance, information on S may be robust whilst that on P is not, making it difficult to propose reliable action (R). Another scenario is to have good S and P information, but actions that do not necessarily follow from this. This analysis prompts scrutiny of all outliers and can be used, in combination with the Red List categories and other criteria, to prioritise immediate action on a global basis for all our threatened species.

Present opportunities of ecotourism and its impact on Himalayan pheasants in the Pipar Area, Nepal

Suman Sharma

School of Natural and Built Environment, University of South Australia, Adelaide 5000, SA

Ecotourism combined with sustainable development is the major factor to influence the economic development of the society. This project aims to find out what the possible opportunities for ecotourism are and at the same time it impacts on pheasants in the Pipar area of Nepal. These two things can then be managed side by side. This project acts as a baseline for the development of ecotourism which acts as a guide for other organisations and stakeholders to develop ecotourism management plans of the area. Geographic Information Science and Remote sensing satellite data were used for the modeling of ecotourism in respect to the pheasant's habitat followed by the subsequent field visit. It was found that in the past the Pipar area was the least used for trekking by tourists. However, due to recent development and popularity of different trekking routes, many tourists are attracted to the area. This study shows these trekking routes are unable to address the tourism impact on the pheasant's habitat if the tourist number keeps on increasing. So in order to address this issue, this study recommends informing local people of these issues and developing management guidelines, which address the habitat of pheasants for tourist trekking in Pipar area before it gets too late.

Genetic signature of anthropogenic population collapse in Reeves's pheasant (*Syrmaticus reevesii*)

Jiang Chang, Ning Wang, De Chen and Zhengwang Zhang

State Key Laboratory Of Earth Surface Progresses and Resource Ecology & MOE Key Laboratory for Biodiversity Science and Ecological Engineering, Colloge of Life Science, Beijing Normal University, Beijing 100875, China

Studies on genetic signature of population collapse of endangered species using microsatellite DNA has been more prosperous recently than before. However, few studies have focused on pheasants with distributions that are limited to parts of southeast Asia. Using the largest ever genetic sample from wild Reeves's pheasant (*Syrmaticus reevesii*) populations, which is restricted to limited areas in China, we show strong evidence for a historic demographic collapse in the central and east of China. This signature is independent of the mutation and demographic models used. The contemporary effective population size (Ne) was just 1% of historical Ne and the collapse times of different populations were recognised from 200-1000 years before present. This is the first evidence using genetic data to detect and quantify the effect of human-induced deforestation and hunting on wild pheasants, represented by Reeves's pheasant, in southeast Asia. Because current No of Reeves's pheasant in focal areas was small (<100), this emphasises the need for conservation efforts.

Grouping behaviour of white eared-pheasant

Wang Nan

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From February to August 2008, a white eared-pheasant population of more than 100 birds was monitored in Bebo Monastery in Daocheng, Sichuan, China. Seventy one of them were marked for identification. Before egg lying, the winter population is disorganised, forming incompact groups with paired and non-paired individuals inhabiting new home ranges. Non-paired males tend to be in groups mixed with pairs, pairs moving along or stay within groups. Non-paired females move in groups of 1 to 3 individuals, or follow groups or pairs. The mates of hatching hens join in groups or guard nests. Nine marked pairs have had their chicks successfully. The incompact group concentrated into families and fed chicks. The families avoid mixing with others when the chicks are young. The other members always change within the closed chick-rearing groups. With the maturation of the chicks, the families mixed with each other and formed bigger chick-rearing groups. The behaviours showing the hierarchy appeared in the whole observing period. Roughly, the hierarchic rank is the single-line pattern, and the adult males were higher than sub-adult males (first year), and females were the lowest, but there were some exceptions and some circle hierarchic rank. Drastic displaying and fighting to each other appeared in winter, pairing season, hatching season, and chick rearing season, between sub-adult males and adult males, between adult males, sub-adult males, females, adult males and females, chicks in one brood and chicks from two families, but not between the birds with existing hierarchic rank or between birds who met each other frequently. The hierarchic ranks between some individuals were changed when the bird groups reformed in chick rearing season.

Factors limiting population size of grey partridge in upland agricultural landscapes in northern England

David Baines, Philip Warren and Kathy Fletcher

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In the UK, grey partridge are largely considered to be associated with lowland cereal ecosystems. However, significant numbers are found in the upland areas of the Pennine Hills in northern England where there is no arable farming. Here, extensive grasslands are grazed by sheep and cattle or livestock and seasonally excluded to provide hay. We describe annual counts of grey partridges from approximately 30 upland farms between 1989 and 2009. Chick survival was similar to sites monitored in lowland southern England, despite the presence of abundant insects preferred by chicks in the uplands. Higher insect abundance appeared to be off-set by cooler, wetter weather which was the primary factor explaining annual variations in breeding success. Higher densities and breeding success occurred in areas where generalist predators were legally controlled to benefit other native Galliformes. Annual survival of adults was related to severity of winter weather, with winter snow resulting in very high mortality. Management techniques including fostering of captive reared chicks to wild barren pairs and provision of supplementary food to negate the effects of weather on breeding success and over-winter survival are discussed.

SESSION 9

Wednesday 10 November 2010
14:00 – 15:40

Taxonomy and ecology

Chair
Natalie Clark
World Pheasant Association
U.K.

Evaluation of genetic diversity and admixture analysis of red junglefowl with domestic chicken in India: preliminary findings

Mukesh[1,4], M. Fernandes[1], S. Sathyakumar[1], R.S. Kalsi[2], Rahul Kaul[3] and R.P. Mandhan[4]

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2. Department of Zoology, M.L.N. College, Yamuna Nagar 135 001, Haryana, India
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4. Department of Biotechnology, Kurukshetra University, Kurukshetra- 136119, Haryana, India

