

**KALA-JARIISTARAPORTTEJA nro 65**

*Kai Westman and Kaarina Manninen (eds.)*

**Institutes, research workers and  
programmes related to research  
on crayfish in Europe**

**Helsinki 1996**



**RIISTAN- JA KALANTUTKIMUS**

FINNISH GAME AND FISHERIES RESEARCH INSTITUTE

KALA- JA RIISTARAPORTTEJA nro 65

INSTITUTES, RESEARCH WORKERS AND PROGRAMMES RELATED TO  
RESEARCH ON CRAYFISH IN EUROPE

Edited by

Kai Westman and Kaarina Manninen

Prepared in collaboration with FAO European Inland Fisheries Advisory Commission  
Working Party on Crayfish

Helsinki 1996

---

*Published by*

Finnish Game and Fisheries Research Institute

*Date of Publication*May 1996

---

*Author(s)*Kai Westman and Kaarina Manninen (eds.)

---

*Title of Publication***Institutes, research workers and programmes related to research on crayfish in Europe**

---

*Type of Publication**Commissioned by**Date of Research Contract*Finnish Game and Fisheries Research Institute

---

*Title and Number of Project*

---

*Abstract*

The FAO European Inland Fisheries Advisory Commission (EIFAC) Working Party on Crayfish has collected information on institutes, research scientists and programmes related to research on crayfish in Europe. The present report contains information from 22 European countries and 76 research institutes.

---

*Key words*

EIFAC, freshwater crayfish, research on crayfish

---

*Series (key title and no.)*

Kala- ja riistaraportteja 65

*ISBN*

951-776-062-0

*ISSN*1238-3325

---

*Pages*

82

*Language*

English

*Price**Confidentiality*Public

---

*Distributed by*Finnish Game and Fisheries Research Institute  
P.O.Box 202  
FIN-00151 Helsinki, Finland*Publisher*Finnish Game and Fisheries Research Institute  
P.O.Box 202  
FIN-00151 Helsinki, Finland

Phone +358 0 228 811 Fax +358 0 631 513

Phone +358 0 228 811 Fax +358 0 631 513

---

## CONTENTS

ACTIVITIES OF THE EIFAC WORKING PARTY ON CRAYFISH.....	1
INFORMATION REQUESTED .....	3
BELGIUM .....	4
CZECH REPUBLIC .....	6
CYPRUS.....	7
DENMARK.....	9
ESTONIA .....	11
FINLAND .....	13
FRANCE.....	19
GERMANY .....	28
GREECE.....	33
HUNGARY .....	36
IRELAND .....	37
ISRAEL .....	40
LITHUANIA.....	41
NETHERLAND.....	45
NORWAY .....	46
POLAND .....	48
PORTUGAL .....	51
SPAIN.....	53
SWEDEN.....	57
SWITZERLAND .....	69
TURKEY .....	70
UNITED KINDOM .....	71
ACKNOWLEDGEMENTS.....	82

## ACTIVITIES OF THE EIFAC WORKING PARTY ON CRAYFISH

Kai Westman <sup>1</sup>

Interest in developing freshwater crayfish fisheries has revived strongly in Europe since the 1970s, chiefly due to the growing demand for crayfish as a delicacy but especially to the availability of crayfish plague-resistant North American species, in particular the signal crayfish (*Pacifastacus leniusculus*) and the red swamp crayfish (*Procambarus clarkii*), for stocking and restoring the crayfish fishery in numerous waters devastated by the plague. At the same time interest in the management of the native European species has also markedly increased. Consequently, the demand for research strongly increased, as did the need to create contacts between crayfish researchers. The First Freshwater Crayfish Symposium was held in 1972 when a decision to establish the International Association of Astacology (IAA) was made as well.

In view of the increasing interest in crayfish in Europe, the Tenth Session of FAO European Inland Fisheries Advisory Commission (EIFAC) in 1978 recommended that a Working Party on Crayfish be established. The objectives of the Working Party are to stimulate and coordinate studies and activities leading to the effective management of crayfish stocks and to the development of crayfish culture. To avoid duplication of work, close cooperation with the IAA has been maintained.

Collection of information on crayfish stocks, fisheries, catches and research in Europe was identified as a priority area for action by the Working Party at its first meeting, held during the 11th Session of EIFAC in Stavanger, Norway (Westman 1980). The Working Party collected information on the status of crayfish stocks, fisheries, diseases and culture in Europe, and identified the main problems in developing crayfish fisheries (Westman & Pursiainen 1982a); this status report has been lately updated (Westman *et al.* 1990). The Working Party arranged a workshop on crayfish culture in 1987 (Skurdal *et al.* 1989) in cooperation with the Norwegian Directorate for Nature Management at Trondheim, Norway. A Workshop on Crayfish Management and Stocking was arranged in cooperation with the Finnish Game and Fisheries Research Institute and the University of Kuopio, in Kuopio, Finland in 1991 (Westman & Järvinen 1992).

During the early 1980s, the Working Party collected information on institutes, research scientists and programmes related to research on crayfish in Europe (Westman & Pursiainen 1982b). This report was presented at the 12th Session of EIFAC, Budapest, Hungary, in 1982. At the 17th Session of EIFAC, Lugano, Switzerland in 1992 it was decided to update the report. To fulfill this task, the members of the Working Party and EIFAC correspondents were asked to check the information concerning the respective countries. The present report contains information from 22 European countries and 76 research institutes. The information submitted has been made as uniform as possible and is presented country by country.

---

<sup>1</sup>)Convener, EIFAC Working Party on Crayfish, Finnish Game and Fisheries Research Institute, P.O. Box 202, FIN-00151 Helsinki, Finland

## REFERENCES

- SKURDAL, J., WESTMAN, K. & BERGAN, P.I. (eds.) 1989: Crayfish culture in Europe. Report from the Workshop on Crayfish Culture, 16-19 Nov. 1987, Trondheim, Norway. 198 p.
- WESTMAN, K. 1980: Report of the Working Party on Crayfish. FAO European Inland Fisheries Advisory Commission (EIFAC), 11th Session, Stavanger, Norway, 1980. EIFAC/XI/80/Inf., 4, 4 p. (Mimeo).
- WESTMAN, K. & JÄRVINEN, A. (eds.) 1992: EIFAC Workshop on Crayfish Management and Stocking, 22-23 August 1991, Kuopio, Finland. Finn. Fish. Res. 14. 159 p.
- WESTMAN, K. & PURSIAINEN, M. (eds.) 1982a: Status of crayfish stocks and fisheries in Europe. FAO European Inland Fisheries Advisory Commission (EIFAC), 12th Session, Budapest, Hungary, 1982. EIFAC/XII/82/Inf., 4, 97 p. (Mimeo).
- WESTMAN, K. & PURSIAINEN, M. (eds.) 1982b: Institutes, research workers and programmes related to research on crayfish in Europe. FAO European Inland Fisheries Advisory Commission (EIFAC), 12th Session, Budapest, Hungary, 1982. EIFAC/XII/82/Inf. 5, 27 p. (Mimeo).
- WESTMAN, K., PURSIAINEN, M. & WESTMAN, P. (eds.) 1990: Status of crayfish stocks, fisheries, diseases and culture in Europe. Report of the FAO European Inland Fisheries Advisory Commission (EIFAC) Working Party on Crayfish. Helsinki. Riista- ja kalatalouden tutkimuslaitos. Kalatutkimuksia-Fiskundersökningar 3. 206 p.

**2. INFORMATION REQUESTED**

1. Name of the institute
  - 1.1 Native language
  - 1.2 English equivalent
2. Connections
  - 2.1 Postal address
  - 2.2 Telephone
  - 2.3 Telefax
  - 2.4 Telex
3. Research facilities
  - 3.1 Total number of research scientists
  - 3.2 Crayfish researches. Number of research scientists and biologists working on crayfish research (names and special fields of interest)
  - 3.3 Current facilities. Laboratories, culture stations and other installations
  - 3.4 Plans for expansion
4. Crayfish research programmes
  - 4.1 Current research programme (name of the programme, objectives, when begun, when will be finished, number of scientists participating, name of leading scientist, names of participating foreign scientists)
  - 4.2 New work planned (as in 4.1.)
5. The most important problems in crayfish research in your country (in order of importance if possible)

## BELGIUM

by P. Gérard

### Ministère de la Région Wallonne

1. Name of the institute
  - 1.1 Station de Recherches Forestieres
  - 1.2 Forest Research Station
2. Connections
  - 2.1 Avenue Maréchal Juin 23  
B-5030 Gembloux  
Belgium
  - 2.2 Tel. (32)-81611169
  - 2.3 Fax (32)-81615727
3. Research facilities
  - 3.1 Eight research scientists
  - 3.2 P. Gérard: *Astacus astacus*. Production of stocking material
  - 3.3 One hatchery and four ponds (brood stock)
  - 3.4 Increase in the number of ponds for brood stock
4. Research programmes
  - 4.1 Current. Recovery of crayfish (*Astacus astacus*) stocks  
Distribution of different species in the country
  - 4.2 No plans for expansion
5. The most important problems in crayfish research
  - Lack of information on restocking
  - Lack of information on the ecology of crayfish plague fungus



**Universit  Catholique de Louvain**

1. Name of the institute
  - 1.1 Laboratoire de Pisciculture M. Huet
  - 1.2 M. Huet Fish Culture Laboratory
2. Connections
  - 2.1 Route de Blocry 2  
B-1348 Louvain-la-Neuve  
Belgium
  - 2.2 Tel. (32)-10472533
  - 2.3 Fax (32)-10474991
3. Research facilities
  - 3.1 Six research scientists
  - 3.2 X. Rollin: *Astacus astacus*, *Astacus leptodactylus*, *Pacifastacus leniusculus*, *Orconectes limosus*. Production of stocking material
  - 3.3 One laboratory with controlled environmental chambers, merocosm, etc. and seven ponds (brood stock)
4. Research programmes
  - 4.1 Crayfish culture in controlled aquaria and tanks. Recovery of crayfish (*Astacus astacus*) stocks. Distribution of *Astacus astacus* in the country
  - 4.2 Nutritional requirements of *Astacus astacus*. Molecular genetics of resistance mechanisms to *Aphanomyces astaci* in *Astacus astacus*, *Pacifastacus leniusculus* and *Orconectes limosus*
5. The most important problems in crayfish research

Lack of information on restocking  
Lack of information on resistance mechanisms to plague

## CZECH REPUBLIC

by Z. Adámek

### Research Institute of Fish Culture and Hydrobiology

1. Name of the institute

1.1 Výzkumný ústav rybářský a hydrobiologický, Vodnany

1.2 Research Institute of Fish Culture and Hydrobiology, Vodnany

2. Connections

2.1 Research Institute of Fish Culture and Hydrobiology, Vodnany  
Laboratory Pohorelice, Vídenská 717  
691 23 Pohorelice

2.2 Tel. (42 626)-931372

2.3 Fax (42 626)-931243

3. Research facilities

3.1 Twenty-two research scientists

3.2 J. Hamáčková, Z. Adámek: Initiating reproduction and culture trials with  
*Astacus astacus* and *Pacifastacus leniusculus*

3.3 Laboratory

4. Research programmes

4.1 No crayfish research programme is under way at present. Some trials in  
crayfish culture occur within the activity of angling organizations and clubs  
and private farmers

4.2 Production of crayfish stocking material from small brooks and earthen ponds

5. The most important problems in crayfish research

Lack of experience in experimental work with crayfish. No financial support for  
crayfish research programmes. Lack of particular data concerning knowledge of  
crayfish occurrence in Czech waters

## CYPRUS

by D. Stephanou

### **Department of Fisheries Division of Fish Culture and Inland Waters Management**

1. Name of the institute
  - 1.1 Tmima Aliias
  - 1.2 Department of Fisheries, Division of Fish Culture and Inland Waters Management
2. Connections
  - 2.1 Department of Fisheries, Division of Fish Culture and Inland Waters Management  
13 Aeolou Street  
Nicosia
  - 2.2 Tel. 357-2-303526
  - 2.3 Fax 357-2-365955
  - 2.4 Telex 4660 MINCOMIN CY
3. Research facilities
  - 3.1 Three research scientists in the Division of Fish Culture and Inland Waters Management
  - 3.2 Daphne Stephanou: Crayfish culture and stocking of crayfish in Cyprus waters
  - 3.3 One experimental freshwater fish culture station at Kalopanayiotis, with laboratory, and aquarium room. Fish keeping facilities at the Department of Fisheries at Nicosia
  - 3.4 Excavation of earthen ponds at Kalopanayiotis Station. Establishment of a hatchery/nursery for warmwater species in lowlands. Setting up of an experimental marine species culture station
4. Research programmes
  - 4.1
    - a) Establishing populations of selected crayfish species in freshwater areas of Cyprus
    - b) Determining methods to allow for crayfish culture on a commercial basis under conditions in Cyprus
    - c) One scientist, D. Stephanou

d) Work is at present centred on *Astacus astacus* and *Pacifastacus leniusculus*

4.2 Introduction, stocking and/or experimental culture of other species of crayfish, with the same objectives as in present efforts

5. The most important problems in crayfish research

Lack of

a) information on crayfish culture

b) bibliography covering other aspects of crayfish, especially biology of the different species

c) reliable sources of disease - free crayfish stock at reasonable prices

d) suitable culture facilities

## DENMARK

### **Inland Fisheries Laboratory**

by G. Rasmussen

1. Name of the institute
  - 1.1 Institut for Ferskvands Fiskeri og Fiskepleje, Ferskvandsfiskerilaboratoriet
  - 1.2 Inland Fisheries Laboratory
2. Connections
  - 2.1 Vejlsøvej 51  
DK - 8600 Silkeborg  
Denmark
  - 2.2 Tel. 009 45 86 814 722/339 63100
  - 2.3 Fax 009 45 339 63150
3. Research facilities

