Volume 53, Number 254, Pages 92-176 1 February, 2017

Discovery

About the Cover

CELEBRITY OF THE MONTH

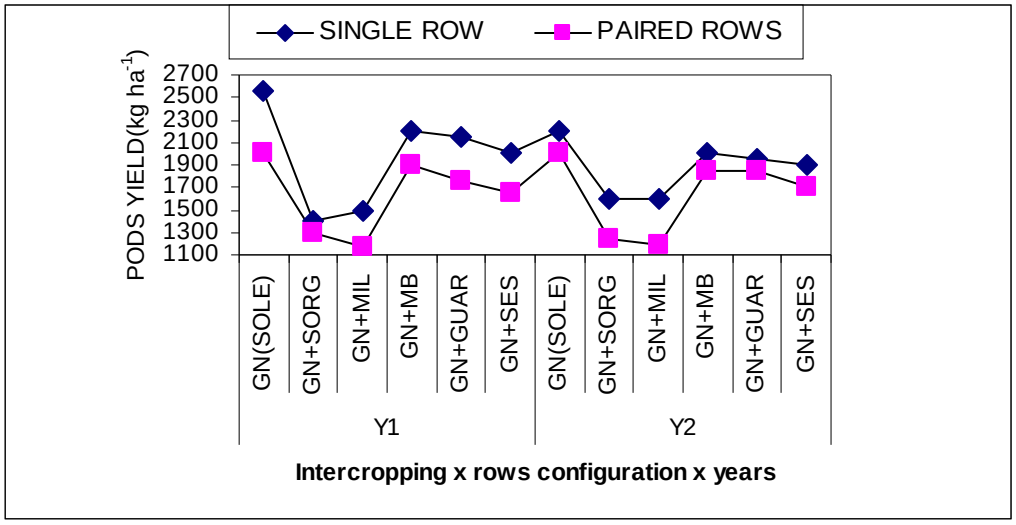
Emilio Gino Segrè
112th Birthday (1 February 1905 – 22 April 1989)
Discovered the elements technetium, astatine, and antiproton

Emilio Segre was born in Tivoli, Rome, on February 1st, 1905. He was an Italian-born American physicist who was cowinner, with Owen Chamberlain of the United States, of the Nobel Prize for Physics in 1959 for the discovery of the antiproton, an antiparticle having the same mass as a proton but opposite in electrical charge. In 1935 they discovered slow neutrons, which have properties important to the operation of nuclear reactors. Emilio Segre entered University of Rome as a student of engineering in 1922. In 1927 he changed over to physics and took his doctor's degree in 1928 under Professor Enrico Fermi. He served in the Italian Army in 1928 and 1929. Segre left Rome in 1936 to become director of the physics laboratory at the University of Palermo. One year later he discovered technetium, the first man-made element not found in nature. He and his associates discovered the element astatine in 1940, and later, with another group, he discovered the isotope plutonium-239, which he found to be fissionable, much like uranium-235. Plutonium-239 was used in the first atomic bomb and in the bomb dropped on Nagasaki. From 1943 to 1946 Segre was a group leader at the Los Alamos Scientific Laboratory, Los Alamos, N.M. He wrote several books, including *Experimental Nuclear Physics* (1953), *Nuclei and Particles* (1964), *Enrico Fermi: Physicist* (1970), and two books on the history of physics, *From X-rays to Quarks: Modern Physicists and Their Discoveries* (1980) and *From Falling Bodies to Radio Waves* (1984). Shortly after winning the Nobel Prize, Segre wrote the entry on the proton for the 1960 printing of the 14th edition of the *Encyclopaedia Britannica*. He died on April 22, 1989, in Lafayette, California, of a heart attack (Ref: community.emc.com); (Image: http://alice.physicsmasterclasses.org/).

RESEARCH

Intercropping and Rows Configuration Influence Productivity of Dryland Groundnut (*Arachis hypogea* L.)

