



भारतीय वन्यजीव संस्थान  
Wildlife Institute of India

# W.I.I. Newsletter

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## News : Training and Workshops

### XXV Certificate Course in Wildlife Management concluded

The 3-month Course concluded on January 29, 2010. The Management Tour was conducted during January 3-21, 2010 at various parts of Gujarat. During the tour, the officer trainees visited the Gujarat Ecological & Educational Research (GEER) Foundation and Centre for Environment Education, Nalsarovar Wildlife Sanctuary, Wild Ass Sanctuary, Gulf of Kutch Marine National Park, Sakkarbagh Zoo, Gir National Park & Sanctuary and Velavadar National Park. The objective of this tour was to provide first-hand experience of various management practices related to habitat management; endangered species management; wildlife protection; captive management; eco-development; wildlife interface conflicts; and eco-tourism. The performance of officer trainees was assessed by theoretical examination and practical evaluation based on the field projects. The Viva-Voce was conducted on January 28, 2009.



The Valedictory Function was organized on January 29, 2010. Dr. R.D. Jakati, Director, Indira Gandhi National Forest Academy, was the Chief Guest on the occasion. He presented the Certificates and various awards to the officer trainees. All 21 officer trainees have successfully completed the course. Twelve out of 21 officer trainees received Honours Certificates. In addition, the following awards were also given away to the deserving officer trainees for their outstanding performance:

Shri Paresh C. Porob, Goa bagged the Wildlife Conservation Gold Medal for the 'Top Trainee'. He also received Institute's Silver Medal for the 'Best All Round Wildlifer'. Dr. Sam Varghese (A & N Islands) received Institute's Silver Medal for the 'Best Performance in Wildlife Management Module and Management Tour'. Shri Pema Thinley, Bhutan was awarded the Institute's Silver Medal for the 'Best Foreign Trainee'.

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**One-Week Compulsory Training Programme on "Ecotourism and Livelihoods" for IFS Officers, Periyar Tiger Reserve, Thekkady, Kerala, January 4-8, 2010.** This short-duration training programme was sponsored by Ministry of Environment and Forests, Government of India, New Delhi. The objectives of training programme were to: (i) understand the concept and broad principles of ecotourism; (ii) demonstrate how ecotourism could be used as a tool for livelihood security of local people and biodiversity conservation; (iii) expose the participants to few important community based ecotourism initiatives in the Southern Western Ghats; and (iv) share experiences of participants in the subject of ecotourism from different parts of India.

Altogether, 21 participants took part in the training. The venue of the training programme was Periyar Tiger Reserve, Thekkady, Kerala, which has some good practices of ecotourism to demonstrate. The first day of the training programme was utilized for understanding the concepts and principles of ecotourism, livelihoods and the linkages between biodiversity conservation, ecotourism and livelihoods of local people. The participants were taken to different sites in and around Periyar where ecotourism programmes are in operation. The participants could interact with the Ecodevelopment Committees (EDCs) involved in these programmes as well as the field officials. One day was utilized for exposing the participants to the



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ongoing ecotourism initiatives of Eravikulam National Park where they could understand the functioning of Forest Development Agency (FDA) for these programmes. On the last day, there was an opportunity to share experiences by the participants representing different States. The final session was used to consolidate the learning of the training programme and develop broad recommendations for implementation of ecotourism programme in other areas. **Contact:** [anilbhardwaj@wii.gov.in](mailto:anilbhardwaj@wii.gov.in)

**A training programme on 'Wildlife Conservation: Issues and Concerns', Kanha Tiger Reserve, February 1-3, 2010.** The training programme was conducted for representatives of the Indian Army in the State Boards for Wildlife at Kanha Tiger Reserve, Madhya Pradesh. There were 14 participants of the rank of Brigadier and above.



