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NORTH EAST BIOLINE

NEWSLETTER OF GUWAHATI BIOTECH PARK

GUWAHATI BIOTECH PARK

Discovering through partnership

Department of Science and Technology, Government of Assam

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Review Meeting with
Sri Sarbananda Sonowal
Hon'ble Chief Minister of Assam

Launch of the 1st issue of NORTH EAST BIOLINE by SHRI KESHAB MAHANTA Hon'ble Minister, Science & Technology Department, Government of Assam, on 1st July 2016

Hon'ble Minister, Science & Technology Department, Government of Assam, Shri. Keshab Mahanta visited Guwahati Biotech Park currently located in the IIT Guwahati campus and also visited the site in Amingoan where the permanent campus of Guwahati Biotech Park will be established on 15th June, 2016. Hon'ble Minister visited the different facilities in the

Incubation Centre like ready-to-lease laboratory and equipment facilities. Shri. Vinod Seshan, IAS, CEO, Guwahati Biotech Park and the officials of the park appraised him on the activities and various services offered by the Incubation Centre. He also interacted with the start up Entrepreneurs associated with Guwahati Biotech Park. In a short interaction thereafter Shri. Seshan also briefed the Hon'ble Minister on the status and progress of the Incubation Centre and the establishment of the Park in the permanent site. Shri. Biswaranjan Samal, IAS, Commissioner & Secretary to the GoA, Science & Technology Department was also present during this visit. Hon'ble Minister assured full support of the Government for the establishment of Guwahati Biotech Park.

सत्यमेव जयते

Shri Vinod Seshan, IAS
CEO, Guwahati Biotech Park

FROM THE CEO'S DESK

So then…it's time for GBP's second newsletter. As usual I'm excited and hoping like the last time that this edition too would have something that would make the reader satisfied. There has been a delay in releasing this on time, but then, we never had any fixed time-line or a target date. We were only resolved to release the next issue at the earliest. However, in the future, we strongly intend to make this a regular quarterly affair.

The last 6 months have been a very testing time for GBP. Some entrepreneurs at GBP have quit and some have joined freshly. The technical review committee spent a considerable time reviewing the performance of all the projects at the incubation centre and the performance of GBP itself as a whole. Some projects have registered good progress while some have progressed without a direction, probably common in research sometimes. But, their sincerity towards research progress hasn't been a point of question, which gives a lot of credibility to GBP and its incubation centre.

Revenues have been coming in and progressing steadily. Expenditure has been steady like the last fiscal. We do intend to register significant incomes in the upcoming 4th quarter to close this critical fiscal on a high. Raising revenues though is not our primary job. Our primary job is to sustain research work and enable start-ups. Hence, some important plans have been laid out and execution has commenced. Financially, the Department of Biotechnology (DBT) has extended their support to the incubation centre project of GBP by another two years and that has been a major boost to GBP in the last 6 months. IIT, Guwahati too have allowed the lease of space arrangement to GBP for another 24 months which is another positive feather. The incubation centre project is now relatively comfortable and secure and looking forward to add more new-innovative projects in the days to come.

GBP recently signed a MoA with the Sualkuchi Tat Silpa Unnayan Samiti in Kamrup in order to promote silk testing. As part of the MoU, a technological grant has also been provided to the Samiti. The Detailed Project estimates (DPR) for the permanent building of the Technology Incubation centre have been prepared

and submitted to the Science & Technology Department, Government of Assam, while the Master plan for the entire area of the biotech park is now nearing completion. Some new instruments like the Fermenter (5L & 40 L), FPLC, Chromatography Unit etc. have been added to the list of research equipment available at GBP. Many senior researchers, many investment and start-up specialists have visited GBP in the last few months, primarily to help and to see the incubation centre grow further. Universities like Cotton College State University have signed agreements to promote biotech study and research at GBP and many of their students are seen visiting the facility frequently. Many other researchers and students, irrespective of the university they belong to, have also been using the infrastructure at the incubation centre to complete their project reports and to undergo internship and dissertation work. A National Talent Search competition had been announced and over 50 research proposals have been received from various places in the country. Our scientists have participated in various technical seminars as well as research forums and presented interesting ideas while also evaluating a few others.

So, overall, though not thoroughly sparkling, very satisfying progress has been made in the last five months. As we move forward towards the close of the financial year, we intend to do a few more interesting activities, other than just raising revenues. A biotech networking conclave, with technical and business sessions, is scheduled for January while a Children Science Festival is planned for February. GBP also plans to learn from organizations like NIPER (National Institute of Pharmaceutical Education and Research), which is coming up in North Guwahati and explore mutual areas of interest. There are discussions with industry consortiums like ABLE (Association of Biotech-Led Enterprises) and FINER (Federation of North Eastern Industries) to explore how GBP may benefit from their expertise to improve the bio-tech presence and growth in the North Eastern region and India overall. GBP is also exploring opportunities to set up a sericulture biotech incubation lab to understand and promote, pre-cocoon silk work, especially for MUGA, the famed Golden Fiber of Assam. We are also hoping that the Government of Assam would sanction the construction of the permanent building for the incubation centre.