Four circular tanks for crayfish studies
4. Research programmes

The effect of crayfish feeding on detritus in nutrient recycling in freshwater ecosystems

### **Odense University Institute of Biology**

by Frank B. Jensen

1. Name of the institute
  - 1.1 Biologisk Institut, Odense Universitet
  - 1.2 Institute of Biology, Odense University
2. Connections
  - 2.1 Campusvej 55  
DK-5230 Odense M  
Denmark
  - 2.2 Tel. +45 66 15 86 00
  - 2.3 Fax +45 65 93 04 57

3. Research facilities
  - 3.1 Twenty-two research scientists
  - 3.2 Frank B. Jensen: physiology/ecophysiology
  - 3.3 Laboratory and aquaria
4. Research programmes
  - 4.1 Acid-base regulation
  - 4.2 Gas transport
  - 4.3 Uptake and effects of nitrite and nitrate

## ESTONIA

### Department of Fish Farming Estonian Institute of Animal Breeding and Veterinary

by Tiit Paaver

1. Name of the institute
  - 1.1 Kalakasvatuse osakond, Eesti Loomakasvatuse ja Veterinaaria Institut
  - 1.2 Department of Fish Farming, Estonian Institute of Animal Breeding and Veterinary
2. Connections
  - 2.1 Kreutzwaldi St.1  
EE2400 Tartu  
Estonia
  - 2.2 Tel. 372-34-31062, 372-34-99192
  - 2.3 Fax 372-34-34897
3. Research facilities
  - 3.1 Six research scientists
  - 3.2 Two crayfish researchers  
Tiit Paaver: genetics, management, culture  
Margo Hurt (postgraduate student): management
  - 3.3 Fish culture experimental station in Ilmatsalu, where conditions are badly suited for crayfish research as special facilities and equipment are missing
4. Research programmes
  - 4.1 Current
    - 4.1.1 Comparative estimation of efficiency of testfishing by traps and dip nets (1994). Three scientists are involved (T. Paaver, M. Hurt, M. Kivistik from the Environment Protection Department of Võrumaa County administration)
    - 4.1.2 Restoration of crayfish population in South Estonian Lake Lövaski, destroyed by crayfish plague (begun in 1993). Two scientists are involved (T. Paaver, M. Kivistik)
  - 4.2 Planned
    - 4.2.1 Genetic structure of noble crayfish populations in native and plague-affected and stocked areas (1995)

5. The most important problems in crayfish research
  - 5.1 Distribution of crayfish plague in Estonia and estimation of damage caused  
Possibilities of restoring populations damaged by plague
  - 5.2 Development of technology for cultivation of crayfish juveniles for stocking  
in natural waters and for crayfish farms

**Estonian Institute of Forestry  
Nature Conservation Research Centre**

by Jaanus Tuusti

1. Name of the institute
  - 1.1 Looduskaitse Uurimiskeskus, Eesti Metsainstituut
  - 1.2 Estonian Institute of Forestry, Nature Conservation Research Centre
2. Connections
  - 2.1. In all matters related to crayfish contact Jaanus Tuusti at the following home address:  
  
Põllu 8-14  
Haljala  
Lääne-Virumaa  
Estonia
  - 2.2 Tel. 372-32-49630 (office)  
372-32-49569 (home)
3. Research facilities
  - 3.1 One research scientist, Jaanus Tuusti
  - 3.2 No other crayfish research scientists
  - 3.3 No research facilities
4. Research programmes
  - 4.1 Current
    - 4.1.1 Estimation of size of crayfish stock in lakes and rivers by test fishing  
Determining measures for protecting and increasing the crayfish stock
  - 4.2 Planned
    - 4.2.1 Cooperation with Norwegian crayfish biologists (Dr. J. Skurdal) is  
planned to improve current research on estimation of size and  
condition of crayfish populations



## FINLAND

## Finnish Game and Fisheries Research Institute

by Kai Westman

1. Name of the institute
  - 1.1 Riista- ja kalatalouden tutkimuslaitos
  - 1.2 Finnish Game and Fisheries Research Institute
2. Connections
  - 2.1 P.O. Box 202  
FIN-00151 Helsinki  
Finland
  - 2.2 Tel. 358-(9)0-228811
  - 2.3 Fax 358-(9)0-631513
3. Research facilities
  - 3.1 Seventy-four research scientists
  - 3.2 Eight crayfish researchers  
Esa Erkamo; ecology, culture  
Teuvo Järvenpää; physiology, ecology, culture  
Viljo Nylund; diseases  
Markku Pursiainen; ecology, culture  
Eira Railo; physiology  
Riitta Savolainen; ecology, culture  
Jouni Tulonen; ecology, culture  
Kai Westman; ecology, physiology, culture, diseases
  - 3.3 Laboratory in Helsinki  
Crayfish culture and research in four of 17 fish culture and research stations
4. Research programmes
  - 4.1 a) Crayfish catch statistics in Finland (begun in 1979, continuing)
  - b) Studies on diseases (and associated pathogens) and parasites of noble crayfish (*Astacus astacus*) and signal crayfish (*Pasifastacus leniusculus*), including the incidence, spread, control methods and significance of crayfish plague (*Aphanomyces astaci*), *Psorospermium haeckeli*, white-tail disease (*Thelohania contejeani*), burn-spot disease (*Ramularia astaci*) and other parasites and diseases  
  
The effects of *Psorospermium haeckeli* on crayfish culture

c) Studies on *A. astacus* and *P. leniusculus* culture:

Artificial incubation of crayfish eggs

Long-duration transport of crayfish eggs

Temperature manipulation and its effect on growth and survival of crayfish juveniles in pond culture systems

Growth rate, survival and reproduction of *A. astacus* and *P. leniusculus* under similar conditions

Effect of winter temperature on the quality of eggs and hatchlings

Temperature limits of crayfish juveniles

d) Effects of environmental factors on *A. astacus* and *P. leniusculus* stocks:

Acidification and neutralization. Forestry practices

e) Crayfishing and management of *A. astacus* and *P. leniusculus* stocks:Stocking studies with *A. astacus* and *P. leniusculus*Research on production of *A. astacus* and *P. leniusculus* in Finnish lakes

## 5. The most important problems in crayfish research

The life cycle, spread and control of crayfish plague, development of new disinfection methods for crayfish traps and equipment and significance of *Psorospermium haeckeli*

Profitable culture methods for producing crayfish for consumption

Food and feeding

Brood stock cultivation and breeding

Recovery of crayfish stocks in waters decimated by crayfish plague

**University of Helsinki**  
**Department of Biosciences**  
**Division of Animal Physiology**

by Kai Kaila

## 1. Name of the institute

1.1 Helsingin yliopisto, Biotieteiden laitos

1.2 University of Helsinki, Department of Biosciences, Division of Animal Physiology

## 2. Connections

2.1 Arkadiankatu 7 (P.Box 17)  
 FIN-00014 University of Helsinki  
 Finland

2.2 Tel. 90-40271

3. Research facilities
  - 3.1 Twenty research scientists
  - 3.2 Two crayfish researchers:  
Kai Kaila; neurophysiology  
Juha Voipio; neurophysiology
  - 3.3 Laboratory and aquaria
4. Research programmes
  - 4.1 a) Physiology of giant axons  
b) Physiology of the neuromuscular junction

**University of Kuopio**  
**Department of Applied Zoology**

by Ossi V. Lindqvist

1. Name of the institute
  - 1.1 Kuopion yliopisto, Soveltavan eläintieteen laitos
  - 1.2 University of Kuopio, Department of Applied Zoology
2. Connections
  - 2.1 P.O. Box 1627  
FIN-70211 Kuopio  
Finland
  - 2.2 Tel. 971-162211
  - 2.4 Telex 42218 kuy sf
3. Research facilities
  - 3.1 Twelve research scientists
  - 3.2 Six crayfish researchers:  
Ossi V. Lindqvist; physiology and ecology of crayfish  
Paula Henttonen; diseases and parasites, crayfish farming  
Jay V. Hunter (University of Southwestern Louisiana); crayfish farming and management  
Tarja Viikinkoski; crayfish physiology  
Japo Jussila; crayfish management and farming  
Ari Mannonen; ecology of crayfish

- 3.3 We have both ecological and physiological laboratories at the Department of Applied Zoology, and an experimental aquaculture research unit on the University campus area that provides unique facilities for physiological, technical and genetic studies of farmed crayfish and fish
- 3.4 The crayfish and fish research unit will be enlarged with a new water treatment unit and outdoor tanks and ponds

4. Research programmes

- 4.1 a) Management and development of crayfish stocks in Finland, begun in 1974 (objectives are self-explanatory), we concentrate on *Astacus astacus*. Five people are involved, with Prof. Ossi V. Lindqvist as the group leader. Prof. Jay V. Hunter has belonged to the group since 1982

b) Development of intensive crayfish culture techniques including circulation plant and feeding techniques for enhancing the growth rate (begun in 1988; continuing). Four researchers; leading scientist Prof. Ossi V. Lindqvist

c) The culture of *Astacus astacus* in earthen ponds, pond production and management and economics of farming as a part of rural development. Development of crayfish fishery and tourism in cooperation with surrounding municipalities and private landholders. Begun in 1987; continuing, five researchers; leading scientist Prof. Ossi V. Lindqvist

d) Crayfish diseases both in wild and farmed populations. Begun in 1988; five researchers, team leader Paula Henttonen

e) Crayfish populations living directly under the influence of waters coming from peat mining areas and a steel factory. Begun in 1991; continuing; seven researchers; team leaders Ari Mannonen and Tarja Viikinkoski

- 4.2 New efforts planned in crayfish research deal with the nutritional aspects, including East African crayfish species

5. The most important problems in crayfish research

Ecological and physiological adaptations of crayfish to northern conditions. Lack of information on crayfish diseases and parasites both in wild and cultured populations. Impact of the new species, *Pacifastacus leniusculus*, on populations of the native *Astacus astacus*

**University of Jyväskylä  
Department of Biological and Environmental Science**

by Jari Rantamäki

1. Name of the institute
  - 1.1 Jyväskylän yliopisto, bio- ja ympäristötieteiden laitos
  - 1.2 University of Jyväskylä, Department of Biological and Environmental Science
2. Connections
  - 2.1 P.O. Box 35  
FIN-40351 Jyväskylä  
Finland
  - 2.2 Tel. + 358-41-602220
  - 2.3 Fax +358-41-402221
3. Research facilities
  - 3.1 Sixty research scientists
  - 3.2 One part-time crayfish researcher (Jari Rantamäki); crayfish plague, crayfish immunology
  - 3.3 Several thermo- and light-regulated laboratory rooms with tap water supply  
Normal laboratory facilities for biological research
  - 3.4 No plans for expansion
4. Research programmes
  - 4.1 A trial to set up and run a Nordic Network for scientists working on crayfish  
(an e-mail group, possibly later a real newsgroup)
  - 4.2. No plans for new research
5. The most important problems in crayfish research

Lack of money; the area is considered to be marginal and less important both in science and economy

**University of Turku**  
**Laboratory of Animal Physiology**

by Liisa Kivivuori

1. Name of the institute
  - 1.1 Eläinfysiologian laboratorio, Biologian laitos
  - 1.2 Department of Biology, Laboratory of Animal Physiology
2. Connections
  - 2.1 University of Turku  
FIN-20500 Turku  
Finland
  - 2.2 Tel. 921-63351
  - 2.3 Fax 921-6336590
3. Research facilities
  - 3.1 Six research scientists
  - 3.2 Two crayfish researchers:  
L. Kivivuori and S. Lehti-Koivunen
4. Research programmes
  - 4.1 Eurythermy in *Astacus astacus* and adaptation to northern conditions
    - a) Effects of temperature on crayfish behaviour and on functions and structure of nerve cells. Analysis of membrane structure and function
    - b) Temperature preference behaviour
  - 4.2 Same programme as in 4.1.a  
  
Why temperature preference behaviour is important in all ectothermic animals. How crayfish select environmental temperatures if stressed or infected? How the critical thermal maximum (CTMax) of crayfish is modified by handling or thermal stress?