This was the third such training programme for senior army officers nominated to represent the Indian Army in the various State Boards for Wildlife. **Contact:** [ssen@wii.gov.in](mailto:ssen@wii.gov.in)

**Two-day training workshop for IFS officers on "Managing Landscapes, Corridors and Connectivity for Effectives Biodiversity Conservation: Challenges and Way Forward", Dehradun, February 3-4, 2010.** This workshop was sponsored by Ministry of Environment and Forests, Government of India. The workshop was conducted as a part of a regular capacity building initiatives of the Ministry of Environment & Forests. In this training workshop, 25 officers from

11 States of the country participated. The broad objectives of this training workshop were to: (i) introduce the concepts and board principles of landscape approach for biodiversity conservation; (ii) share and discuss the existing experience of landscape scale research and management initiatives in India and elsewhere; and (iii) explore the ways and means of integrating the landscape scale approach in the existing management systems for biodiversity conservation.

The workshop was designed in such a way that the first day was totally adopted on the concept of the subject and the existing experience of landscape management in India and else where. On the second day, the participants worked in small groups to discuss the issues involved in landscape level management of biodiversity conservation of different regions of the country.

This was followed by a discussion leading to the major recommendations of the workshop. The understanding helped the participants to formulate broad strategies of translating the concept of landscape planning and managing for biodiversity conservation in their own areas. **Contact:** [anilbhardwaj@wii.gov.in](mailto:anilbhardwaj@wii.gov.in)

**Two-week special course in Wildlife Protection, Law and Forensic Science for the Indian Revenue Service (Customs and Central Excise) Group-A Probationers of 60<sup>th</sup> Batch (Second Group), Dehradun, February 8-19, 2010.** The objective of the course was to sensitize the participants about the unique biodiversity of India, its importance and the challenges of conservation and also about the gravity of issues related to illegal trade of wildlife and wildlife products, available legal instruments to control this trade and role of custom officers. In addition, providing basic skills of Forensic Science for identification of important wildlife products in trade was another objective.



This course was attended by 63 officers. The training module basically aimed at sensitizing the young officers of Indian Revenue Service (Customs & Excise) of 60<sup>th</sup> batch towards wildlife trade in the country and their role in checking it. Apart from providing classroom inputs, the officers were also taken to Asan Barrage and to protected area like Corbett National Park, where they had interaction with forest officers. Jungle safaris in the Dhikala and Bijrani area of Corbett National Park, sensitized them not only towards flagship species, but also some other keystone species.

All the young officers of Indian Revenue Service took a keen interest in understanding various aspects of wildlife conservation both during classroom and field training. **Contact:** [gsbhardwaj@wii.gov.in](mailto:gsbhardwaj@wii.gov.in)

**Two-day consultation workshop for State Forest Secretaries, Principal Chief Conservator of Forests and Chief Wildlife Wardens on "Emerging Trends and Future Challenges in the Wildlife Sector", Tarangi Retreat near Corbett Tiger Reserve, February 12-13, 2010.** This maiden workshop was attended by 30 senior officials. The deliberations of the workshop focused on two critical issues related to tiger conservation. First, the National Tiger Conservation Authority's (NTCA) directives on 2<sup>nd</sup> All India monitoring of tiger, co-predator, prey and habitats, critical tiger habitats, notification of buffer zones of Tiger Reserves, relocation of villages from the critical tiger habitats; second, the man-animal conflict issues related to some of the conflict species, such as



objectives were to enhance the protected area managers and conservation practitioners' understanding of the complex and multifaceted nature of tiger conservation, the tools and mechanisms available for conservation practice, and the possible course of actions that can be taken to improve conservation practices that benefit animals, people and the environment. The first part of the course was conducted in India for six weeks. The second part of the course will be conducted at the Conservation & Research Center Facility of the Smithsonian in the USA between 1 to 15 June, 2010. A total of 25 participants applicants were selected from a pool of over 175 qualified applicants and government nominees from seven countries including Bangladesh, Bhutan, India, Nepal, Malaysia, Russia and Thailand. Applicants were chosen to ensure good representation of

elephant, sloth bear and brown bear; rhesus macaque, bonnet macaque; nilgai and wild pig. The possible mitigation strategies were discussed. The workshop provided a forum to deliberate on various emerging issues and possible management interventions to effectively deal with the challenges. Various doubts about the advisories from NTCA could also be clarified by the delegates. The inputs from the participating States were significant and the valuable suggestions received from the delegates will be helpful in incorporating other important issues in future initiatives of similar kind. Half a day field visit to the Corbett Tiger Reserve was also organized for the delegates during the workshop in order to appreciate the wilderness, biodiversity conservation issues and to understand prominent management practices in the Reserve.

