Section 1   Theoretical Biology

A. Inleidende tekst

The section designs unifying frameworks as well as mathematical tools, for studying evolutionary and ecological problems, both on an a priori basis and in close cooperation with experimental groups. The research ranges from exploring the consequences of established biological theories to the construction of models for specific biological systems, the latter often with a view to develop data-analytical techniques. In addition the section investigates the nature of key biological concepts, both with a narrow biological focus, and seen against the context of their societal embedding.

B. Voortgang projecten

Project 1.94.1.

Mathematical foundations of individual - based population models.

Head: Prof.dr. J.A.J. Metz.

Description: The design and examination of mathematical formalisms for stepping from the physiological/behavioural levels to the description of changes in population densities.

Progress: (1) With O. Diekmann and M. de Jong we have extended our earlier results on the probability of epidemic outbreaks, and on final size of epidemics, in social networks where everybody is connected to but a small circle of acquaintances, to variably sized circles of acquaintances. This provides one further step towards analytically dealing with epidemics on graphs, a subject that till recently only consisted of a barrage of simulation studies. (2) The work with O. Diekmann, M. Gyllenberg and H. Thieme on a general mathematical formalism, based on cumulative numbers of births, for the description of physiologically structured populations living in variable environments, has been successfully rounded of. The resulting manuscript has been accepted by the Journal of Mathematical Biology. We can now proceed to the next step, that is, consider non-linear structured models in which the course of the environment derives from the population trajectory. (3) We have systematically explored the adequateness of diffusion approximations for characterizing šindividual-based mutation-selection models. In several respects the convergence of individual-based models to the classical diffusion approximations were found to be unsatisfactory. A promising route to overcome these problems was found by introducing the cummulant metric, a new nonlinear metric in function space.

Project 94.2.

Population dynamics

Head: Prof.dr. J.A.J. Metz.

Description: Investigation and classification of the types of dynamical behaviour of populations in dependence on the underlying mechanisms.

Progress: With F. van den Bosch we have found an improved set of approximations for the speed of spatial expansion of a structured population dispersing over more than one spatial scale. This approximation further brings out the intriguing fact that the speed of such an expansion stays fully dominated by the far dispersal, even when the fraction of far dispersing individuals goes to zero.

Apart from this, we spent no time on this project in 1996.

Project 1.94.3.

Adaptive dynamics.

Head: Prof.dr. J.A.J. Metz

Description: The investigation of the process of trait substitutions resulting from the selective filtering of mutational variation, with particular reference to the characterization and classification of singular points such as branching points and Evol. Stable Strategies.

Progress: (1) We found a further set of necessary and sufficient conditions that tell whether the ESSes for a particular model satisfy an optimisation principle. This condition has the advantage that it can be algorithmically implemented, but the disadvantage that it is somewhat further removed from a concrete biological interpretation. (2) With U. Dieckmann we have shown in what way the matrix formalism of traditional evolutionary game theory artificially induces a number of highly non-generic properties into the structure of invasion processes. We have made some initial progress in unfolding the resulting degeneracy. (3) With U. Dieckmann we have shown, by direct simulation, the correctness of our guess that the population composition in finite variants of some classical models for resource competition yielding continuous ESSes, evolutionarily converges to a small number of well separated strategies, each played by a largish number of individuals. (4) With P. Klinkhamer, T. de Jong, and C. Cadet we have elucidated the role of some hidden assumptions in the classical models for size dependent sex allocation. Alternative more realistic assumptions turn out to remove the sharp switch in allocation predicted by the classic models, but not observed in the field. In the future we hope to explore the resulting general models in some more detail to see how the picture changes quantitatively.

Project 1.94.4.

Phylogeny-reconstruction and analysis of historically associated lineages.

Head: Dr. M.Zandee.

Description: Development of theory, methods and data - analysis in systematical biology, based on the cladistic method.

Progress: In a comparative study concerning group-compatibility and spectral analysis (based on the Hadamard conjugation) it was found that using restriction enzyme data from laboratory reared and evolved lines of the T7 bacteriphage, the group compatibility method as implemented in CAFCA was able to recover the known phylogeny, even when the spectral frequency of the different character types was 1; a condition under which standard parsimony methods failed to recover the known phylogeny.