So, this general report apart, I sincerely hope that this edition is living up to your expectations. Please give us your feedback as we intend to keep improving.

Vinod Seshan

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ARTICLES

TURTLES

The armoured warrior fighting for existence

Mr. Jayaditya Purkayastha
General Secretary, Help Earth

Turtles are animals with backbones, ie they are vertebrates who breathe through lungs, have a body that is covered with scales or scutes, in most cases are oviparous (lay eggs) except in some cases where they are ovoviviparous (producing young by means of eggs which are hatched within the body of the parent). They are ectotherms, which means their body internally generates very low or almost no heat to run their metabolic processes. Thus they have to depend upon external sources of heat for their body processes. That is the reason why these animals need to bask. From the combination of above characteristics turtle qualifies to be a reptile, one of the five classes of vertebrate animals. Modern day reptiles comprises of turtles, crocodilians, lizards, snakes and tuatara.

Turtles are one of the oldest groups of reptiles whose earliest record dates back to 220 million years. The usage term turtles and tortoises vary from place to place and there is not much to tell them apart. Generally speaking water dwelling forms are referred to as turtles, land dwelling ones as tortoises. Scientifically they are referred to as chelonian or testudines. One broad evolutionary divergence between the living turtles divides them into two groups the Pleurodira or the side- neck turtles which

folds their neck sideways under the shell margins and Cryptodira which can pull their head and neck inside the shell. All the turtle species found in India belong to Cryptodira.

Turtle shell is a complex structure primarily acting as a shield and protecting the internal organs of the animal. The shell is a combination of modified vertebrae, shoulder, ribs and pelvis. The shell of the turtle is one of the most important keys for proper identification. Some of the turtles shell are covered with hard scutes and are known as hardshell turtles and the otherswith leathery skin are known as soft shell turtles. The dorsal portion of the shell is called carapace, the ventral as plastron. Carapace and plastron are joined by bridges.

Important bones that make up the Carapace are:neurals (8), suprapygal(1) pleurals (8 pairs), nuchal bone (1), peripherals (11 pairs). The shell of hard shell turtles are externally is covered with scutes which are horny plates made of keratin, the protein that makes our nails, hairs etc. They are named as Vertebrals (Rows of scutes running along the median of the shell), Coastals(rows of scutes running on each sides of Vertebrals in pairs), Marginals (rows of scutes running along the circumference of the shell), Nuchal (absent is some species, if present, it is situated at the anterior tip of the shell placed within the first and the last marginal). Some species also may have an additional scute, supra marginal alongside magrinals Important scutes that makes up the plastron of hard shell are gular, humeral, pectoral, abdominal, femoral and anal. Some species additionally may have intergulars and infra-marginals. There may be one or two hinges present between these scutes. In softshell species, plastral callosities are important features. In flapshells an additional femoral flap is present. Leatherback sea turtle (*Dermochelys coriacea*) and Asian softshell turtle (*Pelochelys cantorii*), are the largest living turtles, both reaching a shell length

of 200 cm. Amongst the smallest ones the speckled tortoise (*Homopus signatus*) is down there with a shell length of 10 cm.

The eyes of turtle have exceptionally large number of rod cells giving them very good night vision. Turtle have rigid beaks and their buccal cavity does not have teeth, instead they have horny ridges. Turtles cannot stick out their tongue like other reptiles. Amongst air breeding animals, turtles can withstand the highest concentration of carbon dioxide in their blood, which is why and how they keep submerged in water for long duration of time. In fact, the breathing mechanism in turtle is quite different from other tetrapods. In human beings, with movement of muscle diaphragm we increase our chest cavity which creates a drop in air pressure in lungs and thus air enters our body system from outside. But for an animal whose body is encompassed by a shell, similar tactics is not possible. Rather turtles swallow air through their buccal cavity. Also the posterior portion of turtles, which is outside the shell acts in almost similar way as diaphragm does for us but with much less amount of intake of air.In turtles, limbs are modified according to their habitat preference. In most cases the forelimb has five claw bearing digits and hind limb has four well developed claw bearing digits and a reduced clawless fifth digit. In some species forelimb may have four digits (*Testudo horsfieldii*), hind limb may have only three clawed fingers (*Trionychidae*), some may be entirely clawless (*Dermochelys coriacea*). Sea turtles have flippers, whereas terrestrial turtles have well developed limbs with claws. In terrestrial turtles, there is no or very less webbing between digits and in amphibious species the webbings are well developed.