Shri P.R. Sinha, Director, WII; Dr. S.S. Bisht, Principal Chief Conservator of Forests and CMD, West Bengal Forest Development Corporation; Dr. Rajesh Gopal, Member Secretary, NTCA and Dr. Y.V. Jhala, Scientist-G, WII were the key speakers, who facilitated the deliberations of the workshop. **Contact:** [melkani@wii.gov.in](mailto:melkani@wii.gov.in)

**The Training of Trainers: Tiger Conservation Practitioners' Course, Dehradun, February 19, 2010 - March 26, 2010.** The Global Tiger Initiative of the World Bank organized a course through the Smithsonian Institution, Washington, DC in collaboration with the Wildlife Institute of India for training Tiger Range country personnel in Tiger Conservation Practices. Main



geographic areas, affiliations (academic, government and NGO sectors), and levels and types of expertise.

To provide proper exposure to course participants, theoretical and practical sessions were conducted in five locations, including the Wildlife Institute of India; National Zoological Park, New Delhi; Rajaji National Park; Pench National Park; and Kanha National Park. The Scientists from Wildlife Institute of India facilitated in coordinating the logistics for the course. They conducted most of the field exercises and lectures in Pench and Kanha National Park. Over 50 resource persons from five different



countries provided their inputs for the course. Session topics covered a broad range of priority themes including conservation biology of tigers, protected area management, community-based ecotourism, communications, community of practice, development and infrastructure, wildlife trafficking, monitoring and assessing tigers and prey populations, habitat assessment, law enforcement, human impact assessments, buffer and corridor management, patrolling, etc. The course provided opportunities for lectures, demonstrations, hands-on exercises and discussions. Multiple case studies from the region were presented and participants interacted with key persons from those case studies. Networking and team building was a key aspect of the training. Participants engaged with each other and resource persons during formal and informal sessions. During the interim between Part I and Part II of the course, participants will work on their Personal Leadership Plan and Group Implementation Projects. A major component of the course is the practical training by field projects to be done post the US training component. Many of the implementation projects are trans-boundary in nature and address important issues to result in effective conservation of tigers. **Contact:** [jhalay@wii.gov.in](mailto:jhalay@wii.gov.in)

**Training workshop on Wildlife Conservation: Issues and Challenges, Dehradun, March 8-12, 2010.** The Department of Science and Technology (DST) has launched a scheme "National Training Programme for Scientists &





management of ecotourism; (iii) debate of various issues related to management of ecotourism; and (iv) share the experience of ecotourism in India with participants and understand the role of the staff in the programme.

The training programme was conducted on the principle of adult learning. This involved different methods, which focused on the experience of the participants. The training sessions were

Technologists working in Government Sector". As a part of this scheme, training programmes exclusively for women scientists/technologists have been initiated. The Wildlife Institute of India organized this one-week training workshop at its campus. The objectives of the program were to enable the participants to: (i) get appraised of the current trends and challenges in biodiversity and wildlife conservation; (ii) appreciate the issues related to balancing conservation and livelihood aspirations of natural resource dependent communities; (iii) understand the problems and prospects of mainstreaming wildlife conservation issues in the development processes; (iv) get an idea of the legal issues in conservation; (v) get an exposure of the field situation and some key issues in conservation by visiting the Rajaji National Park, Uttarakhand; and (vi) interact with other professionals in the field. Twenty women scientists from different institutions all over the country participated in this program. **Contact:** [ruchi@wii.gov.in](mailto:ruchi@wii.gov.in)

**Training programme on Ecotourism for the Frontline Staff of Uttarakhand Forest Department, Dehradun, March 15-17, 2010.** As per the request of Ecotourism Wing of Uttarakhand Forest Department (UKFD), the training programme was organised for the frontline staff of UKFD. In this training programme 22 staff members and officials from different forest divisions of Uttarakhand participated. The broad objectives of this training programme were to: (i) understand the concept and principles of ecotourism; (ii) emphasize the role of local communities to



conducted by in-house and external faculty members. Programme was able to build better understanding about the concept and management of ecotourism among the participants and it could also help in devising broad understanding of future programme in the State. The medium of communication during the training programme was Hindi. **Contact:** [anilbhardwaj@wii.gov.in](mailto:anilbhardwaj@wii.gov.in)