Project 1.94.5.

Study of the separate effects of evolutionary optimisation and phylogenetic constraints on the variation in behaviour within groups of related .

Heads: Dr. P. Haccou, Dr. M.R. Zandee.

Description: Development of optimality models of behaviour in general, specifically applied to parasitoids of the genus Leptopilina. Study of the relationship between phylogeny and behavioural strategies.

Progress: A begin has been made to generalise previous results on patch-leaving under competition (see Sjerps and Haccou, Evolutionary Ecology 1994 and Theoretical Population Biology 1994) for the case of superparasitism. The situation is complicated by the fact that the payoff of a female from patch visits is affected by the behaviour of individuals remaining in the patch after she has left. However, it appears that a reformulation of the previously developed model can be used to study this problem too.

Project 1.94.6.

Analysis of speciation šthrough partial reproductive isolation.

Head: Dr. F.H.D. van Batenburg.

Description: Analysis of the influence of partial reproductive isolation upon speciation using simulation models.

Progress: We build a simulation model that was able to explain divergence through partial reproductive isolation. Currently we explore factors that stabilize that divergence.

Project 1.94.7.

Development of methods for predicting the secondary structure of RNA.

Head: Dr. F.H.D. van Batenburg.

Description: Development of theory, methods and computer programs for the deduction of the secondary structure of RNA from data on the primary structure.

Progress: The Genetic Algorithm turned out to be the best (and only) program available in the world that roughly simulates the folding pathway rather than exclusively predicting the final folding structure. We were able to explain functional states by predicting intermediate metastable structures that was puzzling to the experimental group. We also explained different functions (such as wether synthesize a killing enzyme or not) by predicting different intermediate states.

Project 1.94.8.

Analysis of the effects of human activities on the development of ecological systems.

Head: Drs. E. Meelis.

Description: Development of methods for the analysis of environmental monitoring data.

Progress: Three refinements of the sequential probability ratio test for testing against a minimal trend were derived: (1) the critical region is made funnel shaped; (2) the nuisance parameters are estimated and (3) observing is stopped as soon as a predescribed accuracy is attained. The robustness against serial and spatial correlation was studied and the results were illustrated by field data on three Tern

.

Project 1.94.9. Relation between reductionist and non - reductionist approaches within biology.

Head: Dr. Th.E. Sprey.

Description: Research into the importance of šstructuralist and phenomenological approaches for biology, and for the role of biology within society, for instance in relation to the discussion about basic attitudes and the environmental crisis.

Progress: It has been proposed to describe the relation between an organism and its environment in terms of Bohm's concept of an implicate order. In the process of unfolding the information from the implicate order into the explicate order, Husserl's concept of intentionality has been used in a more general meaning, as the tendency to self-realization (Portmann). Wether this process of self-realization is regarded as a materialistic, dualistic or spiritual process seems to be correlated with the individuation process of the researcher himself.

Project 1.94.10. Biological science and the rela¬tion between man and nature/animals.

Head: Dr. H. Verhoog.

Description: Analysis of the human (biologist's) attitude and relation towards nature, and the implications of biological thinking for our concept of man.

Progress: The first results of the Project `Moral Relevance of naturalness' (NWO Program Ethics and Policy) successfully passed a critical discussion on an expert seminar; the project was continued for another two years. The work on the concept of `intrinsic value' led to two publications and a proposal for the contents of a book on Intrinsic Value (Van Gorcum, Series on Animals in Philosophy and Science). The cooperation with Brian Goodwin resulted in an invitation to attend a workshop in the U.S. about complexity theory compared to the phenomenological approach of life.

Project 1.94.11. Development of the concept of composite .

Head: Prof.dr. D.J. Kornet.

Description: Formal reconstruction of the concept, especially the determination of boundaries in the time dimension.

