

## RESEARCH HIGHLIGHTS

### Genetic diversity analysis in *Labeo calbasu*

*Labeo calbasu* (Hamilton, 1822) is one of the important compatible species for polyculture with other Indian major and minor carps. *L. calbasu* has been proposed as the 'State Fish' by the Government of Haryana. In order to adopt proper conservation and management measures of this commercially significant species, the information on stock structure is vital. As a part of detailed investigation to describe population genetic structure of *L. calbasu* across its native distribution range in India, microsatellite markers were identified. The extensive cross priming experiments with 105 primers from seven cyprinid fish species were tested, out of which nine polymorphic microsatellite loci (*R1\**, *R3\**, *R12\**, *Lr28\**, *Lr29\**, *Lr 38\**, *Lro23\**, *Lro25\** and *MFW 11\**) were identified. Specimens from rivers Bhagirathi (n=20) and Godavari (n=25) were genotyped for each of the nine microsatellite loci to assess genetic variation. The mean number of alleles per locus ranged from 7.33 (Bhagirathi) to 8.11 (Godavari); whereas, expected heterozygosity ranged from 0.795 (Bhagirathi) to 0.801 (Godavari). No evidence of linkage disequilibrium was found. Possibility of null allele was evident at one locus *R3*. Significant genetic heterogeneity ( $P < 0.05$ ) was evident at three loci, *Lr 29\**, *Lro 25\** and *Lro 23\**. The various estimates provided strong evidence that genetic variation detected at the identified microsatellite loci can be significant in stock structure analysis of *L. calbasu*.



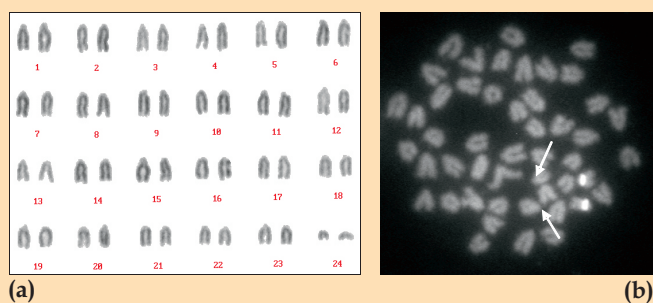
### Dr. W.S. Lakra conferred with 'Dr. M.S. Swaminathan Best Indian Fisheries Scientist Award 2007'

Dr. W.S. Lakra, Director, NBFGGR has been conferred with 'Dr. M.S. Swaminathan Best Indian Fisheries Scientist Award 2007'. The award has been conferred in recognition of his research contribution and publications in fish genetics and biotechnology by PFGE. The NBFGGR family feels proud as this brings honour to the Institute and the Council.



## Cytogenetic characterization of marine fish species *Zanclus canescens*

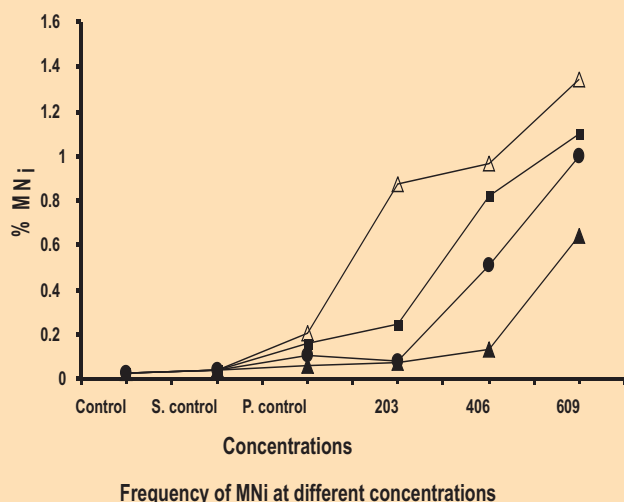
Cytogenetic characterization was undertaken in *Zanclus canescens* (local name: Moorish idol), a marine ornamental species collected from Kovalam area of Kerala using Ag-NOR, with CMA<sub>3</sub> staining and C-banding. The species was found to possess a diploid number of 48 chromosomes. All the chromosomes were telocentric in morphology. The CMA<sub>3</sub> staining revealed presence of intercalary NORs on one pair of chromosome near its centromere.



