
STATISTICAL ECOLOGY AND RELATED ECOLOGICAL STATISTICS - 25 YEARS

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1 Introduction

The year 1994 marks the 25th year of statistical ecology and related ecological statistics with reference to the First International Symposium on Statistical Ecology held at Yale University in 1969. The three symposium co-chairmen (G. P. Patil, E. C. Pielou, and W. E. Waters) represented the fields of statistics, theoretical ecology, and applied ecology. It is a pleasure for me to share with you the silver jubilee celebration of statistical ecology. It was in the fall of 1967 when I requested the Ford Foundation to support the concept of statistical ecology and the first international symposium on this new subject area. The Ford Foundation supported the proposal. It was an important historic event. Several well known statisticians and ecologists came together for the first time and began the dialogue, leading to collaborative research and outreach in one form or the other. This led to a Liaison Committee on Statistical Ecology of the International Association of Ecology, International Statistical Institute and Biometric Society, and it led to a Statistical Ecology Section in the International Association for Ecology and a Statistical Ecology Section in the Ecological Society of America. Further on, a standing Committee on Environmental Statistics has been formed in the International Statistical Institute. Also, a Section of Statistics and the Environment has been initiated in the American Statistical Association.

This is how Statistical Ecology and Environmental Statistics began essentially as a Center Without Walls.

Then came the First Advanced Institute on Statistical Ecology in the United States in 1972 held at Penn State with the Department of Statistics as the host with support of the National Science Foundation. Participants were chosen solely on one basis: clear potential for impact in the subsequent five year period. The Crystal Ball surely has held out.

Then came the 1977-78 Satellite Program in Statistical Ecology with Headquarters at Penn State, the program spanning over Berkeley, California, College Station, Texas, Parma (Italy) and Jerusalem, (Israel) in which several hundred participants participated over several weeks, and deliberated, and brought out a series of 10 statistical ecology volumes jointly edited by eminent cross-disciplinary statisticians and ecologists.


Over the past twenty-five years, statistical ecology has had a major impact on the collection, analysis, and interpretation of data on various fields of application and their theory, whether related to ecology in an obvious manner or not. There have been many successful applications of statistical ecology both in scientific discovery and public policy. While much progress has been made in the past, the future promises even more rapid developments as sophisticated computing technology is utilized to apply newly developed statistical methods to increasingly detailed data bases in both space and time. An invited panel discussion session was organized at the Joint Statistical Meetings in Toronto with a distinguished chair and a panel of five known for their long standing involvement in statistical ecology and related ecological statistics.

The chair was C. R. Rao, and the distinguished panelists were Harold Burkhart, Ian MacNeill, G. P. Patil, Paul Switzer, and Wolfgang Ufer with G. P. Patil as the organizer of the session. Interestingly, Burkhart, MacNeill, Rao, and Switzer partic-
ipated in the 1969 Symposium that Patil directed, whereas Ufer has been active in ecological and environmental statistics research and outreach for a long time in Europe.


2 International Ecological Congress and the Distinguished Statistical Ecologist Awards

The Statistical Ecology Working Group of the International Association for Ecology (INTECOL) planned a substantive celebration of the Statistical Ecology Silver Jubilee on the first morning of the Sixth International Congress of Ecology held in Manchester, United Kingdom during August 1994 under the leadership of G. P. Patil and J.N.R. Jeffers. The celebration consisted of the Inaugural Session of the Congress Program on Frontiers of Statistical Ecology and Ecological Statistics. The celebration included a Distinguished Statistical Ecologist Awards Ceremony, an Invited Panel Discussion on Challenges and Directions in Statistical Ecology for Year 2000 and the Silver Jubilee Reception in the Penthouse at the top of a building for the Congress that offered impressive views over Manchester and the Pennines. Professor Dr. Wolfgang Haber, President, INTECOL and Professor George Knox, a former President, participated in the ceremonies. President Haber presented the awards and paid glowing tributes. Professor Patil was the master of ceremonies.

