
SCIENCE NEWS

SEMINAR ON 'BREEDING FOR STRESS RESISTANCE IN CROP PLANTS'.

The National Seminar on 'Breeding for Stress Resistance in Crop Plants' which was organized by the Indian Society of Genetics and Plant Breeding at the Haryana Agricultural University, Hissar, was attended by 300 participants from all over India as well as from Philippines and Thailand. The seminar was chaired by Dr M. V. Rao, Deputy Director General (Crop Sciences). Dr D. Sharma, Director, On Farm Research ICRISAT acted as Rapporteur. In all, six papers on non-biotic stresses such as salt, drought and temperature were presented by the invited speakers. The speakers were Dr S. K. Sinha (IARI, New Delhi), Dr T. T. Chang (IRRI, Manila), Dr I. P. Abrol (Central Soil Salinity Institute, Karnal), Dr R. S. Rana (CSSRI, Karnal), Dr Sushil Kumar (IARI, New Delhi), and Dr R. S. Paroda (Haryana Agricultural University, Hissar). At the conclusion of presented papers, about 15 invited panelists initiated a discussion. The major recommendations are given below:

1. There is need to define and understand the various levels of environmental stresses. This would facilitate in using not only the correct terminology but would also enable the scientists to understand the extent of stress injury or resistance in crop plants and would, therefore, provide relative comparison of research results obtained at different locations.
2. To understand precisely the extent of tolerance/resistance to a given stress, a pre-requisite is to characterise the environment with respect to levels of stresses operative in a given environment. Obviously, proper understanding of environmental factors such as extent of precipitation and its distribution in relation to extent of drought, the probability levels with regard to predictability of rainfall, the level of toxicity with respect to specific ions, level of pH, EC, ESP etc. and the environmental variations for temperature fluctuations, nutrient availability in relation to moisture level/salinity in the soil, duration for crop growth etc. will be necessary to define research objectives for a particular situation operating in the specific area/region.
3. At present a number of morphological, physiological and biochemical attributes are implicated in good performance under a given stress. A

thorough understanding is necessary to be able to identify those parameters/plant processes that have direct relevance so that they are exploited for meeting the desired objectives. It will also be necessary to screen the available germ plasm for these attributes so that the required genetic variability is exploited in the desired direction. Simultaneously, efforts will be needed to study the genetics of such attributes and their possible influence on the relative performance of an individual when they have been incorporated.

4. Screening techniques are necessary for identifying suitable plant material, possessing the desired attributes related to the inbuilt tolerance to different stresses. Infrastructural facilities for this purpose are required to be strengthened since presently, facilities available at most of the Institutions are inadequate. Also, it is essential that reliable screening techniques are devised which are capable of (i) assessing the plant resistance at the critical developmental stages; (ii) quick to measure (iii) better in repeatability even for small sample size; and (iv) capable of screening large populations efficiently. Efforts in this direction will obviously require an interdisciplinary team approach, which is presently lacking at most of the centres.
5. Identification of relevant attributes and selection criteria are required for a practicable breeding programme aimed at achieving a meaningful genetic advance. Biomass is the result of action and interaction of the biotic and abiotic factors. Plant breeders cannot, therefore, work in isolation. There is need to adopt an integrated approach to increase productivity under stress and non-stress conditions in the face of biotic and abiotic stresses.
6. Breeding demands identification of genotypes with stability under stress conditions. The breeders and physiologists have to develop criteria of selection. The diversity gap between the products of natural selection and human selection could be bridged through intermating of the genetic stocks (or land races) and the high yielding varieties. The genetic stocks could be supplemented by selection through appropriate screening

methods. The products of stabilizing selection should be alternated or 'shuttled' between stress and non-stress environments while effecting selection for opposite (desirable) characters. Genotypes with recovery resistance, better rooting pattern, and more productivity, as measured in terms of per day production, should be chosen for advancement. Appropriate breeding methodology will also have to be used for achieving quick and desired results.

7. There is an increasing gap between the yield obtained under optimal and under stress environmental conditions. The drought/saline/waterlogged area represent a major proportion of the cultivated land in the country. Unlike breeding for endowed environment, the improvement of the yield in problematic areas will require larger research investments in spite of expected slow progress. The cultivated area cannot further be increased. It is, therefore, essential for agricultural funding agencies like ICAR/Agricultural Universities etc. to make larger investments in research programmes directed to improving yields under stress environments.
8. A meaningful breeding programme for stress conditions will demand infrastructure in terms of field facilities, sophisticated equipments and an

interdisciplinary team of scientists. Teams of scientists with sound knowledge of basic sciences and agro-climatologists, breeders, agronomists etc. would be essential. Further, manpower training in chosen specialised laboratories/institutions abroad and strengthening basic research on resistance breeding in the country is required urgently.

