

## **1. Introduction**

It is a pleasure for me to introduce the laboratory's 1998 Annual Report.

At present the financial circumstances of the Danish Pest Infestation Laboratory are reasonably good with an appropriate division between the basic grant and externally financed activities. The laboratory will endeavour to maintain this division as it gives a fine balance between strategic research and a more user-oriented research. However, the financial circumstances do not seem promising for the years to come. A couple of big research projects will expire, and at the present time it has not been possible to find replacements. Therefore, it is my hope that possibilities of applying for relevant research programmes will turn up soon that could carry on some

of the research which has resulted in very promising findings during recent years.

The projects concerning research in biological and microbiological control and biochemical mechanisms underlying pesticide resistance expire at the end of 1999. Both programmes are carried out in collaboration with the Royal Veterinary and Agricultural University and the Danish Institute of Agricultural Services; the resistance research in collaboration with the Roskilde University as well. Ph.D. education is attached to both programmes.

Two projects concerning mammal research have been commenced, each with a Ph.D. student attached. The laboratory gives high priority to research education and intends to include provision for Ph.D. students in future projects.

The event of the year was the celebration of the laboratory's 50th anniversary. The whole staff spared no effort in order to make the day of jubilee as interesting and festive as possible. In connection with the celebration an exhibition had been established, in which a great deal of the old PR material of the laboratory was used. Besides a number of tableaux, a number of old posters and drawings were on display. The Danish Pest Infestation Laboratory possesses many sketches by Robert Storm-Petersen which have been used in campaigns for the control of stored product pests and rats. Some of these sketches may be familiar as the laboratory makes use of them on its Christmas cards. The jubilee celebration was a great success. Many of the invited guests were able to attend and took great interest in the exhibiton.

For many years complaints concerning the very limited working space of our laboratory have been expressed in the introduction of the Annual Report. A solution to this problem has finally been found as the Appropriation Act for 1999 contains a considerable appropriation for an extension and a conversion of the laboratory. The extent of this project is approx. 1200 m<sup>2</sup> of new building and approx. 800 m<sup>2</sup> of rebuilding of the existing facilities. Detailed planning and contracting will be completed in 1999 and building work carried out in the period 2000-2002. The project is expected to be completed within the first six months of 2002, and construction is planned to take place in stages in order to maintain the level of research activity. It is with great expectations that the laboratory looks forward to start using the new facilities and considers it the best jubilee present imaginable.

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  
Dansk Bilharziose Laboratorium  
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

Ellis Byrgiel Sommer  
Research Secretariat, Danish Directorate for Development  
Ministerial representative without voting right

## **2.2 Staff 1998**

### **DIRECTOR**

Nils Bille

### **SECRETARIAT, ACCOUNTS AND BOOKKEEPING**

Inge Børgesen

Marianne Christensen (part-time)

Lisbeth Gammelgaard (part-time)

Jette Hansen (part-time)

Ilse Hall Jensen

Kirsten Engell Jørgensen (part-time)

Hanne Olsen

Vibeke Rostgaard Schmidt

Annette Pilgaard (until 08.04)

### **DEPARTMENT OF ENTOMOLOGY**

#### **Scientists**

Jørgen Brøchner Jespersen (Head)

Lise Stengård Hansen\* (part-time)

Karl-Martin Vagn Jensen\*

Ole Østerlund Kilpinen

Michael Kristensen\*

Kim Søholt Larsen\* (until 30.11)

Mette Knorr Lauridsen (part-time) (from 01.09)

Henri Mourier (until 31.01)

Per Sejerø Nielsen\*

Henrik Skovgård Pedersen

Anne Marie Rasmussen (part-time) (from 01.02)

Andrew Spencer

Tove Steenberg\*

\* Senior Scientists

#### **Technicians**

Aase Borges (part-time)