Red junglefowl [RJF] is believed to be the wild ancestor of all domestic chickens in the world. Due to close interaction of wild RJF and domestic/ or feral chickens in certain localities, it is suspected that the wild population is genetically contaminated by the introgression of domestic chicken genes. In order to verify this concern, 185 samples (153 RJF & 32 domestic chickens) were collected across 17 RJF range states within India. Genetic diversity and admixture analysis of RJF with domestic chicken was assessed using 12 microsatellite loci. A total of 412 alleles were distinguished. Locus LEI0234 yielded the highest number of alleles (Na = 27) in the northern RJF population while loci ADL0268, MCW0165, ADL0112, MCW0222, MCW0216, MCW0037 and locus MCW0216 yielded the lowest number of alleles (Na = 1) in the central and the northeastern RJF populations, respectively. The number of alleles among five RJF populations and one domestic chicken population across all 12 loci ranged from 10.166 and 1.454. The number of observed private alleles among five RJF populations and one domestic chicken population for all 12 microsatellite loci ranged from 0 to 32. Northeastern RJF populations showed the highest polymorphism and extensive genetic diversity, with Ho = 0.575 while the central RJF population showed the lowest polymorphism with Ho = 0.182. Mean observed heterozygosity was lower than mean expected heterozygosity for all the five RJF populations and domestic chicken population. MGI and MGD in between domestic chicken population and all other five RJF populations were also calculated. The Nei's MGD and MGI values ranged 0.244 (Northeastern RJF population) to 0.406 (Central RJF population) and 0.783 (Northeastern RJF population) to 0.666 (Central RJF population), respectively. The dendrogram based on Nei's MGD showed RJF populations in India formed three clusters: (i) central and southeastern, (ii) northern and eastern, and (iii) northeastern. The domestic chicken samples were clustered along with the northeastern population. While structure analysis reflected that northeastern zone is a centre of domestication within the Indian subcontinent.

Taxonomic clarification in a plumage polymorphic species, silver pheasant

Lu Dong[1], Yanyun Zhang[1], Gerald Heckel[2] and Guangmei Zheng[1]

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2. Computational and Molecular Population Genetics, Institute of Ecology and Evolution, University of Berne, Switzerland

Evolutionary change occurs through the accumulation of morphological and genetic variation over time but it is rarely known to what extent morphology and genetics co-segregate or what their causal links are. Additionally, environmental change has the potential to deeply impact on these processes through the separation of populations and the action of selection. Here we investigate the evolutionary history of a plumage-polymorphic Galliformes species and examine the extent of morphological and genetic change associated with environmental perturbations and physical separation of populations. The silver pheasant (*Lophura nycthemera*) is widely distributed in southeast Asia with 15 subspecies in total. The geological isolation shaped its partial continuous and holistic separate pattern of distribution on an intraspecific level. We grouped the subspecies into a dark morph group and a pale morph group after examining plumage colour, measurements, and carrying out a review of the literature in respect of nomination history and geographical distribution of all subspecies. Moreover, we discovered that some assumed subspecies do not deserve the status of subspecies due to the overlap of morphological traits and absence of unambiguous geological limits. Further, the phylogenetic analyses of mitochondrial DNA and microsatellites revealed a consistent pattern of genetic subdivision in the pale morph group inconsistent with subspecies taxonomy but consistent with morphological variation and geographical distribution. Combined with the morphological, genetic and distribution evidence, three evolutionary significant units (ESU) were defined as the Western ESU, the Eastern ESU and the Hainan ESU. Moreover, the Sichuan population should be treated as a management unit for conservation concern.

The spatial variation of plant food for *Syrmaticus humiae* in spring at Dazhongshan, Yunnan

Chang Lina and Zhou Wei

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2. Nature Reserve Management Bureau of Chuxiong Prefecture, Chuxiong 675000, China

Hume's pheasant (*Syrmaticus humiae*) is related to the family Phasianidae, and order Galliformes. The vegetal food and feeding habits of *S. humiae* living in different habitats was analysed, with the aim of revealing the spatial variation of plant food. In addition, we aimed to explore the similarities and differences of feeding strategy in different habitats, and provide basic information for protected areas on scientific management of this endangered species. *Syrmaticus humiae* feeds mostly on trees (31.6%), followed by herbs (23.3%), and shrubs (19.0%) in spring, and leaves are its main food. Feeding habit results showed that in the foraging patches, feeding all the food suitable to prey is the primary feeding countermeasures while selecting high quality food is the secondary one. The feeding structure of the vegetal food for *S. humiae* in spring is compared by using niche breadth and overlap index. Their feeding strategy is significantly different in different seasons, but has high similarity in different space in our results. The main factors affectting the feeding strategy of *S. humiae* are food availability, different food quality, energy needed, and the behaviour of avoiding predation by natural enemies.

Seasonal variation in the diet of gray junglefowl (*Gallus* sonneratii) in Theni Forest Division, Gudalur range, Western Ghats, Tamilnadu, Southern India

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2. PG and Department of Zoology, Nehru Memorial College (Autonomous), Puthanampatti, Trichy district, Tamilnadu, South India

One thousand, four hundred and nineteen fresh droppings of grey junglefowl were collected in pre-monsoon , monsoon , post-monsoon and summer seasons. The overall results revealed that the diet of the grey junglefowl constituted 55.0%, 31.1% and 13.9% of plant matter, animal matter and grit respectively. Undigested animal remains such as insect legs, head, mandible, ovipositor, thorax and elytra were observed. The microscopic analysis of droppings of grey junglefowl revealed the presence of undigested insect parts of 46 species belonging to six orders , Coleoptera, Dictyoptera, Hemiptera, Hymenoptera, Isoptera and Orthoptera. One hundred and thirty four droppings (9.4%) contained only plant matter. Only animal matter and grit were recovered in 60 (4.2%) and 11 (0.8 %) droppings respectively. Plant matter combined with animal matter was found in 215 (15.2 %) droppings. Along with the plant matter, grit was found in 299 (21.1 %) droppings. Animal matter in combination with grit was found in 71 (5.0 %) droppings of grey junglefowl. Plant matter in combination with animal matter and grit was recovered in 629 (44.3 %) samples. The overall results revealed that the proportion of plant matter and animal matter in the grey junglefowl droppings was similar in all seasons except the animal matter was low in proportion in post-monsoon season. While plant matter proportion in grey junglefowl droppings varied between 50.2% and 63.4%, the animal matter proportion ranged from 19.4% to 36.0% and the grit ranged between 10.9% and 17.3%. The proportion of undigested plant and animal remains and grit did not vary statistically among seasons. Maximum frequency of seeds of 477 (28.06%) and *Lantana camara* with frequency of 427 (27.94%) were recorded. The seeds with minimum frequency and quantity, *Azima tetracantha*, *Carica papaya*, *Cynodon* sp. *Waltheria indica*, *Acacia torta*, *Achyranthus aspera*, *Lycopersicon lycopersicum* and *Salmalia malabarica* were recorded. Among the insect diet, maximum frequency of *Camponotus* species was recovered with a frequency of 402 (22.05%).

