

Discovery

About the Cover



CELEBRITY OF THE MONTH

Sir Jagadish Chandra Bose

159th Birthday (30 November 1858 – 23 November 1937)

One of the Fathers of Radio Science

Jagdish Chandra was born on November 30, 1858. He was born in a Hindu Kayastha Bengali family. He was a polymath; a physicist, botanist, biologist, archaeologist and also a reputed writer of science fiction. He championed the investigation of radio and microwave optics, made an important contribution to plant science. He was the person who put India in the world map by his scientific flair and ingenuity. He is one of the most prominent first Indian scientists who proved by experimentation that both animals and plants share much in common. He demonstrated that plants are also sensitive to heat, cold, light, noise and various other external stimuli. His experiments on the quasi-optical properties of very short radio waves (1895) led him to make improvements on the coherer, an early form of radio detector, which have contributed to the development of solid-state physics. IEEE named him one of the fathers of radio science. On 29 March 1904 he became the first Indian to get a US patent, for his "detector for electrical disturbances". He did invaluable work in Science; his work was recognized in the country only when the Western world recognized its importance. He founded the Bose Institute at Calcutta, devoted mainly to the study of plants. He was knighted in 1917 and became an FRS in 1920. He died on November 23, 1937. In 1958, on his Birth Centenary, the Jagadis Bose National Science Talent Search Scholarship was created to "select students with special aptitude for science and providing a scheme for counselling, conserving and helping this most precious resource, namely, human talent, which is necessary for building up the nation, by award of scholarship and otherwise". As a pioneer, J.C. Bose has remained an inspiration to thousands of Indian students aspiring to a career in science.

An overview of white rust disease in Brassica: taxonomical, biochemical aspects and management approaches

Muhammad Asif, Muhammad SaqibMushtaq, Hina Firdous, Muhammad Mubashar Zafar, Ali Imran, Tanvir Ahmad, Hafiz Muhammad Arslan Abid, Hafiz Saad Bin Mustafa

Rapeseed (*Brassica napus* L.) belongs Brassicaceae family is the second most important oilseed crop in Pakistan after cotton. It contains 40-46% oil content and 22% protein. There are several factors which lowers seed yield like abiotic and biotic stresses. *Alternaria* blight and white rust diseases are the major threat for reducing Brassica seed yield in Pakistan. White Rust (WR) is the most destructive disease of brassica in tropical and subtropical areas of Pakistan caused by *Albugo candida*. It causes 20-90% yield losses throughout the world. In Pakistan, it was first reported from FATA and BAJAUR Agency with 32% pod losses and 52% foliage losses. *A. candida* is an obligate parasite and its survival rate is very high in plants debris and soil. It is reported from different Asian and European countries causing different epidemics. It has wide host range of *Cruciferae*, *Ficoidaceae*, *Capparaaceae*, and *Cleeeomaceae* white or off-white (creamy) raised pustules of pin size to various forms, and sizes leading to stag-head formation. Three types of spores are produced and their nature of infection is variable. Oospores are seed and air borne when carried on seed, or overwintered in soil; serve as prime source of infection in Brassica. Through extensive research different races of *A. candida* are identified on different host range. Few races like AC 2, 3, 4, 5, 6, 7, 8, 9 are common in various countries and different researcher named them accordingly. That's why it is being placed in different families, and genera. Infection of pathogen brings different biochemical changes in plant. These changes in host are useful to understand the biochemistry, host pathogen-interaction and to manage the disease by avoiding symptom's ambiguity. Screening of resistant germplasm is a prime factor and extensive research is being conducted in this regard. Resistant cultivars are the best option to control the disease as they are eco-friendly, locally adapted to the environment, and durable. Different genotypes of *Brassica juncea*, *B. carinata*, *B. napus* and *B. rapa* were evaluated in field conditions against white rust for five years. Resistant sources are mentioned in this review according to the local climate of different countries. Chemicals protect the plants by forming layer on leaves surface while some have ability to penetrate the system and help the plant to reverse the biochemical changes induced by the pathogen. The Symptomology of a disease plays an imperative role in the understanding of altered physiological changes and the establishment of pathogen with in host but there are many factors which caused the symptoms uttered by pathogenic fungus like infection time, type of infection, plant age, genetic makeup of the host plant and environmental conditions which need further research. Biochemical changes play an important role in the plant defense and induce resistance as the proteins form complex with fungus to inhibit it. One compound regulates the level of other one in tissues as H_2O_2 is produced at a very high rate in susceptible but less in moderately resistant lines. As a defensive action on H_2O_2 the quantity of CAT which led to increase in POD and SOD is increased to manipulate later and so is the way of regulating it. Catalase (CAT) prevents the accumulation of H_2O_2 in the cells. CAT activity increases in resistant varieties and it breaks down the hydrogen peroxide into water and oxygen. Peroxidase (POD) plays a significant role in defense response and its activity is associated with resistance induction in different species of plants. It is also involved in the breakdown of hydrogen peroxide. Increased activity of peroxidase leads to the production and accumulation of hydroxypyrone rich glycoprotein into the cell wall. Peroxidase is involved in lignin polymerization. The enzyme has role in cell wall metabolism as well as in defense regulation and induction. Superoxidase dismutase enzyme acts as a first line of defense against reactive oxygen species (ROS) and rapid induction of SOD leads to recognize the pathogen's avirulence factors. phenolic contents can be increased due to glycosidic esters formed by the enzymatic activity of host or pathogen or due to migration of phenols from uninfected tissue. Our research findings support the above-mentioned facts. Different researcher has reported different chemicals of same formulations as Meralaxyl, Mancozeb, Captaf, Swing and Atracol to control white rust either using them as seed treatment or foliar application. These biochemical and chemicals interactions need more exploration.