Amanullah JAN, Amanullah



Groundnut (*Arachis hypogea* L.) is one of the most important crops grown as sole or intercropped under rainfed condition in Northwestern Pakistan. There is lack of publish research to indicate better intercropping system for groundnut under rainfed condition. This research work was therefore designed to investigate groundnut intercropping in legumes and non-legumes crops for understanding and development of production technology for groundnut under rainfed areas where indiscriminate intercropping is practiced. Field experiments were conducted at the Agricultural Research Farm of The University of Agriculture Peshawar, Northwestern Pakistan, during summer 2008 and 2009. Goundnut (*Arachis hypogea* L.) intercropped in single and paired rows in different crops [two legume crops viz. guar (*Cyamopsis tetragonoloba* L.) and mungbean *(Vigna radiata* L.), two cereals crops viz. millet (*Pennisetum typhoides* L.) and sorghum (*Sorghum bicolor* L.) and one oilseed crop viz. sesame (*Sesamum indicum* L.) which is non cereal/non leguminous crop] was studied. Sorghum, millet and sesame as sole crops had depleted soil N contents form the initial value; however, improvement in soil N contents was observed when these crops were intercropped with groundnut. On the other hand, legumes sole crops had more soil N content, and the soil N content dropped in intercropped legumes. Sole groundnut had higher yield and yield components than groundnut intercropping in cereal crops. Groundnut grown in single row produced more pod plant^{-1}, pod yield and harvest index than paired rows configuration. The LER (land equivalent ratio) decreased in groundnut + cereal < groundnut + sesame < groundnut + legume intercropping. These results based on LER suggest the adoption of single row of groundnut intercropping preferably with legumes (mungbean and guar) and sesame than cereals intercropping.

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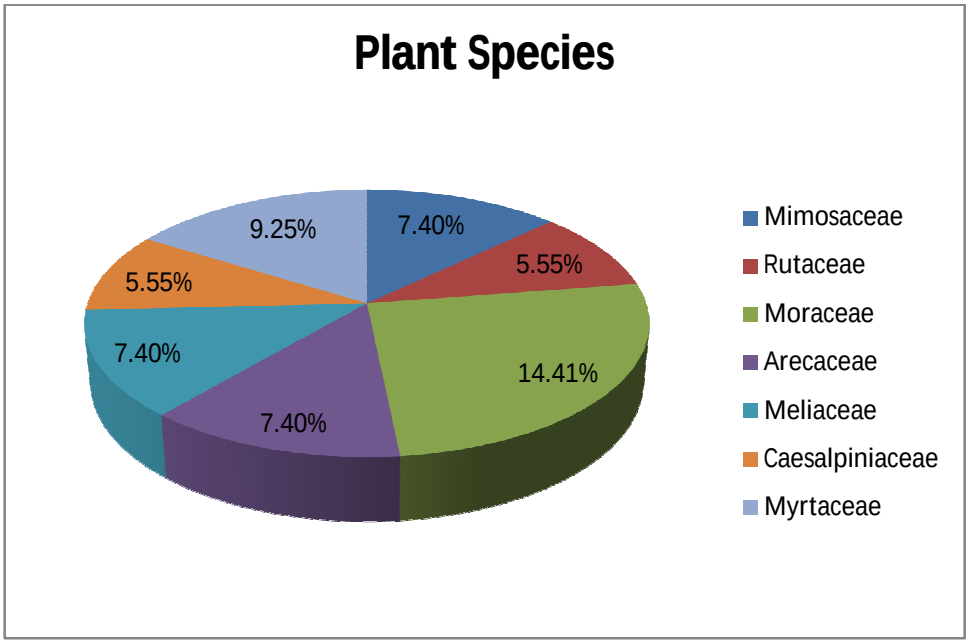
Annotated List in the Graveyards Trees of Rajshahi City, Bangladesh

Mahbubur Rahman AHM

Studies of tree species in the graveyards of Rajshahi city were carried out. A total of 54 species under 46 genera belonging to 24 families were collected and identified. Among the total number of species *Acacia nilotica, Acacia catechu, Artocarpus heterophyllus, Anthocephalus chinensis, Ficus religiosa, Ficus benghalensis, Erythrina variegata, Mangifera indica, Psidium guajava* were abundant and *Aphanomixis polystachya, Alstonia scholaris, Diospyros perigrina, Feronia limonia, Terminalia chebula, Phyllanthus emblica* were very rare. For each species scientific name, local name, family and flowering time is provided. All specimens are kept in the Herbarium, Department of Botany, and University of Rajshahi, Bangladesh.