Progress: Research on the interpretation of as monophyletic or paraphyletic groups of subspecific entities, has led to the following conclusion: The requirement implicit in phylogenetic methods that higher taxa, which are ranked hierarchically, should be interpreted as monophyletic groups of is appropriate. The demand however that should be monophyletic groups of subspecific entities (such as populations or internodons) is not appropriate. It would entail that ancestral include their descendant , and therefore that are not mutually exclusive. The Composite Concept defines as paraphyletic groups of subspecific entities: it acknowledges as mutually exclusive entities without jeopardizing the methodology of phylogeny reconstruction. Furthermore a blueprint has been constructed of a coherent theory on the organization of the domains of consciousness, brain and behavioural patterns which connects the ontogeny, specificity and phylogeny of these domains.

In addition research is carried out on the structure of the programming language APL, by Dr. F.H.D. van Batenburg. It is indicated with 'a', since it has no regular projectcode.

C. Personeel

STAFF

Senior investigators	function	source of financedetails
- Prof.dr. J.A.J. Metz	full professor"	Leiden University
- Prof.dr. D.J. Kornet	endowed professor	LUF
- Dr. F.H.D. van Batenburg	assistant professor	Leiden University
- Dr. P. Haccou	assistant professor	Leiden University
- Drs. E. Meelis	assistant professor	Leiden University
- Dr. Th.E. Sprey	assistant professor	Leiden University
- Dr. H. Verhoog	assistant professor	Leiden University
- Dr. M.B.H. Visser	researcher	NWO ?a 0.2
- Dr. M. Zandee	assistant professor	Leiden University

Postdocs

- Dr. R. v.d. Bos	researcher"	NWO
- Dr. H. Turner	researcher"	NWO
- Dr. J. Val	researcher"	NWO 0.5 till 1/2

Junior investigators

- name	function"	source of financedetails
- Drs. J. Hogendoorn	research assistant	SLW till 1/3
- Drs. F.S.A. Jacobs	research assistant	Leiden University
- Drs. M.J.P. Maas	research assistant	NWO 0.8 till 1/5
- Drs. G. Mulder	research assistant	Leiden University0.8
- Drs. S.D. Mylius	research assistant	SLW 0.8 till 1/7
- Drs. M. Schipper	research assistant	Leiden University
- Ir. M. v. Veller	research assistant	SLW from 1/9
- Ir. J. v. Velzen	research assistant	Leiden University

Analytical, technical and administrative staff

- H. Regeer - Groenhuijzen	secretary "	Leiden University
- Y.M. Zitman - de Graaf	secretary "	Leiden University

Guests

- Prof.dr. P. Dullemeijer	researcher"	volunteer ? ?a 0.1
- Dr. S. Gultyaev	researcher"	NWO/EMBO ? ?a

- Dr. N. v.d. Hoeven	researcher"	volunteer ? ?a 0.2
- Drs. A. v. 't Hoog	researcher"	NWO 0.2
- Drs. S.D. Mylius	researcher"	volunteer ? ?a from 1/7
- Dr. J. Val	researcher"	volunteer ? ?a from 1/2
- Drs. J. Verboom	researcher"	IBN 0.2

D. Samenwerking   COOPERATION*f* (projectcodes are indicated between brackets)

Leiden

- RHHB, RUL, Dr. P.C. van Welzen (1.94.11)

- vg. Biochemie RUL, Dr. C. Pley (1.94.7)

- Medische Fac. RUL, Prof.dr. Tj. de Cock Buning (1.94.10)

- Fac. Wijsbegeerte RUL, Dr. J.W. McAllister (1.94.11)

National

- Amsterdam, Filosofie, Prof.dr. W. Achterberg (1.94.10)

- Amsterdam, vg. Theoretische Biologie VUA, S. Kasanmoentalib (1.94.10)

- Amsterdam, CWI, Drs. A. de Koeyer (1.94.2)

- Amsterdam, vg. Zuivere en Toegepaste Oecologie UvA, Prof.dr. A.M. de Roos (1.94.2/3)

- Amsterdam, vg. Zuivere en Toegepaste Oecologie UvA, Prof.dr. M.W. Sabelis (1.94.2/3)

- Amsterdam, ISP, UvA, Dr. H. Turner (1.94.11)

- Bakkeveen, Volkshogeschool Allardsoog, G. WÀG?Àring (1.94.9)

