ABSTRACTS

Keynote paper on *Carolus Linnaeus*

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Swedish savant Carl Linnaeus (23 May 1707-10 January 1778) is rightly known as the "father of modern taxonomy". He laid the foundations for a utilitarian scheme of naming and classifying life, an approach that underlies the present-day Catalogue of Life and the concept of the Tree of Life because it was hierarchical and grouped organisms based on shared characteristics.

Disinterested in the prospect of being a clergyman like his father, the young Linnaeus showed an aptitude for the natural world, especially botany, and was recommended to attend the local university, at Lund. He tried to make something of the neglected botanical garden there but after less than a year he moved to Uppsala University where prospects seemed better. The year was 1728; he was 21. His studies of natural history involved much self-instruction, aided by the Dean of Uppsala Cathedral, Olof Celsius, who was a keen amateur botanist with a fine library. At this time, Linnaeus discovered a review of Sebastian Vaillant's Sermo de Structura Florum, which convinced him of the importance of floral sexual structures. This led to him writing, in 1729, the *Praeludia Sponsaliorum Plantarum* ("On the prelude to the wedding of plants"), his first academic paper. This moved Olof Rudbeck to make Linnaeus "demonstrator" of the Botanical Garden, permitting 23-year-old Carl, with a talent for narrative and humour, to give lectures on floral sex that fascinated his 1730s audience. In 1732, the Academy of Sciences at Uppsala financed an expedition to Lapland, then little known, in the hope of finding commercially exploitable resources. The result was the influential volume *Florula Lapponica* (and later *Flora Lapponica*) that made use of his sexual system of classifying plants according to the numbers (or absence, as in cryptogams) of stamens and pistils. The Lapland accounts were also notable for exotic and adventurous episodes.

During his exploration of the province of Dalarna, Carl met his future wife, but before he could marry he needed to take his doctor's degree and start earning a decent income. Since it was not then possible to take the degree of Doctor of Medicine in Sweden, he had to go to Holland. Having written his doctor's thesis ("Hypothesis nova de Febrium. intermittentium causa") at home in Sweden, it was necessary only that he stay at the University of Harderwijk for a week while he printed and defended it. He achieved his degree on 23 June 1735, which entitled him, inter alia, to teach the art of medicine, visit patients, and prescribe. Returning to Sweden in 1738, he practised medicine and lectured in Stockholm before being awarded a professorship at Uppsala in 1741. In 1743 he redesigned the centigrade thermometer by reversing Anders Celsius's temperature scale. Afternnaeus was ennobled in 1761, he adopted the surname von Linnè.

While in Holland, he had also published his scheme of the classification of nature into three kingdoms - animal, plant, and mineral. Comprising only 11 pages, this was the first edition of the *Systema Naturae*. [The final, 13th edition of 1770 comprised 3000 pages.] It incorporated his sexual system of plants into 24 classes (the 24th being cryptogams) and, controversially for the time, classified humans with other primates *Species Plantarum*, published 1753, serves as the official starting point for botanical names. The *Philosophia Botanica* (1751) laid down rules for classifying and naming organisms that would inform future taxonomic practice. The 10th edition of *Systema Naturae*, 1758, which serves as the official starting point for all animal names, saw whales moved from fishes to mammals.

Linnaeus's contributions were many and varied. His 1746 *Fauna Svecica* was the most comprehensive faunal field guide of its kind for any country. He also laid a foundation for scientific ornithology. His combined botanical and medical interests resulted in the publication of volumes on medical plants, medicines, and pharmaceuticals. And his religious views encouraged him to think holistically about the interrelationships of the Divine and the natural. In his 1749 *Oeconomia Naturae* (The economy of nature), he conceptualized nature as operating in equilibrium, inviting of detailed study, empirical observation, and experimentation; in this, Linnaeus has been labelled a protoecologist. At another level, Linnaeus actively supported the idea that a nation's welfare depended on science-based administration. Accordingly, he promoted the creation of chairs in economics at Swedish universities and undertook research travels within Sweden to identify domestic products that could replace imports.

After Linnaeus's death, his wife, following the instructions of her late husband, sold his collections, books, correspondence, and manuscripts. These were purchased by Englishman Sir James Edward Smith. In 1788, the Linnaean Society was founded and, on Smith's death, the society bought the collections that today reside in London.

Linnaeus had many students. Twenty-three became professors and some 20 took part in expeditions to most parts of the globe, including Carl Peter Thunberg who visited Asia, collecting plants in Japan and Sri Lanka.

FORAMINIFERAL DIVERSITY OF HUGLI-MATLA ESTUARINE COMPLEX, INDIA

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Sediment samples from Hugli-Matl estuarine complex were analysed for benthic foraminifera towards generating baseline information from this vibrant biotope. Forty species of recent, benthic foraminifera under 3 suborders, 11 families and 19 genera were identified and reported from the study area. Total foraminiferal assemblage always outnumbered the living foraminiferal assemblage. The summary of the trilinear plot revealed a somewhat characteristic marine assemblage. Seasonal studies indicated a clear predominance of foraminiferal assemblage during winter, while majority of the foraminifera failed to withstand the monsoonal ecological crisis. *Ammobaculites agglutinaus, Ammonia beccarii, A. tepida, Asterorotalia multispinosa, A. trispinosa, Bolivina seminuda, B. stratuta, B. subreticulata, Elphidium advenum, E. crispum, E. discoidale var. multiloculum, E. hispidulum, E. incertum, E. simplex, E. somaense, Haplophragmoides canariensis, Miliammina fusca, Nonionellina turgida, Quinqueloculina seminulum, Q. vulgaris, Q* sp., *Triloculina brevidentata and Trochammina inflata* were the abundant species of the study area.