Cytogenetic characterization of marine fish species *Zanclus canescens* (a) Karyotype and (b) CMA<sub>3</sub> stained NORs

## Genotoxic effects of chlorpyrifos in freshwater fish *Channa punctatus* (Bloch)

Chlorpyrifos (O, O-diethyl O-3, 5, 6-trichloro-2-pyridylphosphorothioate) is one of the organophosphate pesticides widely used in agricultural practices. Since limited efforts have been made to study acute genotoxic effects of chlorpyrifos in different tissues of fish, genotoxicity of chlorpyrifos was studied in freshwater teleost fish *Channa punctatus*. The fishes



were exposed to three acute concentrations viz. 203, 406 and 609 µg l<sup>-1</sup> of chlorpyrifos for 96 hrs. Significant effects ( $P < 0.01$ ) from both, concentrations and time of exposure, were observed in exposed fishes. It was found that the micronucleus (MNi) induction was highest on 96 hrs at all concentrations in the peripheral blood. Similar trend was observed for the DNA damage measured in terms of the percentage of tail DNA in the lymphocyte and gill cells. This study indicated the usefulness of combined use of micronucleus assay and comet assay for *in vivo* laboratory studies using freshwater fish for screening the genotoxic potential of xenobiotics.

## Species specific DNA based diagnostic assay for *Gyrodactylus elegans*

The taxonomic identification of parasites based on morphology and morphometry may be erroneous. In recent past, taxonomic ambiguity in parasites has been observed. Species-specific molecular diagnostic assays could solve this problem. Therefore, a standardized DNA based diagnostic technique for species-specific identification of *Gyrodactylus elegans* was developed. This is the first attempt, so far, in the country, towards molecular detection of parasites.

## The concept of 'State Fish'-An Innovative approach to conservation

The NBFGR promoted a new concept of a 'State Fish' for each state about two years back. Under this new initiative, all state governments were requested to declare and adopt an important food or threatened fish species of the state as the 'State Fish'. The idea is to involve the stakeholders in conservation and management of identified fish species. Interestingly, seventeen states have declared initiated steps to declare their state fish.

## HUMAN RESOURCE DEVELOPMENT

### Workshop on Fisheries Conservation and Enhancement

The NBFGR organized a Workshop on “Fisheries Conservation and Enhancement: Linking Researchers and Stakeholders” at Guwahati during December 18- 19, 2007. The major objectives of the workshop were:



Dr. S.S. Baghel, Vice Chancellor, Assam Agriculture University inaugurating the live fish gene bank at Guwahati

1) Prioritization of conservation research and programs.



Dr. A.K. Roy, Director Fisheries, Govt. of Assam and Dr. W.S. Lakra, Director, NBFGR releasing fish in the gene bank

the recently proposed “State Fish” of various states.

4) To explore the status and potential of recent technological intervention for fisheries enhancement and biodiversity conservation in the NEH Region, and

5) To strengthen linkages between researchers, stakeholders and policy makers for sustainable management of fisheries resources in the region. On this occasion, Dr S.S Baghel, Vice Chancellor, Assam Agriculture University unveiled the live fish gene bank at Ulubari Fish Farm, Guwahati which is a joint venture of Department of Fisheries, Govt. of Assam and NBFGR (ICAR), Lucknow. Two books published by NBFGR namely, Fishes of North East India and Ornamental Fishes of North East India - An Atlas were also released by the dignitaries on this occasion. A total of ninety participants including leading Professors, Eminent Scientists from Institutes, Officers of the state fisheries departments from north-eastern states, Non-governmental organizations and KVKs, attended the workshop.