## FRANCE

by Jacques C.V. Arrignon

National Workshop on Crayfish, sponsored by the French Limnological Association (FLA)

Representative of the FLA: J. Arrignon

Executive Scientist: C. Roqueplo

Members of the Workshop (see below)

**Institut National de la Recherche Agronomique (INRA)**

1. Name of the institute

1.1 Laboratoire d'Écologie Hydrobiologique

1.2 Laboratory of Hydrobiological Ecology

2. Connections

2.1 65 rue de Saint Briec  
F 35042 Rennes Cedex

2.2 Tel. 9928 5441

2.3 Fax 9928 5300

2.4 Telex INRARES 730 866 f

3. Research facilities

3.1 One part-time research scientist

3.2 One crayfish researcher: A. Neveu

3.3 Laboratory with hatchery and basins

3.4 Expansion of privately owned experimental ponds

4. Research programmes

Ethology of *Procambarus clarkii* with and without other aquatic animals

5. The most important problems in crayfish research

New programme is expected from the actual national inquiry on *Procambarus clarkii*

**Centre d'Études du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts  
(CEMAGREF)**

1. Name of the institute
  - 1.1 Division Qualité des Eaux, Pêche et Pisciculture (DQEPP)
  - 1.2 Division of Water Quality, Fisheries and Fish Culture
2. Connections
  - 2.1 BP 3 Gazinet  
F 33610 Cestas
  - 2.2 Tel. 5636 0940
  - 2.3 Fax 5636 7511
  - 2.4 Telex 540 003 F
3. Research facilities
  - 3.1 One research scientist
  - 3.2 One crayfish researcher, Charles Roqueplo
  - 3.3 Expansion of privately owned experimental ponds
4. Research programmes
  - 4.1 Production of European crayfish species (*Astacus leptodactylus* and *Astacus astacus*) in ponds
  - 4.2 Restocking with *Austropotamobius pallipes* and *Astacus astacus* in southwestern France (in collaboration with the University of Bordeaux)

**Université de Bordeaux**

1. Name of the institute
  - 1.1 Centre National de la Recherche Scientifique (CNRS)  
Station de Recherches de Gradignon
  - 1.2 National Centre of Scientific Research (NCSR)  
Gradignan Research Station
2. Connections
  - 2.1 Laboratoire de Zoologie  
1 Avenue des Facultés  
F 33400 Talence
  - 2.2 Tel. 5680 1434



3. Research facilities
  - 3.1 Two part-time research scientists
  - 3.2 One crayfish researcher, Prof. Nicole Daguerre De Hureaux
  - 3.3 Laboratory in the University  
Crayfish research station in Gradignan with nursery and ponds
  - 3.4 Expansion of privately owned experimental ponds
4. Research programmes
  - 4.1 Studies of factors inducing reproduction in *Austropotamobius pallipes*, *Astacus astacus*, *Astacus leptodactylus*, *Pacifastacus leniusculus*
  - 4.2 Restocking with *Austropotamobius pallipes* and *Astacus astacus* in southwestern France (in collaboration with CEMAGREF-DQEPP)

#### Université de Limoges

1. Name of the institute
  - 1.1 Centre National de la Recherche Scientifique (CNRS) UA 138  
Biologie Comparée des Protistes.
  - 1.2 National Center of Scientific Research (CNCSR) UA 138  
Biology of the Protists
2. Connections
  - 2.1 Faculté des Sciences  
F 87060 Limoges Cedex
  - 2.2 Tel. 5550 4795
3. Research facilities
  - 3.1 One part-time research scientist
  - 3.2 One crayfish researcher, Professor Claude Chaisemartin
  - 3.3 Laboratory in the University
4. Research programmes
  - 4.1 Effects on long-term use of pesticides on the *Astacidae* (thelohanziosis)
  - 4.2 Energy turnover of two crayfishes species (*Austropotamobius pallipes* and *Pacifastacus leniusculus*)

**Université de Montpellier**

1. Name of the institute
  - 1.1 Laboratoire de Physiologie des Invertébrés
  - 1.2 Laboratory of Invertebrate Physiology
2. Connections
  - 2.1 U.S.T.L. 2 Place Bataillon  
F 34095 Montpellier Cedex 5
  - 2.2 Tel. 6754 4742
  - 2.3 Fax 6704 2009
3. Research facilities
  - 3.1 Two part-time research scientists
  - 3.2 One crayfish researcher, Professor Claude Sevilla
  - 3.3 Laboratory in the University
  - 3.4 Expansion of privately owned experimental ponds
4. Research programmes
  - 4.1 Enzymology of *Astacus leptodactylus*
  - 4.2 Biochemical studies of vegetable ingredients in crayfish dry-food formulae
  - 4.3 Formulation and experimental production of dry-food pellets

**Association française de Limnologie**

1. Name of the institute
  - 1.1 Groupe de Travail sur l'Élevage d'Écrevisses en Étangs
  - 1.2 Working Group on Crayfish Culture in Ponds
2. Connections
  - 2.1 24 rue de la Béme Division  
F 60200 Compiègne
  - 2.2 Tel. 4420 1733
  - 2.3 Fax 4486 6950

3. Research facilities
  - 3.1 One part-time research scientist
  - 3.2 One crayfish researcher, Dr. Jacques C.V. Arrignon
  - 3.3 Expansion of privately owned experimental ponds
4. Research programmes
  - 4.1 Breeding of *Pacifastacus leniusculus* in gravel pits
  - 4.2 Studies on artificial habitats

#### **Union Nationale de la Pêche en France**

1. Name of the institute
  - 1.1 Union Nationale des Fédérations de Pêcheurs
  - 1.2 National Union of Angler Federations
2. Connections
  - 2.1 18 rue Bergère  
F 75015 Paris
  - 2.2 Tel. (1) 4824 9600
  - 2.3 Fax (1) 4801 0065
3. Research facilities
  - 3.1 About 500 research technicians
  - 3.2 One crayfish researcher, Dr. Jacques C.V. Arrignon
  - 3.3 Local facilities of angler federations
4. Research programmes
  - 4.1 National enquiry on the status of crayfish species in nature
  - 4.2 Special studies on the situation of *Austropotamobius pallipes*
  - 4.3 New work on the spread of *Procambarus clarkii*

### **Parc Naturel Régional du Morvan**

1. Name of the institute
  - 1.1 Parc Naturel Régional du Morvan
  - 1.2 Morvan Regional Park
2. Connections
  - 2.1 Maison du Parc  
F 58230 Saint-Brisson
  - 2.2 Tel. 8678 7016
  - 2.3 Fax 8678 7422
3. Research facilities
  - 3.1 Two part-time research scientists
  - 3.2 One crayfish researcher, Dr. Pierre J. Laurent
  - 3.3 Local Regional Park facilities
4. Research programmes
  - 4.1 Status of *Astacus astacus*, *Austropotamobius pallipes* and *Orconectes limosus* in Park brooks
  - 4.2 Restocking of *Astacus astacus*

### **Cevenner National Park**

1. Name of the institute
  - 1.1 AQUADEV
2. Connections
  - 2.1 63 rue du Caducée  
Parc Euromédecine  
F 34090 Montpellier
  - 2.2 Tel. 6752 1448
  - 2.3 Fax 6704 1933
  - 2.4 Telex 490 459 F

3. Research facilities
  - 3.1 Park technicians
  - 3.2 One crayfish researcher, Dr. Gérard Lamy
  - 3.3 Local Regional Park facilities
4. Research programmes
  - 4.1 Status of *Austropotamobius pallipes* in Park brooks
  - 4.2 Restocking of *Austropotamobius pallipes*

#### **Chambre d'Agriculture de la Meuse**

1. Name of the institute
  - 1.1 Groupe de Travail sur l'Élevage d'*Astacus astacus*
  - 1.2 Working Group on the Breeding of *Astacus astacus*
2. Connections
  - 2.1 P.J. Laurent  
Avonnex, Main  
F 74200 Thonon
  - 2.2 Tel. 5071 5007
  - 2.3 Fax 5026 6513
3. Research facilities
  - 3.1 Agricultural Board technicians
  - 3.2 One crayfish researcher, Dr. Pierre J. Laurent
  - 3.3 Privately experimental ponds
4. Research programmes
  - 4.1 Restocking of *Astacus astacus*
  - 4.2 Production of *Astacus astacus* in ponds

**CEREOPA**

1. Name of the institute
  - 1.1 Centre d'Etudes et de Recherche sur l'Economie et l'Organisation des Productions Animales (CEREOPA)
  - 1.2 Research Center on the Economy and Organization of Animal Production (CEREOPA)
2. Connections
  - 2.1 16 rue Cl. Bernard  
F 75231 Paris Cedex 05
  - 2.2 Tel. (1) 4337 4510
  - 2.3 Fax (1) 4331 8382
  - 2.4 Telex 250985 FINAPG
3. Research facilities
  - 3.1 One research scientist
  - 3.2 One crayfish researcher, Dr. Catherine Mariojouis
  - 3.3 Data of INSEE and other statistical offices
4. Research programmes
  - 4.1 Production ability of crayfish farmers
  - 4.2 The crayfish market in France

**Bureau d'études "Eaux Naturelles"**

1. Name of the institute
  - 1.1 Bureau d'études "Eaux Naturelles"
  - 1.2 Bureau of Natural Water Research (Consultant "Wild Waters")
2. Connections
  - 2.1 Le Chateau d'Esboz  
F 70280 La Bruyere
  - 2.2 Tel. 8494 3030
3. Research facilities
  - 3.1 Two research scientists
  - 3.2 One crayfish researcher, Dr. Francois Degiorgi
  - 3.3 Privately owned experimental ponds
4. Research programmes
  - 4.1 Strategies for stocking *Astacus astacus* in ponds
5. The most important problems in crayfish research
  1. Physiological adaptation of exotic crayfishes (*P. leniusculus* and *P. clarkii*) to different environmental conditions
  2. Current state of distribution of crayfish species in France
  3. Stocking and restocking strategies
  4. Pathology and toxicology

## GERMANY

by Erik Bohl

### **Bavarian State Agency for Water Research Wielenbach Experimental Field.**

#### 1. Name of the institute

1.1 Bayerische Landesanstalt für Wasserforschung  
Versuchsanlage Wielenbach

1.2 Bavarian State Agency for Water Research  
Wielenbach Experimental Field

#### 2. Connections

2.1 Demollstraße 31  
8121 Wielenbach  
Germany

2.2 Tel. 049 881 1850

2.3 Fax 049 881 41318

#### 3. Research facilities

3.1 Seven research scientists

3.2 One crayfish researcher, Erik Bohl; crayfish ecology, environmental impact and stock situation in Bavarian waters

3.3 Experimental ponds, aquarium room and laboratory

3.4 No plans for expansion

#### 4. Research programmes

4.1 a) Continuation of investigations on species distribution, stock situation and environmental conditions

b) Restocking experiments

Work is centered on *Astacus astacus* and *Austropotamobius torrentium*. The main project was performed during 1985-1989

4.2 Further studies on habitat structure, distribution and development of stocks of native and introduced species, but no details are yet available



## 5. The most important problems in crayfish research

Lack of:

- specialists
- experience in stock management
- facilities for diagnosis of *Aphanomyces astaci*
- public interest

**Fishereiforschungsstelle des Landes Baden-Württemberg**

## 1. Name of the institute

1.1 Fishereiforschungsstelle des Landes Baden-Württemberg

1.2 Baden-Württemberg Fisheries Research Station

## 2. Connections

2.1 Lake Constance  
Mühleesh 13  
D-88085 Langenargen

2.2 Tel. 049 7543 93080

2.3 Fax 049 7543 930820

## 3. Research Facilities

3.1 Five research scientists

3.2 Two crayfish researchers, R. Berg, P. Dehus; crayfish-fish interaction, reproduction and culture

3.3 Laboratory and experimental ponds

3.4 No plans for expansion

## 4. Research Programmes

4.1.1 R. Berg: Local distribution of crayfish species in the Upper Rhine Valley; interactions between the native species *Austropotamobius torrentium* and *A. pallipes*. The investigations were begun in 1990 and completed in 19934.1.2 P. Dehus: Culture of *A. astacus* in experimental ponds. The goal of the project is to promote extensive crayfish culture and to prepare reintroduction and restocking programmes. The project was begun in 1993

4.2 No plans for expansion

## 5. The most important problems in crayfish research

The efficiency in many restocking projects should be evaluated

## Institut für Gewässerökologie und Binnenfisherei

1. Name of the institute
  - 1.1 Institut für Gewässerökologie und Binnenfisherei
  - 1.2 Institute of Freshwater and Fish Ecology
2. Connections
  - 2.1 Müggelseedamm 310  
G-12587 Berlin  
Germany
  - 2.2 Tel. 030 6452803
  - 2.3 Fax 030 6452803/6452891
3. Research facilities
  - 3.1 Five departments with 43 research scientists
  - 3.2 Three crayfish researchers:  
Prof. Dr.Habil K. Anwand; ecology of crayfish  
Dr. B. Rennert; reproduction and feeding of crayfish  
Dr. Wirth; chemical composition of crayfish food
  - 3.3 Lakes, rivers, experimental ponds, aquarium room and laboratory
  - 3.4 No plans for expansion
4. Research programmes
  - 4.1 Morphometric and ecological investigations on the crayfish *Orconectes limosus*; begun in 1992; one scientist  
Leading scientist: Prof. Dr. habil K. Anwand  
  
Natural and controlled reproduction and experimental feeding of the crayfish *Orconectes limosus*; begun in 1992; two scientists  
Leading scientist: Dr. B. Rennert
  - 4.2 Further studies in the same fields as in 4.1 with *Astacus astacus*

## Erste Bayerische Satzkrebszucht

by Max Keller

1. Name of the institute
  - 1.1 Erste Bayerische Satzkrebszucht
  - 1.2. First Bavarian Crayfish Hatchery
2. Connections
  - 2.1. Habsburgstr. 14  
D-86199 Augsburg  
Germany
3. Research facilities
  - 3.1. Two part-time research scientists with seasonal assistants
  - 3.2. Two crayfish researchers, Max Keller (owner) and Max Michael Keller;  
production of *Astacus astacus* for stocking (80%) and consumption (20%)
    - 3.3.1 One hatchery in Augsburg for breeding crayfish and raising  
summerlings (simple outdoor recirculating system with 50 basins,  
working without filters)  
Breeding capacity: 300,000 juveniles  
raising capacity: 100,000 summerlings
    - 3.3.2 One crayfish farm in Bernbach (five ponds and 10 basins = 1.5 ha)  
capacity/a: 3 000 egg-bearing females and  
20 000 two-summer-old crayfish
    - 3.3.3 One crayfish farm in Rebergreuthen (11 ponds = 1.3 ha)  
capacity/a: 300 kg large-sized crayfish for consumption  
5 000 crayfish for stocking (1+ and 2+)
    - 3.3.4 One gravel pit in Lake Bronnen (3 ha)  
capacity/a: 15 000 crayfish for stocking (2+) = 450 kg
    - 3.3.5 6-km (= 4-ha) stretch of the River Kammel/Loppenhausen with  
endemic stocks of *Astacus astacus* and *Austropotamobius torrentium*
  - 3.4. No plans for expansion
4. Research programmes
  - 4.1.1 Development of a simple and effective breeding system for *Astacus  
astacus* and *Pacifastacus leniusculus* (begun in 1972, ended in 1994,  
Max Keller)
  - 4.1.2 Development of a profitable and effective method of raising  
summerlings of (*Astacus astacus*). Program was ended in 1993 and  
attained constant survival rates of 85% (Max Keller)