BENTHIC FAUNAL DIVERSITY IN AND AROUND THE MANGROVE-ESTUARINE SECTOR OF INDIAN SUNDARBANS

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Mangroves are very specialized ecosystem found at the land-sea interface of the tropical and subtropical regions of the world bordering the sheltered sea coasts and estuaries. The mangrove - estuarine complex of Indian Sundarbans supports a luxuriant benthic fauna along the different mud and sand flats, tidal creeks and floor of the mangrove forests. Well marked seasonal variations in faunal structure and compositions due to various sedimentological and hydrobiological parameters in the study area. The dominant group of macrobenthos are the cnidarians, nematodes, nemertines, polychaetes, isopods, amphipods, echiurids, shrimps, stomatopods, decapods, xiphosurids, gastropods bivalves, holothuroids, hemichordates, sipunculidand mudskippers etc. Foraminifera represent the major meiobenthic components. Different feeding strategies (filter feeding, browsing and deposit feeding) are undertaken by the different groups. Various factors including naturaland anthropogenic, are contributing significantly towards the loss of biodiversity from this unique biotype.

ASSOCIATION OF ABRUSCULAR MYCORRHIZAE IN DIFFERENT LEGUME CROPS GROWN IN SOME SELECTED AGROECOLOGICAL ZONES OF BANGLADESH

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The association of arbuscular mycorrhizal (AM) fungi in ten leguminous crops collected from five agroecological zones (AEZs) of Bangladesh was studied. The crops surveyed were blackgram, bushbean, chickpea, cowpea, gardenpea, grasspea, mungbean, groundnut, lentil and soyabean. The selected sites were AEZ 3 (Rangpur), AEZ 11 (Jessore), AEZ 12 (Faridpur), AEZ 18 (Noakhali) and AEZ 28 (Gazipur). Root colonization at AEZ 3, AEZ 11, AEZ 12, AEZ 18 and AEZ 28 ranged from 30.00 to 76.67, 23.33 to 86.67, 24.44 to 65.56, 30.00 to 86.67 and 22.22 to 66.67%, respectively. Spore population at AEZ 3, AEZ 11, AEZ 12, AEZ 18 and AEZ 28 varied from 92.89 to 528.33, 118.00 to 402.11, 89.00 to 529.22, 105.78 to 367.00 and 90.22 to 285.11 100 g-1 soil, respectively. The highest root colonization (86.67%) and spore number (529.22 100 g-1 soil) were recorded with mungbean at all the AEZs except AEZ 18.

Grasspea and soyabean had the highest root colonization (86.67%) and spore number in rhizosphere soil (367.00 100 g-1 soil), respectively at AEZ 18. Bushbean had the lowest root colonization (22.22%) and spore number in rhizosphere soil (89.00 100 g-1 soil) at AEZ 28 and AEZ 12, respectively. Glomus was the most common genus of AM while.

Sclerocystis was the least prevalent genus in the rhizospheric soil.

FUNGAL DIVERSITY IN BANGLADESH

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A large number of fungi were encountered from Bangladesh plant and soil during the last fifteen years of study in the Mycorrhiza Laboratory of Chittagong University. Three different types of fungi (wood decay fungi, ectomycorrhizal fungi, arbuscular mycorrhizal fungi) were recorded. More than thirty five different types of wood decay fungi belonging to 12 genera, twenty different types of ectomycorrhizal fungi under ten genera and more than thirty different types of arbuscular mycorrhizal fungi under six genera were observe. The wood decay fungi from different types of forest plants and ectomycorrhizal fungi from Dipterocarpus plants and arbuscular mycorrhizal fungi mainly from agricultural and forest soil were enlisted. All the six established genera ot arbuscular mycorrhizal fungi were found from Bangladesh soil. The diversity of macrofungi is host independent. Ectomycorrhizal fungi are host specific and mainly dependent on rainfall. On the other way arbuscular mycorrhizal fungi are ubiquitous. The implication of diversity of fungi in Bangladesh will be discussed.

DIVERSITY OF APHIDS (HOMOPTERA: APHIDIDAE) AND THEIR PREDATORY COMPLEX ON SUGARCANE *(Saccharum officinarum)* IN INDIA AND ADJOINING COUNTRIES

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Sugarcane is the second largest cash crop in India. Sugar production has emerged as one of the major agro-, industries in the rural areas of India. It is an important source of income and employment for the farming community in the sugar producing countries. This plant is suffered by the infestation of aphids. In India 8 species under 5 genera of which 4 species from Pemphiginae, 2 species from Hormaphidinae, 1 species from Chaitophorinae and 1 from Aphidinae are known on this plant.

In recent years, sugarcane plants are found to be heavily infested by aphids, particularly by Sugarcane Wooly Aphid (SWA), *Ceratovacuna lanigera* Zehntner causing serious damage to the plant and loss of sugar yield in several parts of India, specially in southern states in India.

Several predatory insects under the families Pyralidae (Lepidoptera)-1 species; Hemerobiidae (Neuroptera)-1 species; Chrysopidae (Neuroptera)-1 species; Syrphidae (Diptera)-3 species and Coccinellidae (Coleoptera)-5 species are associated with SWA in India.A taxonomic detail of the species found on sugarcane plant and a key for separating this species have been provided. In addition, a discussion on the taxonomic identity of SWA and its related species has also been given.

