
BOOK REVIEWS

Environmental Analysis — Water, Soil and Air by M. M. Saxena, (Published by M/s. Agro Botanical Publishers (India), Old Ginnani, Bikaner 334 001), 1987, pp. 176. Price: Rs. 150/-.

Exploitation of natural resources and commercial activities of modern civilization has disturbed the ecological balance at an unprecedented rate. The quality of environment is largely dependent on the physical, chemical and biological processes of renewal, and regeneration of the components of the environment for the benefit of the life processes.

The main components of environment are water, soil and air with associated biotic species. The physical and chemical characteristics exert varied influences on the biotic species depending on the quantitative distribution of chemical constituents in water, soil and air. The analytical methods for analysis of water, soil and air are quite scattered in diverse disciplines of subject matter.

The author has compiled these analytical procedures from diverse origin in one publication. The subject matter is divided into sections A, B and C covering water, soil and air analysis procedures respectively. These sections are further subdivided into items covering sampling techniques and analysis of physical, chemical and biological parameters. Principles of reactions, equations and morphology of biotic species have been omitted but methods of calculation and expression of results have been included in the book. Bibliography furnishing the source of materials utilized in compilation of this text has been furnished.

In the first chapter, environment has been defined and justification for analysis of environment as well as methodology has been propounded. However, the book suffers serious lacunae in that, the safe limits of each constituent in water, soil and air as defined by the Environmental Protection Agency, Central and State acts on prevention of pollution, as well as limits as prescribed under the publications of Indian Standards Institution have not been given. Had the safe limits been given, the reports coming from laboratories using this book as a manual could have become more purposeful in evaluating the environmental quality of the samples. It has been stated on p. 31, that waters having up to 20 mmho/cm conductance are considered to be suitable for irrigation but it appears to be highly

erroneous. A few errors of spelling and chemical formulae have crept into the book which could have been avoided by careful proof-reading.

Now-a-days, many institutions have started to impart instructions on environmental science and the book under review serves a useful purpose by coming to the aid of such institutions.

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Laboratory Methods for Blue-Green Algae by B. D. Kaushik, (Published by Associated Publishing Co., 8798/7, Shidipura, Karol Bagh, New Delhi 110 007), 1987, pp. 171, Price: Rs. 150 or \$ 35.

Blue-green algae are receiving increasing attention in the hands of botanists, microbiologists, geneticists, agronomists, biochemists, physiologists, etc. This is because of the awareness on the benefits we derive from these organisms, which help in economic utilization of the natural phenomena of nitrogen fixation and biomass production for better returns from crop fields and waterspreads. What we know so far about algae and their qualities is very limited when compared to what is unknown. In attempting to learn more about these organisms, often efficient and suitable techniques become the limiting factor. The students of algology have to spend considerable time searching through the scattered literature, and then select and test verify a few for their suitability and adoption.

The author has done well in compiling all the available information on the techniques for laboratory studies of blue-green algae and has presented the same in a systematic and cogent form. Inclusion of chapters under Classification, Preservation and Enumeration, and information on various biochemical analysis including analysis of soil for its innumerable qualities, makes the book "self-contained" for a laboratory worker in algology. Being superfluous, the information on pH measurements, buffer solutions, tables on imperial to metric conversion, on elements and atomic weights and the

statistical formulae seems to dilute the 'specialist' quality of the book.

I am confident that this will soon become a very popular handbook with the students and scientists concerned with blue-green algae.

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IRRI Annual Report for 1986—Published in 1987, (Published by International Rice Research Institute, P.O. Box 933, Manila, Philippines), pp. 639.

The report is divided into 11 parts viz. genetic evaluation and utilization (GEU) programme, control and management of rice pests, irrigation water management, soil and crop management, climatic environment and rice, constraints on rice yields, consequences of new technology, cropping systems programme, machinery development and testing, training programmes and cooperative programmes.

In the innovative breeding methods, mapping of genes coding for isozymes and varietal classification based on isozymes is presented. In 1986 IRRI continued to identify factors such as *in vitro* conditions, source of explants and media components that could increase callus induction and plant regeneration efficiency. Abscisic acid up to 30 mg/l added to callus induction medium increased the callus induction efficiency. Mannitol and sorbitol as osmotica in callus induction media were tested. Control and management of rice pests included reports on biological control using species of *Pseudomonas* and *Bacillus* on Sheath blight of paddy. Thirteen species of *Trichoderma* were used to test their potential as agents in suppressing pathogens of rice grown in rain fed and upland cropping systems. Taking advantage of their competitive saprophytic nature, the cellulolysis adequacy index (CAI) was used as an indication of their capacity to decompose plant debris. *T. reesei* 206 had the highest CAI. The bacterial blight (BB) pathogen *Xanthomonas campestris* Pv *oryzae* (XCO) was detected in the seed using the technique of phage typing.

The Entomology Division reports that ethylene could serve as a marker for estimating the degree of insect infestation and seedling vigour and could also

serve as a tool in the screening for varietal resistance to storage insects. The work reported, pertains to the storage pest *Rhizopertha dominica* F. *Pila leopordvillensis*, golden apple snail, an aquatic gastropod has been recorded as a new pest feeding voraciously on the newly transplanted rice and also on *Azolla*. Organotin molluscicides are good but are toxic to fish and tadpoles. Handpicking has been recommended.