**6<sup>th</sup> State of the Planet Conference, March 25-26, 2010 (1830 to 0330 hours IST).** 12 participants including students, researchers and faculty members from WII participated in the web-conference from the facility installed in the Porta Cabin. The Conference had four major sessions: (a) Climate change; (b) Poverty; (c) Economic recovery; and (d) International systems to deal with transnational issues. India was one of the leading participants, and TERI, New Delhi was one of the host sites for the session on Climate Change.

Discussion on Agenda - Climate Change was represented by delegates from New Delhi, India. India came up with idea of innovating eco-friendly technologies for addressing current

Climate Change concerns. Shri Nitin Desai, Former UN Under-Secretary-General from TERI emphasized the need for enforcement of international agreement. Prince Albert II of Monaco, Princess Máxima of the Netherlands, President Felipe Calderón Hinojosa, United Mexican States were among the dignitaries, who participated in the conference. Mr. Ban Ki Moon, UN Secretary-General also addressed this conference.

Possible ways and means for mitigation of effects of climate change, improving the economic growth rate of nations and challenges on poverty were explored and international commitment with action was stressed by all to address the current global issues. The conference was successfully hosted by the Earth Institute, Columbia University, USA. **Contact:** [karthik@wii.gov.in](mailto:karthik@wii.gov.in); [ashishb@wii.gov.in](mailto:ashishb@wii.gov.in)

## On the Move

**International conference on "Mountain Biodiversity Conservation and Sustainable Utilization" Dehradun, March 13-15, 2010.** The conference held at Doon University was sponsored by Uttarakhand Science, Education and Research Centre (USERC); Department of Science and Technology (DST); and Council of Scientific and Industrial Research (CSIR). A total of 100 participants took part in conference, and discussed about various aspects of mountain biodiversity; below ground microbial diversity; below ground faunal diversity; conservation of faunal diversity; ethno-botany and traditional knowledge; utilisation of medicinal plants, NWFP's and bio-prospecting; geomatics in biodiversity conservation; climate change and carbon sequestration. Shri Ashwini Kumar Upadhyay presented a paper titled "Conservation status, and distribution of wild ungulates in Changchenmo Valley, Eastern Ladakh". **Contact:** [ashwini@wii.gov.in](mailto:ashwini@wii.gov.in)

## WII in the Field

### MOTHS: THE NIGHT TIME JWELLS IN OUR BACKYARD

- **Abesh Kumar Sanyal**  
*JRF, Gangotri Landscape Project*

One of the major crises we face today is the species mass extinction caused by human activities. Out of the 5 to 50 million species that are known to exist, about 17,500 being lost each year, that is, 2 species every hour. Of these, the vast majority belongs to poorly studied groups such as invertebrates, "the little things that run the world" according to E.O. Wilson. Despite their fundamental roles in nature invertebrates have been largely ignored in conservation studies. How do we conserve species when we have very limited knowledge of the number of endangered species? Clark and May in 2002 found deep taxonomic bias in conservation research, with vertebrate studies dominating (69% of papers versus 3% of described species) over plants (20% of papers versus 18% of described species), and with invertebrates lagging far behind (11% of papers versus 79% of described species).

Beetles are arguably the most diverse insect order on Earth. Lepidoptera (moths and butterflies), with approximately 3,50,000 described species, follows close behind. In common parlance, Lepidoptera comprises the butterflies (some 20,000 species in three superfamilies) and moths (the great majority of species, spread among some 30 superfamilies). The largest families of moth (such as Noctuidae: 35,000 species; Geometridae: 21,000 species) include more species than the whole of the butterflies. Another "working division" of the Lepidoptera, of considerable relevance to conservation, is that of so-called "macro-lepidoptera" (butterflies and large moths) and "micro-lepidoptera" (predominantly smaller moths) with the more ancient superfamilies forming the micro-group, and

the more recent species comprising the macro-group. An exception to the rule, in terms of size, is the ghost moths of Australia. They belong to micro-lepidoptera, phylogenetically and biologically, but are extremely oversized.