Ulrik Cold

Lars Damberg

Eva Hald

Henriette Hansen  
Nicolai Hansen  
Gitte Jensen  
Dorthe Kyster (from 17.09)  
Marianne Søs Ludvigsen (until 30.09)  
Bodil Malle Pedersen (part-time)  
Kirsten Peschel  
Jonna Rungsøe (until 30.06)  
Minna Wernegreen (part-time)

## **MAMMAL DEPARTMENT**

### **Scientists**

Herwig Leirs (Head)  
Thomas Bolbroe (from 07.12)  
Ann-Charlotte Heiberg (from 01.06 until 31.07)  
Jens Lodal

### **Technicians**

Sarah Adams  
Kristian Fordsmand  
Folmer Jensen

## **TECHNICAL MANAGEMENT**

Jørgen Christensen

### **Assistants in the workshop**

Githa Christensen (1) (until 31.03)  
Ib Bjarne Nielsen (1)  
Volker Pieper (1) (from 02.06)  
Mirjana Zibar (1) (from 19.10)

(1) Paid using special reemployment funds

### **2.3 Ph.D. and M.Sc. students**

Michael Carlsen, Ph.D. student (University of Aarhus)

Ann-Charlotte Heiberg, Ph.D. student (University of Copenhagen - from 24.08)

Vibeke Kalsbeek, Ph.D. student (Royal Veterinary and Agricultural University, Copenhagen)

Saskia Mercelis, Ph.D. student (University of Antwerp, Belgium)

Christian Nansen, Ph.D. student (Royal Veterinary and Agricultural University, Copenhagen - from 01.05)

Solveig Vibe-Petersen, Ph.D. student, Royal Veterinary and Agricultural University, Copenhagen)

Thomas Bolbroe, M. Sc. student (University of Copenhagen - until 30.11)

Lars Dag Erichsen, M. Sc. student (University of Copenhagen - until 31.08)

Ditte Hendrichsen, M. Sc. student (University of Copenhagen)

Mette Homann Keseler, M.Sc. student (University of Aarhus)

Thomas Nørgaard, M.Sc. student (University of Aarhus)

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

J. B. Jespersen participated in the WHO Pesticide Evaluation Scheme (WHOPES) informal Consultation on the “Guideline specifications for household insecticide products”, 3-6 February, in Geneva, Switzerland.

J. B. Jespersen participated in the first Workshop of the Working Group on Myiasis in Livestock, Cost Action 833, 3 April, London, UK.

H. Leirs participated at the Workshop on Management of Rodent Pests in Southeastern Asia at the International Rice Research Institute, Los Baños, the Philippines, 5-8 April 1998. He gave a special seminar entitled “Rodent management in Eastern Africa: challenges and prospects for the future.”

V. Kalsbeek participated in the British Mycological Society’s International Symposium “The future of fungi in the control of pests, weeds and diseases”, Southampton, UK, 5-9 April, and presented a poster authored by Tove Steenberg, entitled “Entomopathogenic potential of *Verticillium* and *Acremonium* species”.

A. Spencer attended a discussion meeting held 8-9 April by the Royal Society (UK) “Insecticide resistance: from mechanisms to management”.

J. B. Jespersen participated in the first Workshop of the Working Group on Mange in Livestock, Cost Action 833, 20 April, Brussels, Belgium.

J. B. Jespersen attended a Danida meeting on “Danish research in developing countries”, 5 May, in Copenhagen, Denmark.

J. B. Jespersen attended the Second ENMARIA business meeting and a workshop on “Pesticide resistance in horticultural crops”, 12-15 May, in Almería, Spain. Together with Ian Denholm he presented a paper entitled “Introduction to the workshop and background to ENMARIA”.

O. Kilpinen participated in the International Symposium on Ecology of Bird Parasites in Vilnius, Lithuania, 25-28 June, and presented a paper entitled “Behavioural responses of the chicken mite *Dermanyssus gallinae* to host-related stimuli.

M. Carlsen participated in the Euro-American Mammal Congress, 19-24 July, in Santiago de Compostela, Spain, where he presented a poster entitled "Survival in *Microtus agrestis* in a predator exclusion experiment".