- 4.1.3 Development of methods for obtaining high yields/ha/a of large-sized crayfish for consumption by stocking the ponds with males only to avoid stunting as a result of population pressure (begun in 1979 and continuing, Max Michael Keller)
  - 4.2.1 Selection of fast-growing crayfish specimens to shorten the production time in aquaculture
  - 4.2.2 Studies of water parameters necessary for crayfish farming
  - 4.2.3 Studies of natural and artificial food requirements of *Astacus astacus* and *Pacifastacus leniusculus*
  - 4.2.4 Studies of results of restocking actions (survival rates, population dynamics, predators)
  - 4.2.5 Consequences of trapping pressure on crayfish populations
5. The most important problems in crayfish research
- 5.1.1 The spreading of American crayfish species as permanent vectors of the crayfish plague
  - 5.1.2 The stocking of traditional crayfish waters with nonendemic fish species (eels etc.) by fishermen
  - 5.1.3 The low scientific and public interest in native crayfish

## GREECE

By M. Grimbis

**University of Athens  
Department of Biology**

1. Name of the institute
  - 1.1 Panepistimio Athinon  
Tmima Biologias
  - 1.2 University of Athens  
Department of Biology
2. Connections
  - 2.1 University of Athens  
Panepistimioupoli  
15771 Ilisia  
Greece
  - 2.2 Tel. 01 7284622
  - 2.3 Fax 01 2280538, 01 2014265
3. Research facilities
  - 3.1 Five research scientists at the Aquaculture Laboratory of the Department of Biology
  - 3.2 Four crayfish biology research scientists of the Department of Biology (Ekaterini Kozanoglou, Emanouel Nicocirakis and D. Armacas) and the leading Professor of Aquaculture I. Kastritsi-Kathariou
  - 3.3 A laboratory with fish keeping facilities at the Department of Biology in Athens with five concrete open reservoirs
  - 3.4 Establishment of a hatchery - nursery for species under study
4. Research programmes
  - 4.1.
    - a) Experimental feeding of *A. astacus* at different age-stages in which the quantity and quality of proteins and fatty acids are controlled in relation to the temperature conditions
    - b) Natural and controlled reproduction of *A. astacus* in the laboratory
    - c) To find methods allowing intensive farming on a commercial basis under conditions in Greece. Five scientists participating (leading scientist Dr. Kastritsi-Kathariou)

Work is at present centred on *A. astacus*, a species which originates from Orchomenos Biotias, Greece. It was begun in 1989 and ended in 1993

- 4.2.
  - a) Enviromental factors affecting the natural population of *A. astacus*
  - b) Restoration of natural habitat, a proposed submission to the programme "LIFE"
  - c) Experimental farming of other species of crayfish
5. Crayfish research is new to our country

**Aristoteles University of Thessaloniki  
School of Veterinary Medicine**

1. Name of the institute
  - 1.1 Aristotelio Panepistimio Thessalonikis  
Tmima Ktiniatrikis  
Ergastirio Ikologias ke Prostasias Perivallontos
  - 1.2 Aristoteles University of Thessaloniki  
School of Veterinary Medicine  
Laboratory of Ecology and Environmental Protection
2. Connections
  - 2.1 Aristoteles University of Thessaloniki  
School of Veterinary Medicine  
Laboratory of Ecology and Environmental Protection  
University Box 404  
54006 Thessaloniki  
Greece
  - 2.2 Tel. 031 - 991 304
  - 2.3 Fax 031 - 206 138, 200 392
3. Research facilities
  - 3.1 Three research scientists
  - 3.2 Four crayfish researchers: Prof. Dr. S. D. Kilikidis, (Head); Dr. A. P. Kamarinos, Dr. X. N. Karamanlis (Lecturer, specializing in water pollution by nutrients); Dr. G. D. Fotis (Ass. Prof. in the Laboratory of Ichthyology, School of Veterinary Medicine, specializing in ichthyopathology)
  - 3.3 Laboratory of Ecology and Environmental Protection, Laboratory of Ichthyology, Fish Culture  
  
Experimental Station of Edessa (Ministry of Agriculture)

4. Research Programmes

Experimental aquaculture of the crayfish *A. fluviatilis* (= *A. astacus*) and *P. leniusculus*. Leading scientist: Prof. Dr. S. D. Kilikidis. Duration: two years. All the scientists mentioned in 3.2; no foreign scientists

5. *A. fluviatilis* (= *A. astacus*) is not intensively cultivated in Greece. Its presence in natural waters has decreased in recent years as a result of water pollution. The Laboratory of Ecology and Environmental Protection of the School of Veterinary Medicine in collaboration with the Fish Culture Experimental Station of Edessa (Ministry of Agriculture) are working on the experimental reproduction of crayfish and the enrichment of natural waters

## HUNGARY

by L. Kiss-Dala

### Szarvas Fish Culture Research Institute

1. Name of the institute
  - 1.1. Haltenyésztési Kutató Intézet (HAKI), Szarvas
  - 1.2. Szarvas Fish Culture Research Institute
2. Connections
  - 2.1. P. O. Box 47  
H-5541  
Szarvas  
Hungary
  - 2.2. Tel. 36-66/311-312
  - 2.4. Telex 83692
3. Research facilities
  - 3.1. Twenty-five research scientists
  - 3.2. One crayfish researcher: László Kiss-Dala, MSc. Agronomy  
Present address: Agricultural Biotechnology Centre  
P. O. Box 411  
Szent-Gtörgyi A. u. 4.  
H-2100 Gödöllő, Hungary  
Tel. 36 28/330-600, 330-800  
Fax. 34 28/320-096  
E-mail. Kiss@hubi.abc.hu  
  
Fields of research: pond culture technology, propagation, survey of national stocks, reconstruction of destroyed stocks
  - 3.3. Laboratories, culture stations and other installations. The research work is being done in the Szarvas Fish Culture Research Institute (HAKI). The Institute cooperates with some universities in Hungary
  - 3.4. Plans for expansion: HAKI to work together with the Hungarian Ministry for Environmental Protection and its institutions. It is planned to cooperate with the Tropical Department of Gödöllő Agricultural University in the future
4. Research programmes
  - 4.1. Reproduction biology of native astacid crayfish in Hungary  
Leading scientist: László Kiss-Dala
5. The most important problems  
No national attention, lack of funds



## IRELAND

**University of Dublin  
Trinity College**

by J. Reynolds

1. Name of the institute
  - 1.2 Department of Zoology
2. Connections
  - 2.1 Department of Zoology  
University of Dublin  
Trinity College  
Dublin 2  
Ireland
  - 2.2 Tel. 353 1 677 8094
  - 2.3 Fax 353 1 772 694, 679 3545
3. Research facilities
  - 3.1 About 25 research scientists
  - 3.2 Three crayfish researchers: Dr. Julian Reynolds; community ecology, reproduction, feeding and aquaculture  
Mr. Milton Matthews; ecology, reproduction, aquaculture and reintroductions  
Ms. Annetta Zintl; reproduction and behaviour
  - 3.3 Constant-temperature rooms, artificial incubators and recirculation system
  - 3.4 Recirculation system, experimental pond
4. Research programmes
  - 4.1 Current programmes
    - 4.1.1 Distribution and status of native crayfish in Ireland  
  
Begun 1978, continuing  
Variable number of participants, leading scientist J. Reynolds
    - 4.1.2 Ecology of lake populations of native crayfish in relation to lake benthic community structure  
  
Begun 1978, continuing  
Variable number of participants, leading scientist J. Reynolds

#### 4.1.3 Crayfish diseases and parasites

1982-1984 (*Thelohania*; burn-spot), 1987-1989 (plague)  
Three scientists, leading scientist J. Reynolds

#### 4.1.4 Captive breeding, artificial incubation and aquaculture

Begun 1984, continuing  
Up to five scientists participating, including José Carral and Maria Saez-Royuela, University of León, Spain. Leading scientist J. Reynolds

#### 4.1.5 Experimental farming, marketing and restocking

Farming 1986-1988, continuing restocking activity  
Variable number of participants, leading scientist J. Reynolds

### 4.2 Planned new research

#### 4.2.1 Pheromone and endocrine control of breeding

## 5. The most important problems in crayfish research

5.1 Maintenance of wide distribution and current probable plague-free status of Irish *Austropotamobius pallipes* by continuing vigilance against importation of *Pacifastacus leniusculus*

5.2 Exploitation of stocks and development of local markets without endangering current 'protected' status

5.3 Culture problems of low egg production and poor incubation survival

**Fisheries Research Centre**

by C. Moriarty

1. Name of the institute
  - 1.2 Department of the Marine  
Fisheries Research Centre  
Abbottstown, Castleknock County, Dublin  
Ireland
2. Connections
  - 2.2 Tel. 353 1 821 0110
  - 2.3 Fax 353 1 820 5078
3. Research facilities
  - 3.1 About 40 research scientists
  - 3.2 One crayfish researcher, Dr. Christopher Moriarty; biology, fisheries, and legislation

**University College**

by M. Blake

1. Name of the institute
  - 1.2 Department of Zoology  
Lee Maltings, Prospect Row, Cork
4. Juvenile crayfish, ecology and behaviour

**University college**

by J. Fairley

1. Name of the institute
  - 1.2 Department of Zoology  
University College  
Galway
4. Impacts of predation by otter and mink on crayfish stocks

## ISRAEL

by I. Karplus

### **Department of Aquaculture Agricultural Research Organization**

1. Name of the institute
  - 1.1 Department of Aquaculture  
Agricultural Research Organization
2. Connections
  - 2.1 Department of Aquaculture  
Agricultural Research Organization  
Bet-Dagan  
Israel
  - 2.2 Tel. 03 - 9683 - 388
  - 2.3 Fax 972 - 3 - 993998
3. Research facilities
  - 3.1 Seven research scientists
  - 3.2 Four crayfish researchers: Dr. I. Karplus; growth and behaviour  
Mr. A. Barki; behaviour  
Dr. S. Harpaz; nutrition  
Prof. G. Hulata; genetics
  - 3.3 Several recirculating culture systems and earthen ponds
  - 3.4 Cage culture facilities
4. Research programmes:
  - 4.1 Suitability of the Australian red claw crayfish *Cherax quadricarinatus* for culture in Israel
  - 4.2 Red claw feeding behaviour, chemoreception and nutritional requirements
5. Most important problems

Various problems related to suitability of *Cherax quadricarinatus* for culture in the Israeli temperate climate

## LITHUANIA

### Institute of Ecology

by Alouzas Burba and Gouda Mackeviciené

#### Ekologijos institutas

1. Name of the institute
  - 1.1 Ekologijos Institutas
  - 1.2 Institute of Ecology
2. Connections
  - 2.1 Akademijos 2  
LT-2600 Vilnius  
Lithuania
  - 2.2 Tel. +370 2 359241, +370 2 776991
  - 2.3 Fax +370 2 359257
3. Research facilities
  - 3.1 Ninety-three research scientists
  - 3.2 Four crayfish researchers:  
Guoda Mackeviciené; ecology, physiology, ecotoxicology, culture  
Liongina Mickénienė; ecology, microbiology, ecotoxicology, culture  
Aloyzas Burba; ecology, ethology, ecotoxicology, culture  
Janina Syvokiene; microbiology, ecotoxicology
  - 3.3 a) Two field stations at Lake Nevardas (Vilnius district) and Lake Juodis (Trakai district) with laboratory and aquaria (Laboratory of Freshwater Ecology, Institute of Ecology; laboratory head Dr. Guoda Mackeviciené)  
  
b) Laboratory of Ecological Physiology and Behaviour of Hydrobionts (laboratory head Dr. Zita Vosyliene) with aquaria and basins
  - 3.4 Native crayfish (*Astacus astacus*) culture will be expanded to two fish culture stations. Research programme "Fisheries" (a joint project of Institute of Ecology and Fisheries Department for artificial breeding and cultivation of the noble crayfish)
4. Research programmes
  - 4.1 a) Ecotoxicological study of crayfish: effects of heavy metals on crayfish microflora and behavioural and physiological reactions. Begun in 1992, continuing; four scientists participating, leading scientist Dr. Guoda Mackeviciené

b) Stocks and population structure of the noble crayfish (*Astacus astacus*)  
 Begun in 1993, continuing; leading scientist Aloyzas Burba

c) Diseases and parasites of crayfish. Begun in 1993, continuing; leading  
 scientist Liongina Mickėnienė

d) Comparative biochemistry of the noble (*A. astacus*) and signal crayfish  
 (*P. leniusculus*): investigations of steroid hormones. Institute of Ecology  
 together with scientists from Kaliningrad University (Russia). Four scientists  
 participating; leading scientists G. Mackevicienė, N. Chibisova