INSECT BIODIVERSITY AND BIOGEOGRAPHY STUDIES *IN TAIWAN :* A BRIEF REVIEW

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The proportion of insect taxonomists by the species looks higher than that of other animal taxonomists in Taiwan. However, the most of insect taxonomists were focusing only on their own interested groups and leaving many other groups untouched. There are only 14 insect orders that have been studied by Taiwanese taxonomists. The top four popular insect orders in Taiwan are Homoptera (24%), Diptera (13%), Coleoptera (11%) and Hymenoptera (11%). The requirement of identification was mainly focused on insect pests and their natural enemies of the agriculture. And now, it is shifting to the natural resources in biodiversity, conservation and some environmental issues. The shortage of taxonomic manpower is increasing fast and suddenly an idea of the identification service network of insects has been proposed by the author. It was the idea to do the identification by the modeling of TaxNEN of GBIF. Besides, there are some topics under the biodiversity program that the insect taxonomists are undergoing study in Taiwan such as Taiwan Biodiversity Network (TaiBNET), Long Tern Ecological Research (LTER), Taiwan Digital Archieves projects and Quarentin insects of plant protection. There are not many taxonomi, study on the insect biogeography in Taiwan until 6 years ago. The clade of insect fauna in Taiwan have been divided and proposed as 7 clades, i.e., Northern East area, North area, West area, Southern East area, East area, Central area, Southern East Islands area. The insect fauna of Taiwan might be the intermediate in between Oriental and Palaearctic regions.

ELUCIDATION OF THE RELATIONSHIP BETWEEN THE UNDERSTORY AND THE INSECT FAUNA IN GUANDAUSHI FOREST IN CENTRAL TAIWAN

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This work investigated the insect fauna and insect-induced galls at the understories in Guandaushi Forest in central Taiwan from September 1994 to March 1996. Four types of understory selected for study are virgin hardwood (L1), artificial plantation (L2), secondary hardwood (L3, L4 & L5), and the burned site (L6). In addition, the qualitative (species constitution) and quantitative (environmental factors, insect abundance, Shannon and Simpson diversity indices and evenness) data were analyzed by clustering method with Jaccard and Euclidean coefficients. Analysis results indicate that the similar homogeneity of the dominant vegetation in the understory accounts for the dilfferent habitats among different forest types. The far away L1 and L4 are more similar than the nearby L5 and L6. Physical environmental factors also demonstrate that the habitat characteristics of understory in such a forest ecosystem correlated with the insect fauna. Although the constitution of gall-bearing plants can not indicate the relationships among the different stands, the development of galls on host plant *Syzygium buxifolium* was related to altitude.

HISTORICAL AND RECENT INVESTIGATIONS ON THE BEE FAUNA OF TAIWAN (HYMENOPTERA: APOIDEA)

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The bee fauna of Taiwan was studied intensively in the first half of last century and was based in large parts on the extensive material collected by Hans *Sauter* between 1902 and 1914. Subsequent studies on bees of Taiwan have only been sporadic. Within a cooperation between the above mentioned institutions the bee fauna was reinvestigated. It was shown how insufficiently the bee fauna of Taiwan had been investigated so far, in particular, the higher mountain regions. Now about 150 species of bees, belonging to 32 different genera, are known from Taiwan, ten of which have been described or recognized as new for science by the recent cooperation

REVISION OF THE GENUS *ARIPTYELUS* MATSUMURA (HEMIPTERA: CERCOPOIDEA: APHROPHORIDAE)

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The genus *Ariptyelus* Matsumura, comprising 3 species, is reviewed. Two species, *A. arisanus* (Matsumura, 1942) and *A. auropilosus* (Matsumura, 1907) are redescribed for the supplement. The species, *A. arisanus*, is recorded only from Taiwan. *A. auropilosus* from Philippines, Indonesia, and Hainan Is. is new record to the geographic distribution. Some specimens of *A. auropilosus* were collected from offshore islands, Lutao Is. And Orchid Is, are also new record to Taiwan. One species from India and Nepal, *A. subauropilosus* sp. nov., is described as new to science. The diagnostic characters on the genera *Ariptyelus* and *Peuceptyelus* and the distinguished characters among 3 species of *Ariptyelus* are presented.

BEGONIA L. (BEGONIACEAE) IN THE HIMALAYAS

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Nepal ranks on tenth highest flowering plant diversity in Asia and 27th in the world in biodiversity richness. It has about 6,500 species of flowering plants, however, 5345 species of flowering plants, belonging to 216 families and 1534 genera, have been reported so far. Begoniaceae is a small family with only one genus *Begonia* in Nepal flora. *Begonia* L. is a genus of ca. 1,400 species in the world, leaving innumerable hybrids. The number of *Begonia* species in the Himalayas is estimated to be 24 species. About 18 species of *Begonia* occurs in Nepal, including four endemic species (*Begonia tribenensis, Begonia minicarpa, Begonia flagellaris,* and *Begonia leptoptera*). They are found to be growing mostly in subtropical up to temperate regions of Nepal. The distribution of the genus in Nepal is unique having found mostly in Eastern Nepal, some in Central region and very few in the Western region of Nepal. This paper is an effort to present the distribution pattern of *Begonia* in Nepal Himalayas.

HERBARIUM ARCHIVE AND PLANT DATABASES-CONSERVATION IMPLICATIONS

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Basically the talk will be to highlight the importance of accessing the data hidden in the labels of herbarium specimens in addition to the usual purpose of herbarium in taxonomy. Few examples will be highlighted how the information locked up in the labels were used to practice conservation science etc.

A COMPERATIVE STUDY OF *RHIZOBIUM* STRAINS ON LENTIL

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Field experiments were carried out at Regional Agricultural Research Station (RARS), Ishurdi, Pabna during rabi season of 2005-2006 to find out the effectiveness of newly isolated *Rhizobium* strains on lentil. BARI Moshur-4 and *Rhizobium* inoculum (newly isolated strains BARI RLc-104, BARI RLc-105, BARI RLc-106 and BARI RLc-107) with a basal dose of P, K, S, Zn @ 22, 42, 20, 5 kg/ha, respectively for all treatments were used in the experiment. The experiment was carried out with randomized complete block design having four replications in each treatment. Unit plot size was 4 m x 3 m. Among the four strains plants receiving mixed culture produced significantly higher nodule number and nodule weight and also the highest seed yield (1.36 t/ha, 37.4% higher over control) over uninoculated control. But the yield recorded by mixed culture gave identical results with the above four strains