9. There is need to set up a working group at the level of the ICAR to develop proposals for establishing a few lead centres in the country. The lead centres should be located in the natural belt of the relevant stress situation. Such identified centres should be adequately equipped in terms of manpower and instrumentation so that the diversified aspects of stress resistance could be studied in depth. The provisions in the Seventh Plan Proposals are therefore essential for rapid agricultural purposes.
10. Monitoring, review and discussion of results each year in smaller groups is necessary to provide refinement in analysis and to expedite the application value of such basic results.

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NEUROSCIENCE WORKSHOP

A one month workshop on neuroscience sponsored by UGC, COSTED, International Society for Neurochemists, DST, DAE, ICMR, CSIR, British Council, French Government and Sir Pratapsinghrao Gaekwad Charities was held from 1-30 November 1984 under the directorship of Professors Shaila Telang and Lalit Parekh. Participants came from medical Institutions and Life Science Departments of Universities (21 from all over India, one from China, one from Ceylon and ten from Baroda). The permanent faculty consisted of 4 from the department and 3 from outside (Dr Gombos of France, Dr Doble of U.K. and Dr Greenshaw of Canada) and visiting faculty consisted of 5 from Medical College, Baroda, 10 from outside Baroda and two from outside India (Dr Raghupathy from U.S.A. and Dr Meijer from Netherlands).

The participants were engaged from 9 a.m. to 7 p.m. and at times even upto 9 p.m. with lectures, demonst-

rations of techniques, round table discussions, presentation of reviews, tape-slide sessions (Tape slide lectures on Neuroanatomy for the neurochemist by Dr Hokfelt, Neurochemistry for the neuroanatomist by Dr Sokoloff, Multiple sclerosis by Dr Waxman, and Basic neurochemistry lecture by Dr Roth were donated by American Society for Neurochemistry; Tape slide lectures on Histology-neurobiology by Dr Jones, was donated by International Society for Neurochemists; Prof. Bazan and Prof. Jean de Vellis also gifted books, reviews and slides) film shows on Muscle spasm and pharmacology of depression (British Council was kind enough to specially get the films from U.K.).

The course included various facets of neuroscience including anatomy, morphology, physiology, biochemistry, pharmacology and behaviour in relation to the brain and the correlations between these derived from different approaches such as extirpation of brain

tissue, electrical stimulation, nutritional deprivation, environmental manipulation etc. and the effects of these on different aspects of brain development and function were included.

The demonstrations included dissection and separation of different regions of the brain, separation of cell types, isolation of synaptosomal and myelin membranes, culturing of different cell types of nervous tissue, analysis of lipids and incorporation of the labelled precursor into brain lipids, analysis of fatty acids, assay of neurotransmitter levels and enzymes involved in their metabolism, use of stereotaxis for implementation of cannulae and electrodes, studies on self stimulation, drug effects on behaviour of rats, behavioural techniques including those used for assessment of neuromotor development, motor coordi-

nation, learning performance etc.

Round table discussion was arranged on "Methodology of subcellular fractionation". Specialists discussed techniques used in the preparation of monoclonal antibodies, immunohistochemistry, voltage and patch clamp, ligand binding studies and electrophysiology using slides, video etc.

It is proposed to bring out a text book on "Introduction to Neuroscience" which can be used to teach this course. Those interested in this book can contact Prof. L. J. Parekh.

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NEWS

ANTIBIOTICS: THE RESISTANCE PROBLEM

ABSTRACT

The increasing frequency of acquired resistance to antibiotics is a worldwide health problem which demands international attention. However, the rapidity with which new resistant strains are appearing, and the fact that existing resistant strains are becoming more prevalent, highlight the need for more information about the current situation and for action to control it. To meet the need for national and international surveillance of antibiotic resistance, the World Health Organisation (WHO) recommends that health authorities be informed of the best and most cost-effective ways of using antibiotics and pass this information on to all health professionals.

THE discovery of antibiotics was one of the major events in the history of public health. Antibiotics saved millions of lives and shortened the duration of illness for hundreds of millions or more. However, the dramatic nature of their effects encouraged an explosive increase in their use both for humans and in veterinary medicine. All this contributed to the growing problem of bacterial resistance.

First warnings

The first clinically serious consequence of antibiotic resistance was the widespread dissemination in hospitals, in the 1950s, of strains of *Staphylococcus aureus* that were resistant to penicillin. These strains had developed ability to form an antibiotic-destroying enzyme, penicillinase (beta-lactamase) and they sub-

sequently acquired resistance to several other chemically unrelated antibiotics. From the early 1950s onwards, these so called "multiple-antibiotic" resistant staphylococci became endemically established in many hospitals throughout the world.

Recently the situation has worsened. Surveillance data presented to the World Health Organization (WHO) indicate that serious consequences of antibiotic resistance were no longer confined to hospitals but were increasing in the general population.

The prevalence was even greater in developing countries than in industrialized ones. Resistance to such easily available antibiotics as ampicillin, tetracycline, chloramphenicol and sulfonamides has made its appearance. Patients in developing countries are now in a situation where only the low-cost antibiotics are available to them, yet these are becoming progressively