

1. Introduction

It is a pleasure for me to introduce the laboratory's 2000 Annual Report.

The finances of DPIL did not improve in the course of 2000. The research level of the laboratory is still satisfactory, and the Annual Report contains a number of results of high quality. The laboratory continues to work for a strengthening of research into biological and microbiological control in order to maintain this special expert knowledge.

The extension and renovation work of the DPIL was commenced in the spring of 2000, and on the 1st of September the topping-out ceremony for the new buildings took place. According to plan the laboratory can start using the new buildings in the beginning of 2001, and completion of the entire renovation process is expected by December 2001. The staff is looking forward to working in modern facilities with much more room than before. It has been a great pleasure to cooperate with the building contractor who has followed the schedule with great precision and who has solved the unusual problems with great creativity.

Finally, I would like to thank the Board and the entire staff for their fine cooperation during the past year.

N. Bille

2. Management and organization

2.1 Board of the Danish Pest Infestation Laboratory

Members:

Niels Ørnbjerg
Danish Bilharziasis Laboratory
Chairman

Lars Damberg
Danish Pest Infestation Laboratory

Annie Enkegaard
Danish Institute of Agricultural Services, Flakkebjerg

Peter Esbjerg
Royal Veterinary and Agricultural University
Vice-chairman

Lise Stengård Hansen
Danish Pest Infestation Laboratory

Hans Kristensen
Danish Agricultural Advisory Centre

Elisabeth Nørbygaard
Danish Medicines Agency

Peter Weile
Danish Environmental Protection Agency

Ellis Byrgiel Sommer
Research Secretariat, Danish Directorate for Development, Observer

2.2 Staff 2000

E-mail addresses for DPIL staff are available on the Web-site

in Danish: http://www.dpil.dk/frames/medarb_frm.htm

in English: http://www.dpil.dk/frames/Estaff_frm.htm

DIRECTOR

Nils Bille

SECRETARIAT, ACCOUNTS AND BOOKKEEPING

Inge Børgesen

Maj-Britt Børgesen (from 08.06 until 09.08)

Marianne Christensen (part-time)

Lisbeth Gammelgaard (part-time)

Jette Hansen (part-time)

Ilse Hall Jensen

Kirsten Engell Jørgensen (part-time until 30.11)

Hanne Olsen

Volker Pieper

INFORMATION TECHNOLOGY

Vibeke Rostgaard Schmidt

DEPARTMENT OF ENTOMOLOGY

Scientists

Jørgen Brøchner Jespersen (Head)

Lise Stengård Hansen* (part-time)

Karl-Martin Vagn Jensen*

Vibeke Kalsbeek (Ph.D. student)

Ole Østerlund Kilpinen

Michael Kristensen*

Mette Knorr (part-time)

Per Sejerø Nielsen*

Henrik Skovgård Pedersen*

Anne Marie Rasmussen (part-time)

Andrew Spencer* (until 31.08)

Tove Steenberg*

Technicians

Aase Borges (part-time)

Claus W. Dahl (from 01.10)

Lars Damberg

Eva Hald

Henriette Hansen (until 31.07)

Nicolai Hansen

Mette Hovgaard (from 01.10 until 31.10)

Gitte Jensen

Dorthe Kyster

Ib Bjarne Nielsen

Bodil Malle Pedersen (part-time)
 Kirsten Peschel
 Santina Petersen (from 06.11)
 Minna Wernegreen (part-time)
 Mirjana Zibar

MAMMAL DEPARTMENT

Scientists

Herwig Leirs (Head)
 Ann-Charlotte Heiberg (Ph.D. student)
 Jens Lodal
 Solveig Vibe-Petersen (Ph.D. student until 31.10)
 Solveig Vibe-Petersen (from 01.11)

