

ZSI e-NEWS

The Monthly Electronic Newsletter of Zoological Survey of India



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ANIMAL OF THE MONTH



Darjeeling bush frog

Check-list of fauna of India:

Eucharitidae

(Chalcidoidea:

Hymenoptera: Insecta)

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VIDEO

1. [Malabar Whistling - thrush](#)
2. [Tamil Yeoman](#)
3. [Solar Eclipse \(July 22nd, 2009\)](#)

From the Director's Desk

I am glad to inform that the Ministry of Environment and Forests constituted a Task Force of eminent Professors in the country to strengthen the institutional mechanism and development in ZSI. As per the directives of the administrative Ministry, the Regional Stations of ZSI have been renamed as Regional Centres. Several scientists from Headquarters as well as Regional Centers observed the longest solar eclipse of the 21st century on 22nd July, and in connection with that the scientists of the Survey conducted eco-observation studies on the impact of the eclipse on fauna. Another event of significance to ZSI was the participation of 4 scientists in the 'IUCN Eastern Himalaya Freshwater Biodiversity Assessment Training Workshop' held at Kathmandu, Nepal, from 22nd to 26th July.

Dr. Ramakrishna


Headquarters, Kolkata

Field surveys were conducted in Uttar Pradesh and Kolkata Wetlands, and a study to evaluate the feasibility of reintroducing the Pygmy Hog in the Garumara National Park, West Bengal was carried out. During the month, *Discolaimus dhanachandi* (Dorylaimida: Qudsianematidae), *Epipteromalus bengalensis* (Hymenoptera: Pteromalidae) and two species of the genus *Zaischnopsis* Ashmead (Hymenoptera: Eupelmidae) were described as new to science. The genus *Anurophorus* Nicolet (Collembola: Isotomidae) has been recorded for the first time from India. 20 species of Hymenoptera belonging to the families Chalcididae (4 species), Eulophidae (7 species), Eurytomidae (4 species) and Pteromalidae (5 species) were reported for the first time from Sunderban Biosphere

Reserve, of which 19 species also form new records for West Bengal. *Antrocephalus validicornis* (Holmgren) (Chalcididae) is a new record from the Indian subcontinent. Three species of the family Scoliidae (Hymenoptera) are newly reported from Andhra Pradesh and one species from the States of Mizoram, Orissa and Sikkim. Two species of Coleoptera and five species of free living ciliates are newly reported from Uttar Pradesh and Kolkata Wetlands, respectively. The Terai cricket frog *Fejervarya teraiensis* (Dubois) and *Polypedates taeniatus* (Boulenger) are reported for the first time from Uttar Pradesh. Holotypes and Paratypes of three species of Platyhelminthes and one species of Phthiraptera were deposited in the National Zoological Collection by the School of Life

Sciences, North Eastern Hill University, Shillong and the Department of Zoology, Government Raja P.G. College, Rampur, Uttar Pradesh, respectively. Ten lots of specimens received from various organizations were identified and reports submitted. Two body parts of Sambar, *Cervus unicolor* Kerr. were received from the Divisional Forest Officer, Raipur Forest Division, Raipur, Chhattisgarh, as seized material for identification. 8 research papers were published, 2 accepted and 3 submitted for publication. Two Scientists visited Taregna near Patna to study the behaviour of

animals under the changing celestial condition during the solar eclipse on 22nd July. Several scientists also observed the effect of solar eclipse on animals in captivity at the Zoological Garden, and other parks of Kolkata. Three Scientists from other institutions visited different sections for studying the faunal specimens. A scientist attended the Governing Body Meeting of the Vulture Conservation Breeding Programme in West Bengal, at Kolkata and the Managing Committee meeting of the Zoological Garden, Kolkata.