A. Spencer attended "Neurotox '98: Progress in Neuropharmacology and Neurotoxicology of Pesticides and Drugs" held in Oxford, UK, 28-31 July.

N. Bille attended "European Society for Emerging Infections, 1st Congress" in Budapest, Hungary, 13-16 September.

L. S. Hansen and K.-M. V. Jensen participated in the 3rd Nordic Symposium on Insect Pest Control in Museums in Stockholm, Sweden, 24-25 September. L. S. Hansen presented two papers: (i) entitled "Heat treatment of the common furniture beetle *Anobium punctatum* (Coleoptera: Anobiidae) at temperatures between 45° and 54°C - under dry and humid conditions" co-authored by K.-M. V. Jensen, and (ii) entitled "The common furniture beetle *Anobium punctatum* in Danish churches - pest densities and moisture contents monitored for three years". K.-M. V. Jensen presented a paper entitled "Evaluation of chemical methods for prevention of damage to textiles due to Dermestidae and *Tineola bisselliella* (Lepidoptera: Tineidae)", co-authored by L. S. Hansen.

J. B. Jespersen participated in the Management Committee Meeting and the First Annual Workshop of the EU-funded Cost Action 833 on "Mange and Myiasis in Livestock", 30 September - 4 October, in Thessaloniki, Greece.

H. Leirs and S. Vibe-Petersen participated in the International Conference on Rodent Biology and Management, Beijing, China from 5-9 October. H. Leirs was a member of the Organising Committee; he convened the Symposium "Ecologically-based management" and chaired the Closing Ceremony. He presented two papers entitled "Populations of African rodents: models and the real world" and "Ecologically based rodent management in Africa: no quick solutions for urgent problems" and one poster "Palatability and toxicity tests with a systemic insecticide in a rodenticide bait for rat and flea control" co-authored by K. S. Larsen and J. Lodal. S. Vibe-Petersen presented a poster entitled "Predation pressure and population dynamics in African *Mastomys* rats: possibilities for integrated pest management."

K. S. Larsen participated in XIth European SOVE Meeting, Lisboa, Portugal, 13-17 October and presented the paper "Palatability and toxicity

tests of fipronil as a systemic insecticide in a rodenticide bait for rat and flea control". This paper was co-authored by H. Leirs and J. Lodal.

J. B. Jespersen participated in the first meeting of the Global Collaboration for the Development of Pesticides for Public Health (GCDPP), 14-15 October, in Geneva, Switzerland.

P. S. Nielsen participated in the 7th International Working Conference on Stored-Product Protection in Beijing, China, 14-19 October, where he presented a paper entitled "The use of *Blattisocius tarsalis* (Acari: Ascidae) for biological control in flour mills".

J. B. Jespersen participated in the Meeting of the FAO Working Group on Parasite Resistance and the FAO/INDUSTRY Contact Group Meeting, 4-6 November, Rome, Italy.

H. Leirs attended the "Mini-Symposium in Honour of Walter Verheyen", 26 November, Antwerp, Belgium. He was a member of the organizing committee, chaired the afternoon session and presented a paper "Veeltepelratten in de regen."

## **3.2 Visits and co-operation**

### **DPIL staff paid visits to the following countries:**

14 February–3 March, H. Leirs visited the Sokoine University of Agriculture, Morogoro, Tanzania, to start the field work of two Ph.D.-projects.

19 February, J. B. Jespersen visited Silvandersson, Sweden.

5-8 April, H. Leirs travelled as a DANIDA-consultant to the International Rice Research Institute, Los Baños, the Philippines, to discuss ongoing and future projects on rat problems and control in rice fields.

7-9 September, E. Hald and K. S. Larsen visited Novartis in Basle and Sct. Aubin, Switzerland.

23 September, N. Bille, J. B. Jespersen, H. Leirs, J. Lodal, K.-M. V. Jensen and L. S. Hansen visited Anticimex, Stockholm, Sweden.