- Arnhem, RWS, Drs. F. Noppert (1.94.8)

- Bilthoven, RIVM, Dr. M. Kretzschmar (1.94.2)

- Delft, TNO - voeding, Drs. A. Gerritsen (1.94.8)

- Den Haag, RIKZ, Drs. J.H.M. Schobben (1.94.8)

- Driebergen, L. Bolk Instituut, I. E. Lammerts (1.94.10)

- Driebergen, Vrije Hogeschool, B. Siepman v.d. Berg (1.94.9)

- Eindhoven, Reuter (ASWI standaards), Drs. L. van Geldrop (a)

- Enschede, TU Twente, ASWI, Ir. F. Bonnema (a)

- Groningen, Vg. Genetica, Univ. of Groningen, Dr. F. Weissing (1.94.3)

- Haarlem, Dr. H. v. Erkelens (1.94.9)

- Lelystad, CDI - DLO, Dr. M.C.M. de Jong (1.94.1/2)

- Lexmond, Adfee (ASWI standaards), B. Smoor (a)

- Leusden, ILEIA, ETC - Foundation, Dr. M. Kooistra (1.94.9)

- Nieuwegein, OASIS (ASWI standaards), Th. Zwart (a)

- Nijmegen, Filosofie, Dr. H. Zwart (1.94.10)

- Utrecht, Mathematisch Instituut, Prof.Dr. O. Diekmann (1.94.1/2/3)

- Utrecht, RUU, Dr. M. Schilder (1.94.11)

- Utrecht, RUU, RITOX, Prof. W. Seinen (1.94.8)

- Utrecht, RUU, Drs. H. de Vries (1.94.11)

- Wageningen, Ecologische Landbouw LUW, Drs. W. Beekman (1.94.9)

- Wageningen, Ecologische Landbouw LUW, Dr. Ir. R. Boersma (1.94.9)

- Wageningen, vg. Wiskunde LUW, Dr. F. v.d. Bosch (1.94.2)

- Wageningen, Dienst Landbouw, wiskunde - DLO, Dr. J.A.P. Heesterbeek (1.94.2)

- Wageningen, LUW, Dr. A. Hemerik (1.94.8)

- Wageningen, IBN - DLO, Dr. J. Verboom - Vasiljev (1.94.2)

- Wassenaar, Ir. A. Fellendans (1.94.9)

International

- Laxenburg, Austria, ADN - IIASA, Dr. U. Dieckmann (1.94.3)

- Wenen, Austria, Institut fÀG?Àr Mathematik, K. Sigmund (1.94.3)

- Antwerpen, Belgium, UIA, Drs. T. van Dooren (1.92.3)

- Toronto, Canada, Dept. Zoology Univ. Toronto, Prof.dr. D.R. Brooks (1.94.4)

- Vancouver, Canada, Simon Fraser University, Prof.dr. B. Roitberg (1.94.5)

- Helsinki, Finland, Division of Population Biology, Dr. M. Heino (1.94.3)

- Turku, Finland, Math. Inst. Univ. of Turku, Prof.dr. M. Gyllenberg (1.94.1)

- Paris, France, Laboratoire d'Ecologie, Ecole Normale SupÀ)?Àrieure, Dr. R. FerriÀ/?Àre (1.94.3)

- Leipzig, Germany, Umweltforschungszentrum Leipzig, Prof.dr. C. Wissel (1.94.2)

- Budapest, Hungary, Eo?Àtvo?Às University, Dr. À(?À. Kisdi (1.94.3/5)

- Budapest, Hungary, Eo?Àtvo?Às University, Drs. G. Meszena (1.94.3)

- Budapest, Hungary, Eo?Àtvo?Às University, Dr. L. Pasztor (1.94.3)

- Budapest, Hungary, Eo?Àtvo?Às University, Dr. Z. TÀ;?Àth (1.94.3)

- Fukuoka, Japan, Kyushu Univ., Prof.dr. Y. Iwasa (1.94.5)

- Tijuana, Mexico, Esc. de Munanidades, Prof.Dr. H. Matthai Quelle (1.94.9)

- Veracruz, Mexico, Univ. Veracruz, Dr. M. Martinez (1.94.3)