PERFORMANCE OF THREE CHICKPEA VARIETIES TO *Rhizobium* INOCULATION

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A field experiment was conducted at Central Farm of Bangladesh Agricultural Research Institute, Gazipur and Regional Agricultural Research Station, Jessore during 2005-2006 with the objectives to study the response of inoculation with different plant genotypes and to study the effect of different sites (Agro-ecological zones) with inoculation and plant genotypes. Three varieties of chickpea viz. BARI Chola-5, BARI Chola-6 and BARI Chola-7 and rhizobial inoculurn (*Rhizobium* strain RCa-220) were used in this experiment. Unit plot size was 4 m x 3 m. The experiment was designed in randomized complete block design having 4 replications in each treatment. Each variety was tested with/without *Rhizobium* inoculation. Inoculated plants gave significantly higher nodule number, nodule weight, root weight, shoot weight, stover yield and seed yield compared to non-inoculated plants both at Joydebpur and Jessore. Among

3 varieties, BARI Chola-6 produced the highest nodule number and nodule weight. The highest seed yield of 1.20 t/ha at Gazipur was recorded in BARI Chola-5 but at Jessore it was the highest in BARI Chola-6. The interaction effect revealed that the highest seed yield of 1.33 t/ha at Gazipur by BARI Chola-5 with inoculation and 1.38 t/ha at Jessore by BARI Chola-6 with inoculation

RESPONSE OF NEWLY ISOLATED *RHIZOBIUM* STRAINS ON GARDENPEA

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The field experiment was conducted at BARI Central Farm, Gazipur and RARS, Rahmatpur, Barisal and RARS, Jamalpur during rabi season of 2004-2005 with the objectives to find out the efficiency of newly isolated *Rhizobium* strains for gardenpea. The variety BARI Motorshuti-2 and rhizobial inoculum (strain BARI RPs-501, BARI RPs-502 and mixed inoculum of BARI RPs-501and BARI RPs-502) and fertilizer elements (P-K-S-Zn @ 22-42-20-5 kg/ha) for all treatments were used in this experiment. Inoculated plants gave significantly higher number of nodule, nodule weight, and root weight, shoot weight, stover and seed yields compared to uninoculated control. Plants inoculated with BARI RPs-502 produced the highest nodule number (28.7/plant at Gazipur and 74.7/plant at Jamalpur) and nodule weight (31.7 mg/plant at Gazipur and 210.0 mg/plant at Jamalpur). Similar strain also produced the highest seed yield of 1.50 t/ha (48.5% higher over control) at Gazipur and 1.78 t/ha (53.5% higher over control) at Jamalpur, which was identicallo BARI RPs-502 and mixed culture. At Rahmatpur, mixed culture produced the highest nodule number (60.8/plant) and nodule weight (153.0 mg/plant) and also seed yield of 1.94 t/ha (48. 1 % higher over control).

INFLUENCE OF THREE GRASSPEA VARIETIES TO INOCULATION WITH ELITE STRAINS OF *RHIZOBIUM*

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A field experiment was conducted at Central Research Farm, BARI, Gazipur and Regional Agricultural Research Station (RARS), Jamalpur during rabi season of 2005-2006 with the objectives to study the response of inoculation with different plant genotypes at Agro-ecological zone 28 (AEZ-28) and Agro-ecological zone 9 (AEZ-9). Three varieties of grasspea *viz*. BARI Khesari-1, BARI Khesari-2 and Jamalpur local and rhizobial inoculurn (*Rhizobium* strain RLs-10) were used in this experiment. Unit plot size was 4 m x 3 m. The experiment was designed in randomized complete block having 4 replications in each treatment. Each variety was tested with/without *Rhizobium* inoculation. Inoculated plants gave significantly higher nodule number, nodule weight, root weight, shoot weight, stover yield and seed yield compared to non-inoculated plants. Among three varieties, BARI Khesari-1 produced the highest nodule number (31.4/plant at Gazipur and 19.2/plant at Jamalpur), nodule weight (96.1 mg/plant at Gazipur and 35.8 mg/plant at Jamalpur), and shoot weight (1.58 g/plant at Gazipur and 1.10 g/plant at Jamalpur). BARI Khesari-1 gave the highest seed yield (1.17 t/ha) at Gazipur and Jamalpur local gave the highest seed yield (1.26 t/ha) at Jamalpur. The overall results indicated that BARI Khesari-l gave the highest seed yield (1.30 t/ha) with inoculation at Gazipur and Jamalpur local gave the highest seed yield (1.36 t/ha) with inoculation at Jamalpur though the highest nodulation were observed in BARI Khesari-1 at both the locations.

ALGAL FLORA OF THE HIJALPALLI BEEL IN RAJSHAHI, BANGLADESH I. CYANOPHYCEAE

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Algal flora of the Hijalpalli beel at Bagha, Rajshahi has been studied in the year 2000-2002. The physico-chemical conditions of water and seasonal occurrence of the algal flora were studied. The Cyanophyceae of this beel is represented by 32 genera and 110 species. The descriptions and illustrations of this species are provided

CENSUS OF MARINE LIFE: IN QUEST OF THE KNOWN, UNKNOWN AND UNKNOWABLE

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The oceans cover >70% of the earth's surface and contain numerous organisms that are found nowhere else. The diversity of marine life is huge and may rival that of the rain forests in the number of species found there, and, yet, our knowledge of ocean life lags far behind that of terrestrial life. Recent estimates suggest that there could be 229,602 described marine species (reviewed by Bouchet, 2006). However, we are still far from having a global checklist of organisms that live on this planet. Recent survey of the published literature on marine biodiversity emphasis on the importance of Indian Ocean region as one of biodiversity "Hot-spot" as more than 30% of the newly described marine species were actually sampled from the region.