4.2 Crayfish (*Astacus astacus*) culture. Begun in 1993, continuing. Programme  
 "Fisheries" (1993-1997), joint project "Artificial breeding and cultivation of  
 noble crayfish juveniles" (Institute of Ecology, Fisheries Department,  
 Ministry of Agriculture). Five research workers participating, leading  
 scientists G. Mackevicienė, A. Burba

5. The most important problems in crayfish research

- Distribution of different species (3-4) in the country; stock assessment, exploitation  
 and management
- restocking of *Astacus astacus*
- interactions between native and acclimatized crayfish species
- adaptation of crayfish to different environmental conditions
- production of stocking material (native crayfish species)
- lack of information on crayfish culture biotechnology
- lack of facilities for diagnosis of *Aphanomyces astaci*

**Ministry of Agriculture  
 Fisheries Department**

by Česlovas Koreiva

1. Name of the institute

1.1 Lietuvos žemės ūkio ministerijos žuvų ūkio departamentas

1.2 Fisheries Department  
 Ministry of Agriculture of Lithuania

2. Connections

2.1 Juocapaviciaus 9  
 2600 Vilnius  
 Lithuania

2.2 Tel.+370 2 358464

2.3 Fax +370 2 352146

3. **Research facilities**

3.1 Thirteen research scientists

3.2 Two crayfish researchers:  
 Ceslovas Koreiva; ecology, culture  
 Algimantas Lappiené; ecology, culture

3.3 Four fish culture stations (crayfish culture in two)

4. **Research programmes**

Production of *Astacus astacus* in ponds. Studies of the noble crayfish culture according to the Joint Project of The Institute of Ecology and Fisheries Department (1993-1997). Begun in 1993, continuing. Four research workers participating; leading worker Ceslovas Koreiva

5. **The most important problems in crayfish research**

Lack of information on crayfish culture biotechnology

**Department of Environmental Protection**

by Jurgis Zableckis

1. **Name of the institute**

1.1 Gamtos apsaugos departamentas  
 Zvejybos reguliavimo ir zuvivaisos agentura

1.2 Department of Environmental Protection  
 Agency of Fishery Management and Pisciculture

2. **Connections**

2.1 Juozappaviciaus 9  
 2600 Vilnius  
 Lithuania

2.2 Tel. +370 2 353273

2.3 Fax +370 2 352536

3. **Research facilities**

3.1 Thirty research scientists

3.2 Four crayfish researchers: ,  
 Jurgis Zableckis; ecology, culture  
 Petras Pelanis; culture  
 Audrius Garska; culture, ecoogy  
 Donatas Galentas; culture

- 3.3 Four fish culture stations (crayfish culture in one)
- 4. Research programmes
  - Artificial breeding of *Astacus astacus* in hatcheries
  - Restocking of *Astacus astacus*
  - Status of *Astacus astacus* stocks
- 5. The most important problems in crayfish research
  - Lack of information on crayfish culture biotechnology

### **Nevardas Crayfish Culture Stations**

by Rokas Dobrovolskis

- 1. Name of the institute
  - 1.1 Nevardo veziu akvaculturos stotis
  - 1.2 Nevardas Crayfish Culture Station
- 2. Connections
  - 2.1 Kastoonu 2/14-22  
2005 Vilnius  
Lithuania
  - 2.2 Tel. +370 2 354844
  - 2.3 Fax +370 2 227975
- 3. Research facilities
  - 3.1 Two research scientists
  - 3.2 Two crayfish researchers:  
Rokas Dobrovolskis; ecology, culture, marketing  
Anatoliy Terentyev; ecology, sulture, marketing
- 4. Research programmes
  - Artificial breeding of crayfish and juveniles cultivation under semiextensive conditions
  - Production of stocking material of the *Pasifastacus leniusculus*
  - Production of *Pasifastacus leniusculus* in ponds and lakes
- 5. The most important problems in crayfish research
  - Lack of information on *Pasifastacus leniusculus* aquaculture under semiextensive conditions



## NETHERLANDS

by L.B. Holthuis

### National Museum of Natural History

1. Name of the institute
  - 1.1 Nationaal Natuurhistorisch Museum
  - 1.2 National Museum of Natural History
2. Connections
  - 2.1 Postbox 9517  
2300RA Leiden  
Netherlands
  - 2.2 Tel. 071-143844
  - 2.3 Fax 071-133 344
3. Research facilities
  - 3.1 Fifteen research scientists
  - 3.2 One crayfish researcher:  
Prof. Dr. L.B. Holthuis; taxonomy
  - 3.3 Two rooms for taxonomic research on the crustacea
  - 3.4 No plans for expansion
4. Research programmes
  - 4.1.1 With Mr. J.P.H.M. Adema, a free-lance scientist at the Museum, changes in range of *Astacus astacus*. In The Netherlands the range appears to be decreasing rapidly and we are attempting to ascertain the causes (pollution, pest, arrival of foreign species). Presence and range extension of foreign species (*Orconectes limosus*, *Astacus leptodactylus*, *Procambarus clarkii*) and their influence on the native *Astacus astacus*
  - 4.1.2 Taxonomy of freshwater crayfish from western New Guinea
  - 4.2. Continuation of 4.1
5. The most important problems in crayfish research
 

Influence of extension of foreign crayfish - *Orconectes limosus*, *Astacus leptodactylus* and *Procambarus clarkii* - on the native crayfish *Astacus astacus* in The Netherlands

## NORWAY

### Eastern Norway Research Institute

by Jostein Skurdal and Trond Taugbøl

1. Name of the institute
  - 1.1 Østlandsforskning
  - 1.2 Eastern Norway Research Institute
2. Connections
  - 2.1 P.O. Box 1066 Skurva  
N-2601 Lillehammer  
Norway.
  - 2.2 Tel. +47 61 26 03 01
  - 2.3 Fax +47 61 25 41 65
3. Research facilities
  - 3.1 Thirty research scientists
  - 3.2 Two crayfish researchers:  
Trond Taugbøl  
Jostein Skurdal
4. Research programmes
  - 4.1 A. Monitoring of the crayfish plague situation in Norway. Leading scientist: Trond Taugbøl. Begun in: 1988  
  
B. Monitoring and registration of crayfish stocks. Leading scientist: Trond Taugbøl. Begun in: 1988  
  
C. Restoring crayfish in plague-struck areas. Leading scientist: Trond Taugbøl Begun in: 1988  
  
D. Yield and stock structure of Lake Steinsfjorden noble crayfish. Leading scientist: Jostein Skurdal. Begun in: 1979  
  
E. Horizontal distribution of crayfish in relation to lake pH. Evaluation of liming strategy. Leading scientist: Trond Taugbøl. Begun in: 1994
  - 4.2 Reestablishing of crayfish in previously polluted watersheds. Leading scientist: Trond Taugbøl. Begun in: 1992

5. The most important problems in crayfish research
  1. Restoring crayfish in plague-struck areas and other areas where crayfish have been eradicated
  2. Noble crayfish (*Astacus astacus*) and their habitat utilization and requirements
  3. Management and effect of exploitation
6. Other research workers related to research on crayfish
  - 6.1. Dag Olav Hessen  
 Dept. of Limnology  
 University of Oslo  
 P.O. Box 1054 Blindern  
 N-0314 Oslo  
 Interest: crayfish feeding and metabolism
  - 6.2. Svein E. Fevolden  
 College of Fishery Science  
 University of Tromsø  
 Dramsveien 201 Guleng  
 N-9037 Tromsø  
 Interest: genetics

### Central Veterinary Laboratory

by Tore Håstein

1. Name of the institute
  - 1.1 Veterinærinstituttet
  - 1.2 Central Veterinary Laboratory
2. Connections
  - 2.1 P.O. Box 8156, Dep.,  
 N-0033 Oslo  
 Norway
  - 2.2 Tel. +22964500
  - 2.3 Fax +22463877
3. Research facilities
  - 3.1 Ten research scientists
4. Crayfish plague monitoring, *Thelohania* monitoring

**POLAND**

by Dr. Jozef Kossakowski (deceased)

**Inland Fisheries Institute**

1. Name of the institute
  - 1.1 Instytut Rybactwa Śródlądowego
  - 1.2 Inland Fisheries Institute
2. Connections
  - 2.1 Kortowo, blok 5  
10-957 Olsztyn 5  
Poland
  - 2.2 Tel. 25981
  - 2.4 Telex 0522316 IRS PL
3. Research facilities
  - 3.1 Fifty-five research scientists
  - 3.2 One part-time crayfish researcher  
Crayfish biology and acclimatization
  - 3.3 No facilities available
  - 3.4 a) Occurrence of crayfish in Poland and management of crayfish stocks  
b) Further attempts to acclimatize *Pacifastacus leniusculus* in Polish waters
4. Research programmes
  - 4.1 No current research programmes
  - 4.2 No plans for future research
5. The most important problems in crayfish research  

Current state of the distribution of crayfish in Poland and determination of bodies of water in which crayfish exploitation could be reundertaken

**Institute of Biology  
High Pedagogic School**

1. Name of the institute
  - 1.1 Instytut Biologii  
Wyzsza Szkoya Pedagogiczna
  - 1.2 Insitute of Biology  
High Pedagogic School
2. Connections
  - 2.1 ul. Zonierska 14  
10-661 Olsztyn  
Poland
  - 2.2 Tel. 361 20 in. 13
3. Research facilities
  - 3.1 Forty research scientists
  - 3.2 Three crayfish researchers:  
Dr. Maria Stypinska; biology of crayfish fecundity  
Magorzata Bauman-Majerska, M.Sc.  
Danuta Punda, M.Sc.; biology of crayfish; reproduction of *Astacus astacus*,  
*Astacus leptodactylus* and *Orconectes limosus*
  - 3.3 No facilities available
  - 3.4 No plans for expansion
4. Research programmes
  - 4.1 Fecundity of crayfishes inhabiting Polish waters
  - 4.2 Reproduction of *Astacus leptodactylus* in lakes of different trophy and varying degree of pollution

**Laboratory of Fish Disease  
Academy of Agriculture and Technology**

1. Name of the institute
  - 1.1 Zakad Chorob Ryb  
Akademia Rolniczo-Techniczna
  - 1.2 Laboratory of Fish Disease  
Academy of Agriculture and Technology
2. Connections
  - 2.1 Kortowo, blok 37  
10-957 Olsztyn 5  
Poland
  - 2.2 Tel. 28456
  - 2.4 Telex 052 6419 ART PL
3. Research facilities
  - 3.1 Three research scientists
  - 3.2 Two crayfish researchers:  
Dr. Danuta Waluga; ichthyopathology  
Dr. Teresa Wasow; ichthyopathology
  - 3.3 Research-teaching laboratory
  - 3.4 Plans for expansion
    - a) Inventory of crayfish diseases in Mazurian Lakeland
    - b) Inventory of crayfish diseases in Poland
4. Research programmes
  - 4.1 No current programmes research in conjunction with teaching work
  - 4.2 No plans for future research
5. The most important problems in crayfish research
  - a) Need for the definition of health state of crayfish stocks in Poland
  - b) Definition of the effect of environmental factors on crayfish health and condition

## PORTUGAL

**University of Évora**  
**Department of Ecology**

by Maria Ilhéu

1. Name of the institute
  - 1.1 Departamento de Ecologia  
Universidade de Évora
  - 1.2 Department of Ecology  
University of Évora
2. Connections
  - 2.1 Largo dos Colegiais  
Departamento de Ecologia  
Universidade de Évora  
7000 Évora  
Portugal
  - 2.2 Tel. 351.66.25572/3/4
  - 2.3 Fax 351.66.20775
3. Research facilities
  - 3.1. Nine research scientists
  - 3.2 Two crayfish researchers:  
Maria Ilhéu and J.M. Bernardo
  - 3.3 Office and laboratory. Aquarium hall for crayfish stocking and experiments
  - 3.4 Experimental ponds of the laboratory
4. Research programmes
  - 4.1 1) "Trophic ecology of red swamp crayfish, *Procambarus clarkii*, in south Portugal" - to evaluate the ecological impact at the community level. M. Ilhéu & J.M. Bernardo. 1991-1994  
  
2) "Status and distribution of *Austropotamobius pallipes* populations in Portugal" - to develop a conservation and managements strategy.  
J.M. Bernardo & M. Ilheu. 1994-1995

- 4.2
  - 1) Population dynamics of *Procambarus clarkii* and ecological interactions at the community level in different ecosystems
  - 2) Feeding and nutritional studies of *P. clarkii* for ecological management and farming proposes
  - 3) Restocking and monitoring of *Austropotamobius pallipes* populations in Portugal
5. The most important problems in crayfish research
  - 1) Impact of introduced crayfish species on biotic communities and rice cultures
  - 2) Interactions between native and introduced crayfish species
  - 3) Lack of information and strategy for protecting, preserving and increasing the native crayfish *Austropotamobius pallipes*

### **Zoological and Anthropological museum/Bocage**

by Alexandra Marcal Correia

1. Name of the institute
  - 1.1 Museu zoologico e Antropológico/Museu Bocage
  - 1.2 Zoological and Anthropological museum/Bocage
2. Connections
  - 2.1 R. da Escola Politechnica, 58  
1200 Lisboa  
Portugal
  - 2.2 Tel. 01-3969784
  - 2.3 Fax 01-3969784
3. Research facilities
  - 3.1 Five research scientists
  - 3.2 One crayfish researcher:  
Alexandra Marcal Correia: ecology of *Procambarus clarkii*
  - 3.3 Three laboratories
5. The most important problems in crayfish research
 