 In this Issue


Freshwater Biology Regional Center, Hyderabad

The Palair Lake, a multipurpose raw water reservoir in Khammam District, Andhra Pradesh was surveyed from 11th to 15th July, for limno-biological evaluation of the lake's hydrobiological features vis-à-vis the lake's physiochemical parameters and faunal profile. In all, 332 examples of major wetland faunal groups, including zooplankton samples were collected from limnologically significant sites. Further to the documentation of the fauna of Kolleru Lake, West Godavari/Krishna Districts of Andhra Pradesh, 39 field photographs of the predominantly wetland birds (grebes, cormorants, herons, storks, spoonbills, pelicans, jacanas, sand snipes, moorhens, etc.) and other wetland associated birds were taken. 5 species of amphibians - the other major vertebrate nekton component of the wetlands, collected during the field surveys, were identified. A rhacophorid tree frog, *Polypedates maculatus* Grey, was collected from nearby environs (Eluru, Western



Polypedates maculatus

Godavari District) and added to the National collections of the Centre. Based on an enquiry received from the Director (Development), Environmental Protection Training Research Institute (EPTRI), Hyderabad, information on the fauna of Andhra Pradesh was provided for incorporation in the multi-sectoral State of the Environment report under preparation by the EPTRI.

 In this Issue

Western Regional Centre, Pune

Scientists of the station rendered identification services to the Maharashtra State Forest Department (birds, 2 species), Govt. Vidharbha Institute of Science and Technology, Amaravati (aquatic beetles, 7 species) and S. G. Patil Arts, Science and Commerce College, Sakri (freshwater fishes, 9 species). 700 primary school

students visited the museum during the month. A scientist of the Centre participated in the "IUCN Eastern Himalaya Freshwater Biodiversity Assessment Training Workshop" organized by the Freshwater Biodiversity Unit, IUCN Species Programme (Species Survival Commission), Cambridge, United Kingdom, held at

Kathmandu, Nepal from 22nd to 26th July.

Publication:

K. A. Subramanian (2009). *Dragonflies of India* -

A Field Guide. Vigyan Prasar (Department of Science and Technology, Govt. of India). 168pp. ISBN: 978-81-7480-192-0. Price: INR 125/-



In this Issue

Desert Regional Centre, Jodhpur

Two field surveys were conducted, one from 6th to 17th July in the forest areas of Gujarat, resulting in the collection of 167 soil samples and 3257 examples of different faunal groups and the other from 22nd to 30th July in Sita Mata Wildlife Sanctuary and around the lakes of Udaipur, Rajasthan, resulting in the collection of 25 water samples, 35 wet soil samples and 349 examples of different faunal groups. Scientists of the Centre identified 7 species of Lepidoptera of



Lion, *Panthera leo* (Linnaeus), at Gir National Park, Gujarat



Wild Ass, *Equus onager* Boddaert, at Rann of Kutchch, Gujarat

Aravalli Range, 4 species of Coleoptera and 3 species of Orthoptera of Rajasthan and 4 species of Nematoda of Gujarat from the earlier collections of the Centre. The 4th meeting of the Gujarat State Board for Wildlife was attended by the scientists of the Centre at Gandhinagar. 2 manuscripts, 'Fauna of Nalsarovar Wetland, Gujarat' and 'Pictorial Hand Book on Diversity of Nematodes' were submitted for publication. 48 entries of identified fauna were made in the

Faunal Database maintained at the Centre. The Centre's museum was visited by 34 visitors during the month. A scientist of the Centre participated in the "IUCN Eastern Himalaya Freshwater Biodiversity Assessment Training Workshop" organized by the Freshwater

Biodiversity Unit, IUCN Species Programme (Species Survival Commission), Cambridge, United Kingdom, held at Kathmandu, Nepal from 22nd to 26th July [Photograph given under the report from the Western Regional Centre/ ZSI, Pune].