The distinguished statistical ecologist awards were initiated in 1986 at the Syracuse Congress Plenary Session on Statistical Ecology by the INTECOL Statistical Ecology Working Group. Professor G. P. Patil was the first recipient. At the 1990 Congress in Yokohama, four awards were made. Richard C. Hennemuth, J.N.R. Jeffers, E. C. Pielou, and William E. Waters were the distinguished recipients. Largely to highlight and emphasize the cross-disciplinary focus of statistical ecology and ecological statistics, the INTECOL Statistical Ecology Working Group has initiated the distinguished statistical ecologist awards. The awards focus on distinguished contributions made by academic, governmental and industrial scientists, working on problems in statistical ecology and/or ecological statistics. Young investigator awards intended to encourage greater participation and study in statistics, ecology, and the environment are also integral features of this initiative. The nineteen ninety four awards were primarily made in recognition of (i) outstanding contributions to the development of methods, issues, concepts, applications, and the initiatives of statistical ecology and/or ecological statistics; and (ii) foundational effort leading to the formulation of an important area of statistical ecology and/or ecological statistics. The awards committee consisted of: J.N.R. Jeffers (UK), S. Kobayashi (Japan), G. P. Patil (Chair, USA), E. C. Pielou (Canada), and W. E. Waters (USA). On the special occasion of the Silver Jubilee, twenty five awards were planned at the hands of the INTECOL President. For the benefit of the reader, the recipients of the nineteen ninety four awards are listed below:


3 International Ecological Congress and the Frontiers of Statistical Ecology and Ecological Statistics

The planned program went very well indeed, and most everyone involved at the Congress had words of appreciation and praise. The scientific program consisted of the following sessions:


SESSION 2: STATISTICAL ECOLOGY AND ENVIRONMENTAL CHANGE: Chair: B. F. J. Manly. B. F. J. Manly (Dunedin, New Zealand) On analysis of species co-occurrences; S. Doledec, D. Chessel, and R. Sabatier (Villeurbanne Cedex, France) Matching species traits to environmental variables: A new three-table ordination method; A. R. Palmer (Grahamstown, South Africa) and L. Orloci (Ontario, Canada) The potential vegetation of southern Africa, and deviations from this expectation; B. T. Milne, and A. R. Johnson (New Mexico, USA) Spatial phase transitions and dynamics of woodland ecotones; Q. Gao (Beijing, China) Recovering ecological distance using differential attributes; A. Fielding (Manchester, UK) New approaches to bird-habitat studies; and C. Dytham (York, UK) Patterns of habitat loss and species coexistence: A cellular model.

SESSION 3: ENVIRONMENTAL MONITORING AND ASSESSMENT: Chair: Fred Ramsey. J. Brown (Dunedin, New Zealand) Sampling designs for patchy populations; W. S. Overton (Oregon, USA) Analytic surveys: Perspectives and applications in the environmental monitoring and assessment program; S. Stehman (New York, USA) Location-shifted estimators in environmental surveys; N. S. Urquhart, and A. Olsen (Oregon, USA) The anatomy of sampling studies of ecological responses through time; and D. R. Smith (West Virginia, USA) and M. J. Conroy (Georgia, USA) Adaptive sampling for estimating wintering waterfowl density.

SESSION 4: SPATIAL DYNAMICS IN ECOLOGY: Chair: Bai-lian Li. M. Fortin (Quebec, Canada) Significance tests for ecological boundaries; M. J. Conroy (Georgia, USA) Statistical inference on patch-specific survival and movement rates from marked animals; J. L. Dungan (California, USA) Scaling metrics from the Oregon transect ecosystem research project; G. A. Alexandrov (Moscow, Russia) Recursive classification of landscape elementary particles; A. M. Liebhold (West Virginia, USA) Models that predict the spatial dynamics of forest insect outbreaks; H. Wu, and B. Li (Texas, USA) Use of information fractals to characterize spatial point patterns; and D. Stoyan, and V. Gavrnikov (Freiberg, Germany) Point process methods in ecological studies of Siberian forests.