Observations on the Indian peafowl (*Pavo* cristatus) in the Mannar District, Sri Lanka

Charles Santiapillai[1] and Shanmugasundaram Wijeyamohan[2]

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2. Postgraduate Institute of Science, University of Peradeniya, Sri Lanka

The Indian peafowl (*Pavo cristatus*) is distributed widely across Sri Lanka's low country dry zone. Observations of the peafowl were carried out for a total of 46 days from July 2003 to October 2005. A total of 624 birds were recorded of which 342 were males, 270 females and 12 were chicks. The peafowl live in small groups with others of their own sex or in small family groups with one or more adult males. Of the 342 adult males, 169 (49.4%) were solitary, while 35 (10.2%) were found in all male groups. Of the 270 adult females recorded only 31 (11.5%) were solitary, while 33 (12.2%) were found in all female groups. Of the 624 peafowl observed in the study, 49 (7.9%) comprised mixed groups. The average adult male: female sex ratio was 1: 0.79. The principal period when most birds are active is from 1600 to 1900 hrs with a peak between 1700 to 1800 hrs. Breeding season commences in December with the onset of the northeast monsoon and reaches a peak in May with the start of the dry season. Chicks were observed with the peahens in February 2004. The crude density of peafowl was 13.8/km^2. Peafowl are well adapted to living in man dominated and human-altered landscapes. The key to long term survival of the peafowl is the reduction of conflict with agricultural communities and the maintenance of large tracts of scrub forest and associated grassland with an undisturbed access to permanent water.

POSTER SESSION

Tuesday 9 November 2010
16:30 – 18:00

Coordinator

John P. Carroll
Warnell School of Forestry and Natural Resources
University of Georgia
U.S.A.

Vocalization of red junglefowl (*Gallus gallus spadiceus*) in Huai Kha Khaeng Wildlife Breeding Station, Uthai Thani Province

*Sutipong Arsirapoj and Wina Meckvich*ai

Department of Biology, Faculty of Science, Chulalongkorn University, Phatumwan, Bangkok, 10330 Thailand

The study of vocalisation in *Gallus gallus spadiceus* show that the highest frequency of crowing occurred during breeding season from November 2008 to May 2009. During breeding season, it is found that the highest frequency of crowing was in March (29%) (n=21). The highest crowing frequency of a whole day was in the morning between 06:00 to 09:00 (49%) (n=2) and the highest frequency of morning crowing was during the 20 minutes before dawn (n=685). Moreover, the physical analysis showed the crowing frequency were correlated to temperature, humidity and light intensity. The vocalisation characteristics of red junglefowl including *G. g. spadiceus*, *G. g. gallus* and *G. g. domesticus* (domestic fighting cock) were significantly different in both the total time of crowing of second syllable and lower frequency of second and forth syllable (Mann-Whitney U-Test).

Assessment of pesticide load on Indian peafowl (*Pavo cristatus*) in Keoladeo National Park, Bharatpur Rajasthan, India

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2. Wildlife Trust of India, A-220, New Friends Colony, New Delhi, India

Keoladeo National Park, Bharatpur is a world heritage site and is known for its assemblages of migratory birds. This national park also has a substantial population of Indian peafowl (*Pavo cristatus*). The park receives water from Ajanbundh reservoir, which is fed by water contaminated with a variety of pesticides from the catchment area of the Gambhiri River. After it is emptied out, Ajanbundh also turns into a crop field in winter, increasing the load of pesticides to the reservoir. Concentrations of the HCH, DDT (and their metabolites), Aldrin, Dieldrin, Endrin, Heptachlor, Heptaepoxide and Endosulfan (and their metabolites) were quantified by use of gas chromatography (GC) with electron capture detection (ECD). All the samples were found to be contaminated with the above mentioned pesticides. The concentration of Endosulfan 1 was found highest 7.893 (□ 3.770) ppm in all samples at the same time as γ-HCH, S-HCH Endosulfan-II Endo. Sulfate S-Endosulfan 4,4,'-DDE 4,4,'-DDD and DDT could not be detected in the samples taken inside and outside of Keoladeo National Park.

Diet, throughput and faecal analysis of blood pheasants at Daocheng, Sichuan, China

G.W.H. Davison[1] and Wang Nan[2]

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We observed the feeding rate and items eaten by blood pheasants (*Ithaginis cruentus*) in mixed pasture, prickly oak and fir forest at Daocheng, Sichuan, China. Grass and moss were the most common food items during May and June, prior to and during laying and incubation. Feeding was almost continuous during daylight. Defecation occurred up to once per 10 minutes when feeding continuously, and faeces averaged about 3.5 g wet weight. Throughput of materials was approximately 140 to 210 g per day, equivalent to 30% to 40% of female body weight. Maximal feeding rates were up to 100 pecks per 38 seconds, but sustained rates were closer to 100 pecks per 100 second (incorporating time spent in other behaviours). This is equivalent to 600 to 900 pecks per dropping produced or about 0.004 to 0.005 g wet weight of faecal material output per peck of input. These 'back-of-the-envelope' calculations suggest around 36,000 pecks per day. Females spent more time than males feeding, and on average pecked more rapidly with less time spent on other behaviours. We identified various grasses, sedges and 24 moss species at Daocheng, six moss species in the diet as well as the grasses *Agrostis*, *Calamagrostis, Poa* and *Ochlopoa*, and the sedges *Juncus* and *Eriophorum*. Our results tend to support the views of Jia et al. (in press) that low nutrient content requires high throughput, and this necessitates long feeding bouts that entail long periods off the nest.

Brief introduction of Galliformes and the distribution of *Alectoris chukar* in Xinjiang province, west China

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2. Graduate University of Chinese Academy of Sciences, Beijing 100049, China

About 14 species of Galliformes are recorded in Xinjiang, and account for 22.22 % of the total (63 species) of Galliformes in China. Western capercaillie (*Tetrao urogallus*) was in the first class in the list of National Protected Wildlife, and 7 species were in the second class. These 14 species with many subspecies of Galliformes are widely distributed in Xinjiang. The chukar (*Alectoris chukar*) has an extremely large native range, spanning countries from eastern Europe to China, Russia and Africa. This species can be found in valley thickets, low hills, desert grasslands, piedmont desert-gobi and farmland, at the altitude of 550 to 3100 m. Fourteen subspecies of chukars are currently recognised, there are seven subspecies in China, five subspecies in Xinjiang. *A. c. pallesents* is distributed in the southern Pamirs Plateau, Karakorum, Kunlun Mountains and southwest Xinjiang. *A. c. pallida* occurs in Tarim Basin and from Kunlun Mountains to the Altun Mountains. *A. c. falki* occurs from the Southern Tianshan Mountains to the northern Pamirs Plateau, W Xinjiang. *A. c. dzungaria* occurs in Junngar Basin and the surrounding counties, Ili Valley, Irtysh and Ulungur River and Alataw Mountains. *A. c. potanini* occurs from Gansu to Urumqi along the North piedmont of Altay Mountains. The main threats against Galliformes in Xinjiang are fragmentation of habitats and poaching. In order to protect Galliformes effectively, we must strengthen the protection of habitat, stop poaching through better enforcement, strengthen cooperation with international organisations, protect Galliformes through traditional culture and religion and strengthening public awareness through education.