 In this Issue

High Altitude Regional Centre, Solan

A faunistic survey was conducted from 14th to 27th July at Pangi Valley, Chamba District - one of the remotest areas of Himachal Pradesh - for faunal documentation. 250 photographs on fauna and habitats were taken during the survey. Besides, 15 species of pollinator butterflies, 10 species of Orthoptera, 47 species of birds and 1 species of bat were recorded from the area. A senior scientist of the Centre attended the meeting of the Wildlife Board, Chandigarh, held for the formation of Shivalik National Park, a butterfly Park and the ecological monitoring of




Rock Bunting at Kellar (Pangi)



Papilio machaon at Purthi (Pangi)

Sukhna Wetland. A four-day faunistic survey tour to Kalatop and Khajjiar District, Chamba (HP) was conducted to study the intraspecific variation in the snow trouts of river Ravi. The Centre was visited by 40 teachers of the Staff College, in connection with a training programme on environmental awareness and Education conducted for teachers by the Himachal Pradesh University; lectures were delivered by the scientists of the Centre during their visit.

 In this Issue

Northern Regional Center, Dehra Dun

Two intensive surveys were undertaken in Kalesar National Park. 17 species of butterflies were identified, besides observing 11 species of mammals and 35 species of birds. Soil nematodes collected from Ladakh were identified. One intensive survey in and around Dehra Dun was undertaken for collection of helminth Parasites of Vertebrates of Doon Valley and one around Ganges in Haridwar for the ecological and molecular study of fresh water turtles. 14 species of fishes collected from R.

Ganges in Haridwar have also been identified. Mass mud-puddling activity of the butterflies, *Catopsilia pomona*, *C. pyranthe* and *Papilio demoleus* was observed and documented in connection with a special study conducted to document the behavior of wild animals impacted by the solar eclipse on 22nd July. The study was conducted in the southern flank of the Shiwalik range of Rajaji National Park. One research paper referred by an outside journal for review was offered suitable comments. Scientists




The phenomenon of Mud-puddling exhibited by the pierid butterflies, *Catopsilia pomona* and *C. pyranthe*, in Rajaji National Park

of the station attended a workshop on 'Securing Elephant Corridors and Human elephant Conflict mitigation in Northern India',

organized by the Wildlife Trust of India from 2nd to 3rd July. 2 manuscripts were submitted for publication in the ENVIS Newsletter of ZSI on the soil fauna of Ladakh.

Publications:

1. Bahuguna A. 2009. Gene Sanraksan Vigyan evam Vanyajeev, Krishi Chayanika (in Hindi), ICAR Publication (Jan-March 2009), pp. 26-27.
2. Tak, P.C., Kankane, P.L. and Bohra. 2009. Birds of Barmer District, Rajasthan, India. *Newsletter for Birdwatchers*, 49(2): 17-22.
3. Vijay. M. and Bhutia, P.T. 2009. Avifaunal Diversity in Upper Tons River Valley, Uttarkashi District, Uttarakhand. *Ann. For.*, 17(1) 135-142.1

 In this Issue

Central Zone Regional Centre, Jabalpur

A tour to Veerangana Durgavati Wildlife Sanctuary, Damoh District, Madhya Pradesh, to observe the impact of total solar eclipse on animal behavior was conducted on 22nd July and a report submitted. In addition, collections of more than 250 specimens of various orders of insects were also made with the aid of the light traps installed at two localities in the sanctuary. During the month, 14 species of rotifers, 12 species of Cladocera and 14 species of fishes were identified. A scientist of the Centre reviewed a taxonomy paper on gall midges and attended a four-day training programme on the Records Management for RTI at ISTM at New

Delhi. A research paper on Insecta: Homoptera: Membracidae has been submitted for inclusion in the State Fauna series of ZSI on Maharashtra.

Publications:

1. Gupta, S. K. and Chandra, K. 2008. On Orthoptera Collection from Panna National Park, M. P., India. *Indian J. Trop. Biodiv.* 16(1): 97-102.
2. Chandra, K. and Gupta, S. K. 2009. On a collection of Orthoptera from Veerangana Durgavati Wildlife Sanctuary, Madhya Pradesh, India. *Biological Forum-An International Journal*, 1(1): 69-74.