### Training Programme on "Integrated Aquaculture and Fish Disease Management"

The Bureau, at its Aquaculture Research and Training Unit, Chinhath organized a short-term training programme sponsored by National Fisheries Development Board, Hyderabad on "Integrated Aquaculture and Fish Disease Management" for the benefit of the aqua-farmers of Uttar Pradesh during November 14-19, 2007. A total of nineteen progressive fish farmers of Uttar Pradesh participated in the programme. The programme was inaugurated by Shri Deo Dutt, Secretary (Fisheries), Govt. of UP. The training was practical oriented with major thrust on field work and practical aspects. On successful completion of training, Dr. W.S. Lakra, Director, NBFGR, Lucknow gave certificates to the participants.

## Training Programme on “Freshwater Prawn Culture Technology”

A short-term training programme on “Freshwater Prawn Culture Technology” for the benefit of the aqua-farmers of Uttar Pradesh was organized during Dec. 13-18, 2007 at Aquaculture Research and Training Unit, Chinhat of NBFGR, Lucknow. The programme was sponsored by NFDB, Hyderabad and inaugurated by Dr. B.N Singh, Former Deputy Director General, Indian Council of Agricultural Research, New Delhi. A total of fourteen trainees from nine districts of Uttar Pradesh participated in the training. Besides lectures, demonstrations on identification of commercially important fishes and prawn, planktons, harmful aquatic weeds, identification of disease in fishes and analysis of important physico-chemical parameters were conducted. Visits to institute's fish farm and hatchery, as well as, fish farms of private entrepreneurs were also arranged. The participants were given certificates by Dr. S.K Singh, Joint Director, Dept. of Fisheries, U.P.

## Awareness Programme on Fish Conservation

The NBFGR organized an Awareness Workshop on “Conserve Fish for Posterity” at the Rajiv Gandhi University, Itanagar, Arunachal Pradesh during December 20-21, 2007. The major objectives of the workshop were: 1) To create awareness among stakeholders for participating in fish conservation campaign 2) To facilitate interaction, exchanges of ideas, sharing of knowledge and experiences of the end users of the aquatic resources of north-eastern states; 3) To formulate and recommend strategic research plan for conserving ichthyo-fauna in diversified water bodies of Arunachal Pradesh, and 4) To promote participatory research approaches for successful propagation of threatened wild fish fauna of the region. On this occasion, Mr. M. Pertin, Secretary (Fisheries) Government of Arunachal Pradesh, spoke on the need and potential of fish conservation and enhancement in Arunachal Pradesh. A total of seventy five participants from the northern region attended the workshop.

## LECTURES/ TALKS DELIVERED

The following invited lectures/ talks were delivered by the NBFGR scientists at various places:

- Dr. W.S. Lakra, Director acted as a judge and delivered a Lead Lecture at Uttarakhand Academy of Administration, Nainital during Nov. 15-17, 2007.
- Dr. W.S. Lakra, Director gave an invited lecture at the

All India Zoology Congress at Lucknow University on Dec. 8, 2007.

- Dr. Rehana Abidi, Sr. Scientist gave an invited lecture on "Fish diseases management" at the Department of Zoology, Allahabad University, Allahabad on Dec. 10, 2007.

## PARTICIPATION IN WORKSHOPS /SEMINARS/ MEETINGS/ TRAININGS

### Abroad

- Shri Amar Pal, Technical Officer (T-6) attended a training programme “Fish Health Master Class” during Nov. 12-23, 2007 at Bangkok, Thailand.

### In India

Dr. W.S. Lakra, Director attended :

- A workshop on “The India Portal” organized by National Knowledge Commission on Oct. 16, 2007 at New Delhi.
- A Regional Workshop on “*Kendriya Rajyoo ka aajivika paridrishya tatha satatt vikash hetu*

*Matasayaki evem Jalkrishi Niti*” during Oct. 25-27, 2007 jointly organized at Patna by Animal Husbandry and Fisheries Resources Department, Bihar and Central Institute of Fisheries Education, Mumbai.