Lack of financial support for field and laboratory work



## SPAIN

### National Institute for the Conservation of Nature

by A.S. Habsburgo-Lorena

1. Name of institute
  - 1.1 Instituto Nacional para la Conservacion de la Naturaleza
  - 1.2 National Institute for the Conservation of Nature
2. Connections
  - 2.1 Grand Via de San Francisco  
Madrid 5  
Spain
  - 2.2 Tel. 2668200
  - 2.4 Telex 27422
3. Research facilities
  - 3.1 Fifteen research scientists
  - 3.2 Five crayfish researchers:  
Prof. A.S. Habsburgo-Lorena; biology  
Dr. L. Cuellar Carrasco; pathology  
Vet. Mariano Coll; *Astacus pallipes pallipes*  
Vet. Marcelino Ridruejo; *Pacifastacus leniusculus*  
Ing. M. Lopez Vallejo; *Procambarus clarkii*
  - 3.3 One laboratory and four culture stations
  - 3.4 Two culture stations under construction
4. Research programmes
  - 4.1 Impact of *Pacifastacus leniusculus* in Spanish inland waters. Two scientists and two supervisors (Dr. L. Cuellar Carrasco, Vet. Marcelino Ridruejo, Stellan Karlsson, Prof. Habsburgo-Lorena)
  - 4.2 Future research will be realized in the programme called ACUPLAN. The objective is the adequate utilization of inland waters for food production. Began in late 1980 and it will require at least 10 years. Fifteen scientists will work on this programme, the following five crayfish specialists: Prof. A.S. Habsburgo-Lorena, Dr. L. Cuellar Carrasco, Vet. Mariano Coll, Vet. Marcelino Ridruejo and Ing. M. Lopez Vallejo
5. The most important problems in crayfish research
 

Lack of specialists, facilities, information and control

**University of León**  
**Department of Animal Production II**

by Jesús D. Celada

1. Name of the institute
  - 1.1 Departamento de Producción Animal II  
Universidad de León
  - 1.2 Department of Animal production II  
University of León
2. Connections
  - 2.1 Campus de Vegazana s/n  
24071 León  
Spain
  - 2.2 Tel. 87-291188
  - 2.3 Fax 87-291187
3. Research facilities
  - 3.1 Seventeen research scientists
  - 3.2 Seven crayfish researchers; culture of *A. pallipes* and *P. leniusculus*, study of wild native crayfish populations, population dynamics in stocked or restocked habitats:  
  
Dr. Vicente Gaudioso  
Dr. Jesús Celada  
Dr. José M. Carral  
PhD. Student María Sáez-Royuela  
PhD. Student Camino Muñoz  
PhD. Student José R. Pérez  
PhD. Student Andrés Sierra
  - 3.3 Three laboratories at the Department of Animal Production with the following experimental facilities; about 120 fiberglass, fibercement and glass tanks of various capacities designed for crayfish, artificial incubators (experimental and industrial), water recirculation systems, heating and cooling water systems, disinfection water systems and water quality monitoring equipment. The supply comes from a 380 m deep artesian well
  - 3.4 New earthen ponds and phytoplankton and zooplankton culture facilities will be constructed next year

#### 4. Research programmes on crayfish

- 4.1 Development of culture techniques under controlled conditions in white-clawed crayfish (*A. pallipes*) and signal crayfish (*P. leniusculus*): mating and spawning, artificial incubation, egg transport and storage, juvenile production, survival and growth of juveniles in early stages

Establishment of new native crayfish populations and restocking in plague affected waters

Begun in 1983; some projects ended, others continuing. Leading scientists: Vicente Gaudioso and Jesús Celada

#### 4.2 Planned:

Intensification of culture techniques

Survey of new implanted populations of both species

Development of semiextensive culture techniques in man-made or degraded areas

Estimation of productive parameters in wild populations

#### 5. The most important problems in crayfish research

- lack of knowledge of intensive breeding techniques (although some advances were made)
- the need to recover crayfish stocks in previously plague (*A. astaci*)-affected waters
- the scarce and close to extinction populations of native crayfish
- the spread of *Procambarus clarkii*, considered as a plague in many areas of the country

### **Polytechnical University of Valencia**

by Miguel Jover Cerdá

#### 1. Name of the institute

- 1.1 Departamento de Ciencia Animal,  
Universidad Politécnica de Valencia
- 1.2 Department of Animal Science,  
Polytechnical University of Valencia

#### 2. Connections

- 2.1 Camina de Vera, 14  
46071 Valencia  
Spain
- 2.2 Tel. 34-6-3.87.74.34 / 3.87.74.32
- 2.3 Fax 34-6-3.87.74.39

3. Research facilities
  - 3.1 Sixteen research scientists
  - 3.2 One crayfish researcher: Prof. Miguel Jover Cerdá (nutrition)
  - 3.3 Laboratory with 58 experimental 35-l tanks and a cooking-extruder CLEXTRAL BC-45 for preparing extruded diets
  - 3.4 New laboratory with larger capacity tanks
4. Research programmes
  - 4.1 Nutrition of *Procambarus clarkii*. Begun in 1990. The objective is to study nutrient requirements (protein, lipid and carbohydrate) of this crayfish and develop the methodology to study the requirements of other species
  - 4.2 Breeding and nutrition of *Pacifastacus leniusculus*
5. The most important problems in crayfish research

Crayfish are not considered priority species for aquaculture, although wild populations of the indigenous crayfish (*Astacus pallipes*) have disappeared, and the red crayfish (*Procambarus clarkii*) is colonizing inland waters and destroying these ecosystems. The solution could be to restock rivers with *Pacifastacus leniusculus*, which is very similar to indigenous crayfish

## SWEDEN

### Institute of Freshwater Research of the National Board of Fisheries

by Magnus Appelberg

1. Name of the institute
  - 1.1 Fiskeriverkets sötvattenslaboratorium
  - 1.2 Institute of Freshwater Research,  
National Board of Fisheries
2. Connections
  - 2.1 S-178 93 Drottningholm,  
Sweden
  - 2.2 Tel. (46) 08-759 00 40
  - 2.3 Fax (46) 08-759 03 38
3. Research facilities
  - 3.1 Thirteen research scientists
  - 3.2 Five crayfish researchers:  
Ph.D Magnus Appelberg; population dynamics, acidification/liming  
Ph.D Lennart Edsman; behavioural ecology, intraspecific interactions  
Ph.D Tommy Odelström; population dynamics, crayfish farming  
B.Sc Anders Jonsson; behavioural ecology, species interaction  
Ph.D Magnus Furst (retired); ecology, crayfish farming
  - 3.3 Laboratories, aquarium room, ponds and video-equipment for behavioural studies
  - 3.4 Laboratory for RNA/DNA studies. National database for crayfish and crayfish plague distribution
4. Research programmes
  - 4.1 Crayfish research at the institute is coordinated within the project area "Structure and function of lakedwelling fish and crayfish populations". The following projects are included:
    - A. Monitoring crayfish populations and crayfish plague in lakes. Begun in 1992, continuing, M. Appelberg
    - B. Effects of the introduction of *Pacifastacus leniusculus*. 1976-1993. Arne Fjälling
    - C. Inter- and intraspecific competition in crayfish. 1988-1995. Lennart Edsman and Anders Jonsson

D. Farming of *Astacus astacus* in northern Sweden. 1989-1995. Tommy Odelström

E. Effects of competition on habitat choice and resource use in ecological equivalents. 1991-1995. Lennart Edsman and Torbjörn Järvi

5. The most important problem in crayfish research
- Population dynamics and the role of interactions, competition and predation at the individual, population and community level
  - Effects of *Psorosperminum haeckeli* on natural populations
  - Possibilities of restoring Swedish *Astacus astacus* populations
  - Farming *Astacus* and *Pacifastacus*
  - Effects of environmental disturbances on natural crayfish populations

**University of Uppsala**  
**Department of Physiological Botany**

by Kenneth Söderhäll

1. Name of the institute
  - 1.1 Institutionen för fysiologisk botanik
  - 1.2 Department of Physiological Botany
2. Connections
  - 2.1 Box 540  
751 21 Uppsala  
Sweden
  - 2.2 Tel. +46 18 18 28 18 (Prof. Söderhäll)  
Tel. +46 18 18 28 00 (office)  
Tel. +46 18 18 28 11 (laboratory)
3. Research facilities
  - 3.1 Six research scientists, three technicians and about 10 PhD students and visiting scientists
  - 3.2 Ten crayfish researchers: Professor Kenneth Söderhäll, Project leader and Head of Department  
Dr Anna Aspán, biochemistry  
Dr Lage Cerenius, physiology and molecular biology  
Dr Bernard Duvic, biochemistry  
Dr Martin Hall (on leave from Center for Insect Studies, University of Arizona); biochemistry  
Dr Mats W. Johansson, molecular cellbiology  
PhD student Javier Dieguez-Uribeondo, physiology  
PhD student Zicai Liang, molecular biology  
PhD student Jari Rantamäki, physiology  
PhD student Per-Ove Thörnqvist, molecular cellbiology

### 3.3 Laboratory facilities:

Aquaria for stocking crayfish and experiments. Closed aquarium system for infection experiments. FPLC, spectrophotometers, ultracentrifuges, TLC scanner, liquid scintillation counter, facilities for DNA sequencing, PCR, protein purification, experiments with radioactively labelled substances and other facilities and equipment for biochemical and molecular biology studies. Transmission and scanning electron microscopes

## 4. Research programmes

The research is mainly focused on structure and function of the crayfish immune system at the molecular level but also pathology and physiology of different crayfish pathogens are studied. These studies have been on going on since the 1970s, although the focus has been changed during recent years with the isolation and purification of the various proteins of the proPO-activating system

### 4.1 Crayfish immunity.

Project leader: K. Söderhäll

A. Aspán, L. Cerenius, M.W. Johansson, M. Hall, Z. Liang, P.O. Thörnqvist

Collaborators: S. Iwanaga, Fukuoka, Japan

N. Ratcliffe, Swansea, England

L. Sottrup-Jensen, Århus, Denmark

G. Beck & G. Habicht, New York, USA

D. Hultmark, Stockholm, Sweden

N. Parrinello, Palermo, Italy

M. Brehelin, Montpellier, France

L. Grubhofer & P. Kopacek, Ceske Budejovice, Czech Republic and others

4.1.1 Purification, biochemical characterization and cDNA-cloning of various proteins of the proPO-activating system, e.g. prophenoloxidase, the prophenoloxidase-activating enzyme (ppA), the ppA inhibitor and other proteins. Initial stages in proPO system activation. Isolation and purification of a clotting protein and transglutaminase reactions. The possible role of alpha-2-macroglobulin in crustacean immunity. Comparative studies of proPO system proteins in crayfish and other arthropods. Purification, cloning and function of a crayfish interleukin

4.1.2 Cellular communication in immune reactions. Purification and characterization of hemocyte receptors for the  $\beta$ -1,3-glucan-binding protein. Molecular studies of hemocyte attachment and degranulation. Cellular communication and cooperation during activation of the proPO-activating system

4.1.3 Interactions between the proPO-system and different pathogens. Activation of the immune system, expression of different proPO proteins during parasite infections. Resistance towards the crayfish plague fungus and other pathogens

- 4.2 Physiological and epidemiological studies of crayfish parasites  
 Project leader: Kenneth Söderhäll  
 Lage Cerenius, J. Dieguez-Uribeondo, J. Rantamäki, P.O Thörnqvist  
 Collaborators: O.V. Lindqvist and P. Henttonen, Kuopio, Finland  
 M. Dick, Reading, England  
 A. Vey, Saint Cristoble, France
- 4.2.1. Physiology, transmission and pathology of the crayfish plague fungus (*Aphanomyces astaci*), *Saprolegnia parasitica*, *Psorospermium haeckeli*, *Trichosporon beigelii* and other crayfish parasites
- 4.3 Blood coagulation in crayfish
- 4.4. Recognition reactions of crayfish towards foreign objects

**University of Lund  
 Institute of Limnology**

by Stellan Hamrin

1. Name of the institute
  - 1.1 Limnologiska institutionen,  
Lunds Universitet
  - 1.2 Institute of Limnology,  
University of Lund
2. Connections
  - 2.1 Box 3060,  
S-220 03 Lund  
Sweden
  - 2.2 Tel. 046-10 84 25, vx 10 70 00
3. Research facilities
  - 3.1 Twenty-two research scientists
  - 3.2 One crayfish researcher:  
Stellan F. Hamrin; ecology of crayfish (*Astacus astacus*)
  - 3.3 Through-flow aquarium with diel water regulation and IR photocells for activity studies
4. Research programmes
  - 4.1 Impact of diel water regulation on diel activity. Impact of light and temperature on diel activity. Vertical distribution. Begun in 1976



**University of Uppsala  
Institute of Limnology**

by Anders Agerberg

1. Name of the institute

1.1 Limnologiska institutionen  
Uppsala Universitet

1.2 Institute of Limnology  
University of Uppsala

2. Connections

2.1 P.O. Box 557  
S-751 22 Uppsala  
Sweden

2.2 Tel. + 46 -18-182700

2.3 Fax +46-18-131134

3. Research facilities

3.1 About 30 research scientists

3.2 Two crayfish researchers:

Anders Agerberg; intraspecific variation in *Astacus astacus* and *Pacifastacus leniusculus*

Björn Söderbäck; ecology. Population regulation of *Astacus astacus* and *Pacifastacus leniusculus*