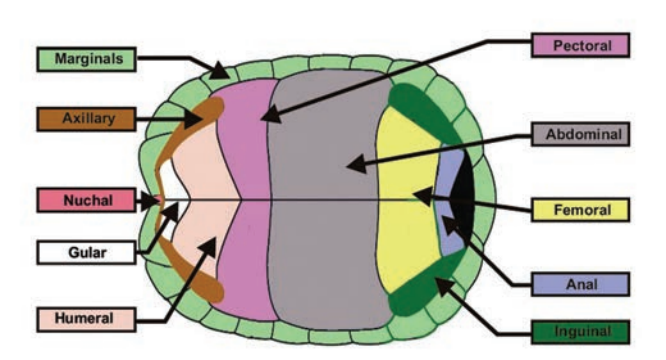
At present there are 341 species of turtles reported from across the

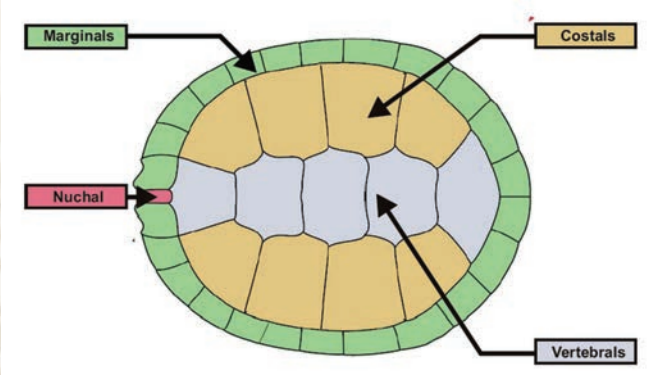






globe. We have 28 and 19 species of turtles and tortoise in India and Assam respectively. More than 50% of global turtle species are threatened with extinction; in fact turtles are the second most threatened group of vertebrates, following primates. Throughout the world turtles are affected because of various threats. Turtles are traded as well as eaten. Although illegal in India, turtles are used in pet trades. Many traditional medicines involve turtle body parts as an ingredient. Apart from this habitat alteration, pollution and fragmentation are a





continuous threat to the survival of turtles. Since 1500 AD eight species and two subspecies of turtles have gone extinct. In a report presented by turtle conservation coalition (2011), 25 species of turtles were identified which face highest threat of extinction. The list includes two species of turtle namely The northern river terrapin (*Batagur baska*) and The red-crowned roofed turtle (*Batagur kachuga*) occurring in India.

Turtles are important component of ecosystem and in many ecosystems they are the keystone species. They are very important component of a river ecosystem as many of the softshell species which inhabits rivers are scavengers. Thus by devouring dead animals, they help to keep the rivers clean. Turtles are also indispensable part of many cultures throughout the world. Due to their long lifespan, they are a symbol of longevity and stability. Hindus believe turtles to be an incarnation of Lord Vishnu- "Kurma Avatar", hence revere them. Even Hindu clan names are derived from turtle ancestors. Religious shrines in this region also accommodate turtles in their ponds. The turtles generally make their way to these ponds by way of devotees. It is seen that devotees donate turtles to a pond when a child is born into their family, with a belief that the new born attains a long life as that of the turtle. The turtles in these ponds are not harmed due to the religious ideologies associated with them. Even feeding these turtles is believed to be a noble act.

In Assam, noteworthy community temple ponds sheltering turtles include: GarakhiyaGosai Than, Sorbhog; HyagribMadhabMandir, Hajo; DhareshwarDebalaya, Shilguri; Kamakhya Temple , Guwahati; Ugratara Temple, Guwahati; Nagshankar Temple, BiswanathChariali; AthkheliaNamghar, Golaghat; BarokheliaNamghar, Golaghat; Deopani Temple, KarbiAnglong. Other temple ponds of eastern India with turtles are Tripureswari temple, Udaipur Tripura; Baneshwar temple, Coochbehar, West Bengal. These community ponds harbour about 12 species of turtles including the most threatened turtles like Black softshell turtle. The turtle species found in these ponds are Spotted Pond Turtle, Tricarinate Hill Turtle, Brown Roofed Turtle, Assam Roofed Turtle, Indian Roofed Turtle, Indian Tent Turtle, Elongated Tortoise, Narrow Headed Softshell, Indian Flapshell, Indian Softshell, Peacock Softshell, Black Softshell. These ponds apart from being a repository of turtles also act as a laboratory for conducting research on various aspects of turtles and also help educate people. Turtles, of late, have become such a rarity that for a common man these temple ponds are the only place where they can see a turtle.

Turtles are not only a part of nature; they are also a part of our heritage and culture. It would be a great shame to lose an animal that are contemporaries of dinosaurs. Long back God knew that the future of the turtles shall be in murky water and thus had taken "*Kurma Avatar*", to show that in turtles too, HE exists. Thus, to show respect to turtles is to respect HIM. It is already late and if we delay any further in hearing the message from God, we may not have his "avatar" i.e. turtles left. God gave us power to destroy but also force to create and care to conserve. It is time we decide on our choice as our future depends on this decision.