Discovery, 2017, 53(254), 107-116

A Preliminary Taxonomic Checklist of Phytoplankton in the Lower Meghna River-Estuary

Abu Sayeed Muhammad Sharif, Md. Shafiqul Islam

Photograph plate

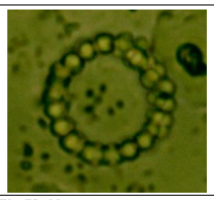


Fig 79: *Nostoc*

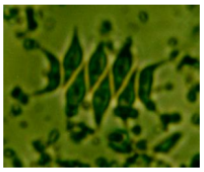


Fig 80: *Scenedesmus*

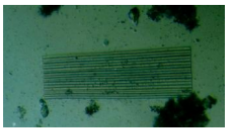


Fig 81: *Fragilaria*

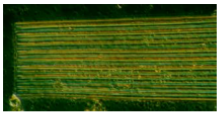


Fig 82:*Fragilaria*

Fig 83:*Fragilaria*

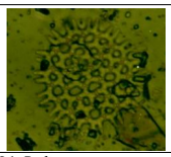


Fig 84: *Pediastrum*

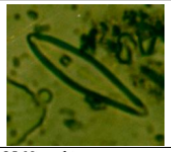


Fig 85:*Nitzschia*

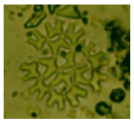


Fig 86: *Pediastrum*

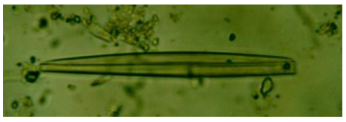


Fig 87: *Pleurosigma*

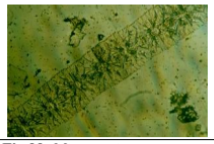


Fig 88: *Micrasterias*

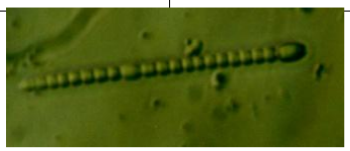


Fig 89: *Nostoc*

Fig 91: *Spirogyra*

Fig 92: *Anabaena*

Fig 93:*Nitzschia*

The study was conducted to uncover Phytoplankton occurrence and distribution in five sites (Sandwip, Hatiya, Bhola, Barishal, and Chandpur) of the Meghna river- estuary, Bangladesh. In the present investigate, a total of 51phytoplankton genera under 28 orders belonging 4 phylum's were identified; of which Chlorophyta (20 genera), Cyanobacteria (7 genera), Bacillariophyta (23 genera) and Ciliophora (1 genus). During the annual cycle Nitzschia was common genera at all five sites. *Nitzschia, Schrodella, Thalassiosira* and *Triceratium* were dominantat Sandwip; *Coscinodiscus, Navicula, Nitzschia, Schrodella* and *Triceratium* were prevalentat Hatiya; *Biddulphia, Cymbella, Nitzschia, Plurosigma, Thalassiosira* and *Triceratium* were common to Bhola; *Biddulphia, Cymbella, Nitzschia, Plurosigma, Thalassiosira,and Triceratium* were frequently recorded from Barishal and *Biddulphia, Nitzschia, Nostoc* and *Rhizosolenia* were predominant at Chandpur during the sampling seasons. During the monsoon *Nitzschia, Thalassiosira* and *Triceratium* were common at all five sites whereas during the post-monsoon *Coscinodiscus, Nitzschia* and *Thalassiosira* were available in the study area.