The global environment is changing with unprecedented rates and the predictions are that, Indian Ocean region will have the maximum impact of the changed climate. A new age of ocean exploration is upon us, and society realizes the very practical need to better understand changes occurring in the seas for their implications on-human life and our marine resources. In a world characterized by crowded shorelines, oceanic pollution, and exhausted fisheries, only an encompassing global marine census can probe the realities of the declines or global changes in ocean resources and the extent of our ignorance. Thus, it is very essential to-prepare the inventory of the available biota that can help in understand the response of biodiversity to the changing climate. In this context, new technologies empowering exploration, and communications connecting scientists open opportunities for such a census.

In the year 2000, the Census of Marine Life (CoML) began, led by an International Scientific Steering Committee of experts in diverse forms of life, habitats, and technologies. CoML is a growing global network of researchers in more than 80 nations engaged in a ten-year initiative to assess and explain the diversity, distribution and abundance of marine life in the world's oceans-past, present and future. The emphasis of the program is field studies, which are to be conducted in poorly known habitats as well as those assumed to be well known. In both coastal and deep waters, projects will identify new organisms and collect new information on ocean life. Through the field studies and other projects, ranging from analyzing historical documents to modeling future ecosystems, the CoML will enable scientists to compare what once lived in the oceans to what lives there now, and to project what will live there in the future.

ASSESSMENT OF ARBUSCULAR MYCORRHIZAL ASSOCIATION IN SOME FRUIT PLANTS IN BANGLADESH

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Nineteen (19) fruit plants from Horticultural farm of BARI, Joydebpur were selected for the assessment of arbuscular mycorrhizal association. Rhizosphere soils were collected in three consecutive years (2004, 2005 and 2006) from the same plants and places. These samples were assessed for counting AM spore population and determining colonization(%) in their roots. The spore numbers were recorded ranging from 48 (Lemon) to a maximum of 1050 (Ata) per 100 g soil in 2004, 41 (Batabi Lemon) to 916.7 (Amloki) in 2005 and 44.3 (Batabi Lemon) to 575.0 (White Jamrul) in 2006. A considerable variation was observed in average spore numbers recorded in three consecutive years. Different fruit plants showed different percentages of root colonization by AM fungi. Among all the fruit plants, the highest colonization (86.7%) was found in Golapjam and Olive and the lowest colonization (20.0%) was recorded in white Jamrul.

RESPONSE OF ONION AND GARLIC SEEDLINGS TO DIFFERENT SOURCES OF ARBUSCULAR MYCORRHIZA

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Arbuscular mycorrhizal (AM) fungi collected from different s6urces were tested for their effectiveness in promoting growth of onion (*Allium cepa* L.) and garlic (*Allium sativum* L.) seedlings in pot experiment during 2004 and 2005 to study the response of onion and garlic seedlings to different sources of arbuscular mycorrhiza. The sources of AM inocula were Jamalpur, Joydebpur, Ishurdi, Hathazari and Exotic. Onion, BARI Piaz-1 and garlic (local variety) were used in this experiment. Mycorrhizal inoculation influenced significantly all the growth characteristics of onion and garlic seedlings over uninoculated control. Same trend was reflected on the root colonization and spore numbers in the rhizosphere soil. In 2003-2004 the highest root colonization (85.0, 77%) were recorded with AM inoculurn collected from Joydebpur and Jamalpur. But the highest spore population (210 and 287 per 100 g soil) were obtained from the rhizosphere soil of AM inoculum collected from Jamalpur and Hathazari. The highest root colonization (60.0, 40%) were recorded with AM

inoculum collected from Hathazari. But the highest spore population (185 and 224 per 100 g soil) were obtained from the rhizosphere soil of AM inoculum collected from Joydebpur and Ishurdi in 2004-2005. Different mycorrhizal inocula influenced seedlings growth differently.

INFLUENCE OF FLOODING ON THE SURVIVAL OF ARBUSCULAR MYCORRHIZA

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A study was conducted for two consecutive years (2004-2005 and 2005-2006) at Ullapara, Shirajgonj particularly in onion growing flooded area to know the status of arbuscular mycorrhizal fungi (AM) in flooded soil. Twenty farmers were selected for two years who cultivated onion in their fields after flood. Soil samples were collected just after removing of flood water. Again rhizosphere soils with roots of onion were collected from the same plots. After assessment of these samples, two years' results indicate that there is a plenty of AM spores in flooded soil. It proves their ability to survive in flooded condition and after flood heavy colonization in onion roots was observed. Higher spore population was also recorded from the rhizosphere soils of onion.

DIVERSITY OF ARBUSCULAR MYCORRHIZAL FUNGI IN TEA GARDENS

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A large number of diversified arbuscular mycorrhizal fungi were encountered from Oodaleah and Neptune tea gardens of Chittagong district; Dhamai, Luyani Shilghat, Balisera, James Finlay PLC and Sathgaon tea gardens of Moulavibazar district. The identified fungi were *Glomus monosperma, G. constrictum,G. multiculis, G. magnicualis, G. pustulatum, G. maculosum, G. aggregatum, G. macrocarpus G. vargeosporus, Acaulospora denticulata, A. splencudd, A. delicata, A. walkeri, A. cavernata, A. tuberculata, Entrophospora colombiana, E infrequens, Scutellospora aurigloboia, S. nigra, Gigaspora margarita, G. heterogama, G. persica, G. gigantea, Sclerocystis rubiformis, S. taiwanensis*

TAXONOMIC STUDY OF *RUSSULA AQUOSA* LECLAIR FROM BANGLADESH

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Russula aquosa Leclair is an ectomycorrhizal fungus, which was found, associated with roots of *Hopea odorata* in Chittagong university Campus. It may be grown single or in a group. The macro and micro- morphological features of the collected fungus were studied in the field and laboratory conditions. The cap of the fungus was 4-6 cm. wide; flattened convex or with centrally depressed; often brownish in the central; lilak- tinted red to palish cherry red; margin decurved and fragile; cap margin entire, even and regular; sticky to dry. Flesh white, very fragile, soft or spongy, thickness 0.5 cm. at disk and 0.2 cm at margin. Gills almost free, well spaced, dirty white, narrow breadth, average, close and even. Stem 4-4.5 cm, central, dirty white, equal, smooth, fragile. Spore print is white. It is generally found early May to late October. Edibility is unknown.