24 October–8 November, H. Leirs visited the Sokoine University of Agriculture, Morogoro, Tanzania, in the framework of several ongoing rodent projects there.

8-10 December, H. Leirs visited the Museum of Natural History at Tórshavn, Faroe Islands, to discuss the possibilities of a research project on Norway rat problems in breeding sea bird colonies.

**The DPIL was visited by the following colleagues and other guests:**

13 January, Senior Officer (parasitology) Jørgen Hansen, Animal Production and Health Division, FAO, Rome, Italy, to discuss pesticide resistance in livestock insect and mite pests.

10 February, Dr. Ian Denholm, IACR Rothamsted, UK, to discuss ENMARIA business matters.

11 February, Dr. Eva Veronesi, Centro Agricoltura Ambiente, Bologna, Italy, to discuss fly and mosquito control.

4 May, Professor and Director, G. Kouri, Instituto de Medicina Tropical, Havana, Cuba, to discuss insect vector control.

10-17 June, Dr. Jan-Erik Bergh, Dalarna University College, Sweden, to do research on a project on museum pests.

22 June, a group of 32 people from the State Plant Protection Administration, Brno, Czech Republic, visited the laboratory to discuss plant protection problems especially concerning rodents. Short introductory talks were given by members of the staff: (1) J. Lodal: Rat control and rodenticide resistance monitoring in Denmark; (2) M. Carlsen: Predator pressure and population dynamics of *Microtus agrestis*; and (3) J. Lodal: Control of voles (*Microtus*, *Arvicola*) in Denmark.

29 June-1 July, Robin Wilkin, Pest Control Consultant, UK to discuss aspects of pest control in flour mills.

23 August-4 September, Professor Bradley A. Mullens, University of California, USA, to do research on *Entomophthora muscae* and *Musca domestica*.

16 September, Professor Howard Whisler, University of Washington, WA, USA, to discuss rearing of the lesser housefly, *Fannia canicularis*.

22 September; Dr. Tom Strang, Canadian Conservation Institute, Ottawa, Canada, to discuss aspects of pest control in museums.

3 December, Dr. Jan-Erik Bergh, Dalarna University College, and Monika Åkerlund, Swedish Museum of Natural History, both Sweden, to discuss a collaborative project on museum pests.

### **3.3 WHO Collaborating Centre and Expert Panel**

The 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. In 1998 J. B. Jespersen participated in the WHO Pesticide Evaluation Scheme (WHOPES) informal Consultation on the "Guideline Specifications for Household Insecticide Products (3-6 February), and the first meeting of the Global Collaboration for the Development of Pesticides for Public Health (GCDPP) (14-15 October), in Geneva, Switzerland.

### **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, and he participated in a Working Group Meeting and a joint FAO/Industry Contact Group Meeting, 4-6 November, in Rome, Italy.

### **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 to develop and promote standardized methods for detection and monitoring of resistance and to identify and disseminate 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 while the second workshop took place in Almería in southern Spain in May 1998. Difficulties encountered in this region with insect and mite control encapsulate well the need to integrate resistance management tactics with non-chemical approaches and are relevant to protected horticulture throughout Europe.

ENMARIA sponsors technical training visits, focusing on techniques for monitoring resistance and evaluating resistance. Until now 8 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 listed below:

Dr. Jørgen B. Jespersen  
Danish Pest Infestation Laboratory  
Skovbrynet 14  
DK-2800 Lyngby  
Denmark  
Tel.: (45) 45 87 80 55  
Fax: (45) 45 93 11 55  
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ENMARIA has established a website giving information about its activities. The home page 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: < <http://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 1998 J. B. Jespersen participated in two Management Committee meetings, two Working Group meetings and a Workshop.

### **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 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 636 persons participated.

17-18 March and 11-12 August, two courses on the biology and control of insects, mites and rodents were run for military personnel intended to operate in foreign countries (N. Bille, K. S. Larsen, L. S. Hansen and J. B. Jespersen).