Ecologically moths are herbivorous insects of ecosystem. A small proportion is harmful to human. A much larger part is beneficial, either directly or indirectly. They are predacious on scale and other pest insects. They assist in pollination of native and crop plants. They are scavengers and feed on dead leaf litter and other organic materials. Most provide food for insectivorous birds and other animals. Some aid in controlling the exotic weeds. In Australia, the attempts to control the *Lantana camara* has been a great success by introduction of tortricid moth *Epinotia lantana*, pterophorid moth *Lantanophaga pusillidactyla* from Central America. For the control of *Perthenium* weed, *Perthenium hysterophorus*, a gall-forming *Tortricid* *Epiblema sternuana* has been introduced from Mexico and within a year off its release it had spread to across 160 km away affecting the weed over an area of 75,000 km<sup>2</sup>. As a major herbivorous group of any ecosystem they respond strongly to deforestation and subsequent regeneration. Due to this sensitiveness, they act as an indicator group and have been widely used for assessing the condition of habitats in tropical South America, Africa and South East Asia.

In spite of all these fascinating roles they play in ecosystem services, the moths have always been regarded as "poor cousins" of butterflies in Lepidoptera conservation, and have lagged behind butterflies in popularity, and in the attention given to their conservation. But what is the reason behind this ignorance? Moths have suffered from bad Public Relations from early time and their first bad press was

also in Bible: "So man wastes away like something rotten, like a garment eaten by moths," Job 13: 28, and "Your wealth has rotted, and moths have eaten your clothes," James 27:18". Myths are always there that they eat and damage the natural-fibre made clothes, but the reality is only very few of moth species eat clothes. And they only prefer dirty clothes that are hidden away in the dark places, where they are not disturbed. Another reason for the ignorance towards them may be that they are nocturnal and only fly by night and all of them are drab coloured and hairy compared with butterflies. Although most of them are nocturnal, there are several species of day-flying moths. Many of them are brightly coloured and beautiful like the brightly patterned tiger moths. On closer inspection, cryptic patterns can be seen, which have evolved to aid camouflage in the daytime to avoid predation from insectivorous birds.

Bats are major predators of moths. They find moths in the dark through echolocation, by emitting high pitched squeaks and listening for the echo. In response to this threat, many night-flying moths have evolved ear-like organs which can pick up the squeaks of the bats and allow them to take evasive action. They may escape by changing direction suddenly, or even by performing aerial loops and spirals, and if the bat is very close they may simply shut their wings and plummet earthwards! Other moths go further and actually make their own squeaking sounds to confuse the bats. Some members of the tiger moth family use bright colours to warn predators. They may use squeaks in the dark to warn bats of their bad taste. The Death's-head Hawk-moth uses squeaks to steal honey. It's a large heavy moth so flying uses a lot of energy and it needs to refuel, but bees will sting to death any thief entering their hive. So this amazing moth makes squeaks which

apparently sound like those of a queen bee, fooling the worker bees into letting it come into their hive and eat their honey! But this isn't the only way moths pretend to be bees. The Bee Hawk-moths have evolved to look just like bumble bees, so that predators think they can sting and will leave them alone.

Not only can moths hear, they can smell scents too. Female Emperor moths produce scents called pheromones to attract males, and the males use their antennae to pick up this scent as it wafts on the air. This is why the antennae of many male moths are feathered, to increase their surface area and make them more sensitive. The amount of scent a female moth produces is small, and it quickly becomes diluted out in the air. Yet male Emperor moths can often be seen following the scent towards females, and have been known to find them over distances of up to five miles!

Moth caterpillars can also do surprising things. The caterpillar of the Goat Moth doesn't eat leaves but actually burrows into a tree trunk and eats the wood. Digesting wood is a slow process so the caterpillar takes four years to reach full size! It then emerges from a hole near the base of the tree, and as the caterpillar is very large (up to 10 cm long) and many caterpillars use the same tree, these holes are noticeable. It is also said that they can be recognised by a goat-like smell that gives the moth its name!