- An International Conference on “Loss of Biodiversity: Causes, Consequences and Conservation” on Nov. 23, 2007 at Kolkata.
- A joint meeting of ICAR Bureaus regarding Genomic Resources Conservation on Dec. 27, 2007 at NBPGR, New Delhi.
- Dr. W.S. Lakra, Director, Dr. A.K Singh and

Dr. P.K. Varshney, Sr. Scientists attended Farmers fair-cum-exhibition on Nov. 02, 2007 at KVK, Dhora, Unnao.

- Dr. W.S. Lakra, Director; Dr. R. Soundararajan, Principal Scientist; Dr. A. Gopalakrishnan, Dr. A.K. Singh, Sr. Scientists and Shri V.S. Basheer and Dr. T. Raja Swaminathan, Scientists (SS) attended the 8<sup>th</sup> Asian Fisheries Forum during Nov. 20-23, 2007 at Kochi.
- Dr. Rehana Abidi, Sr. Scientist presented two papers entitled "Acanthocephalan parasites as potential sentinels of metal pollution on aquatic habitat" and "Molecular biomarkers for aquatic ecosystem health assessment through DNA microarray" in the National Symposium on Biomarkers of Environmental Problems held at Department of Zoology, CCS University, Meerut during Oct. 27-28, 2007.
- Dr. W.S. Lakra, Director; Dr. U.K. Sarkar;

Dr. P.P. Srivastava, Sr. Scientists and Shri. A.S. Bisht, T-4 attended a National Symposium on "Ecosystem Health and Fish for Tomorrow" during Dec. 14-16, 2007 organised by Central Inland Fisheries Research Institute and Inland Fisheries Society of India at Barrackpore.

- Dr. L.K. Tyagi, Scientist (SS) and Shri A.S. Bisht, T-4 attended the All India Zoology Congress at Lucknow University, Lucknow during Dec. 07-09, 2007.
- Shri A. Kathirvelpandian, Scientist and Shri A.K. Singh, Tech. Officer, attended a Winter School on "Biodiversity and stock assessment methods for fisheries professionals" during Nov. 14 - Dec. 04 2007, at Fisheries College and Research Institute, Thoothukudi.
- Dr. L.K. Tyagi, Scientist (SS) attended Indian Social Science Congress organized by the Indian Academy of Social Sciences during Dec. 27-31, 2007 at SNDT Women's University, Mumbai.

## EXTENSION ACTIVITIES

The Institute participated in the following exhibitions related to fisheries and aquatic resources:

- Exhibition organized on the occasion of the 8th Asian Fisheries Forum at Kochi during Nov. 20-23, 2007.
- Exhibition organized on the occasion of All India Zoology Congress at Lucknow University, Lucknow during Dec. 07-09, 2007.
- "Matsya Utsav" organised by Central Inland Fisheries Research Institute and Inland Fisheries Society of India during Dec. 14-16, 2007 at Barrackpore.



Dr. S. Ayyappan DDG (Fy), ICAR visiting the NBFGR Stall at 8th Asian Fisheries Forum at Kochi.



Dr. Mangala Rai, Secretary DARE and DG, ICAR visiting NBFGR Stall at CIFRI, Barrackpore

The following batches of trainees and farmers visited different laboratories, hatchery and fish farm of the Institute during the period:

- A group of 16 students of M.Sc. from Institute of Science, Mumbai on Oct. 26, 2007.
- A group of 42 students from HRP Sardar Patel Degree College, Barabanki on Nov. 12, 2007.
- A group of 48 students from Desh Bharti Public Inter College, Rajajipuram, Lucknow on Dec. 11, 2007.