SESSION 5: COMPUTATIONAL STOCHASTICS AND STATISTICS OF POPULATION DYNAMICS: Chair: E. Kuno. B. Dennis (Idaho, USA) Multivariate model of joint density dependence; A. Grant and T. Benton (Norwich, UK) Life history evolution in a stochastic environment; J. M. Halley and J. Dempster (Berkshire, UK) Using a model to predict the local persistence of butterhead flies; G. Boudjema, G. Lemperiere, and J. Cancea da Fonseca (Paris, France) Reconstruction of the phytophase insects dynamics by dendrochronologic and chaos theorem methods; R. L. Patterson (Michigan, USA) Modeling dependencies among populations in discrete-state, continuous time statistical compartmental networks; L. J. Young (Nebraska, USA) Establishing the relationship of mean and variance: A comparative study; J. Julien, G. Lemperiere, and J. P. Cancea da Fonseca (Paris, France) Hierarchical analysis applied to the study of insect fecundity; R. Ferriere (Arizona, USA), and M. Gatto (Milano, Italy) The evolution of oscillations and chaos in population dynamics; and E. Kuno (Kyoto, Japan) Optimal versus equilibrium sex ratios in theoretical diplo- and haplodiploid population systems.

SESSION 6: STATISTICAL COMPUTING IN
4 International Environmetrics Conference and Silver Jubilee of Statistical Ecology

At the invitation of Dr. A. H. El Shaarawi, President of the International Environmetrics Society and the Chair of the Fifth International Conference on Statistical Methods for the Environmental Sciences held in Burlington, Canada, a Saturday afternoon was devoted to a substantive program to celebrate the Silver Jubilee. The program consisted of two invited panel discussion sessions, as follows:


5 ISEM 95 and Statistical Ecology

The ISEM 95 - the 9th International Conference on State of the Art of Ecological Modeling is planned on the theme of Ecological Progress to Meet the Challenge of Sustainable Development in Beijing, China during August 11-15, 95. Proposed Symposia are announced as follows: Ecosystem Theory; Developments in Modeling Techniques; Remote Sensing and GIS in Ecology; Modeling in Population Dynamics; Modeling Ecological Processes; Modeling in Conservation Biology; Ecological Economics Related to Sustainable Development; and Statistical Ecology.

The Sponsoring Organizations are: Ecological Society of China; International Society of Ecological Modeling; National Natural Science Foundation of China; Chinese Academy of Sciences; International Association for Ecology; International Society for Ecological Economics; International Statistical Ecology Program; and Institute of Zoology, Chinese Academy of Sciences.

Eminent ecologist H. X. Yang of China is the Honorary President, with D. M. Li as the President and R. M. Xu, S. E. Jorgensen, W. Mitsch, and G. P. Patil as Vice-Presidents. Organizing Committee consists of D. M. Li as Chairman, R. M. Xu and S. E. Jorgensen as Vice-Chairmen and L. Kang and B. L. Li as Secretary General. Council of International Conference consists of S. E. Jorgensen as Chairman and R. Costanza and R. M. Xu as Vice-Chairmen.

Interestingly, the International Statistical Institute also meets in Beijing, China in August 95, a week after the ISEM-95. Those interested may indeed wish to take advantage of this co-occurrence.

6 Silver Jubilee of Statistical Ecology Sale

The reader may be interested to know of the silver jubilee sale of the following well-known statistical ecology series volumes at a gift price of only twenty-five dollars each.


Special Features:

* Comprehensive monographs covering a broad spectrum of statistical ecology with emphasis on problems of contemporary interest and concern.

* Creative research expositions pertaining to renewable resources and their habitats by eminent scholars and practitioners in the fields of statistics, ecology, and environment using mathematics, statistics and data analytical techniques.