Technicians

Sarah Adams
 Folmer Jensen
 Iver Munch Skadborg

TECHNICAL MANAGEMENT

Jørgen Christensen

* Senior scientists

2.3 Ph.D. and M.Sc. students

Ann-Charlotte Heiberg, Ph.D. student (University of Copenhagen)
 Vibeke Kalsbeek, Ph.D. student (Royal Veterinary and Agricultural University, Copenhagen)
 Christian Nansen, Ph.D. student (Royal Veterinary and Agricultural University, Copenhagen)
 Solveig Vibe-Petersen, Ph.D. student (Royal Veterinary and Agricultural University, Copenhagen until 31.10)

Ditte Hendrichsen, M.Sc. student (University of Copenhagen)
 Thomas Lisborg, M.Sc. student (University of Odense)
 Mette Drude Kjær Markussen, M.Sc. student (University of Copenhagen)
 Hanne Martin-Lejeune, M.Sc. student (University of Copenhagen)
 Katrine Mohr, M.Sc. student (University of Copenhagen)
 Thomas Nørgaard, M.Sc. student (University of Aarhus)
 Hans Henrik Petersen, M.Sc. student (University of Copenhagen)
 Tina Stendal Svendsen, M.Sc. student (University of Copenhagen)

2.4 Guest scientist

As in previous years we have had the pleasure of frequently seeing J. Keiding, Scientist Emeritus.

3. International collaboration

3.1 Conferences

L. Stengård Hansen participated in the first meeting of EU COST-action 842 on “Biological control of pest insects and mites, with special reference to Entomophthorales”, 14-15 February, in Brussels, Belgium. L. Stengård Hansen was elected member of the management committee and vice-chairperson of Working Group 4 on “Biocontrol of arthropod pests in stored products”.

J. B. Jespersen, M. Kristensen and L. Stengård Hansen participated in the XXI International Congress of Entomology, 20-26 August, Foz do Iguassu, Brazil. M. Kristensen and J. B. Jespersen presented a poster entitled: “Multiple acetylcholinesterase phenotypes in Danish field populations and laboratory strains of the housefly *Musca domestica*”. J. B. Jespersen co-authored a paper presented by Ian Denholm entitled “Combating Insecticide Resistance: ENMARIA and the European perspective”. L. Stengård Hansen presented a paper entitled “*Trichogramma turkestanica*, a candidate for biological control of *Ephestia kuehniella* in flour mills”.

J. B. Jespersen participated in the 13th European SOVE meeting, Society for Vector Ecology, 24-29 September, Belek, Antalya, Turkey. J. B. Jespersen acted as a member of the Scientific Committee for the meeting.

O. Kilpinen participated in the Third Annual Workshop of EU Cost Action 833 “Mange and Myiasis in Livestock”, 28-29 September, Ceske Budejovice, Czech Republic, giving a lecture “Host seeking behaviour of the chicken mite”.

T. Steenberg participated in a meeting of EU COST action 842 “Biological control of pest insects and mites with special reference to Entomophthorales”, 28-30 September, in Zürich, Switzerland.

H. Skovgård participated in Ecology Conference 2000, 1-2 November, in Vamdrup, Denmark.

3.2 Visits and co-operation

DPIL staff paid visits to the following countries:

22 October, 1999–31 May, 2000, S. Vibe-Petersen visited Sokoine University of Agriculture (SUA), Rodent Research Unit, Morogoro, Tanzania. The visit was related to her Ph.D. project.

18-29 February, L. Stengård Hansen and H. Skovgård visited International Institute of Tropical Agriculture, Cotonou, Benin, H. Skovgård to develop a proposal on “Integrated control of the Angoumois Grain Moth, *Sitotroga cerealella* (Ol.) in resource poor farmers’ maize stores in the Guinea Savanna area of Benin” and L. Stengård Hansen as supervisor for Ph.D. student C. Nansen on his project on the larger grain borer *Prostephanus truncatus* in natural habitats.

21-25 February, H. Leirs and S. Vibe-Petersen participated in a course concerning analysis of capture-mark-recapture data, at the CNRS in Montpellier, France.

10 April-10 May, H. Leirs visited the Sokoine University of Agriculture in Morogoro, Tanzania, carrying out field studies on population ecology of *Mastomys*-rats and discussing with students.