- A group of 50 students of B.Sc. from Dayanand Bachhrawan P.G College, Bachhrawan, Raebareli, UP on Dec. 12, 2007.
- A group of 60 progressive fish farmers along with two officials from Fish Farmers Development Agency, Lucknow on Dec. 14, 2007.
- A group of 14 students of B.F.Sc. from College of Fisheries, Ratnagiri on Dec. 22, 2007.
- A group of 75 students of M.Sc. from C.S.J.M University, Kanpur on Dec. 27, 2007.

## OTHER ACTIVITIES

- Dr. Rehana Abidi, Sr. Scientist was conferred with the Fellowship of Academy of Environmental Biology on October 26, 2007.
- Dr. A.K. Singh and Dr. P.K. Varshney, Sr. Scientists acted as Jury members at the 15th National Children's Science Congress on Biodiversity: Nurture Nature for Our Better Future at State level during Nov. 27-28, 2007 organized at Nehru Yuva Kendra, Lucknow.
- A mid-term SRC meeting was organized during December 6-7, 2007.

## DISTINGUISHED VISITORS

- Dr. P.V. Dehadrai, Former Deputy Director General (Fisheries), ICAR, New Delhi.
- Dr. V.R.P Sinha, Former Director/Vice Chancellor, Central Institute of Fisheries Education, Mumbai and Consultant, World Bank/F.A.O.
- Dr. B.N Singh, Former Deputy Director General (Fisheries), Indian Council of Agricultural Research, New Delhi.
- Shri Deo Dutt, Secretary (Fisheries), Govt. of U.P.
- Dr. S.K Singh, Joint Director, Department of Fisheries, Uttar Pradesh.

## अनुसंधान समाचार

### लैबियो कलबासु में आनुवंशिक विविधता विश्लेषण

लैबियो कलबासु (हैमिल्टन, 1822), दूसरी भारतीय मुख्य व माइनर कार्प मत्स्य प्रजातियों के साथ पालीकल्चर (बहुसंवर्धन) हेतु एक महत्वपूर्ण प्रजाति है। हरियाणा सरकार ने लैबियो कलबासु को अपनी 'राज मछली' घोषित करने की दिशा में कदम उठाए हैं। इस व्यवसायिक रूप से महत्वपूर्ण प्रजाति के लिए संरक्षण एवं प्रबंधन के उपयुक्त तरीके अपनाने हेतु, इसकी स्टाक संरचना के बारे में सूचनाएं उपलब्ध होना आवश्यक है। अतः, भारत में लैबियो कलबासु की प्राकृतिक वितरण रेंज में, इसकी जनसंख्या आनुवंशिकी संरचना का विस्तृत अध्ययन करने हेतु, माइक्रोसेटेलाइट चिन्हकों की पहचान की गई। इसके लिए 7 साइप्रिनिड मत्स्य प्रजातियों से, 105 प्राइमर्स के साथ विस्तृत क्रॉस प्राइमिंग प्रयोग किए गए, जिनसे 9 पालीमारफिक माइक्रोसेटेलाइट लोसाई की पहचान की गई। आनुवंशिक विभिन्नता का अध्ययन करने के लिए, पहचान किए गए प्रत्येक पालीमारफिक लोसाई हेतु, भागीरथी तथा गोदावरी नदियों से प्राप्त लै. कलबासु के क्रमशः 20 तथा 25 नमूनों को जीनोटाइप किया गया। एलील्स की प्रति लोकस औसत संख्या 7.33 (भागीरथी) से 8.11 (गोदावरी) के बीच थी