3.3. Field station at Lake Erken with laboratory and aquarium facilities

3.4. No plans for expansion

4. Research programmes

4.1 The main objective of the project "Genetic and ecological variation in the freshwater crayfish *A. astacus* L. and *P. leniusculus* Dana" is to genetically and ecologically characterize populations of the two species and to examine causes and effects of variation in certain aspects of the reproduction biology. The project was initiated in 1986 and will be completed in 1992. Project leader Magnus Appelberg at Drottningholm

- 4.2 Population regulating mechanisms in coexisting populations of *A. astacus* and *P. leniusculus*. The project was begun in 1987 and will be completed in 1993. The objective of the project is to evaluate the importance of interspecific competition, predation and reproductive interference in regulating sympatric populations of the two species. The work includes both experimental and field studies. Project leader; Björn Söderbäck in cooperation with M. Appelberg and T. Odelström at Drottningholm
- 4.3 B. Söderbäck and M. Appelberg are planning to begin a new project with the aim of quantifying the role of predatory fish in regulating crayfish populations

**National Board of Fisheries  
Härnosand Fisheries Research Office**

by Anders Agerberg

1. Name of the institute
  - 1.1 Fiskeriverket  
Utredningskontoret i Härnösand
  - 1.2 National Board of Fisheries  
Härnosand Fisheries Research Office
2. Connections
  - 2.1 Stora Torget 3  
S-871 30 Härnösand  
Sweden
  - 2.2 Tel. 0611-18250
  - 2.3 Fax 0611-17955
3. Research facilities
  - 3.1 Four research scientist
  - 3.2 One crayfish researcher (Anders Agerberg)
4. Research programmes
  - 4.1 No current programmes
  - 4.2 Effects on crayfish of water construction works. Leading scientist: Dr. Anders Agerberg

## Swedish Water and Air Pollution Research Institute

by Magnus Enell

1. Name of the institute
  - 1.1 Institutet för Vatten- och Luftvårdsforskning (IVL)
  - 1.2 Swedish Water and Air Pollution Research Institute
2. Connections
  - 2.1 P.O. Box 21060  
Hälsingegatan 43,  
S-100 31 Stockholm,  
Sweden
  - 2.2 Tel. +46 8 7291500
  - 2.3 Fax: +46 8 318516  
  
Sten Sturegatan 42, Box 5207  
S-402 24 Gothenburg  
Sweden, tel . 0 3 1 -8 1 028 0
3. Research facilities
  - 3.1 Five research scientists
  - 3.2 Two crayfish researchers:  
Olle Linden; biology and life cycle studies of *Macrobrachium* and an Australian freshwater crayfish  
Karl-Johan Lehtinen; biology and life cycle studies of tropical freshwater crayfish species in connection with farming possibilities using heated industrial effluents
  - 3.3 Current facilities:
    - Laboratories, culture stations and other installations
    - Field station at Studsvik: facilities with aquaria and small-size basins
    - Field station at Aneboda: closed systems and activated sludge sewage treatment plant
  - 3.4 Plans for expansion  
Negotiations with industries concerning buildup of farming facilities using heated waste waters
4. Research programme
  - Further developments concerning farming

## **Simontorp Aquatic Breeding Laboratories**

by Stellan Karlsson

1. Name of the institute
  - 1.1 Simontorp Aquaculture AB
2. Connections
  - 2.1 S-270 35  
Blentarp  
Sweden
  - 2.2 Tel. +46 416-240 20
  - 2.3 Fax +46 416-139 33
3. Research facilities
  - 3.1 Four research scientists
  - 3.2 Due to their interdisciplinary nature most projects cover both scientific and applied aspects, requiring teamwork often carried out in connection with external scientific and applied partners. See 4 below
  - 3.3. Four buildings: 1. offices, 2. quarantine (the only authorized general fish quarantine in Sweden), 3. greenhouse and 4. laboratories (about 2500 m<sup>2</sup>). The laboratories include two large halls for reproduction of crayfish and production of juveniles, a workshop, storage rooms and a number of medium-sized laboratories, as follows:
    1. Three rooms (about 150 m<sup>2</sup> each) with separate recirculation systems equipped with biofilters: two systems for temperate climate and one for tropical conditions
    2. One hall (about 250 m<sup>2</sup>) with series of separate recirculation systems with biofilters for tropical conditions
    3. One hatchery for crustacea and feed organisms
    4. One room for culturing algae
    5. One laboratory for routine chemical analyses of water (sophisticated analyses are carried out at the Department of Chemical Ecology, Ecology Building, Lund University)
    6. Two ordinary laboratories that can be used by guest researchers

Outside Simontorp model crayfish farms are located at:

1. Jät, Smålandskräftan: 174 ponds (pond length total 25 km), water temporarily recirculated, ponds lake-fed with filter and automated control of pH and liming

2. Knutstorp, Scania: 39 ponds, stream-fed (pond length 7.5 km)

4. Research programmes

In general, environmental problems and economy have enforced restrictions on the lavish use of energy and material resources. Both for crayfish farms in the field and controlled culturing of animals and plants efficient and parsimonious techniques called for. This again implies fair knowledge of the ecological characteristics of the organisms and their life strategies

Activities at Simontorp focus on development and application of rational means to satisfy these requirements in the production of animals and plants in aquatic systems. Recycling under control of environmental conditions and with continuous use of biofilters is used for study and production of crayfish, prawns, fish and plants (hydroponics)

Investigations are accepted and carried out for authorities, industries and entrepreneurs interested in aquaculture and hydroponics

4.1 The following programmes on crayfish are currently ongoing:

1. Technique and ecological prerequisites for large-scale pond farming of *Pacifastacus*
2. Factors regulating survival and distribution of juveniles
3. Population development in relation to environmental change
4. Food and feeding
5. Populations under stress
6. Economy of crayfish production and crayfish fishery

**University of Stockholm  
Department of System Ecology**

by Rolf Gydemo

1. Name of the institute
  - 1.1 Institutionen för Systemekologi  
Gottlandsavdelningen  
Stockholms Universitet
  - 1.2 Department of Systems Ecology  
Section Gotland  
Stockholm University
2. Connections
  - 2.1. Ar Fleringe  
S-620 35 Fårösund  
Sweden
  - 2.2. Tel. +46-(0)498 22 46 30
  - 2.3. Fax +46-(0)498 22 45 67
3. Research facilities
  - 3.1 Six research scientists
  - 3.2 Three crayfish researchers:  
Dr Rolf Gydemo; ecology, aquaculture, diseases  
PhD student Mikael Svensson; interactions, ecosystem changes  
Dr Lars Westin; ecology
  - 3.3 New office, laboratory and culture station at Ar. Visitor facilities and minor lab in Slite  
  
Laboratory facilities include experimental rooms, thermorooms and analysis labs, all with high flexibility. Several experimental ponds of various sizes at Ar and access to other ponds and natural waters, as well as to culture ponds through cooperation with crayfish farmers
  - 3.4 Plans for expanded office, laboratory and guest research facilities

#### 4. Research programmes

##### 4.1 Current research programmes:

A. Studies of the life history and ecology of the noble crayfish, *Astacus astacus*. Begun in 1982. Subprojects: reproduction and growth under extensive and intensive culture, intraspecific predation, behavioural studies on *Astacus astacus* and *Pacifastacus leniusculus*, pheromones, migration patterns, population dynamics, diseases, stocking methods, pond design, development of traps and equipment

Rolf Gydemo + two scientists. Since 1982

B. The signal crayfish problem in Gotland: interaction between signal crayfish and noble crayfish

Rolf Gydemo and Lars Westin. Since 1985

C. Factors affecting production in noble crayfish populations

Rolf Gydemo. Since 1986

D. Crayfish diseases in Gotland: survey programme

Rolf Gydemo. Since 1988

E. Population development in noble crayfish under reduced predation and competition

Mikael Svensson. Since 1989

F. Breeding experiment with noble crayfish

Rolf Gydemo. 1989-1991

G. The development of noble crayfish culture as a new industry

Rolf Gydemo. Since 1988, in cooperation with crayfish farmers

##### 4.2 A. Eel - crayfish interaction and predation

Lars Westin and Rolf Gydemo

B. Ecological investigations of *Psorospermium haeckeli*: transmission and effects

Rolf Gydemo

C. Effects of exploitation and migration on population structure

Rolf Gydemo

#### 5. The most important problems in crayfish research:

5.1 How to protect, preserve and increase the native noble crayfish distribution under threat from crayfish plague and introductions of signal crayfish

5.2 Management and exploitation of crayfish populations

5.3 Diseases: identification, transmission, effects and treatment

**University of Stockholm  
Department of Zoology**

by Hans Ackefors

1. Name of the institute
  - 1.1 Zoologiska Institutionen  
Stockholms Universitet
  - 1.2 Department of Zoology  
University of Stockholm
2. Connections
  - 2.1 Department of Zoology  
University of Stockholm  
S-10691 Stockholm  
Sweden
  - 2.2 Tel. +46 8 164 020
  - 2.3 Fax +46 8 167715
3. Research facilities
  - 3.1 About 100 research scientists
  - 3.2 Two crayfish researchers:  
Professor Hans Ackefors  
Ph D student Pia Keyser  
One new research student beginning summer 1994
  - 3.3 Department of Systems Ecology  
Ar, Gotland
4. Research programmes
  - 4.1 Current
    - A. Nutritional requirement of *Astacus astacus*. Begun in 1985
    - B. Moulting frequency of *Astacus astacus*. Begun in 1989
    - C. Fatty acid composition of *Astacus astacus*. Begun in 1993
    - D. Environmental effects on body composition and reproduction



## SWITZERLAND

by Erich Staub

### **Federal Office of Environment, Forests and landscape**

1. Name of the institute
  - 1.1 Bundesamt für Umwelt, Wald und Landschaft
  - 1.2 Federal Office of Environment, Forests and landscape
2. Connections
  - 2.1 Hallwylstrasse 4  
CH-3003 Bern  
Switzerland
  - 2.2 Tel. +313229377
  - 2.3 Fax +313712583
3. Research facilities

No facilities present
4. Research programmes

No research at present
5. The most important problems in crayfish research

Inventories concerning distribution of crayfish species in Switzerland

## TURKEY

by Harun Vatansever

### Egirdir Fisheries Research Institute

1. Name of the institute
  - 1.1 Egirdir Su Ürünleri Arastirma Enstitüsü
  - 1.2 Egirdir Fisheries Research Institute
2. Connections
  - 2.1 Tarım ve Köyisleri Bakanligi  
Su Ürünleri Arastirma Enstitüsü Müdürlüğü  
32500 Egirdir/Isparta  
Türkiye
  - 2.2 Tel. 9/3281/2296-2297-3090
  - 2.3 Fax 9/3281/3539
3. Research facilities:
  - 3.1. Ten research scientists
  - 3.2 Two crayfish researchers:  
Harun Vatansever; veterinarian. Crayfish diseases and culture research  
Ahmet Alp; biologist. Limnological research
  - 3.3 Current facilities:  
Three laboratories: fish disease research laboratory, water pollution research laboratory, and limnology laboratory. One aquarium room and new small, covered hatchery system building with aquarium room, a plankton production room and applied laboratory
4. Research programmes
  - 4.1 Project name: Increasing resistance of crayfish to plague in lakes of Egirdir, Beysehir and Civril (Isikli)  
Objectives: Present status of crayfish stooks, reproduction of crayfish  
Begun:1987, will end: 1993. Leader: Harun Vatansever
5. The most important problems in crayfish research
 

Production and increase of crayfish defence against plague

Crayfish culture methods

Crayfish nutrition and preparation of appropriate diets

Lack of information and experience in crayfish culture and diseases

## UNITED KINGDOM

**University of Durham**  
**Department of Biological Sciences**

by K. Bowler

1. Name of the institute
  - 1.2 Department of Biological Sciences  
University of Durham
2. Connections
  - 2.1 Science Laboratories  
South Road  
Durham City  
DH1 3LE  
U.K.
  - 2.2 Tel. Durham (091) 374 2421
3. Reserach facilities
  - 3.1 About 100 research scientists
  - 3.2 One crayfish researcher: Prof. K. Bowler; Growth and population biology of *Austropotamobius pallipes*. Diagnostic kit for identification of crayfish plague fungus
  - 3.3 Aquarium
  - 3.4 New laboratories planned for 1994
4. Research programmes
  - 4.1 Ended in 1991 through lack of funds
  - 4.2 Work planned: Continuation of population study on *Austropotamobius pallipes*
5. The most important problems in crayfish research

Potential danger of the introduction of *Pacifastacus* (which has reached quite dramatic proportions in the past two years) on the native populations of *Austropotamobius pallipes*

**University College School**

1. Name of the institute
  - 1.1 University College School
2. Connections
  - 2.1 Frogna1, London NW3 6XH
  - 2.2 Tel. 071-435 2215
3. Research facilities
  - 3.1 One research scientist
  - 3.2 One crayfish researcher: Mr. R. Jenks
4. Research programmes
  - 4.1 Functional anatomy of the chelipeds of *Austropotamobius pallipes*. The work was begun in 1977. (External M. Phil under Dr. Bailey at Chelsea College)

**University of London  
Goldsmiths College**

by Jean Davies

1. Name of the institute
  - 1.1 University of London  
Goldsmith College
2. Connections
  - 2.1 New Cross  
London  
SE146NW
  - 2.2 Tel. 01-692 0211 ext 264
  - 2.4 Telex 01-692 7171
3. Research facilities
  - 3.1 Fifteen research scientists
  - 3.2 Two crayfish researchers:  
W. Thomas, Dr. Clive Seymour