In the biological control of rice pests several new and rare fungi were collected and isolated from rice *Metarhizium flavoviride* Gams and Rozsypal, *Hirsutella citriformis* Speare on BPH, *Metarhizium album* Petch from planthoppers and leafhoppers. A new species of *Hirsutella* and *Cordyceps* was collected from leafhoppers in Indonesia and on BPH in Korea.

Neem seed kernel 'bitters' (limonoids) extracted as a crystalline powder was tested for the effect on BPH, WBPH and GLH. Only 10–20% first instar nymphs of BPH, WBPH and GLH reached the adult stage when caged on rice plants sprayed with 500 ppm of the neem seed kernel extract.

Evidence has been adduced to show that the neem seed derivatives affect insect behaviour and physiology. Neem seed kernel extract and neem oil were tested on the mating behaviour of BPH. Neem oil (20 mg) caused 85% mortality on BPH adults but only 26% of the mirid bug predator.

Turmeric oil (*Curcuma longa*), seed flag (*Acrocorus calamus*) and neem based insecticide Margosano were found to have repellent action on *Tribolium castaneum*.

Laboratory evaluation on 11 insecticides and a mixture on mortality at 48 HT with BPH, WBPH showed that monocrotophos gave over 80% mortality of BPH and WBPH and 100% on GLH. Ethoxyproxyfen 10E gave 100% mortality of BPH and GLH. In irrigated transplanted rice DOWCO 356, DOWCO 433 applied 8 days after transplanting gave yields comparable to those of Butachlor and hand weeding.

Irrigation water management department presented results on water harvesting and conservation to increase productivity, a simulation model for pumped irrigation system operation and effects of water regime on rice yield.

Soil and crop management studies, reported results on the total aerobic heterotrophs and nitrogen fixing putative azospirilla associated with the submerged portion of rice plants at five sites.

Inoculation of plants with *Pseudomonas diazotrophicus* strain HB by dipping roots for 6 h in an

inoculum enhanced $\text{NH}_4^{+}\text{-N}$ uptake significantly at 7, 14, 21 and 42 DAI more than did *Azospirillum* inoculation. *Azospirillum* inoculation also increased significantly P uptake of rice. It is suggested that inoculation with diazotrophs promoted plant growth through processes, other than nitrogen fixation by increasing mineral uptake.

Straw yield was higher with ammonium sulphate followed by gypsum, elemental sulphur and urea. S. Bentonite was not as good as the others.

Results from 42 on-farm trials conducted from 1983 to 1985 in Sind-Pakistan showed that the adaptation of recommended practices increased farm yields by 2.5 t/ha on an average from a simulated farmer's yield of 6.2 t/ha to 8.7 t/ha. Fertilizer and tillage levels seem to be an important contributing factor.

The importance of environmental conditions in understanding the variability of adaptation rates of modern varieties (MV) across areas has shown that adaptation rates in India have been confined to the

northern and southern regions which are mostly irrigated but account for only about 1/4 of the total rice area. In contrast eastern India which gets heavy rains during the growing season with poor water management has the lowest adaptation rate.

There is a chapter on machinery development and testing describing the results of ground driven rotary tiller, animal drawn cono puddler, drum seeder conical weeders with fertilizers applicator and a simplified axial flow pump. There are two chapters one on training programme and the other on cooperative programmes in different parts of the world.

The report is very useful for all those institutions which are engaged in Rice Research.

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SCIENCE NEWS

'CONCEPTS, LIMITS AND EXTENSION OF INDIAN GONDWANA'

The term Gondwana System was proposed by H. B. Medlicott in 1872 in his report on the Satpura Basin, but was omitted from the report when published (*Mem. geol. Surv. India*; Volume 10, part 1, pages 133-188). The term was revived by Ottokar Feistmantel in 1876 (*Rec. geol. Surv. India*, Volume 9, p. 28) and was adopted by the Geological Survey of India in 1879 (*Manual of the Geology of India* by H. B. Medlicott and W. T. Blanford). Since then it has been used in all official publications of the Survey.

The first available comprehensive definition is by Fox (1931). According to him (1931, *Mem. geol. Surv. India*, Vol. 58, p. 78) "The name Gondwana System was applied to the deposits of conglomerates, sandstones, shales and coal-measures of fluvial or lacustrine origin which occur in the Indian Peninsula and whose geological age ranges from middle Carboniferous to upper Jurassic. The fauna and flora of these Gondwana sediments are largely of terrestrial forms and include some fresh water fishes and amphibians".

The term Gondwana acquired several meanings with the passage of time. Extrapeninsular co-eval

sedimentary sequences were classified under the Gondwana due to mere presence of *Glossopteris* or *Ptilophyllum* floral associations, even if the sediments were primarily of marine origin. Similarly, the coastal sedimentary sequences with *Ptilophyllum* floral association were classified as Coastal Gondwana disregarding undoubted marine signatures.

The Geological Survey of India therefore organized a colloquium, in 1984, on Gondwana Stratigraphy for bringing a precision in the definition of the term. A revised definition of the Gondwana Sequence was proposed to include mainly terreginous facies with "Gondwanic" floral/faunal bondage.

The Birbal Sahni Institute of Palaeobotany invited a select gathering of Gondwana specialists to take stock of Gondwana related data generated so far, at a workshop on 'Concepts, Limits and Extension of the Indian Gondwana' (November 14-18, 1987). State-of-the-art reports on key areas of Gondwana research were presented with a view to identify problems and areas that require immediate synergistic research. Inaugurating the