Declines and conservation of threatened Galliformes in the Himalayas

Jonathon C Dunn

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Species with small and declining distributions are at especially high risk of extinction. Short-term extinction probabilities are used by conservationists to prioritise conservation effort between species. The long-term patterns and practical conservation implications of range change leading the final extinction phase have not been well studied. For most species, this is impossible due to a paucity of data. The Galliformes are unusual in that detailed historical records exist. My project will seek to examine four main aims:

(i) to map past geographic ranges and compare them with more current distributions to explore the underlying causes of decline in Himalayan Galliformes.

(ii) to investigate whether monitoring programmes for Galliformes are more likely to identify declines in restricted range species than declines in widespread species.

(iii) to compare changes in predicted future distributions of Galliformes to the known distribution of likely conservation actions and threats.

(iv) to identify the gaps in the knowledge of Himalayan Galliformes and design a monitoring framework to attempt to fulfil these gaps.

The success of the latter half of the project will depend on making appropriate contacts from Asian conservation agencies and scientists, who will be able to contribute valuable local knowledge. This will be used to help provide detailed information regarding threats and give vital information on the history of human-wildlife interactions in their respective localities.

Niche separation between the seven pheasant species in Karst Mountains in southwest Guangxi province, China

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Seven species of pheasant occur in the Karst Mountains in the southwest of Guangxi province, China. They are Chinese francolin (*Francolinus pintadeanus*), bar-backed partridge (*Arborophila brunneopectus*), Mountain bamboo partridge (*Bambusicola fytchii*), Chinese bamboo partridge (*Bambusicola thoracicus*), red junglefowl (*Gallus gallus*), silver pheasant (*Lophura nycthemera*) and common pheasant (*Phasianus colchicus*). The seven pheasant species forage mainly in the understory and they share similar resources on the ground. Why and how can they coexist in the Karst Mountains? The habitat and activity patterns were studied to understand and define niche breadth and degree of overlap. The major ecological differences between the seven species were found in their foraging habitat type and activities at different altitudes. Chinese francolin, Mountain bamboo partridge, Chinese bamboo partridge, red junglefowl and common pheasant were similar in foraging habitat selection, which was mainly in scrublands, but in comparison with their activities at different altitudes showed obvious divergence. The five species were distributed at different relative heights. In the same situation, bar-backed partridge and silver pheasant were both foraging mostly in the forest, but one was in the upper part of the mountain and another in the lower part of the mountain. This information permits a better understanding of the niche separation of the seven pheasant species that enables their coexistence.

Opportunistic shift in nesting strategy by buff-throated partridges in tree-line habitat, China

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We report on the use of two opportunistic nesting strategies by buff-throated partridges (*Tetraophasis szechenyii*) in tree-line habitats of the Pamuling Mountains, Sichuan Province, China. Buff-throated partridges used both ground nests and tree nests. Ground nests were scrapes made in the soil, and were positioned at the base of a tree or scrub. Tree nests were cup shaped and placed 1.9-12.0 m above ground level. Compared with the ground nests, tree nests were more common in re-nesting attempts and higher canopy cover habitats. Opportunistic shifts from a ground nesting strategy to the more arboreal tree nesting strategy occurred for two females after the abandonment of first nests within the breeding seasons. We suspect that opportunistic nesting strategies by the buff-throated partridge are a response to unpredictable and sudden shifts in ecological conditions, or reflect changes in the perception (or actual level) of predation risk for a particular nesting strategy

Distribution and relative abundance of pheasant in Pindari Valley, Nanda Devi Biosphere Reserve, India

Kandpal V. and Sathyakumar S.

Wildlife Institute of India, P.O. Box 18, Chandrabani, Dehradun-248 001, Uttarakhand, India

We assessed the distribution and relative abundance of Himalayan monal (*Lophophorus impejanus*) and koklass pheasants (*Pucrasia macrolopha*) in Pindari Valley (118 km^2) located in the buffer zone of Nanda Devi Biosphere Reserve, Uttarakhand, India, from June 2007 to July 2009. We sampled six trails (206 walks; 644 km) for estimating the relative abundance and distribution of monal. We estimated the relative abundance of calling male koklass pheasants by call counts (n = 26) during April-May. We recorded 719 sightings (751 individuals) of monal and only one sighting of koklass in the subalpine scrub. All monal sightings and their calls were recorded in the subalpine and alpine habitats (3,000-4,200m), whereas koklass calls were recorded from the forested habitats of subalpine and temperate regions (2,500-3,200m). The encounter rate for monal ranged between 0 and 5.47 individuals/km^2 with a pooled mean of 1.64 ± 0.08. Areas with differences in the levels of anthropogenic pressures did not show any variability in the abundance estimates for monal, with the exception for autumn (Mann-Whitney U Test, $p < 0.006$). The relative abundance of koklass was 2.5 ± 0.19 calling males/ station. The relative abundance of monal and koklass in Pindari Valley were higher when compared to estimates from other areas in the buffer zone of Nanda Devi Biosphere Reserve. Management recommendations include control of poaching for meat by the local communities, and maintenance of the current levels of anthropogenic pressures in the pheasant habitats of Pindari Valley.

Koklass (*Pucrasia macrolopha biddulphi*) relative abundance and habitat use at lower Dachugam National Park, Kashmir

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We investigated the Koklass (*Pucrasia macrolopha biddulphi*) relative abundance and habitat use in Dachigam National Park, Kashmir, India from March 2008 to February 2009. After reconnaissance survey in Dachigam NP (n=8) transects were laid representing different habitat types, and vegetation sampling plots (n=98) were also laid along these transects for habitat characterization and to understand habitat use by koklass. We recorded 32 (51 individuals) sightings of koklass and 29 male calls were counted based on 192 days of field effort (372 km of transect/trial walks and call count at three call count stations). The relative abundance (# sightings / km ± SE) of koklass was highest (0.55±0.13) in autumn followed by spring (0.49±0.13), and it was lowest (0.16± 0.05) in summer. Overall mean call counts were (1.92±0.19) estimated at three call count stations. We classified five koklass habitats , Riverine (1,600-2,000 m), lower temperate mixed (*Celtis australis, Morus alba, Rhus succidiana, Aesculus indica, Juglans regia* and *Parrotiopsis jacquemontiana*, 1,800-2,200 m), lower temperate pine mixed (*Pinus wallichiana* and others, 1,800-2,500 m), mid temperate mixed (*Ulmus wallichana, C. australis, A. indica* and *P. jacquemontiana*, 2,300-2,600 m), temperate grassland and scrubland (*Carex cernua, Themeda anethra*, 1,900-2,900 m). in lower Dachigam. Habitat use was significantly different across seasons (F=1.44, d.f.=5, p=0.2) and the maximum number (31.25%) of sightings were recorded in mid-temperate habitat and the minimum number (9.37%) was in low-temperate. Data on distribution of koklass and Himalayan monal (*Lophophorus impejanus*) in the greater Dachigam landscape will be presented and discussed in the poster.