17 April and 13-14 September J. B. Jespersen participated in joint meetings in Plaisir and Limours, France, respectively, to work out a research proposal aiming at the development of a new natural insecticide for sustainable agriculture and public health uses.

19 May–25 June, A.-C. Heiberg visited Oregon State University (OSU), Institute of Zoology. The visit at OSU was related to her Ph.D. project.

8-9 August, H. Leirs visited the University of Oslo, Norway, to discuss ongoing bio-economics modelling work.

16-20 August, L. Stengård Hansen participated in a field trip, visiting grain storage and processing facilities in the state of Parana, Brazil.

1-9 September, H. Leirs and S. Vibe-Petersen visited the Sokoine University of Agriculture in Morogoro, Tanzania, for the first co-ordination meeting for the Staplerat-project.

13-23 September, H. Leirs visited Laos and Vietnam as a short-term consultant for DANIDA, discussing possibilities for rodent research with the International Rice Research Institute.

9-12 October, S. Vibe-Petersen visited the University of Antwerp, Belgium, as part of her data analysing and discussions with colleagues.

26-27 November, H. Leirs visited the Natural Resources Institute at the University of Greenwich, England, and participated in a workshop on the need for new initiatives in rodent management research in developing countries.

11-12 December, J. B. Jespersen, K.-M. Vagn Jensen, M. Kristensen, and N. Bille visited Umweltbundesamt, Berlin Dahlem, Germany to discuss subjects of mutual interest.

13–20 December S. Vibe-Petersen visited University of Oslo (UIO), Oslo, Norway as part of data analysing for her PH.D. project.

DPIL was visited by the following colleagues and other guests:

6-7 June, J.-E. Bergh, Dalarna University, Sweden, visited the DPIL to discuss preparation of a paper on the effect of anoxic treatment on museum pests with K.-M. Vagn Jensen and L. Stengård Hansen.

16 June-14 July, Bradley A. Mullens from the Department of Entomology at University of California at Riverside, U.S.A., visited the DPIL for a collaborative research project on “Behavioural reactions of chicken mites to temperature gradients after variable periods of starvation”.

22-23 June, L. Stengård Hansen and P. S. Nielsen hosted a meeting with European colleagues with a view to develop a proposal for an EU-project.

26-27 September, Nils Chr. Stenseth, H. Andreassen from University of Oslo, Norway, and Anders Skonhøft from University of Trondheim, Norway, visited DPIL to discuss collaborative work on the bio-economics of rodent control.

19 October, John Williams, UK, visited DPIL to discuss fly problems in Europe.

1 November, DPIL was visited by a group of PCOs from Mortalin, Haslev, Denmark.

27 November, Ian Denholm, IACR-Rothamsted, Harpenden, UK, visited DPIL to discuss ENMARIA matters.

28 November–1 December, Grant Singleton from CSIRO, Canberra, Australia, Nils Chr. Stenseth and H. Andreassen from University of Oslo, Norway, visited DPIL to discuss collaborative work on rodent population dynamics and control.

3.3 WHO Collaborating Centre and Expert Panel

DPIL is a “WHO Collaborating Centre on Pesticide Resistance”. The terms of reference are:

1. To study insecticide resistance developments in flies, cockroaches and rodents, and to establish discriminating concentrations/exposure times to different pesticides used for the control of these pests.
2. To maintain strains of susceptible and resistant colonies for the above studies and serve as a reference centre providing material from the above colonies for other WHO collaborators.
3. To study how to overcome resistance problems caused by the above-mentioned pests through delay approaches, alteration, change of control methods or a combination of methods.

Much of the work summarized in the section “Scientific and technical work” fulfils the terms of the centre.

Since 1991 J. B. Jespersen has been a member of the WHO Expert Advisory Panel on Vector Biology and Control, and in 1996 he accepted an invitation to serve as a member for a further period of four years.