 In this Issue

Gangetic Plains Regional Centre, Patna

An extensive survey in Dalma Wildlife Sanctuary, Jharkhand and three local surveys in Patna, Chapra, and Saran Districts of Bihar were undertaken. About 60 examples of Insects of various orders from Dalma Wildlife Sanctuary and 150 examples of insects from Bihar were collected for taxonomic studies and faunal documentation. Butterflies of 2 species and moths of 8 species (Insecta: Lepidoptera) from Dalma Wildlife Sanctuary, fishes of 8 species and zooplanktons of 12 species from river Subernarekha, Jharkhand, and chalcids (Insecta: Hymenoptera) of 4 species from




Arhopala amantes (Hewitson), Insecta: Lepidoptera: Rhopalocera) - first record from Dalma W.L.S.

Bihar were identified, which included one species of Pteromalidae collected for the first time from Bihar. A Scientist of the station attended an International symposium at Tirupathi from 25th to 27th July and presented a paper on the fauna of Gandak River, Bihar. 2 papers, one on Chalcidoidea (Hymenoptera: Insecta) and the other on mantid fauna (Insecta: Mantodea) of Orissa were accepted for publication. The Ministry of Environment and Forests, New Delhi, sanctioned Rs. 9, 52, 78,000/-, the tentative cost, for the construction of the office building for GPRC, in the newly purchased plot of land at Patna.



Hestiasula brunneriana Saussure
(Insecta: Mantodea) - first record from Bihar

 In this Issue

Arunachal Pradesh Regional Centre, Itanagar

A special study was conducted on 22nd July to observe the influence of solar eclipse on the behavior of wild animals. On the day, Itanagar witnessed more than 98% of the total eclipse. Scientists of the Centre visited the Zoological Park at Itanagar to observe the behavioural changes of mammals and birds kept in Zoo during the eclipse. Observations were made on the behaviour of captive Hoolock Gibbons, *Bunopithecus hoolock*, wild Rhesus Macaques, *Macaca mulatta*, as well as the wild birds in the Zoo. An experiment to investigate the feeding behaviour and oxygen consumption of the grasshopper, *Oxya fuscovittata*, before, during and after the solar eclipse was also conducted. The studies resulted in some interesting observations. A project proposal received for reviewing was scrutinised and comments



The Great hornbill, *Buceros bicornis*

offered. A scientist of the Centre has been reappointed as the Indian member of the IUCN-SSC Lagomorph Specialist Group for the next four years. A video recording of the total solar eclipse witnessed at Itanagar is hyperlinked with the departmental website www.zsi.gov.in.

 In this Issue


North Eastern Regional Centre, Shillong

During the month, 7 species of Rotifera and 8 species of Cladocera from Deepor beel, Kamrup district, Assam, and 6 species of Rotifera, 5 species of Cladocera, 1 species of aquatic Hemiptera and 11 species of Pisces from Nokrek Biosphere Reserve, Garo Hills, Meghalaya were identified and registered. 11 species of Pisces were identified for the Zoology Department, North Eastern Hill University, Shillong. A faunistic survey was conducted at the Loktak Lake and Keibul Lamjao National Park,



The 'All Shillong Inter School Quiz Championship' organised by NERC/ZSI

Manipur from 8th to 17th July and representative faunal samples collected. A local trip was also conducted to Deepor beel (a Ramsar site) and water samples as well as qualitative and quantitative plankton samples were collected from six sampling sites. The Centre, as part of its Golden Jubilee Celebration, organized the 'All

Shillong Inter School Quiz Championship' in association with Doordarshan Kendra, Shillong from 20th to 22nd July, at the Martin Luther Christian University, Shillong and sponsored by NEEPCO and State Bank of India, Shillong. Many top students of various schools in Shillong participated in the quiz programme.  In this Issue