जबकि हैट्रोजायगोसिटी 0.795 (भागीरथी) से 0.801 (गोदावरी) के बीच थी। लिंगेज असामान्यता का कोई प्रमाण प्राप्त नहीं हुआ। नल एलील की संभावना एक लोकस (R3) पर दिखाई दी। तीन लोसाई पर सार्थक आनुवंशिक हैट्रोजिनायटी प्रदर्शित हुई। विभिन्न अनुमानों से ठोस प्रमाण मिला कि पहचान किए गए माइक्रोसेटेलाइट लोसाई पर प्राप्त की गई आनुवंशिक विभिन्नता, लै. कलबासु की स्टाक संरचना के विश्लेषण में महत्वपूर्ण हो सकती है।

### डा. वजीर एस लाकड़ा 'डा. एम.एस. स्वामीनाथन बेस्ट इंडियन फिशरीज साइंटिस्ट एवार्ड 2007' से सम्मानित

संस्थान के निदेशक डा. वजीर एस. लाकड़ा को 'डा. एम.एस. स्वामीनाथन बेस्ट इंडियन फिशरीज साइंटिस्ट अवार्ड 2007' से सम्मानित किया गया है। यह अवार्ड डा. लाकड़ा को, मत्स्य आनुवंशिकी एवं जैवप्रौद्योगिकी में, उनके शोध योगदान हेतु पीएफजीएफ द्वारा दिया गया है। ब्यूरो परिवार इस सम्मान से गौरवान्वित महसूस करता है।

## समुद्री मत्स्य प्रजाति जेन्क्लस केनेसेन्स का कोशिकानुवंशिकी चरित्र-चित्रण

केरल से एकत्रित की गई एक समुद्री मत्स्य प्रजाति, जेन्क्लस केनेसेन्स, का कोशिकानुवंशिकी चरित्र-चित्रण किया गया। इस प्रजाति में डिप्लायड क्रोमोसोम संख्या 48 थी। सभी क्रोमोसोम टीलोसेन्द्रिक थे। CMA<sub>3</sub> स्टेनिंग से, क्रोमोसोम के एक जोड़े पर इसके सेंट्रोमिअर के निकट इन्टरकेलरी NORs की उपस्थिति प्रदर्शित हुई।

## मीठाजल मछली चन्ना पंकटेटस में क्लोरपायरीफास के आनुवंशिक-विषाक्तता प्रभाव

मीठाजल मछली चन्ना पंकटेटस में एक आर्गेनोफास्फेट कीटनाशक क्लोरपायरीफास के आनुवंशिक-विषाक्तता प्रभावों का अध्ययन किया गया। मछलियों को कीटनाशक के तीन तीव्र मात्राओं से प्रभावित किया गया। जिससे मछलियों में

सार्थक प्रभाव देखे गए। पेरीफैरल रक्त में माइक्रोन्युक्लिअस का इंडक्शन 96 घंटों के पश्चात्, सभी मात्राओं में सर्वाधिक था। इसी प्रकार, लिम्फोसाइट तथा गिल कोशिकाओं में डीएनए क्षति में भी ऐसी ही प्रवृत्ति देखी गई। इस अध्ययन से, मीठाजल मछलियों में जीनोबायोटिक्स की आनुवंशिक-विषाक्तता क्षमताओं के इन विवो अध्ययन हेतु, माइक्रोन्युक्लिअस तथा कामेट ऐसे के संयुक्त प्रयोग की उपयोगिता का संकेत मिला।

## गायरोडेक्टायलस एलीगान्स हेतु प्रजाति-विशिष्ट डीएनए आधारित नैदानिक एसे

परजीवियों में वर्गिकी-सम्बन्धी अस्पष्टता को दूर करने में प्रजाति-विशिष्ट आण्विक एसे बहुत सहायक हो सकते हैं। इसलिए, गायरोडेक्टायलस एलीगान्स की प्रजाति-विशिष्ट पहचान करने हेतु, एक डीएनए आधारित तकनीक विकसित की गई। देश में परजीवियों की आण्विक आधारित पहचान करने की दिशा में यह पहला प्रयास है।