3.4 FAO Expert Panel on Resistance in Parasites in Livestock

In 1998 J. B. Jespersen became a member of the FAO Panel of Experts on Resistance in Parasites in Livestock.

3.5 Scientific and Environmental Monitoring Group (SEMG)

In 1985 the European Commission formed the SEMG to monitor the application of insecticide in the Regional Tsetse and Trypanosomiasis Control Programme (RTTCP) on Malawi, Mozambique, Zambia and Zimbabwe. In 1992 the mandate of SEMG expanded to include other effects of tsetse control with regard to land use and other possible environmental effects. In addition the activities of SEMG were not to be restricted to just RTTCP, but could now also involve all other EDF-funded projects in Africa. In 1997 the role and mandate of the SEMG were reviewed again. The mission of SEMG is now to support the European Commission, its member states and partners in the development and implementation of socially, economically and environmentally sustainable livestock production systems for agriculture. At a meeting in Brussels on September 23-24, 1997, the new terms of references were discussed, agreed upon, and referred to the member states.

J. B. Jespersen has been the Danish member of SEMG since 1988.

3.6 ENMARIA: European Network for the Management of Arthropod Resistance to Insecticides and Acaricides

ENMARIA (European Network for the Management of Arthropod Resistance to Insecticides and Acaricides), a new EU-funded Concerted Action, was launched in November 1996 to promote the development and implementation of management strategies for insecticide and acaricide resistance throughout Europe, thereby minimizing reliance on these chemicals and avoiding their increased use following resistance outbreaks. Nominated participants in ENMARIA include scientists and advisors from 13 countries and the agrochemical industry’s Insecticide Resistance Action Committee (IRAC). ENMARIA hopes to achieve progress in four main areas - compilation of a European resistance database, workshops, training visits and publicity.

The database will detail all individuals and institutions engaged in insecticide and acaricide resistance research activities and all available information on the incidence, impact and management of resistance in EU and EFTA countries. It will also include information on insect strains (especially susceptible reference strains) cultured by different laboratories that could be shared to save unnecessary duplication of effort.

The workshops will aim at developing and promoting standardized methods for detection and monitoring of resistance and at identifying and disseminating guidelines for its management. The first workshop was held at IACR-Rothamsted in April 1997, in conjunction with the Resistance '97 International Conference on Pesticide Resistance. The second workshop took place in Almería in southern Spain in May 1998, whereas the third workshop took place in Thessaloniki, Greece in May 1999. Difficulties encountered in these regions with insect and mite control encapsulate well the need to integrate resistance management tactics with non-chemical approaches and are relevant to protected horticulture and agriculture throughout Europe.

ENMARIA sponsors technical training visits, focusing on techniques for monitoring resistance and evaluating resistance. Until now 10 such training visits have been funded.

The primary long-term objective of ENMARIA is to encourage close and formal scientific collaboration on resistance research between European laboratories, thereby avoiding duplication of effort and expertise. In addition, ENMARIA will remain committed to creating an environment more favourable for the implementation of resistance management strategies, notably by promoting open and frequent dialogue between researchers, pest management advisors, the agrochemical industry and regulatory authorities.

Involvement in ENMARIA is open to all interested individuals and organizations; further details are available from the main coordinators whose details are as follows:

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ENMARIA has established a Website giving information about its activities. The Homepage includes logos, maps and details of participants, and the site will eventually include working papers prepared by national representatives reviewing resistance problems in their respective countries. The address is:

www.res.bbsrc.ac.uk/enmaria

3.7 Mange and Myiasis in Livestock in Europe

As part of the European co-operation in the field of scientific and technical research, a European Concerted Action 833 on Mange and Myiasis in Livestock was established in 1998 with the following objectives:

1. To develop accurate means of diagnosis of mange and myiasis in livestock and so prevent suffering and improve animal welfare.
2. To develop effective and environmentally sensitive methods of treatment and control of these diseases and so increase economic performance and decrease pressure on the environment.
3. To increase the epidemiological knowledge of these diseases in order to facilitate control and eradication programmes.