Conservation breeding of hume's pheasants

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Conservation Breeding of Hume's Pheasant has been started at Aizawl Zoological Park, Mizoram, India, only recently with limited knowledge and experience, yet successful results have been achieved by breeding four Hume's Pheasants in the zoo. Conservation Breeding of Hume's Pheasant is found to be very vital for conservation of Global Biodiversity.

A novel PCR method for gender identification of *Tetraophasis szechenyii*

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Tetraophasis szechenyii is an endemic species of Phasianidae in China, and has been listed as Category I state protected species. Accurate estimation of the sex ratios in wild populations is important for understanding the population structure of the endangered species. The absence of conspicuous sexual dimorphism in *Tetraophasis szechenyii* makes it difficult to determine their gender on the basis of external morphology. In this study, we report on a triple-primer PCR method based on the UBAP2 (Ubiquitin-associated protein 2) alleles that are located on the avian sex chromosomes of all birds for sex identification. The amplification products were screened by agarose gel electrophoresis, showing three bands (~ 110bp, ~190bp and ~790bp) in females and a single (~190bp) band in males. The absence of the ~790bp band has little implication for gender identification, therefore highly degraded DNA from non-invasive samples can be used for analysis. We demonstrated that the gender of *Tetraophasis szechenyii* can be accurately and rapidly identified. Furthermore, similar results have been obtained in the cross species test indicating that our novel PCR method has the potential to successfully work on most (if not all) Phasianidae species

Genetic evidence for male-biased dispersal in Elliot's pheasant (*Syrmaticus ellioti*) in China

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Sex-biased dispersal, in which individuals of one sex tend to disperse and breed at a greater distance from the natal site than individuals of the other sex, appears to be common in vertebrate organisms and is very important to population structure and dynamics. Many studies have well documented the dispersal patterns of monogamous birds; however, the data are few for polygynous birds. Here we report on sex-biased dispersal in Elliot's Ppheasant (*Syrmaticus ellioti*) which is a vulnerable species endemic to China, using polymorphic DNA microsatellite loci (105 individuals and seven loci) and mitochondrial DNA control-region sequences (63 individuals). Contrary to the traditional concept that the males are the more philopatric sex and females are the more dispersing sex in birds, all the genetic information extracted from the two markers suggests that dispersal is male-biased in Elliot's pheasant. We argued that polygynous species in Galliformes without lekking behaviour are more likely to exhibit a male-biased dispersal pattern, which conforms to the expected result based on the polygynous mating system of Elliot's pheasant.

Distribution of green peafowl (*Pavo muticus imperator*) after human disturbance and reintroduction at Mae Wong National Park, Kamphang Petch Province

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In the past, green peafowl was distributed all over Thailand but at present, they are found only in northern and western parts due to habitat loss, habitat fragmentation and human disturbance. Recently, the national park and wildlife sanctuary in Thailand planned forest management and wildlife reintroduction for Eld's deer, gibbons and green peafowl. Before they were released two males and two females of green peafowl were fixed with radio telemetry. Five males and four females were released in November 2009 at Mae Rewa forest ranger station, Mae Wong National Park. After the reintroduction, we detected them with a receiver as well as searching for all signs and tracks along trails in the forest. The distribution of green peafowls were recorded with GPS and the distance from green peafowl to the road and the housing area was recorded. We visited the green peafowls a week after they were released and they were moving and rooting at the same place near the release point. A month after they were released, one male moved a further 5 km while the rest moved only 1 km from the release point. Three months after release, they moved further, far from human settlements and stop moving. In April, five months after released all green peafowls moved nearly 20 km to the north due to the burning of their habitat. A month later, some of them came back and others disappeared. Human settlements did not affect the green peafowl as much as fire caused by humans.

Assessment of genetic diversity of red junglefowl (*Gallus gallus*) population in Himachal Pradesh, India

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Red junglefowl (RJF) is believed to be threatened with genetic endangerment throughout its distribution range due to hybridization with domestic or feral chickens. We analysed 79 individuals from the captive stock of Himachal Pradesh in India. Microsatellite genotypes were derived and allelic and genotypic frequencies, heterozygosities and gene diversity were estimated. A total of 126 alleles were distinguished by the 12 microsatellite loci which were highly polymorphic, with a mean (± S.E.) allelic number of 10.5 ± 4.94, and ranged from 4 to 21 per locus. The observed heterozygosity in the population ranged between 0.229 and 0.671, indicating considerable genetic variation in this population. Mean observed heterozygosity over the 12 loci was 0.394 ± 0.123, which was lower than the expected heterozygosity of 0.739 ± 0.102. Expected heterozygosity in RJF population ranged from 0.544 to 0.885. Mean heterozygosity estimation in this study was 0.734± 0.102. All the 12 loci were tested for any deviation from the Hardy-Weinberg equilibrium. Eleven microsatellite loci showing PIC values higher than 0.5 are normally considered as informative in population-genetic analyses. These loci were informative in the present study as the PIC value was 0.44 for locus MCW0098. The mean PIC in the present RJF population was 0.6937. Genetic bottleneck hypotheses were also explored and we found a normal 'L-shaped mode-shift' graph showing lack of recent genetic bottleneck in RJF population in Himachal Pradesh in the recent past.