* Timely and useful to students, teachers, scientists and managers in quantitative ecology, ecometrics, environmentics, applied mathematics, statistics, and applied probability. These carefully edited volumes are based on refereed and updated research and review papers discussed at a very successful Satellite Program in Statistical Ecology organized by the International Statistical Ecology Program.

For Volumes 1, 2, and 3: Write to The Pennsylvania State University Press, University Park, PA 16802 USA. For Volumes 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14: Write to the International Co-operative
7 Looking Ahead

The challenges and opportunities for statistical ecology and related ecological statistics appear to be great at this time. You are invited to take part. Professor Wolfgang Ufer, Dortmund, Germany is heading the Liaison Committee of the INTECOL Statistical Ecology Working Group. The Liaison Committee is expected to consist of interested representatives of various organizations involved in statistics, ecology, and the environment. His address is: Wolfgang Ufer, Department of Statistics, University of Dortmund, D-44221 Dortmund, Germany (telephone: 49/231/755-3121; fax: 49/231/755-5303; and email: uuf012@unidea.rhrz.uni-dortmund.de). Please feel free to contact him as per your interest.

Further, three journals interested in statistics, ecology, and the environment have announced plans to have special features and issues consistent with the spirit and content of statistical ecology. The three journals are: (1) Journal of Environmental and Ecological Statistics; (2) International Journal of Ecology and Environmental Science (IJBEES); and (3) COENOSES - International Journal for Population and Community Ecology.

The IJBEES and the COENOSES are well-established journals, whereas the Journal of Environmental and Ecological Statistics is a relatively new journal, which has just started publishing with Chapman & Hall. Professor Patil is the Editor-in-Chief of this cross-disciplinary journal with an eminent editorial group of one hundred and twenty scholars in relevant disciplines. As indicated in the Editorial of the first issue (Patil, 1994), the Journal is expected to be a forum for communication for a broad community of scholars, field workers, and policy makers. Emphasis will be on applied mathematical statistics, statistical methodology, and data interpretation and improvement for future use with a view to advance statistics for environment, ecology, and environmental health, and to advance environmental theory and practice using valid statistics.

Should you have an interesting and timely manuscript to share, please contact Professor Patil. His address is: Center for Statistical Ecology and Environmental Statistics, Department of Statistics, Pennsylvania State University, University Park, PA 16802 (telephone: 814/865-9442; fax: 814/863-7114; and email: gpp@psuvms.psu.edu).

The INTECOL Statistical Ecology Working Group has also a Program Committee with initial members: Jack Blundell (France); Harold Burkhart (USA); Brian Dennis (USA); Phillip Dixon (USA); Jessica Gurevitch (USA); Pierre Legendre (Canada); B. F. J Manly (New Zealand); James H. Matis (USA); Laszlo Orloci (Canada); J. N. Perry (UK); and Wolfgang Ufer (Germany). The Committee is being expanded. If you have any suggestions on nominations, please contact Jessica Gurevitch, the Committee Chair. Her address is: Department of Ecology and Evolution, State University of New York, Stony Brook, NY 11794-5245 (telephone: 516/632-8600; fax: 516/632-7828; and email: jgurevit@biolvms.bitnet).

The Distinguished Statistical Ecologist Awards Committee continues with Professor Patil as its Chair. Your suggestions and nominations for these prestigious awards would be very well received. We look forward to hearing from you and to working with you in these exciting initiatives of the INTECOL Statistical Ecology Working Group. Perhaps you may also wish to consider becoming a member yourself of the Group, in which case you may write to the INTECOL Headquarters for a membership form. The address is: International Association for Ecology; Rebecca Sharitz, Secretary General, Savannah River Ecology Laboratory, P. O. Drawer E, University of Georgia, Aiken, SC 29803, Telephone: 803/725-2472; Fax: 803/725-3309.

REFERENCES