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A Preliminary Taxonomic Checklist of Zooplankton in the Karnaphuli River Estuary

Abu Sayeed Muhammad Sharif, Md. Nesarul Hoque

Photographic plate 3

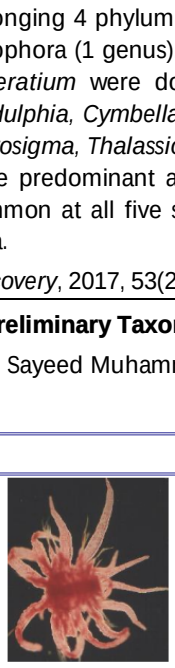


Fig 1. Unidentified

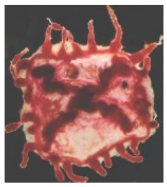


Fig 2. Hydromedusae

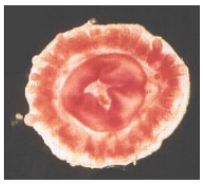


Fig 3. *Balanus*

Fig 4. Crab Zoea

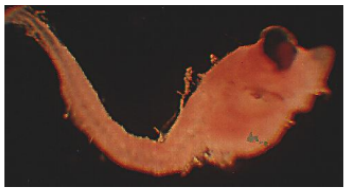


Fig 5. Fish Larvae

Fig 6. Cumacea

Fig 10. Acetes

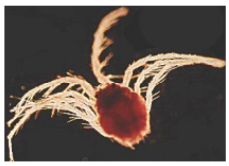


Fig 7. Acari

Fig 8. Acari

Fig 9. Tanaidae

Fig 11. *Lucifer*

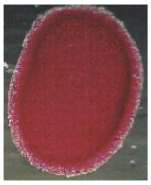


Fig 12. Porifera

Fig 13. Diptera

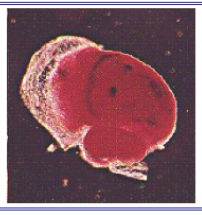


Fig 14. Gastropoda

Fig 15. Bivalvia

The present study was conducted to identify phytoplankton occurrence in 6 sites (15 No Jetty, Marine Fisheries Academy, Bridge Ghat, Nazirchar, Halda Mouth and Karnaphuli River above Halda's Confluence) from the Karnaphuli River Estuary. In the investigation, a total of 25 major taxa were identified under Arthropoda (19 order), Cnidaria (2 order), Chaetognatha(1 order), Porifera (1 order), Ciliophora(1 order), Mollusca(1 order).Further 6 genus of cladocera were also identified, namely:*Daphnia, Bosmina,*

Diaphanosoma, Moina, Ilyocryptus and *Penilia*. The highest peak of zooplankton during monsoon and pre-monsoon season were 423.54 indivs/$m^3$and 437.39 indivs/m^3at same site near Karnaphuli River above Halda's confluence.Whereas, during post-monsoon highest 654.40 indivs/m^3zooplankton were recorded at Nazirchar site between the sites. During monsoon, post-monsoon and pre-monsoon seasons maximum 15, 17 and 19 major taxa were identified from Karnaphuli River above Halda's confluence, near Nazirchar and Marine Fisheries Academy sites respectively.

Discovery, 2017, 53(254), 133-144

REVIEW

Thermostable enzymes and their industrial application: a review

Md. Fakruddin

Enzymes produced by hyperthermophilic microorganisms are stable at high temperature. Most of the hyperthermophiles are Archaea but there are two groups of bacteria: Thermotogales and Aquificales. Activity of thermostable enzymes can be at temperature close to the organism's growth temperature or at above the organism's growth temperature or can be below the organism's optimum growth temperature. Archaeal transcription systems are more closely related to eukarial than bacterial transcription system. Thus cloning of genes from hyperthermophiles in fast-growing mesophilic eukaryotes (*Saccharomyces cerevisiae*) byrecombinant DNA technology can show stability as native enzyme. Thermostableenzymes are highly specific and thus have considerable potential for many industrial applications. The use of such enzymes in the food and paper industry, detergents, drugs, toxic wastes removal and drilling for oil is being studied extensively. In this review, the source of microorganisms and properties of thermostable starch hydrolyzing amylases, xylanases, cellulases, chitinases, pectinases, lipases, DNA polymerases and DNA ligases have been discussed.