Conservation status of western tragopan (*Tragopan melanocephalus*) in Machiara National Park, Muzaffarabad, Azad Kashmir, Pakistan

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Machiara National Park (MNP) is categorized as an important bird area and the western tragopan (*Tragopan melanocephalus*) is declared as a 'Vulnerable' species by Birdlife International. Surveys were carried out in 2008, to collect the data on current distribution, population density and conservation status of western tragopan (*Tragopan melanocephalus*) in MNP. This was the third comprehensive survey of western tragopan after Mirza et al. (1978) & Islam (1982) in MNP. The survey revealed that the major part of its local population is distributed in the forest compartments CO.8, CO.9, CO. 11 and CO. 14 of the park. A total of 22 males were recorded during the survey. Raveri was the calling site with the highest abundance of the western tragopan, 5 out of 22 (SE.0.23). Hunters aged between 20 to 40 years are the major group involved in the hunting of tragopans. Month, day, season and weather conditions used for hunting are also discussed in the paper. Besides hunting, habitat fragmentation, fire and timber wood collection, destruction of eggs during mushroom collection and lack of conservation education and awareness are found to be the major conservation issues of the western tragopan in Machiara National Park.

Roost sites selection of scaly-breasted partridge in seasonally wet evergreen forest

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To increase understanding of roosting behaviour and roosting site selection of scaly-breasted partridge (*Arborophila chloropus*) we sampled habitat traits at 46 roosting trees used for night roosting by 5 radio-collared birds within the 30 ha Mo Singto Research Plot in Khao Yai National Park (Thailand) during a 2 year period (2009 to2010). To measure site characteristics we used a 5 m radius circular plot, which set roosting position in the centre of a plot, which we measured in 46 sites. This data was compared with that collected in 64 randomly located plots in order to define the relationship between used and available sites. Over 92 evening birds were observed roosting and we recorded 46 distinct roosting sites of which 21 were reused. Males and females roosted on the same perch and with juvenile birds until they dispersed. When separate roosting was observed (55% of total events) each individual roosted within their territories. Selection of habitat for night roosting by the partridge was associated with higher percentage cover of canopy above the perch site and lower percentage cover below the perch site of used roosting habitat. The median of perch height was 3.05 m (range 2.81-3.61 m) above the ground. The median of roosting plants height was 5.43 m (range 4.36-7.38 m). Habitat selection with greater canopy cover above a bird's head may play an important role to reduce their visibility from predators at night and observe predators more easily through the lighter cover below the perch site.

Distribution and relative abundances of Galliformes in Khangchendzonga Biosphere Reserve, Sikkim, India

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We assessed the distribution and relative abundance of Galliformes in Khangchendzonga Biosphere Reserve, from February 2008 to April 2010. We sampled Prek Chu catchment (182 km^2) by using trail sampling (n=22) and camera trapping (n=20). Only trail sampling was used to survey the other watersheds of the Biosphere Reserve. Through direct sightings and camera trap photos, we confirmed the presence of blood pheasant (*Ithaganis creuntus*), Himalayan monal (*Lophophorus impejanus*), satyr tragopan (*Tragopan satyra*), snow partridge (*Lerwa lerwa*), hill partrdge (*Arborophila torqueola*) and kalij pheasant (*Lophura leucomelanos*). Presence of chestnut-breasted partridge (*Arborophila mandellii*) was confirmed through camera trap photograph only and presence of tibetan snowcock (*Tetraogallus tibetanus*) was confirmed through calls, droppings and feeding signs at Lhonak valley, the northern trans – Himalayan part of the Biosphere Reserve. Evidence of snow partridge, blood pheasant and Himalayan monal was encountered in subalpine and alpine habitats whereas evidence of satyr tragopan was encountered in subalpine and temperate forests. Sightings of kalij pheasant and hill partridges were restricted to temperate zones only. Estimated encounter rates (#/ km walk) of the Galliformes of Khangchendzonga Biosphere Reserve decreased as follows: blood pheasant (1.09±0.24) > snow partridge (0.49± 0.12) > Himalayan monal (0.15± 0.03) > satyr tragopan (0.08±0.03) > kalij pheasant (0.07±0.03) > hill partridge (0.05± 0.02). Presence of traps and snares inside the subalpine and temperate forests and collection of *Cordyceps sinensis* during summer in the northern part of the Biosphere Reserve may be a concern for degradation of Galliformes habitat and pose threats to their survival in the future.

Participatory survey of cheer pheasant through broadcasting a radio programme in far western Nepal

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Habitat loss and alteration, pollution, and hunting are the main threats to Nepal's birds. Monitoring the populations and conservation education for local people is crucial to conserve these threatened birds. Far western Nepal supports more than 16 globally threatened bird species including cheer pheasant. The aim of this project was to survey the cheer pheasant with the people's participation via broadcasting on a radio programme and raise public awareness on how the populations of threatened birds are declining. Script reading, essays, quiz competitions, and participatory bird monitoring were the main activities. Scripts on pheasants and other Galliformes species were prepared and aired from two radio stations once a week. People were asked to send in their stories if they had seen or heard the cheer pheasant in their areas. Calls of a cheer pheasant were broadcasted in every episode for people's attention. Villages were identified within the altitudinal range of 1800 m to 3000 m. Radio coverage and events were concentrated in these areas. The bird stories sent in by people were broadcasted and acknowledged by the radio. The best stories were rewarded with T-shirts and Nepalese birds' books. Radio audiences reported that the cheer pheasant was found in Kulau VDC of the Baitadi district, Kanachour VDC of the Doti district, and Basti, Balata, Kunti Bandali, Bhairabsthan, Devisthan, Marku and Timilsain VDCs of the Achham district It would be worth verifying the populations of cheer pheasant in these new areas to update its present status in Nepal.

Status of cheer pheasant in Nepal

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The cheer pheasant (*Catreus wallichi*) is on the IUCN Red List as Vulnerable and is confined to relatively open habitats in the Himalayan foothills of Nepal, India and Pakistan at 1,000 to 3,000 m. During 2003 to 2009 there have been a number of surveys of this species in the breeding season (April to June) in or close to three protected areas in Nepal: Rara National Park, Annapurna Conservation Area and Dhorpatan Hunting Reserve. There is no recent evidence of cheer populations elsewhere in Nepal. We have collated all the survey data. By standardising the derivation of a population density index derived from dawn call count data, we are able to analyse trends through time at some sites. We have also rationalised the information available on local habitat conditions and human impacts at each site in order to look for correlations with our density index. Based on these circumstances, we identify particular problems facing some of the populations and attempt to derive management options from these that should provide some safeguards for the near future. However, our understanding of the ecological requirements of cheer in its highly impacted and successional habitats remains rather poor.