### **4.2 Lectures**

20 January, J. Lodal gave a lecture on rat resistance to anticoagulants at an Authorization Course in Rat Control held by the Ministry of the Environment, Copenhagen.

9 March, L. S. Hansen gave two lectures on "Pest related to storage and production of food" for food technology students at the Royal Veterinary and Agricultural University, Copenhagen.

17 April, T. Steenberg, V. Kalsbeek, L. S. Hansen and T. S. Mortensen gave lectures on different aspects of microbial and biological pest control for a group of students from the Royal Veterinary and Agricultural University

23 April, J. Lodal gave a lecture on the present situation of resistance to anticoagulants in the brown rat in Denmark at a meeting of Branche-foreningen for Kommunal Skadedyrbekæmpelse (an association of pest control companies involved in municipal pest control).

30 April, J. B. Jespersen gave two lectures on "Flies and mosquitoes" for students at the Royal Veterinary and Agricultural University, Copenhagen.

26 May, L. S. Hansen gave a lecture on "Biology and control of seed destroying pests" for a group of students from developing countries participating in a course on seed pathology at the Danish Plant Directorate.

10 June, J. B. Jespersen and H. Leirs gave lectures in a course on “Tropical Medicine” for senior military health staff, intending to operate in foreign countries.

26 August, A.-C. Heiberg gave a lecture at a graduate course “Molecular evolution” at the DNA-laboratory, University of Copenhagen, on microsatellites in general.

4 September, A.-C. Heiberg gave a lecture at a graduate course “Molecular evolution” at the DNA-laboratory, University of Copenhagen, on a project presentation with special emphasis on the usage of molecular markers for population genetic studies

4 November, T. Steenberg and K.-M. V. Jensen gave lectures on “Microbial control of flies on pastured cattle” and “Biology and importance of Diptera associated with pastured livestock” at the Organic Agricultural School, Åbybro.

16 December, J. B. Jespersen gave a lecture on “Litter beetles in broiler farms; biology and control” for broiler farmers in North Jutland.

### **4.3 External examiner and reviewer duties**

N. Bille served as an external examiner for veterinary students in veterinary special pathology and in environmental hygiene. He is also chairman of the external examiners at the Veterinary Faculty, Royal Veterinary and Agricultural University, Copenhagen, and external member of the Senate.

L. S. Hansen served as an external supervisor for Ph.D. student Charlotte Danielsen, University of Copenhagen, and Ph.D. student Christian Nansen, Royal Veterinary and Agricultural University, Copenhagen.

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

L. S. Hansen served as an external examiner for a student at the Royal Danish Academy of Fine Arts - School of Conservation, Copenhagen.

K.-M. V. Jensen served as supervisor for one M.Sc. student at the University of Aarhus.

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

J. B. Jespersen served as a referee for the journal *Entomologica Experimentalis et Applicata* (1).

M. Kristensen served as a referee for the *Bulletin of Entomological Research*.

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

H. Leirs served as an adviser to one M.Sc. student at the University of Copenhagen, one M.Sc. student at the University of Aarhus and one M.Sc. student at the University of Oslo (Norway). He also regularly advised students at the Royal Veterinary and Agricultural University, Copenhagen.

H. Leirs served as a member of the Editorial Board to *Mammalia* (Paris).

H. Leirs served as a referee for *Mammalia* (5), *Journal of Tropical Ecology* (1), *Journal of Zoology* (2); as editor of a multi-authored book to be published in 1999, he reviewed 4 contributions and commented on several others.

H. Leirs served as a reviewer for the European Union (DG XII - ISTC programme) and for several foreign institutes and funds.

J. Lodal served as a referee for the *Journal of Applied Ecology* (2).

J. Lodal served as a supervisor for one Ph.D. student, at the University of Aarhus.

T. Steenberg served as a supervisor for one M.Sc. student at the University of Copenhagen and one Ph.D. student at the Royal Veterinary and Agricultural University