TAXONOMY, DISTRIBUTION AND DIVERSITY OF *POLYPORUS* IN CHITTAGONG, CHITTAGONG HILL TRACTS AND COMILLA

M.A.U. Mridha[1], M.K Bhuiyan[2], S. Dewan[3] and M.S. R.Mazumder[4]

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The Macrofungi have a great importance not only in the viewpoint of ecosystem but also 'in decomposition, nutrient cycling and nutrient transport. Samples of different macrofungi were collected from Chittagong (Hathazari and Kalurghat), Chittagong Hill Tracts (Kaptai, Subolong, and Rangarnati Sadar) and Comilla (Balutupa, Gangchar and Shaktala). A very rich diversity was found within the genus *Polyporus* and altogether fourteen different diversified species were recorded from the study areas. Comilla district has the highest number (nine) of species; Chittagong and Chittagong Hill Tracts have the same (six) number of species. *Polyporus sanguineus, P. xanthopus* and *Polyporus* sp. (8) found very common in three districts. *Polyporus arcularlus*, *Polyporus hirsutus, Polyporus* sp. (11), *Polyporus* sp. (12), *Polyporus* sp.(13) and *Polyporus* sp.(14) recorded only from Comilla district. In addition, *P. zonalis* and *Polyporus* sp. 19) found only in

Chittagong; *Polyporus* sp. (7) recorded from Chittagong Hill Tracts. *Polyporus* sp. (6) observed in both Chittagong and Chittagong Hill Tracts, whereas *Polyporus* sp. (10) found in Chittagong Hill Tracts and Comilla district.

TAXONOMY, DISTRIBUTION AND DIVERSITY OF *LENZITES* IN CHITTAGONG, CHITTAGONG HILL TRACTS AND COMILLA

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The Macrofungi have a great importance in the viewpoint of ecosystem as they stimulate wood decomposition and help in carbon cycling and some of them have high medicinal values. Samples of different macrofungi were collected from Chittagong (Hathazari and Kalurghat), Chittagong Hill Tracts (Kaptai, Subolong, and Rangamati Sadar) and Comilla (Balutupa, Gangchar and Shaktala). Altogether five different diversified species of *Lenzites* were recorded from the study areas. On the basis of morphology of the sporocarps, they were identified as *Lenzites betulina, Lenzites striata* (Swartz ex Fries) Fries, *Lenzites adusta* Massee, *Lenzites* sp. (4) and *Lenzites* sp. (5). Out of three districts, Chittagong Hill tracts is rich with highest number of species (four). Chittagong and Comilla districts each have only two species. *Lenzites betulina* and *Lenzites* sp. (4) were recorded from Chittagong Hill Tracts and Comilla; *Lenzites striata* recorded only from Chittagong Hill Tracts; *Lenzites adusta* recorded from Chittagong and *Lenzites* sp. (5) found only from Chittagong Hill Tracts.

TAXONOMY, DISTRIBUTION AND DIVERSITY OF *DAEDALEA* IN CHITTAGONG CHITTAGONG HILL TRACTS AND COMILLA

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Samples of different macrofungi were collected from eight different locations of three districts (Chittagong, Chittagong Hill Tracts and Comilla). On the basis of morphology of the sporocarps, very diverse collections were observed and ten different species of *Daedalea* were identified. Out of three districts, Chittagong Hill tracts is rich with *D. andamani, D. flavida, D. stereoides, Daedalea* sp. (4), *Daedalea* sp. (5), *Daedalea* sp. (6) and *Daedalea* sp. (9), Comilla district has six different species namely *D. flavida, D. stereoides, Daedalea* sp. (7), *Daedalea* sp. (8), *Daedalea* sp. (9) and *Paedalea* sp. (10) and very few (three) species such as *D. stereoides, Daedalea* sp. (4) and *Daedalea* sp. (6) were recorded from Chittagong district. *D. stereoides* were found very common in three district ; *D. flavida* and *Daedalea* sp. (9) recorded from both Chittagong Hill Tracts and Comilla. Whereas *Daedalea* sp. (6) found in Chittagong and Chittagong Hill Tracts.

TAXONOMIC STUDY OF *AMANITA CAESAREA* (FR) SCHW FROM BANGLADESH

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Amanita caesarea (Fr) Schw one of the most common mushroom-like ectomycorrhizal fungus, found in Chittagong University Campus in association with roots of *Hopea odorata.*

It is usually grown alone or in a small-scattered group. The macro and micro morphological features of the collected fungus were studied in the field and under laboratory conditions. The cap of the fungus is 5 to 13 cm wide; hemispherical, becoming convex to nearly flat, usually with knob; margin prominently radially lined; sticky, smooth; yellow. to deep orange color at the center, again yellowish. Gills free, remote, broad, distant, and yellow. Stalk 6-15cm long, 0.3-2cm thick; smooth to wooly scaly; yellowish; stuffed, becoming hollow; sac like cup. Universal veil white; leaving persistent, thick. Partial veil membranous, yellow, leaving pendant ring on upper stalk. Spore oval, smooth, colorless, nonamyloid. Spore print white. The species is available from July to October. It is edible with caution.