Assessment of pesticide load on Indian peafowl (*Pavo cristatus*) in Keoladeo National Park, Bharatpur Rajasthan, India

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Keoladeo National Park, Bharatpur is a world heritage site and is known for its assemblages of migratory birds. This national park also has a substantial population of Indian peafowl (*Pavo cristatus*). The park receives water from Ajanbundh reservoir, which is fed by water contaminated with a variety of pesticides from the catchment area of the Gambhiri River. After it is emptied out, Ajanbundh also turns into a crop field in winter, increasing the load of pesticides to the reservoir. Concentrations of the HCH, DDT, (and their metabolites), Aldrin, Dieldrin, Endrin, Heptachlor, Heptaepoxide and Endosulfan (and their metabolites) were quantified by use of gas chromatography (GC) with electron capture detection (ECD). All the samples were found to be contaminated with the above mentioned pesticides. The concentration of Endosulfan 1 was found highest 7.893 (□ 3.770) ppm in all samples at the same time as γ-HCH, S-HCH Endosulfan-II Endo. Sulfate S-Endosulfan 4,4,'-DDE 4,4,'-DDD and DDT could not be detected in the samples taken inside and outside of Keoladeo National Park.

Diurnal behaviours of *Crossoptilon auritum* in northwestern China

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The blue-eared pheasant (*Crossoptilon auritum*) is endemic to China and is mainly found in the east and northeast Qinghai Province, northwest and south Gansu Province, northwest Sichuan Province, and west Ningxia Autonomous Region. From 1st December 2007 to 10th January 2008, the diurnal behaviour of *Crossoptilon auritum* was studied by scan sampling in Zecha forest, northwest China. In behaviour time budgets, feeding proportion was highest (40.62%), followed by resting (28.01%), moving (19.17%), guarding (12.55%). Moving percentage in different habitats was significantly different (χ^2 =13.994, d.f.=3, P <0.01), as well as resting percentage (χ^2=15.899, d.f.=3, P<0.01). In behaviour rhythm, the foraging behaviour of blue-eared pheasant focuses on 9:00-11:00 and 15:00-17:00. The moving behaviour concentrates on 9:00-10:00 and 18:00-19:00. The resting behaviour commonly appears at 11:00-13:00. In different habitats, the foraging and guarding time in farmland habitat were higher than those in the others, and the resting time in stream belt and shrub habitat were highest.

Complete mitochondrial genome of *Tetraophasis szechenyii* Madarász, 1885 (aves: Galliformes: Phasianidae), and its genetic variation as inferred from the mitochondrial DNA CR

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The buff-throated partridge, *Tetraophasis szechenyii* (Madarász, 1885) is a species endemic to west China. The complete mitochondrial genome of this species was sequenced. It was 16,706 base pairs (bp) in length and contained 13 protein-coding genes, 2 ribosomal RNA (rRNA) genes, 22 transfer RNA (tRNA) genes, and a control region (CR). The phylogenetic relationships of the buff-throated partridge and 19 other Phasianidae species were inferred by Bayesian inference and maximum likelihood analyses based on 12 protein-coding genes. With the exception of a few nodes, most internal branches were supported by a high Bayesian posterior probability (BPP = 1.0). The resulting trees clarified the phylogenetic position of *T. szechenyii* within Phasianidae. The genetic diversity and population structure of the Pamulin population of *T. szechenyii* were examined based on the mitochondrial DNA CR. Nucleotide sequence analysis defined 18 haplotypes in 24 individuals. Haplotype diversity (h) was 0.953 and nucleotide diversity (h) was 0.0044. The results revealed that the genetic diversity of this population was not particularly low. Combined with the field work conducted by our lab, we found that members of the Pamuling population are cooperative breeders and the population may contain individuals from neighbouring groups. Our work provided genetic background information for the conservation and management of this species.

Cooperative breeding in the kalij pheasant (*Lophura leucomelanos*): basic ecology and the role of habitat saturation

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Cooperative breeding behaviour in animals is evolutionarily significant because of the seemingly altruistic behaviour tha appears to conflict with the theory of evolution by natural selection. Such behaviour is rare and mostly found in altricial species (helpless hatchlings). However, cooperative breeding in precocial species (independent hatchlings) can reveal the influence of ecological factors without the constraint of substantive offspring needs. I have observed cooperative breeding behaviour among males in kalij pheasants (*Lophura leucomelanos*), a precocial species, in Hawai'i Volcanoes National Park. This study takes place in Kipuka Puaulu - a native forest isolated by historical lava flow that limits the dispersal of pheasants. High density has been observed at the study site, and habitat saturation is likely a factor influencing cooperative breeding in the population. I have found the dominant composition of breeding groups to be one female with multiple (2 or 3) males, with one male dominant over the other(s). Parental and/or alloparental care has been observed from all adults including both dominant and subordinate males, such as leading chicks in the forest and calling them over for food. A removal experiment will be carried out to examine the effect of habitat saturation on the cooperative breeding behaviour of males.

Comparison of artificial breeding methods of *Crossoptilon harmani*

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The poster shows the key elements of the research during 2005 and 2006 in Beijing Zoo. Many Tibetan eared pheasant (*Crossoptilon harmani*) chicks developed twisted toes during hand rearing in 2005. In 2006, the chicks were divided into three groups and each group was provided with a different diet and management. We measured different parts of the chicks such as weight, beak, tarsus and wing for 2 months and compared the nutritional component of three alternative diets, as well as the survival and leg normality in the three different groups. We have found that deficiency of vitamin B2 in the diet is the main reason causing the toe disfigurement.

Phylogenetic study on Phasianidae species based on CR1 retrotransposable elements

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Despite previous studies on morphology and mitochondrial DNA analysis, a number of issues regarding the phylogeny of Phasianidae remain unsolved. Chicken repeat 1 (CR1) elements are a class of retrotransposons belonging to long interspersed elements and have been recognized as powerful tools for phylogenetic and population genetic studies. Here we decipher the phylogenetic relationships of 12 Phasianidae species based on CR1 retrotransposons. Together with 20 loci reported previously, a total of 100 CR1 loci were identified from chicken genome and turkey BAC clone sequence. The presence or absence of the CR1 across species was investigated via electrophoretic size separation of amplification products. Fifty eight markers are used to address the branching order of 12 species in Phasianidae. Importantly, the topology of our tree suggests that: 1) *Gallus gallus* possessed a basal phylogenetic position within Phasianidae and was related to *Bambusicola thoracica*; 2) results are inconsistent with previous research based on mtDNA, *Arborophila rufipectus* diverged from Phasianidae after the *Gallus gallus* and *Bambusicola thoracica* lineage; 3) 22 CR1 loci strongly support the hypothesis that the other nine phasianids under investigation shared a common ancestor. Among them, *Tragopan temminckii* diverged firstly from other birds ; *Tetraophasis szechenyii* and *Lophophorus lhuysii* showed a sister relationship, and *Pucrasia macrolopha* and *Meleagris gallopavo* shared a closer relationship than other birds. The position of *Chrysolophus amherstiae* was also clarified in our study. In summary, our study has illustrated a robust phylogeny of Phasianidae birds and shown a prospective utility of CR1 markers for the phylogenetic study in Aves.