- Ascot, UK, Imperial Coll./NERC Centre for Pop. Biol., Dr. Ir. V.A.A. Jansen (1.94.3)

- Bristol, UK, Dept. Mathematics Univ. of Bristol, Dr. J. McNamara (1.94.5)

- Cambridge, UK, Univ. of Cambridge, Dr. A. Dickinson (1.94.11)

- Edinburgh, Herriot Watt University, Dept. of Agricult. Math. Prof. Dr. D. Mollison (1.94.2)

- Milton Keynes, UK, Open Univ., Prof.dr. B.C. Goodwin (1.94.10)

- St. Andrews, UK, Univ. of St. Andrews, Dr. R. Byrne (1.94.11)

- Sheffield, UK, School of Probability, Univ. of Sheffield, Prof.dr. C. Cannings (1.94.3)

- Southampton, UK, Univ. of Southampton, Dr. J.W.S. Bradshaw (1.94.11)

- York, UK, University of York, Dr. R. Law (1.94.3)

- Albany, New York, USA, Dept. Humanities, Prof.dr. W. Wittkowski (1.94.9)

- Belmont, MA, USA, World Inst. Phenomenological Research, Prof.dr. A.T.T. Tymieniecka (1.94.9)

- Coledge Park, MA, USA, Dept. of Zoology, Univ. of Maryland, Drs. S.A.H. Geritz (1.94.3)

- Rochester, New York, USA, Dept. Psychology, Dr. L. Sundararajan (1.94.9)

- Stanford, USA, Stanford University, Prof.dr. S. Tuljapurkar (1.94.5)

- Tempe, USA, Arizona State Univ., Dr. H.R. Thieme (1.94.1)

E. Publicaties

PUBLICATIONS (projectcodes are indicated between brackets)

Publications in scientific journals"

FHD van Batenburg Font for the future. Vector (1995, appeared 1996) 12: 64 - 69 (a)

FHD van Batenburg, E Gittenberger Ease of fixation of a change in coiling: computer experiments on chirality in snails. Heredity 76: 278 - 286 (1.94.6)

R van den Bos, H de Vries Clusters in social behaviour of female domestic cats (Felis silvestris catus) living in confinement, J. Ethol. 14: 123 - 131 (1.94.11)

F van den Bosch, JAJ Metz The velocity of spatial population expansion: an overview of the individual based approach. Aspects in Applied Biology 46: Modelling in applied biology: Spatial aspects. 231 - 238 (1.94.2)

F van den Bosch, JAJ Metz The continental spread of plant disease. Aspects in Applied Biology 46: Modelling in applied biology: Spatial aspects. 249 - 251 (1.94.2)

U Dieckmann, P Marrow, R Law Evolutionary cycling in predator prey interactions: population dynamics and the Red Queen. J Theor Biol (1995, appeared 1996) 176: 91 - 102 (1.94.3)

U Dieckmann, R Law The mathematical theory of coevolution: a derivation from stochastic processes. J Math Biol 34: 579 - 612 (1.94.3)

O Diekmann, AA de Koeijer, JAJ Metz On the final size of epidemics within herds. Canadian Applied Mathematics Quarterly 4: 21 - 30 (1.94.2)

EL Enserink, N van der Hoeven, M Smith, M van der Klis, MA van der Gaag Competition between cohorts of juvenile "Daphnia magna". Archiv fÀG?Àr Hydrobiologie 136: 433 - 454 (1.94.2)

K Hellendoorn, AW Mat, AP Gultyaev, CWA Pleij Secondary structure model at the coat protein of turnip yellow mosaic virus RNA: long, C - rich, single - stranded regions. Virology 224: 43 - 54 (1.94.7)

N van den Hoeven, JD Elsas A model based on soil structural aspects describing the fate of genetically modified bacteria in soil. Ecological Modelling 89: 161 - 173 (1.94.8)

P Haccou, Y Iwasa Establishment probability in fluctuating environments: a branching process model. Theor. Pop. Biol. 50: 254 - 280 (1.94.5)

