
BOOK REVIEWS

Annual Review of Entomology by Thomas E. Mittler (Published by Annual Reviews Inc. 4139, El. Camino Way, Palo Alto, California 94306, USA) Vol. 30, 1985, pp. 492, Price USA\$27-00, Elsewhere \$30-00

True to its tradition, the 30th volume in this series, has maintained a wide subject coverage, the 20 review articles ranging from the study of insect-walking to the implications of Biotechnology and Genetic Engineering in pest control. That fundamental areas of entomological research like morphology, biology and behaviour continue to find a place in this series is noteworthy.

The review on the biology of *Halobates* provides useful information on species composition, origin, phylogeny, morphology, food, predatory behaviour and adaptations of these unique bugs occupying a two dimensional marine habitat. Aspects of Tsetse fly (*Glossina*) population ecology are discussed with reference to the natural and abiotic components as well as the density dependence of their populations. Significant information on the Psocoptera is provided in the review on the geographical and ecological distribution of arboreal Psocoptera, whose importance as links in the food chain as prey consumers and saprophages and as pollution indicators are highlighted.

That parthenogenesis is the prime factor in shaping aphid populations is emphasised in the review on the structure of aphid populations. The evolution of polymorphism, the concomitant division of labour, telescoping of generations, enable these insects to achieve a high rate of population increase. The ability of even parthenogenetic forms to adapt to wide range of host plants and environmental conditions is said to be due to mutation rather than to genetic variability produced by endomeiosis. The taxonomic and evolutionary significance of acoustic communication, methods for speciation are discussed in the review on Homopteran acoustic systems. Emphasis is laid on the possibility of divergent acoustic signals between populations occurring much earlier than genetic differentiation. The review on the regulation of reproduction in eusocial Hymenoptera briefly discusses the various theoretical hypotheses on their life-history, to account for the origin of eusociality. Maintenance of their society has been attributed to the effects of queen

control, the loss of which enable the workers to realise reproductive success and regulate direct genetic contributions.

The high degree of developmental synchrony, the hormonal milieu of the host affecting the development of both parasites and hosts, have been highlighted in the review on the endocrine interactions between endoparasitic insects of their hosts. A comprehensive account of the effects of hormones, or analogues or antagonists on the development of endoparasites is provided. The impressive review on nitrogenous excretion in cockroaches examines the lacunae still existing in our understanding of the basic metabolic process in a common insect. Though uric acid is produced, their excretory ejecta hardly contains any nitrogenous waste product in sufficient quantity that is characteristic of typical terrestrial insects. The nitrogenous excretory wastes of nearly 80 species of cockroaches are analysed bringing to light the existence of different excretory patterns. The review also discusses several interesting facts about the importance of uric acid in the physiology of these insects with suggestions for future line of work on the phylogeny of excretion.

The reasons for the lack of information on thermo- and hydro-receptors of insects as compared to those of chemo and mechano-receptors are highlighted in the review on the ultrastructure and function of insect thermo- and hydro-receptors, besides providing significant information about the number and location of sensillae, dendritic structure and stimulus conducting function of these sensillae. In addition, a wealth of information is also available on the various physiological types of these important sensory structures serving to understand their biotypes.

Insects being ideal materials for morphometric studies, the application and interpretation of such approaches on morphological structure of the insects is extensively reviewed in the article on insect morphometrics which outlines new vistas of research on the basis of readily available computer techniques. Insects being convenient models for elucidating the problems of developmental biology, the review on the morphology of insect development attempts to project morphogenesis of insects with emphasis on cytological events; the fundamentals of tissue morphogenesis, as well as gross morphogenesis of the organ of insects are

discussed. The fascinating review on the factors regulating insect walking concentrates particularly on straight walking in insects. The concept of pattern generator in the CNS producing rhythmic pulses to control walking in insects is almost 20 years old, and the motor patterns of these generators are modulated by inputs from various sense organs generating precisely timed sequences of many actions. The success story of the usage of pheromones for monitoring and controlling stored product pests forms the theme of the review on pheromones on stored product insects, emphasising the need for different strategies for a wide variety of commodities. The review on the scope and application of forensic entomology outlines various methods employed to obtain clues useful to an investigation as well as for civil proceedings as this branch of entomology, still in infant stage is bound to become an important tool for other forensic sciences.

The review on multiple acquisition of vectoral agents brings to light the need for a helper factor for efficient horizontal transmission of dependent/assistant type of unrelated vector-dependent plant pathogens for their acquisition and or for subsequent transmission. The present decade has witnessed the emergence of molecular genetics particularly recombinant DNA technology as a powerful tool to probe the functioning of biological systems at the molecular level. In this context the review on insect control biotechnology suggests many possibilities for the development of new generation of bio-insecticides especially neuropeptides, by careful genetic manipulations of bacteria, virus, fungi and other organisms which have already established commercial potentialities. Genetic variation in resource use has been shown to be common in insect populations. The need for a systematic and extensive documentation to assess such variation within population is stressed in this review article. An understanding of ethological and physiological trait variation and their inheritance in resource use is also emphasised. The review also lays stress on our meagre understanding of aspects related to evolution of resource preferences, physiological adaptations and the co-evolution of such traits.