## मानव संसाधन विकास

### फिशरीज़ कन्ज़रवेशन एवं एनहान्समेन्ट पर कार्यशाला

ब्यूरो ने 'फिशरीज़ कन्ज़रवेशन एन्ड एनहान्समेन्ट : लिंगिंग रिसर्चर्स एन्ड स्टेकहोल्डर्स' पर दिसम्बर 18-19, 2007 के दौरान गुवाहटी में एक कार्यशाला का आयोजन किया। कार्यशाला में 90 प्रतिभागियों ने भाग लिया। इस अवसर पर डा. एस.एस. बाघेल, कुलपति, असम कृषि विश्वविद्यालय ने उलुबारी फिश फार्म, गुवाहटी पर एक जीवित मत्स्य जीन बैंक का उद्घाटन भी किया जो कि ब्यूरो तथा मात्स्यिकी विभाग, असम सरकार का एक संयुक्त प्रयास है। अतिथियों ने इस अवसर पर ब्यूरो द्वारा प्रकाशित दो पुस्तकों : 'फिशरीज़ आफ नार्थ ईस्ट इंडिया' तथा 'आर्नामेन्टल फिशेज आफ नार्थ ईस्ट इंडिया : एन एटलस', का विमोचन किया तथा जीन बैंक में मछलियां भी छोड़ीं।

### 'समन्वित जलकृषि एवं मत्स्य रोग प्रबंधन' तथा मीठाजल झींगा पालन तकनीकी' पर प्रशिक्षण कार्यक्रम

संस्थान ने अपनी चिनहट इकाई पर 'समन्वित जलकृषि एवं मत्स्य रोग प्रबंधन' पर, नवम्बर 14-19, 2007 के दौरान तथा 'मीठाजल झींगा पालन तकनीकी' पर दिसम्बर 13-14, 2007 के दौरान, राष्ट्रीय मात्स्यिकी विकास बोर्ड, हैदराबाद द्वारा प्रायोजित दो अल्पकालीन प्रशिक्षण कार्यक्रम आयोजित किए। इन कार्यक्रमों में उत्तर प्रदेश के विभिन्न जनपदों से क्रमशः 19 तथा 14 प्रगतिशील मत्स्य पालकों ने भाग लिया। इन प्रशिक्षणों में व्यवहारिक पहलुओं पर विशेष ध्यान दिया गया।

### मत्स्य संरक्षण पर जागरूकता कार्यक्रम

ब्यूरो ने 'कन्ज़र्व फिश फार पोस्टेरीटी' विषय पर, राजीव गाँधी विश्वविद्यालय, इटानगर, अरुणाचल प्रदेश में दिसम्बर 20-21, 2007 के दौरान एक जागरूकता कार्यक्रम आयोजित किया जिसमें उत्तर-पूर्वी क्षेत्र के 75 प्रतिभागियों ने भाग लिया।

### अन्य गतिविधियां

- संस्थान की वरिष्ठ वैज्ञानिक डा. रेहाना अबिदी को 'फैलोशिप आफ एकेडमी आफ एनवायर्नमेंटल बायोलाजी' प्रदान की गई।
- श्री अमर पाल, तकनीकी अधिकारी ने 'फिश हेल्थ मास्टर क्लास' में नवम्बर 12–23, 2007 के दौरान बैंकाक, थाईलैन्ड में भाग लिया।
- संस्थान के निदेशक एवं वैज्ञानिकों ने इस अवधि के दौरान विभिन्न स्थानों पर तीन आमंत्रित व्याख्यान दिए।
- संस्थान के निदेशक एवं वैज्ञानिकों ने 11 राष्ट्रीय कार्यशालाओं/संगोष्ठियों में भाग लिया।
- संस्थान की स्टाफ शोध परिषद् की मध्यावधि बैठक दिसम्बर 6–7, 2007 को आयोजित हुई।
- इस अवधि में पाँच विशिष्ट अतिथियों ने संस्थान का दौरा किया।

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