P Marrow, U Dieckmann, R Law Evolutionary dynamics of predator - prey systems: an ecological perspective. J Math Biol 34: 556 - 578 (1.94.3)

JWAM Pijls, LM Poleij, JJM van Alpen, E Meelis Interspecific interference between "Apoanagyrus lopezi" and "A. diversicornis", parasitoids of the cassava mealybug "Phenacoccus manihoti". Entomologia Experimentalis et Applicata 78: 221 - 230 (1.94.8)

H Turner, R Zandee The behaviour of Goloboff's tree fitness measure F. Cladistics (1995, appeared in 1996) 11: 57 - 72 (1.94.4)

H Verhoog Genetic modification of animals: should science and ethics be integrated? The Monist 79 (1996): 247 - 263 (1.94.10)

Books and book chapters

R van den Bos Reflections on the organisation of mind, brain and behaviour. In: Marcel Dol "et al., "ed., Animal consciousness and animal ethics, pp. 144 - 166. Assen, Van Gorcum (1.94.11)

M Dol, S Kasanmoentalib, S Lijmbach, E Rivas, R van den Bos, eds. Animal consciousness and animal ethics, Perspectives from the Netherlands. Assen, Van Gorcum (1.94.11)

JAP Heesterbeek, JAJ Metz The saturating contact rate in epidemic models. In: V. Isham & G. Medley, eds. Models for Infectious Human Diseases. Their Structure and Relation to Data, p.308 - 310. Cambridge University Press (1.94.2)

I Kumm, SD Mylius, D Promislow Evolutionary dynamics of structured populations. In: H. Caswell & S. Tuljapurkar, eds. Structured - Population Models in Marine, Terrestrial and Freshwater Systems, p. 329 – 353 (1.94.3)

JAJ Metz, SAH Geritz, G MeszÀ)?Àna, FJA Jacobs, JS van Heerwaarden Adaptive dynamics, a geometrical study of the consequences of nearly faithful reproduction. In: S.J. van Strien & S.M. Verduyn Lunel, eds. Stochastic and spatial structures of dynamical systems. pp. 183 - 231. A'dam, North - Holland (1.94.3)

J Val, F Villa, K Lika, K Boe Nonlinear models of structured populations: In: H. Caswell & S. Tuljapurkar, eds. Structured - Population Models in Marine, Terrestrial and Freshwater Systems, p. 587 - 613. (1.94.3)

H Verhoog, MBH Visser A view of intrinsic value not based on animal consciousness. In: Marcel Dol "et al., K "ed. Animal consciousness and animal ethics, pp. 223 - 232. Assen, Van Gorcum (1.94.10)

Other publications

R van den Bos, ed. Welzijn van dieren en wetenschap. Door welke bril kijkt U? Tilburg University Press (1.94.11)

R van den Bos Wetenschap en welzijn: de kleren van de keizer? In: R. van den Bos (ed.) Welzijn van dieren en wetenschap. Door welke bril kijkt U? p. 1 - 6. Tilburg University Press (1.94.11)

R van den Bos Post - conflict behaviour in domestic cats in confinement. Proceedings Isaz - meeting, Cambridge, UK 24 - 26 July p. 65 (1.94.11)

R van den Bos Dierenwelzijnsbeleid: een inleiding. Symposium welzijn van dieren en dierenwelzijnsbeleid. Amsterdam, 13 december 1996, p.1 (1.94.11)

R van den Bos Welzijn van dieren en wetenschap. NVG mededelingenblad 5: 10 - 21 (1.94.11)

O Diekmann, M Gyllenberg, JAJ Metz, HR Thieme On the formulation and analysis of general deterministic structured population models. I. Linear theory. Amsterdam, CWI Report AM - R9607: 1 - 34p (1.94.1)

SAH Geritz, À(?À Kisdi, G MeszÀ)?Àna, JAJ Metz Evolutionarily singular strategies and the adaptive growth and branching of the evolutionary tree. IIASA Working Paper WP - 96 - 114: 1 - 27 (1.94.3)

SAH Geritz, JAJ Metz, À(?À Kisdi, G MeszÀ)?Àna The dynamics of adaptation and evolutionary branching. IIASA Working Paper WP - 96 - 77: 1 - 4 (1.94.3)