Altogether, 16 countries are involved in implementation of the COST Action 833, which is organized by the Management Committee. In 1998 J. B. Jespersen was appointed the Danish representative of the Management Committee. In 2000 J. B. Jespersen participated in one Management Committee meeting. O. Kilpinen participated in the Third Annual Workshop, 27-30 September, in České Budějovice, Czech Republic, where he presented a paper on the chicken mite *Dermanyssus galinae*.

3.8 EPPO (European and Mediterranean Plant Protection Organization)

As from October 1994 J. Lodal has become a permanent member of the EPPO Rodent Control Panel.

4. Educational activities

4.1 Training courses

In February and March nine one-day courses for personnel using phosphine-generating pellets for the control of moles and water voles were run by J. Lodal in various parts of the country. A total of 770 persons participated.

4.2 Lectures

10 February, H. Leirs gave a research seminar “Ratting in the rain: population dynamics of African *Mastomys* rats” at the Department of Population Biology, Copenhagen University.

2 March and 2 November, O. Kilpinen gave lectures on “Biology and importance of ectoparasites with emphasis on fleas, lice and mites” for master students on the study of International Health at the University of Copenhagen.

16 March, L. Stengård Hansen gave two lectures on pests related to storage and processing of food for food technology students at the Royal Veterinary and Agricultural University, Copenhagen.

20 March, J. B. Jespersen gave two lectures on “Flies and mosquitoes” for students at The Royal Veterinary and Agricultural University, Copenhagen.

13 April, J. Lodal gave a lecture on rats, mice and voles, their biology, control and resistance problems for a group of visitors from Anticimex, Sweden.

29 November, different projects on biological and microbial pest control were presented to students from the Royal Veterinary and Agricultural University visiting the DPIL

29 November, L. Stengård Hansen gave a lecture on biological control of flour moths for agronomy students from the Royal Veterinary and Agricultural University, Copenhagen.

4.3 External examiner and reviewer duties

L. Stengård Hansen served as external examiner for forestry students in forest entomology and ecology at the Royal Veterinary and Agricultural University, Copenhagen.

L. Stengård Hansen served as external supervisor for a Ph.D. student at the Royal Veterinary and Agricultural University, Copenhagen.

J. B. Jespersen served as external examiner for a Ph.D. Student at the Royal Veterinary and Agricultural University, Copenhagen.

J. B. Jespersen served as supervisor for a Ph.D. student at the Royal Veterinary and Agricultural University, Copenhagen and an M.Sc. Student at Roskilde University, Roskilde.

J. B. Jespersen, as external examiner, participated in reviewing the qualifications of applicants for a position as associated professor at The Royal Veterinary and Agricultural University, Copenhagen.

H. Leirs served as a supervisor for a Ph.D. student at the Royal Veterinary and Agricultural University, Copenhagen, a Ph.D. student at the University of Copenhagen, a Ph.D. student at the University of Antwerp (Belgium), and two Ph.D. students at the Sokoine University of Agriculture, Morogoro (Tanzania).

H. Leirs served as adviser to four M.Sc. students at the University of Copenhagen, a M.Sc. student at the University of Odense and two M.Sc. students at the Kenyatta University (Nairobi, Kenya). He also regularly advised students at the Royal Veterinary and Agricultural University, Copenhagen.

H. Leirs served as external examiner for a Ph.D.-thesis at the Friedrich-Schiller Universität Jena (Germany) and an M.Sc. dissertation at the Potchefstroom University for Higher Christian Education, (Potchefstroom, South Africa)

H. Leirs served as Associate Editor for *Mammalia* (Paris).

H. Leirs served as referee for *Advances in Vertebrate Pest Management*, *Proceedings of the 8th African Small Mammals Symposium*, *Oikos* and *Journal of Tropical Ecology*.

J. Lodal served as referee for *Advances in Vertebrate Pest Management*.

S. Vibe-Petersen served as referee for a manuscript for *Mammalia*.