*The day-flying Bees Hawk Moth, **Cephonodes hylas** from WII campus.*

Another moth with an amazing life history is a British species that has become famous around the world, the Peppered Moth. The Peppered Moth is widespread in Britain and Ireland and frequently found in ordinary back gardens. An amazing discovery has made them famous all over the world. It is one of the best known examples of evolution by natural selection, Darwin's great discovery, and is often referred to as 'Darwin's moth'. Peppered Moths are normally white with black speckles across the wings, giving them this name. This patterning makes them camouflaged against lichen-covered tree trunks when it rests on them during the day. There is also a naturally occurring genetic mutation which causes some moths to have almost black wings. These black forms (called 'melanic') are not as well camouflaged on the lichen as normal 'peppered'

forms and so they are more likely to be eaten by birds and other predators. This means that, fewer black forms survive to breed, and so they are less common in the population than the paler peppered forms. This is the normal situation observed in the countryside of Britain and Ireland. However, in the nineteenth century, it was noticed that in towns and cities it was actually the black form of the moth that was more common than the pale peppered form. Industrialisation and domestic coal fires had caused sooty air pollution, which had killed

off lichens and blackened urban tree trunks and walls. So now, it was the pale form of the moth that was more obvious to predators, while the melanic form was better camouflaged and more likely to survive and produce offspring. As a result, over successive generations, the black moths came to outnumber the pale forms in towns and cities. Since moths are short-lived, natural selection operated randomly. The first black Peppered Moth was recorded in Manchester in 1848 and by 1895, 98% of Peppered Moths in the city were black. In the mid-twentieth century controls were introduced to reduce air pollution and as the air quality improved tree trunks became cleaner and lichen growth increased. Once again the normal pale Peppered Moths were camouflaged and the black forms were more noticeable. Now the situation in urban areas has again become the same as in the countryside,

### **Sports: Participation of WII's contingent in All India Forest Sports & Games Meet at Bhopal**

In accordance with the directives of the Ministry of Environment & Forests, Government of India, WII's contingent of 19 officials participated in the 18th All India Forest Sports & Games Meet conducted by the Forest Department, Madhya Pradesh at Bhopal during February 2-6, 2010. The contingent participated in Cricket, Lawn Tennis, Table Tennis, Rifle Shooting, Billiards, Carrom, and Chess. It was a matter of pride for the Institute that Dr. Manoj Kumar Agarwal won Bronze Medal in Rifle Shooting event. **Contact: [adhikaribs@wii.gov.in](mailto:adhikaribs@wii.gov.in)**





with normal pale Peppered Moths being far more common than the black forms. So natural selection has been seen to work in both directions, always favouring the moth that is best suited to the environmental conditions. The same thing has been observed throughout Europe and North America. Sadly, having adapted so well to survive the earlier ravages of industrialisation, this species is now declining overall. Between 1968 and 2002 numbers of the Peppered Moth in Britain fell by almost two thirds, although the causes are as yet unknown.

Another very interesting natural history of a particular moth is of *Xanthopan morgani*, or Morgan's Sphinx, which is a very large hawk moth from West Africa (Rhodesia, Nyasaland) and Madagascar. It is the sole member of its genus, and little is known of the biology, though the adults have been found to visit orchids, and it is believed that the larvae feed on *Uvaria*. In January 1862 while researching insect pollination of orchids, Charles Darwin received a package of orchids from the distinguished horticulturist James Bateman, and in a follow up letter with a second package Bateman's son Robert confirmed the names of the specimens, including *Angraecum sesquipedale* from Madagascar. Darwin was surprised at the defining characteristic of this species: the "astonishing length" of the whip-like green spur forming the nectary of each flower, and remarked



Another beautiful Hawk moth, *Daphnis nerii* from the campus.