M Heino, JAJ Metz, V Kaitala Evolution of mixed maturation strategies in semelparous life - histories: the crucial role of dimensionality of feedback environment. IIASA Working Paper WP - 96 - 126: 1 - 17 (1.94.3)

TJM Van Dooren, JAJ Metz Delayed maturation in temporally structured populations with non – equilibrium dynamics. IIASA Working Paper WP - 96 - 70: 1 - 26 (1.94.3)

H Verhoog Biotechnologie en ethiek. Natuur & Techniek, 64/6: 72 - 75 (1.94.10)

H Verhoog Deregulering transgene dierproeven holt wetgeving uit. BIOnieuws 6/3: 3 (1.94.10)

H Verhoog Ook dieren hebben eigenbelangen. De Bazuin 79/18: 10 - 12 (1.94.10)

H Verhoog Ruzie over koetjes en kalfjes. Friesch Dagblad 6.4.1996 (1.94.10)

MBH Visser, LJE Rutgers, FWA Brom eds. Intrinsieke waarde van het dier in de praktijk. Studies in dierÔ ? ?"(?   p-%)%)J?J?? Ô«ethiek 2. Nederlandse Vereniging voor Bio - ethiek & Centrum voor Onderzoek Relatie Mens - Dier. 60p. RULeiden. ISBN 90 - 75019 - (1.94.10)

F. Dissertaties

 J Verboom Modelling fragmented populations: between theory and application in landscape planning. Proefschrift RUL 119p (1.94.2)

G. Invited lectures INVITED LECTURES

DJ Kornet Composite as Paraphyletic Groups of Internodons. 15th Meeting of the Willy Hennig Society, Cape Town University, Kaapstad, South Africa, 15 December

JAJ Metz Population Dynamics and Adaptive Dynamics. European Science Foundation conference on Theoretical Biology. BackagÀ#?Àrden, Ho?Ào?Àr, Sweden, 17 - 20 October

JAJ Metz Towards a Bifurcation Theory for ESSes. Mathematische Modellen in der Biologie. Oberwolfach, Deutschland, 21 - 25 October

JAJ Metz The spatial Spread of Expanding Population Waves. Low Dimensional Dynamics of Spatial Ecological Systems, Laxenburg, Austria, 8 November

JAJ Metz Simple Models Spontaneously Give Rise to (Linnaean) . ICSEB V, Budapest, Hungary, 19 August

JAJ Metz, SD Mylius, O Diekmann When Does Evolution Optimise? ICSEB V, Budapest, Hungary, 23 August

H Verhoog Intrinsic Value and Animal Welfare. 2nd World Congress on Alternatives and Animal Use in the Life Sciences, Utrecht, 20 - 24 October

H. Membership of external boards MEMBERSHIP OF EXTERNAL BOARDS*f*

FHD van Batenburg

- Board Dutch APL Association

- APL Study group International Standards Organisation

- Nederlands Normalisatie Instituut afd. programmeertalen

R van den Bos

- External Board Animals in Philosophy and Science, Van Gorcum, Assen

P Haccou

- Chair team SLW Study group Population Biology

- Associate editor Behavioural Processes

- Associate editor American Naturalist

E Meelis

- Chair team SLW Study group Ethology

- Secretary Study group Milieubeheer Leiden

JAJ Metz

- Consultant Department of Mathematics, Utrecht University

- Leader of the Adaptive Dynamics Network, IIASA, Austria

- Judgement committee D, SLW

- Committee Non - linear Population dynamics

- Advisory committee Theoretical Biology RUG

- Curator LUF endowed chair Philosophy of Biology

- Editor Acta Biotheoretica

- Organising Committee ICSEB V

H Verhoog

- NIBI Committee Profession codes

- Subcommittee Ethics and societal aspects, committee Genetical Modification (VROM)

- Provisional committee Ethical testing genetical modifi¬cation of animals (LNV)

- Study group intensive cattle farming (animal protection society¬)