Marine Aquarium cum Regional Centre, Digha

The aquarium of the Centre was visited by an average of 235 visitors per day. 63 examples of live animals were introduced for display in the aquarium tanks which were mostly procured through local surveys. The major attractions among the displayed animals during the month were the Black spotted Moray (*Gymnothorax favagineus*), Shunk Clownfish (*Amphiprion akallopisos*) and Yellow-tailed blue Damsel (*Chrysiptera parasema*). Apart from the aquarium maintenance, 30 examples of marine invertebrates were also collected through local surveys. All the specimens collected during the

month were processed for identification. The collection comprised of 6 species of fishes, 32 species of bivalves, 1 species of gastropod, 1 species of cnidarian and a species of cirripede. A special study was conducted during the solar eclipse on 22nd July, to observe the behavioural changes, if any, of the various groups of marine animals in captivity in the aquarium. A staff member of the Centre participated in the training programme on IT awareness & E-Governance, organized by the administrative ministry at Kolkata. Advisory services were rendered to various groups of visitors who visited the aquarium.



Sea cucumbers (Holothuroidea: Echinodermata)



The Vermiculate Spinefoot, *Siganus vermiculatus* & the Mottled spinefoot, *Siganus fuscescens*



Shunk clown fish, *Amphiprion akallopisos*



Black spotted moray eel, *Gymnothorax favagineus*

Estuarine Biology Regional Centre, Gopalpur-on-Sea

A faunistic survey tour to Bhanjanagar, Ganjam District in Orissa was conducted from 26th June to 2nd July and over 240 examples of various groups of insects were procured for taxonomic studies. 6 species of crabs and 1 species of prawn from Nuanai Estuary, Puri and 1 species each of aquatic Coleoptera and Hemiptera from Brahmani-Baitarani estuary, Bhadrak District, Orissa were identified. One scientific paper was reviewed for a publication of ZSI and comments offered. In connection with the solar eclipse on 22nd July, the scientific team of the Centre

observed the behavioural pattern of the marine coastal fauna of the Gopalpur Creek, Ganjam District, Orissa. A scientist of the Centre participated in the “IUCN Eastern Himalaya Freshwater Biodiversity Assessment Training Workshop” organized by the Freshwater Biodiversity Unit, IUCN Species Programme (Species Survival Commission), Cambridge, United Kingdom, held at Kathmandu, Nepal from 22nd to 26th July [Photograph given under the report from the Western Regional Centre/ZSI, Pune].

 In this Issue

Southern Regional Centre, Chennai

A research paper on Hemiptera (aquatic & semi-aquatic: Insecta) of the Bandhavgarh Tiger Reserve has been accepted for publication in the Conservation Area series: *Fauna of Bandhavgarh Tiger Reserve*, to be brought out by the department. A manuscript on Membracidae (Homoptera: Insecta) of Maharashtra, dealing with 8 species under 6 genera so far known from the State has been submitted for inclusion in the departmental publication: *Fauna of Maharashtra*. 10 species of freshwater fishes and 6 species of Orthoptera (Insecta) were identified out of the material collected from Southern Eastern Ghats and Karnataka state respectively. A field study was conducted at the Vedanthangal Bird Sanctuary, Tamil Nadu on 22nd July to observe

and document the impact of solar eclipse on the behaviour of birds in the sanctuary. A checklist of Membracidae (Homoptera: Insecta) known from India, comprising of 233 species under 42 genera and 3 subfamilies, was made ready. A scientist of the Centre delivered a lecture on dipteran diversity at the Zoology Department, University of Madras, Chennai in a programme organized by the University for the newly recruited lecturers of Govt. Arts Colleges of Tamil Nadu. A video on the Malabar Whistling - thrush, *Miophonus horsfieldii*, documented during the field survey conducted in the Kanniyakumari Wildlife Sanctuary is hyperlinked with the departmental website www.zsi.gov.in.