Discovery, 2017, 53(254), 147-152

PERSPECTIVE

Islam prohibits interest

Muhammad Talha Bilal, Hafiz Muhammad Tayyab, Muhammad Arshad Ullah, Mr. Arshad Mahmood

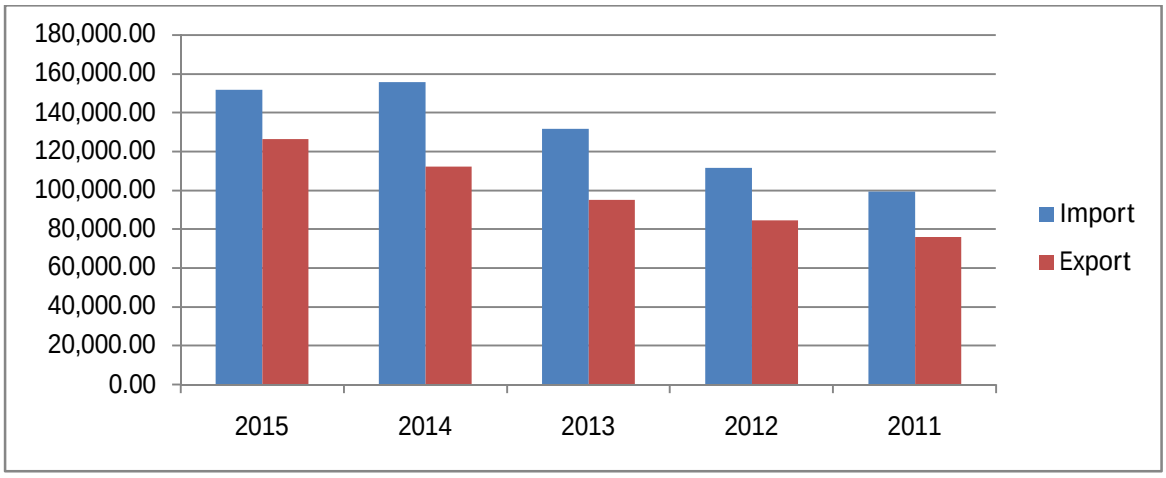
Interest is the price paid for the use of money or credit. Islam religion teachings are very close to nature. Islam prohibits interest rate and promotes Qarz-e-hasna (Give money to the needy people without interest). Interest disturbs the economics of the society. Higher interest rates increase the cost of consumption and less saving. It also damages the confidence between the consumers and producers. Interest rates increase the unemployment in the world. Pakistan budget always showed deficit due to the payment of loans attained with the highest interest rates. The goods purchase by the loans with interest rates increased the cost of production and ultimately failed the economics.

Discovery, 2017, 53(254), 158-163

CASE STUDY

Performance of foreign exchange operation of private commercial banks: a case on southeast bank limited

Anwarul Islam KM



Banking sector is expanding its hand in different events every day. At the same time the banking process is becoming faster, easier, and the banking area becoming wider. As the demand for better service increases day by day, they are coming with different innovative ideas and products. In order to survive in the competitive field of the banking sector, all banking organization are looking for better service opportunity to provide their fellow clients. As a result, it has become essential for every person to have some idea on the bank and banking procedure. Southeast Bank Limited believes in the vision of together, towards, tomorrow. To achieve the desire goal the bank is showing the excellence at all stages with a climate of continuous improvement. Banks strategic plans and networking will strengthen its competitive performance over others in this rapidly changing competitive environment. The overall objective of this research had represented the foreign exchange performance of import, export and foreign remittance of Southeast Bank Limited. This paper examined about import, export and remittance performances have been analyzed and find out some problems relating to foreign exchange activities. Finally this research finished with some possible recommendation and concluding remark of the study.

Discovery, 2017, 53(254), 170-176