MBH Visser

- Dutch Association for Bio - ethics

- Steering committee Biotechnology IMPULS: Technology Museum NINT, Amsterdam

- External advisory committee Education Animal Management, Van Hall Institute

- Committee 'Re - use', Primate Research Centre TNO

I. Wetenschappelijke prijzen

VAA Jansen, Kuenenprijs, Dfl 1000. - + oorkonde, uitreiking 15 November, uitreiker ProfDr R Hoekstra doel prijs: prijs is bestemd voor de eerste autuer van het beste artikel, gebaseerd op eigen promotieonderzoek, dat binnen 2 jaar na beëindiging van de aanstelling geaccepteerd, dan wel gepubliceerd is in een internationaal wetenschappelijk tijdschrift; mening jury (Vincent heeft die alleen van Rolf gehoord tijdens de uitreiking, een juryrapport heeft hij nooit gezien, 't bestaat wel (Hanna zoekt ernaar)

J. 2e Fase cursussen/summer - of winterschools

The Composite Concept. Onderzoekschool Biodiversiteit AIO/OIO course. Two weeks

in April. DJ Kornet. 9 part.

Theoretical Aspects of Systematics. Onderzoekschool Biodiversiteit AIO/OIO course

(obligatory). Two weeks in October. DJ Kornet, R Zandee. 15 part.

K. Symposia, congressen

Workshop Ethiek en Biologie - onderwijs, Beroepscode Commissie van het NIBI, Utrecht, 6

mei, H Verhoog

Day session on Adaptive Dynamics: beyond the ESS in ICSEB V, Budapest, Hungary, 17 – 24 August, JAJ Metz

Workshop on Adaptive Dynamics, Satelite Conference of ICSEB V, Matrahaza, Hungary, 25ª30 August, JAJ Metz

Statistical Analysis of behavioural data. Eo?Àtvo?Às university, Budapest (Go?Àd), Hungary. Sept. (duration: one week), P Haccou

Early Evolution, EEW and IMP, Leiden university, Netherlands, 1 Oct. 1996, P Haccou

International Forum for Genetic Engineering, Dornach, Switzerland, 2 - 5 October Discussionleader morning sessions H Verhoog

Low - dimensional Dynamics of Spatial Ecological Systems. Laxenburg, Austria, 7 – 16 November. JAJ Metz

Welzijn van Dieren en Dierenwelzijnsbeleid. Doelstelling, instrumenten en evaluatie.

Nationaal Vakbondsmuseum, Amsterdam. 13 December. R van den Bos. 83 part.

L. Bezoekende onderzoekers

S Brauckmann Dr, UniversitÀ??Àt MÀG?Ànster, Deutschland, 18 - 29 March

C Cadet PhD - Student, Lab. d'Ecologie, À(?Àcole Normale SupÀ)?Àrieure, Paris, France, 18 June - 1October

C Cannings ProfDr, School of Probability, Univ. of Sheffield, Sheffield, UK, 11 – 30 November

M Heino Dr, Dept. of Ecology and Systematics, Univ. of Helsinki, Finland, 15 January – 15 April

J Joshimura Dr, Centre for Population Biology, Silwood Park, 11 - 14 November

K Kull ProfDr, Institute of Zoology and Botany, Tartu, Estonia, 18 - 29 March

A Mathias, PhD - Student, Dept. of Genetics, Eo?Àtvos University, Budapest, Hungary, October ªNovember 3 weeks

D Mollison Prof, Heriot - Watt University, Edinburgh, UK, 11 - 14 September

Àsztor Dr, Dept. of Genetics, Eo?Àtvos University, Budapest, Hungary, 1 October – 15 January 97

Z Toth Dr, Dept. of Genetics, Eo?Àtvos University, Budapest, Hungary, 1 October - 15 January 97

M. Gastsprekers

22 November, C Cannings, Sheffield, UK, A Model for Sperm Competition

26 November, Dr L PÀ??Àsztor, Hungary, Geographic Variation in Optimal Clutch Size and Density Dependence

28 November, C Cannings, Sheffield, UK, A Symetric Multiplier Conflict.

N. Overig

H Verhoog

 - participant in `Achterkant van het Gelijk' Marcel van Dam's program on Genetics andEthics.

 - participant discussion on radio (Radio London) on biotechnology.