The review on the semiochemicals of Acari brings to light many interesting and intricate aspects about such information-bearing compounds playing a much simpler role among Acari tending to regulate different events in Acari behaviour in contrast to their complex and dominant role in insects. The article on the ecology of *Ixodes* spp., aims at establishing the vector status of these ticks for Babesiosis and Lyme disease besides discussing the natural history of zoonoses,

with some concepts for possible reduction of the tick-borne human diseases. The review on the genetics of Phytoseiid mites emphasises the need for basic genetic studies in terms of the unique productive opportunities available for research on these predators.

The inclusion of a cumulative index, under appropriate headings of all the 696 review articles that have appeared in the last 30 years including a cumulative index of contributed authors is noteworthy. There is no doubt that the Annual Review of Entomology will continue to be a treasure house for researchers in the entomological field.

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"Potential productivity of field crops under different environments" published by the International Rice Research Institute.

The global agricultural production is at the cross-road. The agriculture has to feed the growing population. The population growth rate in most of the developing countries is surpassing the agricultural growth rate. The productivity in these countries remains to be very low. In many developed countries, the productivity potential of many field crops have been reached through the adoption of modern technology. Thus differences in production of several crops in developed and developing countries are very apparent. Although the primary reasons for these differences may be the differences in the degree of the adoption of modern technology, but the fact remains beyond this limitation. The crop yield is the product of the crop, environment and farming community. Thus the global production necessitates a comprehensive review of the existing parameters and their optimum utilization. When the agricultural planners are fixed at this juncture, a new light has been brought by the International Rice Research Institute by publishing a book entitled "Potential productivity of Field crops under different environments". Outstanding global authors have contributed to this book, keeping the future requirements in view.

Each crop has a potential productivity and a relative productivity. Breeding programmes are to be taken to

improve the productivities. The environmental, physical and biological factors related to the productivities have been illustriously contributed by Professor I. Elston, Dr R. Dudal and his associates, Professor F. W. T. Penning and finally by Professor A. Tanaka. In each country, the crop planners should review their research planning considering the basis put forward by these authors. The soil-biological parameter in productivity, however, has not been discussed by any author. The article on "Tropical crop breeding achievements and challenges" contributed by Dr K. Kawane and Dr P. R. Jennings has provided a good review on the status of breeding tropical crops. It has also outlined the challenges for such future programmes. It would be worthwhile, if the authors could provide some information on the interactions between the bred cultivars and the natural ecosystem.

The growth and yield of important field crops have been discussed by several authors. All the discussions are very informative and thought-provoking. These may definitely guide the crop research and planning in different countries. A discussion on pulses and oilseeds has not however, been included.

The last two chapters on "Crop productivity under different environments" and "Increasing productivity through cropping systems" have enormous relevance to the present day global needs. Dr L. D. Haws, and his associates compare the crop productivity in the tropics and temperate zone. Dr A. R. Pereira proposed crop planning for different environments. Professor K. Kyuma has discussed the productivity of lowland soil. Professor P. A. Sanchez has discussed the productivity of soils in rainfed farming systems. The "Increasing crop productivity through cropping systems" has been discussed by Dr S. M. Virmani, Dr Kuang-Chi, Dr Ch. Krishnamoorthy, Dr D. J. Greenland and Dr B. N. Okigbo. An attempt has been made to explain the differences between the productivity in the tropical and temperate countries. The possibilities for the enhancement of the productivity in the tropical countries have also been pointed out. In the crop planning for different environments, the crop zoning has been rightly emphasized. There is however, enough scope to work on this very important issue. The agronomic techniques to overcome climatological limitations, as pointed out by the author should also receive careful consideration. In the article on the productivity of lowland soils, a genesis of the limiting factors in such soils particularly in the tropics, has been provided. A short discussion on the waterlogged soil could further enrich this valuable article. In the article on "Productivity of soils in rainfed farming

systems", emphasis has been laid on soil productivity and the scope of different farming systems at different levels. In the article on the "Optimum cropping patterns for the dry tropics", the reasons for the unstable production have been discussed and an agroclimatic approach has been made for resource development, management and use for the sustained increase in production. The article on "low input cropping systems" has much implications for the agriculture in the developing countries. It may serve as a source material for appropriate demonstration and extension. The article on "High input cropping system" presents the account of the agritechnological development in Taiwan but it has a relevance to those areas where high inputs can be provided. The crop production under shifting cultivation and maintenance of soil fertility is a very contemporary topic. It has been discussed very critically and claims the appreciation of the readers.

To sum up, this is a very comprehensive exposition of the contemporary thoughts in agricultural production and development and may serve as a source book for global agriculturists in general and agriculturists of the developing countries in particular.