4. **Research programmes**

- 4.1 Crayfish sense organs and behaviour. The study was begun in 1968
- 4.2 The relation of setal function to gross behaviour- hatchlings to adults

**University of Nottingham  
Department of Life Science**

by David Holdich

1. **Name of the institute**

- 1.1 University of Nottingham
- 1.2 Department of Life Science

2. **Connections**

- 2.1 Department of Life Science  
University of Nottingham,  
Nottingham, NG7 2RD  
England
- 2.2 Tel. 0602 51321999
- 2.3 Fax 0602 513251

3. **Research facilities**

- 3.1 Thirty-five academic staff
- 3.2 Seven crayfish researchers:  
Dr. D.M. Holdich; aquaculture, comparative biology and conservation  
Dr J.P. Reader; ecophysiology and ecotoxicology  
Mr W. D. Rogers; aquaculture and conservation  
Ms D. Middleton; immunology  
Ms C. M. Ashley; detoxification mechanisms  
Mr M. Harlioglu; aquaculture  
Mr Z. Ye: aquaculture
- 3.3 Current facilities:  
One laboratory for experimental work and computing, four constant-temperature rooms, indoor and outdoor culture facilities
- 3.4 Plans for expansion:  
Warm-water system for intensive culture

#### 4. Research programmes

##### 4.1 Current

- 4.1.1 Crayfish conservation & management. Dr Holdich, Mr Rogers and Dr. Reader - to develop a conservation strategy for *Austropotamobius pallipes* and a management strategy for wild populations of *Pacifastacus leniusculus* and *Astacus leptodactylus*. 1992 - 1995. Funded by National Rivers Authority
- 4.1.2 Comparative biology. Dr Holdich, Ms Ashley & Ms Middleton - ecophysiology, ecotoxicology, immunology, detoxification mechanisms of indigenous and introduced species of crayfish in response to water quality and stress. Two research studentships funded by Science and Engineering Research Council. 1992 - 1994
- 4.1.3 Aquaculture. Dr D. M. Holdich, Mr Ze (Guangzhou College of Education, China) and Mr Harlioglu (Firat University, Turkey) - factors affecting the survival and growth of crayfish in intensive culture systems 1992-1995

##### 4.2 Planned: intensification of culture methods for warm-water species

#### 5. The most important problems in crayfish research

Conserving indigenous crayfish under the terms of the EC Habitats Directive including creation of "no-go" areas for crayfish farming

Developing environmentally safe crayfish aquaculture systems which prevent escapes into the wild

Intensification of culture methods

Responses of crayfish to environmental stress

#### Joint Nature Conservation Committee

##### 1. Name of the institute

1.1 Joint Nature Conservation Committee

##### 2. Connections

2.1 Monkstone House  
City Road  
Peterborough PE1 1JY

2.2 Tel. 0733 62626

2.3 Fax 0733 555948

3. Research facilities
  - 3.1 About 25 research scientists
  - 3.2 One crayfish researcher:  
Mrs Margaret Palmer, Head, Species Conservation Branch
4. Research programmes
  - 4.1 Current: Production of a national strategy for the conservation of *Austropotamobius pallipes*. Begun in 1991, to be ended in 1995
  - 4.2 Planned: Investigation into extent of site protection for native crayfish in Great Britain
5. The most important problems in crayfish research
  - a. Mortalities of native crayfish due to crayfish plague (carried by the farmed alien species *Pacifastacus leniusculus*)
  - b. Limitation of the spread of alien species of crayfish in the wild
  - c. Conservation of a national network of sites for *Austropotamobius pallipes*
  - d. Re-establishment of the native species in areas devastated by plague

**University of Reading  
Department of Pure and Applied Zoology**

by Dr. George F. Warner

1. Name of the institute
  - 1.1 University of Reading  
Department of Pure and Applied Zoology
2. Connections
  - 2.1 Whiteknights  
P.O. Box 228  
Reading RG6 2AJ  
U.K.
  - 2.2 Tel. (0734) 875 123 ext 7087
  - 2.4 telex 847 813 RULIBG

3. Research facilities

3.1 About 20 research scientists (scientific staff + postdocs)

3.2 One crayfish researcher: Dr G.F. Warner (aquatic ecology)

3.3 University laboratories, aquaria, ponds

4. Research programmes

4.1 Current

Feeding strategies and ecology of crayfish. Feeding behaviour has been studied since 1988 from a variety of angles:

- as a test of optimal foraging theory
- to detect feeding preferences
- growth rates on different foods
- as a guide to impact on freshwater communities. The species being studied is *Pacifastacus leniusculus*, a species introduced to Britain for aquaculture. Most of the research is being done as undergraduate project work, supervised by Dr G.W. Warner

5. The most important problems in crayfish research

Interactions between native and introduced crayfish species  
 Impact of introduced crayfish species on biotic communities  
 Optimization of crayfish aquaculture in British conditions

**City of London Polytechnic  
 Department of Biology**

by Dr. R. Lowery

1. Name of the institute

1.1 Department of Biology  
 City of London Polytechnic

2. Connections

2.1 Old Castle Street  
 London

2.2 Tel. 01-283-1030

4. Research programmes

4.1 Current

Biology of *Austropotamobius pallipes*, problems of culture in small ponds  
 Distribution in Thames Water Authority Region  
 Effects of river engineering works on crayfish populations  
 (R.S. Lowery with S. Hoggart of the Thames Water Authority)



5. The most important problems in crayfish research

Information on factors affecting abundance of animals in natural populations of *Austropotamobius*

Effect of crayfish on their habitats particularly with respect to the invertebrates and plants also erated with them

If *Pacifastacus* is cultivated efficiently, methods of intensive or semi-intensive cultivation need to be developed

**Comanac Ltd.**

1. Name of the institute

1.1 Comanac Ltd.

2. Connections

2.1 10 The Lees  
Malvern  
Worcestershire  
WR14 3HT

2.2 Tel. Malvern 64747

3. Research facilities

3.1 Two research scientists

3.2 One crayfish researcher: Nicholas Stamp, B.A., M.Sc., agricultural economist specializing in marketing, feasibility studies and production estimates

3.3 Current facilities  
On-site computer facilities

3.4 Plans for expansion  
Will depend on growth of crayfish industry in this country

4. Research programmes

4.1 Current

Recently completed research on signal crayfish production and marketing in England and Wales carried out by Nicholas Stamp

5. The most important problems in crayfish research

Developing and making available the management techniques for maintaining self-sustained populations of signal crayfish in British waters

Finding inexpensive means of presenting crayfish to a population that is largely unfamiliar with them

Improving the present labour-intensive trapping techniques used for harvesting

**Ministry of Agriculture, Fisheries and Food  
Fisheries Laboratory**

by J.F. Wickins

1. Name of the institute
  - 1.1 Ministry of Agriculture, Fisheries and Food  
Fisheries Laboratory
2. Connections
  - 2.1 Benarth Road  
Conwy  
Gwynedd LL 32 8UB
  - 2.2 Tel. 0492 593883
  - 2.3 Fax 0492 592123
3. Research facilities
  - 3.1 Nine research scientist
  - 3.2 One crayfish researcher: J.F. Wickins
    - a) Watching brief on crayfish culture activities in U.K.
    - b) Watching brief on world wide crayfish aquaculture

**Ministry of Agriculture, Fisheries and Food  
Fish Diseases Laboratory**

1. Name of the institute
  - 1.1 Ministry of Agriculture, Fisheries and Food  
Fish Diseases Laboratory
2. Connections
  - 2.1 Ministry of Agriculture, Fisheries and Food  
14 Albany Road  
Granby Industrial Estate Weymouth,  
Dorset DT4 9TH  
England
  - 2.2 Tel. 0305 772 137
  - 2.3 Fax 0305 770 955
  - 2.4 Telex 41710

## 3. Research facilities

3.1 40 research scientists

3.2 One crayfish researcher

## 4. Research programmes

## 4.1 Current

A monitoring brief is kept on crayfish diseases, particularly the spread of crayfish plague within England and Wales

**University of Buckingham  
School of Life Sciences**

by P. Roy Wiles

## 1. Name of the institute

1.1 University of Buckingham  
School of Life Sciences

## 2. Connections

2.1 School of Life Sciences  
Hunter Street  
Buckingham, Bucks.MK 18 1EG  
UK

2.2 Tel. (0280) 81114080, ext. 2246  
Tel. (0280) 820246 (direct line)

2.3 Fax (0280) 822245

## 3. Research facilities

3.1 Two research scientists (scientific staff and postdocs)

3.2 One crayfish researcher: Dr. P.R. Wiles, (ecology and animal behaviour)

3.3 University laboratories, aquaria

## 4. Research programmes

4.1 Population biology and feeding ecology of signal crayfish in lowland rivers

4.2 Undergraduate projects on burrowing behaviour and competition for hole space

4.3 Applications of a microchip technique for permanently tagging crayfish

## 5. The most important problems in crayfish research

Impact of signal crayfish in lowland rivers

**University of Leicester  
Department of Zoology**

1. Name of the institute
  - 1.1 Department of Zoology  
University of Leicester
  
2. Connections
  - 2.1 School of Biological Sciences  
University of Leicester  
Leicester, LE1 7 RH  
U.K.
  - 2.2 Tel. 0533 5233344
  - 2.3 Fax 0533 5233330
  
3. Research facilities
  - 3.1 10 research scientists (academic staff)
  - 3.2 Three crayfish researchers:
 

Dr. R.R. Harris. Ecotoxicology and ecophysiology of crayfish. Salt and water balance in *Pacifastacus leniusculus* and *Austropotamobius pallipes*

Dr. P.J.B. Hart. Predation of crayfish, behavioural ecology, foraging behaviour, *Pacifastacus leniusculus*

Dr. D. Harper. Freshwater ecology, conservation, natural resource management. Postgraduate research students funded by NERC, SERC and ESF
  - 3.3 Current facilities
 

Laboratories, constant-temperature rooms, aquarium rooms freshwater tank rooms
  
4. Research programmes
  - 4.1 Current
 

Effects of nitrogenous pollutants, ammonia and nitrate, heavy metals on crayfish. Scope for growth measurements in crayfish 1988-

Predation of juvenile and adult *Pacifastacus* by eels 1990-

Conservation ecology of lowland river systems, eutrophication effects on macrofauna
  
5. The most important problems in crayfish research
 

Depletion of native crayfish stocks

Effects of water quality changes on native and introduced crayfish populations

**School of Pure and Applied Biology**

1. Name of the institute
  - 1.1 School of Pure and Applied Biology
2. Connections
  - 2.1 PO Box 915  
Cardiff, CF1 3 TL  
U.K.
  - 2.2 Tel. 0222 874 000 (Field station 0597 89308)
  - 2.3 Fax 0222 874 305 (Field station 0587 89381)
3. Research facilities
  - 3.1 50 research scientists
  - 3.2 Crayfish researchers: Dr. F.M. Slater, ecology and four others  
(*Austropotamobius pallipes*)
  - 3.3 Laboratories, culture facilities, outdoor facilities in Cardiff and at Field Station in mid-Wales
4. Research programmes
  - 4.1 Current  
Monitoring spread of crayfish plague in mid-Wales
  - 4.2 Planned  
Impacts of crayfish introductions into the Atlantic Islands
5. The most important problems in crayfish research
  - Crayfish plague
  - The spread of *Pacifastacus*

*Acknowledgements:* We are most grateful for the information obtained from the following members of the EIFAC Working Party on Crayfish and EIFAC correspondents:

ACKEFORS, H. (Sweden), ADÁMEK, Z. (Czech Republic), AGERBERG, A. (Sweden), APPELBERG, M. (Sweden), ARRIGNON, J.C.V. (France), BLAKE, M. (Ireland), BOHL, E. (Germany), BOWLER, K. (United Kingdom), BURBA, A. (Lithuania), CELADA, J.D. (Spain), CERDÁ, M.J. (Spain), CORREIA, A.M. (Portugal), DAVIES, J. (United Kingdom), DOBROVOLSJKIS, R. (Lithuania), ENELL, M. (Sweden), FAIRLEY, J. (Ireland), GÉRARD, P. (Belgium), GRIMBAS, M. (Greece), GYDEMO, R. (Sweden), HABSBURGO-LORENA, A.S. (Spain), HAMRIN, S. (Sweden), HOLDICH, D. (United Kingdom), HOLTHUIS, L.B. (Netherlands), HÅSTEIN, T. (Norway), ILHÉU, M. (Portugal), JENSEN, F.B. (Denmark), KAILA, K. (Finland), KARLSSON, S. (Sweden), KARPLUS, I. (Israel), KELLER, M. (Germany), KISS-DALA, L. (Hungary), KIVIVUORI, L. (Finland), KOREIVA, C. (Lithuania), KOSSAKOWSKI, J. (Poland), LARSSON, K. (Denmark), LINDQVIST, O.V. (Finland), LOWERY, R. (United Kingdom), MACKEVICIENÉ, G. (Lithuania), MORIARTY, C. (Ireland), PAAVER, T. (Estonia), RANTAMÄKI, J. (Finland), RASMUSSEN, G. (Denmark), REYNOLDS, J. (Ireland), SKURDAL, J. (Norway), STAUB, E. (Switzerland), STEPHANOU, D. (Cyprus), SÖDERHÄLL, K. (Sweden), TAUGBØL, T. (Norway), TUUSTI, J. (Estonia), VATANSEVER, H. (Turkey), WARNER, G.F. (United Kingdom), WICKINS, J.F. (United Kingdom), WILES, P.R. (United Kingdom), ZABLECKIS, J. (Lithuania)