RELATIONSHIP BETWEEN YIELD AND ITS COMPONENT CHARACTERS OF BUSH BEAN (*PHASEOLUS VULGARIS L.*)

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Relationship between yield and its component characters of twenty seven bush bean (*Phaseolus vulgaris* L.) genotypes were studied during November 2002 to February 2003. Ten characters were studied to identify suitable traits for yield improvement of this crop. Significant variation in seed yield per plant was noticed among the genotypes and the yield difference was attributed mainly due to variation in yield components. The number of pods per plant was the highest in BB 15 followed by BB 3. The highest number of seeds per pod was found in BB 3, while BB 22 had the least. Based on the seed yield per plant, the 27 genotypes were grouped as high yielder (BB 3, BB 9 and BB 15), medium yielder (BB 10, BB 11, BB 12, BB 13 , BB 14, BB 16 and BB 18) and low yielder (BB 1, BB 2, BB 4, BB 5, BB 6, BB 7, BB 8, BB 17, BB 19, BB 20, BB 21, BB 22, . BB 23, BB 24, BB 25, BB 26 and BARI Bush bean-1). The differences between genotypic coefficient of variation (GCV) and the phenotypic of variation (PCV) were low for all the characters, indicated a low environmental influence over genetic factors on the characters. The GCV and PCV were generally high for pods / plant, 100-seed weight, duration of flowering, seeds / pod and seed yield / plant. High heritability coupled with high genetic advance was observed for duration of flowering, pods / plant, 100-seed weight, seed yield / plant and protein content. Days to 50% flowering, duration of flowering, plant height, pods / plant and seeds / pod had high degree of significant positive correlation with seed yield / plant. Path analysis indicated that pods / plant, days of 50% flowering, 100?seed weight, seeds / pods, plant height and pod length had positive direct effect on seed yield / plant. Those traits could, therefore, be of useful for yield improvement program of bush bean.

FISH, FRESHWATER AND BANGLADESH

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Bangladesh has a unique position in the sub-tropical region, within the delta of three great rivers - the Ganges, the Brahmaputra and the Meghna (covering an area of 14.30 million ha). The country is very rich in biodiversity. The vast wet-lands, wide river-fed systems, rainfall and warm temperature play a significant role in the diversity of country's ecosystem. There are 290 rivers (of which 54 are international) and numerous ponds, beels, haors, baors, lakes, flood plains, brackish and marine water bodies. Area of inland water is 5.0 million ha, closed water 0.3 million ha, floodplain 2.8 million ha and the coastal belt is 0.166 million km^2. There are 1.4 million permanent fishermen / women in the country (0.76 million freshwater and 0.52 million marine).

The aquatic biodiversity of Bangladesh is ranked as the 3rd largest in Asia behind China and India, with 260 (?) of fresh water fish species. This species diversity has been attributed to the world's one of the largest wetlands (Bengal Delta) and three large river systems that flow from the Himalayan Mountains into the Bay of Bengal. Enormous freshwater fisheries resources feed millions of people living in the Delta. Recent acceleration of aquaculture production of 700,000 tons of fish in Bangladesh has yet to relieve fishing pressure in large rivers and water bodies. It is expected that the demand for fish will reach over 6 million tons by year 2010. Unfortunately, over harvesting of fish is likely to continue and place greater pressure on most small and large size water bodies. Rapid extraction of seed (for stocking) as well as brood fish (for seed production and consumption) from natural waters combined with destructive and unregulated fishing practices (use of mono filament gillnets) has led to extinction of a number of rather valuable native species. Loss of aquatic habitat due to siltation, dam construction (for irrigation, flood control and hydroelectric generation), and other anthropogenic activities has been the primary causes of species loss. Human bias towards some selective species for aquaculture / game / (aquarium in few cases) made other so deserted that we already forgot even the name of the many valuable species.

Recent studies have shown that the number of freshwater small indigenous species (SIS) has been gradually declining at an alarming rate. Some species have been locally extinct. Many species are being considered as endangered / threatened due to their gradual disappearance from the waterbodies. While little can be done to bring back the lost species of Bangladesh, currently 56 species of fresh water fish are endangered or near extinction, needing immediate measures to protect and conserve them. So far no countrywide survey has ever been conducted to evaluate the biodiversity status and habitat conditions of any of the fish of Bangladesh. Therefore, we do not know how many freshwater fish species were there in Bangladesh fifty years ago. The number could be 260 could be more than that. We also do not know presently how many species are left, for sure how many have already been extinct and the level of threat to others.

This is the high time to care for the biodiversity of these beautiful creatures the pride and heritage of the country before they are lost forever. The researchers, policy makers, GOs and NGOs should think about the way of *in situ* and *ex situ* conservation of these precious species. Not only the commercial species but also other species should be brought under research for understanding their biology, habitat preferences and carrying out the breeding programmes. The researchers along with other stakeholders should come forward to write books, prepare poster, build a national natural history museum (and aquarium facilities) for fish and finally make the people from all level aware about our freshwater fishes.

FRUIT PREFERENCES AND FORAGING BEHAVIOUR OF FRUGIVOROUS BIRDS IN CHITTAGONG, BANGLADESH

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Foraging behaviour of 19 species of frugivorous birds belongs to 9 families was studied in the Chittagong University Campus between March 2003 and February 2004. The peak fruiting was recorded in the monsoon being the lowest in the winter. The fairly regular peaks were in April, July, September to November and February. Foraging over the entire period was related to species and families of fruiting plants; foraging overlapping was also noticed at the family level. Seasonal foraging patterns were varied according to fruit availability and consumer choices: *Ficus benghalensis* and *Trema orientalis* were the most favourite fruit items in most of the seasons. The frugivorous birds were found to forage mostly in trees and favoured the small-sized fruits (0.25 to 5.00 mm in diameter). The birds were mostly drupe consumers and differed in choice of colour spectra. There were wide variations of overlapping of fruit diets among the bird species studied. The red vented bulbul was the most regular consumer in all vegetation strata. A comparative data shows that the frugivorous birds foraged highly in the monsoon and the foraging preferences among the frugivores vary considerably.