 In this Issue

Andaman and Nicobar Regional Centre, Port Blair

Surveys were conducted at the Saddle Peak National Park in North Andaman, Mayabunder waters of Middle Andaman and Rutland & Hevelock Islands of South Andaman to investigate the faunal diversity; 58 species of birds, 2 species of reptiles, 5 species of lizards, 1 species of amphibian, 17 species of fishes, 25 species of butterflies, 167 species of corals, 22 species of echinoderms, 20 species of crustaceans, 25 species of gastropods, 9 species of bivalves, 12 species of nudibranchs and 4 species of sponges were identified from these

areas. Among them, the corals, *Fungia taiwanensis* (Hoeksema & Dai, 1991) and *Acropora mirabilis* (Quelch, 1886), gastropod *Cypraea cicercula* (Linnaeus) and the cephalopod *Argonauta hians* Lightfoot turned out to be new records to Indian waters, while the fish *Istigobius diadema* (Steinadachner, 1876) new to A&N archipelago. A study to investigate the effect of solar eclipse on the primary and secondary productivity of Andaman Sea was carried out on 22nd July and observations made. 30 species of corals and 10 species of echinoderms procured

during the recent surveys have been registered and deposited in National Zoological Collection of the Centre. Manuscripts on 'Current scenario of corals and its associated fauna of Katchal and Teressa Islands of Andaman and Nicobar archipelago' and 'New record of *Istigobius diadema*' have been submitted to scientific journals for publication. The Centre received the approval from the A&N Administration for a short-term project 'Present status of gastropods *Trochus niloticus* and *Turbo marmorata* in A&N Islands'. 3 requests received for identification services were attended to. 3 project proposals were reviewed and comments communicated. Scientists of the Centre served as members in the

research advisory committee meeting of the Dept. of Environment and Forests and in the executive council meeting of the Department of Science and Technology, A&N Administration. The Centre represented the state level Wildlife Board meeting and a meeting arranged to discuss the issue pertaining to seashell craft industries of the Islands.

Publication:

Stella, C. and Raghunathan, C. 2009. Age and growth of muricid gastropods *Chicoreus virgineus* (Roding, 1798) and *Muricanthus virgineus* (Roding, 1798), from Thondi coast, Palk Bay, Bay of Bengal. *Nature Environment and Pollution Technology*, 8(2): 237-245.



The Coral, *Fungia taiwanensis* - new record to India



The Coral, *Acropora mirabilis* - new record to India

 In this Issue

Western Ghat Regional Centre, Kozhikode (Calicut)

A new species of *Trissolcus* Ashmead (Platygastridae: Hymenoptera: Insecta), parasitising the egg of scutellarid pest of *Jatropha* was described and the manuscript made ready for publication. A research document entitled 'An annotated checklist of Amphibia of India with some insights into the patterns of species discoveries, distribution and endemism' has been accepted for publication in *Records of Zoological Survey of India: Occasional Paper*. 8 species of Odonata (Insecta) were identified out of the collections received from NRC/ZSI, Dehradun. Two local surveys were undertaken on 2nd and 3rd July at the Kakkayam reserve forest, (area proposed to be declared as

the Malabar Wildlife Sanctuary), Kozhikode District, for amphibian studies. Scientists of the station delivered 8 lectures (Zoogeography in India with special reference to Western Ghats; overview of Western Ghats; invertebrate and vertebrate diversity; hotspots; protected areas; threats and conservation of Western Ghats etc.) to the school teachers under the *Sarva Shiksha Abhiyan* (SSA) educational Scheme of Govt. of Kerala, on 8th and 9th July during a special programme organized by the Centre for the SSA. Another lecture was delivered on 13th of the month by one of the scientists of the Centre, as an invited resource person, during the orientation course for college lecturers, organized by the