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National Institute of Health, Bethesda, USA – An Account of Research in its Laboratories and Clinics by David Dewitt Stetten Jr. (Published by Academic Press, Inc., Orlando, Florida 32887 USA) 1985, pp. 554, Price: \$35.00

This book reviews the origin and growth of the NIH, USA. Several of the articles give a historical outline of the development as well as review the expansion of activities. Only a few of these would be mentioned here *viz.* the adoption studies which helped in understanding the genetic etiology of schizophrenia; discovery of some key enzymes involved in the metabolism of neuro-transmitters; the use of germ free animals in nutrition research; the etiology of viral hepatitis; the understanding of the genetic code; current trends in understanding the lysosomal storage disorders. The academic freedom enjoyed by the workers at NIH and the informal exchanges between

diverse groups have been largely responsible for such outstanding successes. The general mistrust that all agencies sponsored by government are usually not very efficient and progress achieved is slow has been completely nullified when one reviews progress achieved at NIH. This is also pointed out in the foreword. If one wants to know how honesty, sincerity and dedication are important for progress in scientific

work under any circumstance one should read this book. This book is strongly recommended for all research workers specially those in the area of health sciences.

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ANNOUNCEMENT

AWARD OF RESEARCH DEGREES

Berhampur University, Berhampur – Ph.D. (Life Sciences) Sri Sachidananda Satapathy (Title – ‘*Eco-physiological effect of industrial wastes of caustic chlorine factory on fishes with particular reference to effluent mercury*’)

Gulbarga University, Gulbarga – Ph.D. (Microbiology) Shri S. M. Gaddad (Title – ‘*Studies on enzymes in relation to microbial growth and activity in sewage and stabilization ponds*’) Smt. Annapurna B. Hiremath (Title – ‘*Studies on role of fungi in the sewage stabilisation pond ecosystem*’)

The Maharaja Sayajirao University of Baroda, Baroda – Ph.D. (Applied Physics) Kumari Swarnalata Suryanarayan Nandula (Title – ‘*Ultrasonic investigations in some binary and ternary alloys*’) Ph.D. (Applied Chemistry) Smt. Shubha Sunil Thakur (Title – ‘*Physico-chemical studies of metal complexes of ortho substituted 1-naphthols and alkyl substituted ethylene diamines*’) Smt. Shashikala Sadanand Yadwadkar (Title – ‘*Design and synthesis of new mesogens and study of their characteristics and applicability*’) Ph.D. (Microbiology) Shri Vaseem Anvarali Palejwala (Title – ‘*Studies on hormonal control of fruit ripening and microbial spoilage of mangoes*’) and Shri Phiroze Behram Sethna (Title – ‘*Factors regulating nitrogen fixation in rhizobial species*’) Ph.D. (Zoology) Miss Meena Manubhai Patel (Title – ‘*Pineal in relation to breeding and carbohydrate metabolism, histophysiological studies in domestic and wild pigeons, Columba livia*’)

Utkal University, Bhubaneswar – Ph.D (Physics) Shri Alakha Chandra Naik (Title – ‘*Statistical theory of dense fluids*’, Shri Durga Prasad Mahapatra (Title – ‘*Compton scattering study of electron momentum density of some solids*’) Shri Bijoy Kumar Barik (Title –

‘*Theoretical studies of heavy quark systems*’) Ph.D (Chemistry) Shri Shyamapada Chakravorti (Title – ‘*Dynamics of phosphorus and potassium in flooded soils growing rice ‘Oriza sativa’ L*’) Shri Gopeswar Panda (Title – ‘*Kinetics of polymerisation and inhibition reactions*’)

Sri Venkateswara University, Tirupati – Ph.D. (Chemistry) Shri A. Varada Reddy (Title – ‘*Studies in liquid-liquid extraction*’) Ph.D. (Geology) Shri T. V. Krishna Reddy (Title – ‘*Hydrogeology of Tirupati-Renugunta area, Chittoor district, Andhra Pradesh, India*’) Ph.D. (Botany) Sri K. Adikesavulu Naidu (Title – ‘*Certain aspects of photosynthesis and related events in peanut green mosaic virus (PGMV) infected groundnut (Arachis hypogaea, L) leaves*’) Ph.D. (Zoology) Shri B. Sankaravara Prasad (Title ‘*Impact of larval trematode infection on the sugar and amino acid transport by the snail host, lymnaea luteola (Lamarck) – A tracer study*’) Shri E. D. M. Rajkumar (Title ‘*Some biochemical studies on toxic action of parthenium hysterophorus weed extract in select animals and plants*’) Smt. C. Changamma (Title ‘*Comparative study on the effects of gossypol, 5-thio-D-Glucose, Estradiol-17 and prostaglandin F on testicular metabolism in albino rats*’) Smt. B. Vanajakshamma (Title – ‘*Neuro physiological and cardiological studies on the scorpion, Heterometrus fulvipes (C. Koch) with special reference to autoenvenomation*’) Shri B. Kasi Reddy (Title – ‘*The possible metabolic diversions in the nitrogen metabolism adapted by freshwater mussel, lamelidens marginalis lamarck under short-term methyl parathion stress*’) Smt. P. Masthanamma (Title – ‘*Aspects of metabolism of the freshwater bivalves, lammellidens marginalis (Lamarck) and parreysia rugosa (Gamelin) in relation to altered pH of the medium*’.