to Joseph Hooker "I have just received such a Box full from Mr. Bateman with the astounding *Angraecum sesquipedale* with a nectary a foot long—Good Heavens what insect can suck it?". The spur of the flower is 20–35cm (7.9–14inches) from its tip to the tip of the flower's lip. The name "sesquipedale" is Latin for "one and a half feet," referring to the spur length. From his observations and experiments with pushing a probe into the spur of the flower, Darwin surmised in his 1862 book *Fertilisation of Orchids* that there must be a pollinator moth with a proboscis long enough to reach the nectar at the end of the spur. In its attempt to get the nectar and the end of the spur the moth would get pollen rubbed off on its head. The next orchid it visited would then be pollinated in the same manner. In 1903, such a moth was discovered in Madagascar. It was described as a sub-species of the African hawk moth and named *Xanthopan morgani praedicta*. The subspecific epithet "praedicta" was

given in honour of the fact that Darwin predicted its existence; though the subspecies was later determined to be invalid (it is identical to the mainland form of the species). The moth approaches the flower to ascertain by scent whether or not it is the correct orchid species. Then the moth backs up over a foot and unrolls its proboscis, then flies forward, inserting it into the orchid's spur.

The significance of this moth prediction goes beyond the historical details. It relates to Darwin's methodology and to his "evolution by natural selection." The scientific method dictates that hypotheses are tested by experimentation and that a verified hypothesis takes on the status of a theory. Darwin's experimentation with *A. sesquipedale* pollination and the confirmation of his moth prediction is entomological verification of the theory of evolution via natural selection. In recent years this episode in the history of entomology and evolution has taken an exciting turn. Another Madagascan orchid, *Angraecum longicalcar* Bosser, has been found with an even longer nectary than *A. sesquipedale*! This orchid's nectary is nearly 40 cm long, 10 cm longer than that of *A. sesquipedale*. The search can begin again. For somewhere in Madagascar, is a gigantic moth with a proboscis even longer than Darwin's Madagascan hawk moth!

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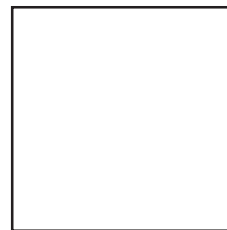
### Welcome Guests

- ◆ 16 P.G. students of Botany from Shri Shivaji Science College, Amravati, *January 1, 2010.*
- ◆ 60 IFS officers under training at Indira Gandhi National Forest Academy, Dehradun, *January 5, 2010.*
- ◆ 10 M.Sc. students accompanied by one faculty member from G.B. Pant University, Pantnagar, *January 8, 2010.*
- ◆ 16 B.Tech. students accompanied by two Professors from College of Agricultural Engineering & Post Harvest Technology (Central Agricultural University), Ranipool, Gangtok, Sikkim, *January 28, 2010.*
- ◆ 30 cadets accompanied by two masters from Rashtriya Indian Military College, Dehra Dun, *January 29, 2010.*
- ◆ 25 trainees of Kashmir Forest's Training Course (KFC) from Forest Department, Jammu & Kashmir, Soil Conservation Training School, Miran Sahib, Jammu, *February 12, 2010.*
- ◆ 42 M.Sc. (Environmental Science) students accompanied by their faculty from Shivaji University, Department of Environmental Science, Vidyanagar, Kolhapur, Maharashtra, *February 16, 2010.*
- ◆ 19 B.Sc. (Forestry) students accompanied by their two faculty members from ASPEE College of Horticulture & Forestry, Navsari Agricultural University, Navsari, Gujarat, *March 5, 2010.*
- ◆ 58 B.Sc. (Forestry) students accompanied by two faculty members from Sam Higginbottom Institute of Agriculture, Technology & Science, Allahabad, *March 11, 2010.*
- ◆ 25 M.Sc. (Geo-informatics) students accompanied by two faculty members from TERI University, New Delhi, *March 17, 2010.*
- ◆ 17 M.Sc. students accompanied by five faculty members and two technical staff from School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, *March 23, 2010.*
- ◆ 28 M.Sc. (Forestry) students accompanied by four faculty members/staff from Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, *March 26, 2010.*
- ◆ 38 SFS officer trainees accompanied by one faculty member from Central Academy for State Forest Service, Coimbatore, *March 31, 2010.* **Contact: [acell@wii.gov.in](mailto:acell@wii.gov.in)**

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