Academic Staff College (UGC sponsored), at the University of Calicut. A scientist of the Centre actively participated in the workshop organized by the Kerala State Forest Department for preparation of the Management Plan pertaining to the newly proposed Malabar WLS on 29th and 30th of the month. 2 research documents, 2 pictorial handbooks, and 6 research papers received from different agencies were reviewed by the concerned scientists of the Centre and comments offered. Identification service on 20 species of fishes, advisory services on avian diversity of Mavoor wetlands, Purathur and Kadalundy estuaries as well as on the activity patterns of selected wetland birds were rendered to college students. During the month, 276 visitors paid their visits to the museum maintained at the Centre. A scientist of the Centre participated in the “IUCN Eastern Himalaya Freshwater Biodiversity Assessment

Training Workshop” organized by the Freshwater Biodiversity Unit, IUCN Species Programme (Species Survival Commission), Cambridge, United Kingdom, held at Kathmandu, Nepal from 22nd to 26th July [Photograph given under the report from the Western Regional Centre/ ZSI, Pune].

The Western Ghats Regional Centre (WGRC), ZSI provided facilities to the Regional Science Centre, Kozhikode to arrange a programme for the general public to view the solar eclipse on 22nd July. A direct web-cast of the eclipse from Bihar was also arranged at the WGRC/ZSI auditorium on the day.

A videograph of the Tamil Yeoman, *Cirrochroa thais* (Fabricius), a nymphalid butterfly, endemic to Western Ghats and Sri Lanka, recorded at the Anackampoil Reserve Forest in Kozhikode District, Kerala is hyperlinked with the departmental website www.zsi.gov.in.



People watching solar eclipse through telescope and through direct web-cast at WGRC/ZSI, Kozhikode on 22nd July



Indrella ampulla (Benson) - a land snail, endemic to Western Ghats

ANIMAL OF THE MONTH

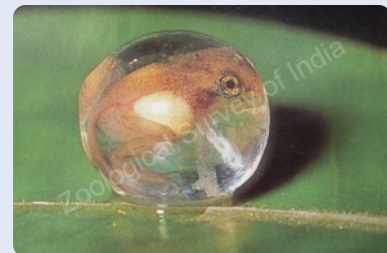


Darjeeling bush frog
Philautus annandalii (Boulenger, 1906)

[Text & Photos by: Kaushik Deuti, ZSI, Kolkata]

If you visit any part of the Darjeeling hills between May and August, the hillsides will resonate with a 'tik...tik.....tik-tik' call with a ventriloquist effect all through the night. This strange call will emanate from every bush, shrub, herb and grass by the roadside, no matter whether you are in Darjeeling or in Kurseong or in Sonada or in Mirik. The caller is a very small frog of only 17-21 mm size, with a pointed snout and large eyes. Its fingers are short and free of webbing while its toes are short but webbed at the base. The discs on the fingers and toes are small. The body colouration varies from light or dark greyish-brown to blackish-brown. The markings and arrangement of spinules on the body also vary. Its underside is creamy-white. The males have the inner side of their thighs bright red in colour during the breeding season. Compared to its small size, its vocal capacity is very high, that its calls can be heard from quite a distance. Its vocal sac, which acts as a resonator, when inflated is equal to or slightly larger than the frog itself! They are mainly nocturnal but are sometimes heard during the day, when the sky is overcast and misty. They spend the day hidden among the litter on the ground or in tiny rock-

crevices but climb on to the bushes during the evening. These frogs have a very strange mode of breeding. They do not require water for depositing their eggs. In 1997, Mallick reported that they lay small clutches of 13-27 large eggs in moist soil or inside rock-crevices. There is no free-living tadpole stage, rather a tiny froglet develops inside each egg and hatches out. In 2007, Sarkar and Deuti observed that sometimes the males fight and wrestle with each other and try to topple the opponent from its perch. Thus these frogs also exhibit territorial behaviour.



Egg of *Philautus annandalii*

References:

1. Mallick, P.K. 1997. Notes on reproduction in *Philautus annandalii* in Sikkim. *Hamadryad.*, 22(2): 123-124.
2. Sarkar, A & Deuti, K. 2007. Wrestling for territorial defense in *Philautus annandalii*. *Hamadryad.*, 31(2): 367-368.