RESPONSE OF ONION AND GARLIC SEEDLINGS TO DIFFERENT SOURCES OF ARBUSCULAR MYCORRHIZA

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Arbuscular mycorrhizal (AM) fungi collected from different sources were tested for their effectiveness in promoting growth of onion (*Allium cepa* L.) and garlic (*Allium sativum* L.) seedlings in pot experiment during 2004 and 2005 to study the response of onion and garlic seedlings to different sources of arbuscular mycorrhiza. The sources of AM inocula were Jamalpur, Joydebpur, Ishurdi, Hathazari and Exotic. Onion, BARI Piaz-1 and garlic (local variety) were used in this experiment. Mycorrhizal inoculation influenced significantly all the growth characteristics of onion and garlic seedlings over uninoculated control. Same trend was reflected on the root colonization and spore numbers in the rhizosphere soil. In 2003-2004 the highest root colonization (85.0, 77%) were recorded with AM inoculurn collected from Joydebpur and Jamalpur. But the highest spore population (210 and 287 per 100g soil) were obtained from the rhizosphere soil of AM inoculum collected from Jamalpur and Hathazari. The highest root colonization (60.0, 40%) were recorded with AM inoculum collected from Hathazari. But the highest spore population (185 and 224 per 100 g soil) were obtained from the rhizosphere soil of AM inoculum collected from Joydebpur and Ishurdi in 2004-2005. Different mycorrhizal inocula influenced seedlings growth differently.

STEVIA : AN ELITE SWEETENING AND MEDICINAL HERB A NEW INTRODUCTION TO BANGLADESH

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Stevia (*Stevia rebaudiana* Bert.) belongs to the family Compositae native of Paraguay is an elite sweetening medicinal and perennial herb. Powder of dry leaves of this plant is 30-40 times and stevioside contained in leaves is 200-300 times sweeter than sucrose. Sweetness of leaves with "zero calorie" attracts to select for introduction of this crop. Bangladesh Sugarcane Research Institute (BSRI) started research for establishment on it after entrained and introduction since 2001. Within a year plant produced flowers and seeds. Rapid establishment becomes barrier by seeds due to poor germination (<10%). Stem cutting is hard to induce of roots. Therefore, tissue culture becomes the best option for rapid propagation and establishment. Propagation protocol has been optimized. Initial establishment has been obtained in pot and field through plantlets and less frequently by seeds. Five generations are passing after establishment through acclimatization. Planting period and spacing are optimized for growth and reproduction. For establishment and enhancement of distribution as well as promotion in areas of diverse climatic conditions through users easy production technique and natural utilization without extraction of chemicals has been developed. This is useful to diabetic patients and others as calorie free sweet.

METHODS OF ETHNOBOTANICAL DOCUMENTATION

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The term *Ethnobotany* was first used by John W. Harshberger in a lecture he delivered to the University of Pennsylvania on 4 December 1895 (Cotton 1997). Ethnobotany is the study of the relationship between plant and people: From "ethno"- study of people and "botany" - study of plants. Ethnobotany studies the complex relationships between (uses of) plants and cultures. The focus of ethnobotany is on how plants have been or are used, managed and perceived in human societies and includes plants used for food, medicine, cosmetics, dyeing, textiles, for building, tools, clothing, rituals, social life and music.

Techniques are tools, and the choice of using one over the other depends on the aims and theoretical approach of the study, field conditions, and expertise of the researcher (Alexiades 1996). There are various techniques recommended for ethnobotanical study to document plant use information from different communities. Today the field of ethnobotany requires a variety of skills: botanical training for the identification and preservation of plant specimens; anthropological training to understand the cultural concepts around the perception of plants; linguistic training, at least enough to transcribe local terms and understand native morphology, syntax. This paper explains the methods for successful ethnobotanical documentation-including the sources of information.

ON-FARM VERIFICATION OF BIOFERTILIZER TO LENTIL IN THE FARMERS' FIELD

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A field trial was conducted at Multi Location Trial (MLT) site in Kustia, Farming System Research & Development site, Ishan Gopalpur, Faridpur, MLT site, Kuadabazar, Jessore and Agricultural Research Station, Pabna during rabi season of 2005-2006 with the objectives i) to evaluate the response of lentil to newly developed bio-fertilizer under farmers' field condition and ii) to reduce the uses of N-fertilizer for lentil cultivation. The experiment was laidout in RCBD with four replications. Unit plot size was 4 m x 5 m. Four fertilizer treatments viz. T1: 50-22-42-20 kg N-P-K-S/ha, T2: 0-22-42-20 kg P-K-S/ha + Inoculum, T3: 0-0-0-0 kg N-P-K-S/ha + Inoculum and T4: Farmers' practice was studied. Farmers' practice was: 20-12-17-0 kg N-P-K-S/ha at Kustia, 25-18-21-0 kg N-P-K-S/ha at Faridpur, 20-15-18-8 kg N-P-K-S/ha at Jessore. BARI Moshur-4 was used in this experiment. Experimental result revealed that application of bio-fertilizer along with PKS produced higher nodulation and seed yield (1.56 t/ha at Kustia, 0.60t/ha at Faridpur, 1.16 t/ha at Jessore). The seed yield recorded at Kustia and Faridpur was higher in T2 (PKS + Inoculum.) than T1 (NPKS) but at

Jessore, the seed yield was higher in T1 (NPKS) which was identical to T2 (PKS+ Inoculum). Farmers' practice showed the lowest yield at Kustia. Application of only bio-fertilizer yielded 1.40 t/ha seed at Kustia, 0.33 t/ha at Faridpur, 1.03 t/ha at Jessore. It is evident from the experiment that application of bio-fertilizer instead of applying nitrogenous fertilizer can achieve the higher yield of lentil at farmers' field in Kustia, Faridpur and Jessore. The overall yield at Faridpur was not satisfactory due to delay sowing and high temperature during the growing period.