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ANALYSIS**Assessment of physico-chemical parameters in the estuarine water of Devgad mangrove swamps, Maharashtra coasts**

Nisha R Mugade, Jagdish B Sapkale

The present research work has attempted to analyse the physico-chemical parameters of estuarine water of Devgad mangrove swamps of coastal Maharashtra. Water samples were collected from mouth zone, middle zone and upstream zone of Devgad estuary for pre and post monsoon season. The present study reveals that, salinity is one of the most important factors which strongly influence the abundance and distribution of the mangroves in estuarine environment. Higher salinity recorded during pre monsoon season due to higher evaporation rate during summer season. Influx of fresh water through heavy rainfall and large quantity of fresh water inflow is high during monsoon that affects on the salinity level and reduces the overall content of salinity in the mangrove swamps.

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Estimation of chloride absorption in concrete cubes with finite moisture content

Balakrishna MN, Fouad Mohamad, Robert Evans, Rahman MM

The exposure of concrete infrastructures to chloride ions is the primary cause of premature corrosion of steel reinforcement. The intrusion of chloride ions, present in de-icing salts into reinforced concrete can cause steel corrosion if oxygen and moisture are also available to sustain the reaction. In fact that, the chlorides dissolved in water can also permeate through sound concrete/reach the steel reinforcement through cracks. Therefore, there is a need to quantify the chloride absorption in concrete cubes which is of most important factor. The present research work was made an attempt to interpret the concrete chloride absorption in ordered to characterize the different concrete mixtures design for in case of pre-conditioned concrete cubes such as dry/fully/partially saturated condition which is salt ponded with chloride solution for about 160 days at 10% NaCl solution. Thus the objectives of this present research are such as, First, this research will examine the influence of conditioning such as dry/fully/partially saturated condition on the results of chloride absorption performed on concrete cubes with different mixtures proportion in which slump, and w/c ratio value was varied with constant compressive strength as in the First case and compressive strength, and w/c ratio value varied with constant slump as in the Second case. Seventy-two concrete cubes (100 mm^3) with Grades of concrete ranges from 25 to 40 N/mm² were prepared and evaluate the chloride absorption under different exposure condition. It's concluded from the results that, in dry/saturated conditioned concrete cubes, the chloride absorption value was increased in all designed mixtures type at longer time duration. Similarly, the average chloride absorption was decreased in solvent/water based impregnation DCC/PSC/FSC cubes as when compared to control DCC/PSC/FSC cubes for constant higher compressive strength and varied slump value as well as varied compressive strength and constant slump value. Whereas the average chloride absorption was increased in solvent/ water based impregnation DCC/PSC/FSC cubes for lesser compressive strength and constant slump value as when compared to constant higher compressive strength and varied slump value and the chloride absorption was goes on decreases with increased compressive strength and constant slump value.

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ANALYSIS**B. Feng's theory - the prediction of mass spectrum of elementary particles and the confidence of at least 4-D space-time (Part I)**

Zhen-hua Mei

Based on Einstein's four-dimensional space time in general relativity and the symmetry principle, B. Feng created his theory in field of elementary particle physics. He proposed 16-regular polytope to express the symmetries of elementary particles' manifold in 4-D space. The manifold's mode changing angle (δ) projected from 4D to 3D plays an important role in his theory. The mass spectrum of elementary particles is then predicted by the theory.

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