Habitat evaluation for Reeves's pheasant (*Syrmaticus reevisii*)

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Forest destruction and degradation are major factors in reducing Reeves's pheasant (*Syrmaticus reevesii*) population and habitat. However, little is known about the distribution pattern of Reeves's pheasant and no quantitative studies have evaluated Reeves's pheasant habitat suitability at a landscape level. We evaluated habitat suitability for Reeves's pheasant using GIS and Biomapper in Dongzhai National Reserve. First, we digitized the topography map, vegetation map, river map, road map and villages/towns map from Landsat satellite images and field surveys by Erdas and ArcInfo, and gave each map layer a suitability index based on our perceptions of the needs of Reeves's pheasant. Second, we used Biomapper to obtain an integrated map of habitat quality. Finally, we compared the calculated habitat suitability with the actual distribution of Reeves's pheasant using historical records and field data collected from surveys and from local people. We found that only 25% of the total area (449.3 km^2) is suitable for Reeves's pheasant and most were located at the site of high quality which indicated that the factors we selected were important for Reeves's pheasant. ENFA analysis found that Reeves's pheasant preferred larger patches of coniferous forest or mixed forest and lower levels of human disturbance. Analysis also implied that the design of effective conservation areas for Reeves's pheasant must include large and dense coniferous forest or mixed forest with a low level of human disturbance.

Workshops

11-13th November 2010

Alongside the programme of visits that will take place after the formal symposium we will be running several workshops. These will be designed to make the most of this opportunity to have so many Galliformes researchers and conservationists together for the symposium. More details will be available at the start of the symposium.

1. Chinese pheasant research and conservation

The National Action Plan for Pheasant Conservation is nearly ten years old now and there has been a great deal of research and conservation work on China's Galliformes as a result. As many Chinese researchers, protected area managers and others with an interest in studying and conserving China's Galliformes will be attending the symposium this workshop will aim to summarise the current issues in research and conservation for China's Galliformes and what needs to be done next.

2. Review of information needs and emerging issues in conserving Himalayan Galliformes

Following on from various presentations at the symposium, both talks and posters, it is timely to bring all of this together to consider what issues we should be concerned about and what should be done to address them. There will be delegates at the symposium from most Himalayan countries and so the aim is to consider whether we have enough information to identify conservation needs and problems, and to discuss whether issues such as climate change and/or ecosystem services may need to be tackled in the near future in order to conserve Galliformes and their habitats.

3. Review of WPA field techniques manual *Designing field studies for Galliformes*

WPA's Conservation Training Officer, Huw Lloyd, has been developing a manual for people who are new to fieldwork. When it is finalised the manual should offer guidance on how to design a field project, which subjects may be suitable for study and how to select the appropriate approach and methods to gather the necessary data. It is planned that the book will be 'standalone' and so not require access to fast internet connections for downloading lots of recent published papers and other sources of information. As this manual is still a draft it is important to have feedback from as many fieldworkers as possible on the strengths of the current draft and where it can be improved.

4. How do we prioritise projects for Red List species?

The 'logical conservation' paper given by Lowell Mills earlier in the week was an overview of the Galliformes SG's attempt to review how much is known about status and threats for each of our species, and how well that information is being used to design, implement and monitor conservation interventions. This process identifies Red List species for which we have insufficient information and/or conservation action is not as it should be. Publicising these gaps is a task for the GSG, but there are many of them: we therefore need to derive a system for prioritising all the work that needs doing. The aim of this workshop is to agree the criteria for ranking all tasks, and to explore how to group them together taxonomically, geographically or strategically.

There will also be the chance for help with project design, data analysis and writing papers, reports and proposals.

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Front Cover: Pheasants of Thailand

1. Crested Fireback / ไก่ฟ้าหน้าเขียว (*Lophura ignita*)
2. Hume's Pheasant / ไก่ฟ้าหางลายขวาง (*Symaticus humiae*)
3. Silver Pheasant / ไก่ฟ้าหลังขาว (*Lophura nycthemera*)
4. Great Argus / นกหว้า (*Argusianus argus*)
5. Siamese Fireback / ไก่ฟ้าพญาลอ (*Lophura diardi*)
6. Kalij Pheasant / ไก่ฟ้าหลังเทา (*Lophura leucomelana*)
7. Green Peafowl / นกยูง (*Pavo muticus*)
8. Malaysian Peacock-pheasant / นกแว่นสีน้ำตาล (*Polyplectron malacense*)
9. Red Junglefowl / ไก่ป่า (*Gallus gallus*)
10. Gray Peacock-pheasant / นกแว่นสีเทา (*Polyplectron bicalcaratum*)

Back Cover: Partridge and Quail of Thailand

1. Rufous-throated Partridge / นกกระทาดงคอสีแสด (*Arborophila rufogularis*)
2. Bar-backed Partridge / นกกระทาดงอกสีน้ำตาล (*Arborophila brunneopectus*)
3. Chestnut-headed Partridge / นกกระทาดงจันทบูรณ์ (*Arborophila cambodiana*)
4. Scaly-breasted Partridge / นกกระทาดงแข้งเขียว (*Arborophila chloropus*)
5. Chestnut-nacklaced Partridge / นกกระทาดงปักษ์ใต้ (*Arborophila charitonii*)
6. Ferruginous Wood-partridge / นกกระทาสองเดือย (*Caloperdix oculea*)
7. Crested Wood-partridge / ไก่จุก (*Rollulus rouloul*)
8. Long-billed Partridge / ไก่นวล (*Rhizothera longirostris*)
9. Mountain Bamboo-partridge / นกกระทาป่าไผ่ (*Bambusicola fytchii*)
10. Chinese Francolin / นกกระทาทุ่ง (*Francolinus pintadeanus*)
11. Rain Quail / นกคุ่มอกดำ (Coturnix coromandelica)
12. Blue-breasted Quail / นกคุ่มสี (*Coturnix chinensis*)
13. Small (Little) Buttonquail / นกคุ่มอีดเล็ก (*Turnix sylvatica*)
14. Yellow-legged Buttonquail / นกคุ่มอีดใหญ่ (*Turnix tanki*)
15. Barred Buttonquail / นกคุ่มอกลาย (*Turnix suscitator*)