

(surface mail expenses included). Make payment to the International Association of Astacology's bank account, Credit Lyonnais, 1 Place Bel Air, Geneve, Switzerland, Compte No 39128. 4. 00. 001.

2. Freshwater crayfish V(1983) - Van Nostrand Reinhold, 115 Fifth Avenue, New York, New York 10003, USA. Cost is approximately \$ 35 plus postage and handling. Check for exact price.

3. Freshwater crayfish VI (1986) - Prof. Per Brinck, Ecology Building, University of Lund, S-223 62 Lund, Sweden. Cost is \$ 30 plus \$ 5 surface postage.

4. Freshwater crayfish VII (1988) - Prof. Pierre Goeldlin, Directeur du musse Zoologique, 6 Place de Riponne, CH-1005 Lausanne, Switzerland. Cost is 63 Swiss francs.

IAA MEMBERSHIP

Dues for the period April 1990 - April 1992 are now due. A membership form is enclosed for your convenience. Please pay your dues promptly.

Whether you have paid your dues nor not, please make copies of the dues form and recruit additional IAA members. Membership is open to anyone or any firm with a strong interest in astacology. Use the application form. Those with monetary exchange problems may petition the secretariat for a reduction in dues to \$12.50 for regular dues or no dues. A statement that demonstrates keen interest in and contributions to astacology must accompany any request for reduced dues or no dues.

Do not hesitate to join the IAA, all members are sent back newsletters and any other mailings for the whole membership period. This means you get full credit for your dues whenever you join.



How to catch crayfish? Here is one method which can be recommended for sampling crayfish for scientific purposes. You just have to catch the fox first. This figure were also send by member Reinhard Spitzzy (Gut Hinterthal, A - 5761 Maria Alm, Austria). We challenge other members to mail illustrations to the secretariat, and thank you to Reinhard Spitzzy.



Crayfish NEWS

IAA Newsletter

Volume 12, Number 4 October 1990

IAA

The International Association of Astacology (IAA), founded in Hintertal, Austria in 1972, is dedicated to the study, conservation, and wise utilization of freshwater crayfish. Any individual or firm interested in furthering the study of astacology is eligible for membership. Service to members include a quarterly newsletter, membership directory, bi-annual international symposia and publication of the journal Freshwater Crayfish.

Secretariat

The International Association of Astacology have a permanent secretariat. The Secretariat is managed by Jay Huner and the address is IAA Secretariat, P.O. Box 44650, University of Southwestern Louisiana, Lafayette, Louisiana 70504, USA; phone (318)231-5239/ fax (318)231-5395.

Officers:

•David Holdich, President, Dept. of Zool., Univ. of Nottingham, Nottingham NG7 2RD, England

•Jay Huner, President-Elect Crawfish Center Univ., Southwestern Louisiana, Lafayette, Louisiana 70504, USA

•Jostein Skurdal, Sec./Treas., County Environ. Prot. Dept., Statsetatenes hus, N-2600 Lillehammer, Norway

•James F. Payne, Past President Dept. of Biology, Memphis State University, Memphis, Tennessee 38152, USA

CONTENTS

Letter from president	p. 2
The presidents of IAA	p. 3
Worldwide crayfish news	p. 4
Membership application form	p. 7
Recent publications	p. 9
New members	p. 10

FROM THE EDITORS

We hope that you find the new format effective and acceptable. Suggestions for improvement are always welcome but remember that our dues are minimal and almost all work done by your officers and board members is accomplished without direct compensation.

We now have about 50% renewals on dues (September 4, 1990). Check your records. If you have not paid, please do. Whether you have or have not paid, please recruit a new member(s). Checks will be returned to those who mistakenly send a second check.

In the next 2-3 months, all members will receive copies of the abstracts from the Eighth International Symposium held in Baton Rouge, Louisiana. Manuscripts for Freshwater Crayfish, A Journal of Astacology, Volume 8, are due in Baton Rouge on 1 October 1990. Publication in spring 1990 is anticipated. A list of members including their addresses will be mailed before the end of October. This will not be our regular Directory of Astacologists. That will be published in early 1991. Deadline for receipt of materials for the Directory is 1 December 1990. All members, in good standing, will be listed, at least with name and address.

Please send us information on the enclosed forms and help us in presenting a useful newsletter.

Jay Huner and Jostein Skurdal

LETTER FROM PRESIDENT

Fellow astacologists,

As the new President of the I.A.A. I would like to extend a welcome to all members old and new. Although the Association is in a healthy state both financially and in terms of membership I hope that we can increase membership substantially in the next two years - please do everything you can to encourage fellow astacologists to join. A special prize will be given to the member recruiting the most new members by the next symposium. If you have not paid your dues then please save the Secretary time by doing so as soon as possible. The Association has come a long way since the initial meeting in Austria in 1972 and I would hope that you will continue to support it for many years to come.

The Executive Board has now been set up and consists (in addition to the Officers) of: Larry de la Bretonne, Jr. (Baton Rouge, USA) Per Brinck (Lund, SWEDEN) Jakov Cukerzis (Vilnius, Lithuanian SSR) Magnus Furst (Drottningholm, SWEDEN) Michael Geddes (Adelaide, AUSTRALIA) Charles Goldman (Davis, California, USA) Ossi Lindqvist (Kuopio, FINLAND) Walter Momot (Thunder Bay, CANADA) Julian Reynolds (Dublin, IRELAND) Kai Westman (Helsinki, FINLAND) Patric Bagot (Sapanca, TURKEY)

A Permanent Secretariat has been set up at the University of Southwestern Louisiana, Lafayette and will be manned by Jay Huner. This will give a firmer footing for the association. However, it is still planned to have a separate Secretary/Treasurer who will remain in office between symposia and who will look after the Newsletter and funds etc. Currently this is Jostein Skurdal of Norway and he is to be congratulated on the new style Newsletter he has created. The editors rely on members sending in items for inclusion in the newsletter so please help by sending them to Jostein of Jay along with any papers/articles you publish. Items are particularly welcome from members outside of North America, Western Europe and Australia where it is sometimes difficult to know what is happening with regard to crayfish farming, academic research, alien introductions, conservation of native stocks etc. I would, therefore, like to encourage members in Central and South America, New Zealand, Asia, Eastern Europe and Africa to contribute items on such issues.

Many of us attended the 8th International Symposium in Baton Rouge in April. This was an excellent meeting and once again I would like to

extend thanks on behalf of those who attended to the organisers, particularly Larry de la Bretonne and Robert Romaine, for all their efforts. A call for manuscripts has now been put out and we look forward to seeing "Freshwater Crayfish VIII" in print before too long.

The 9th Symposium will be held at the University of Reading, England from 5-10th April, 1992 and will be organised by George Warner of that university and myself. This will mark the Association's 20th anniversary so please make every effort to attend. Universities are very popular venues for conferences in England - this is why we have had to announce details so early on. It would help us greatly if you could let us know if you are considering attending so that block bookings for accommodation can be made (see form in the last newsletter).

The aims of the association are to encourage the scientific study of crayfish for the benefit of mankind; to provide for dissemination of research findings relating to crayfish; and to develop an international forum for the free discussion of problems relevant to crayfish. A glance at the seven published volumes of "Freshwater Crayfish", which contain 316 papers, will show that we are meeting these objectives. In *Freshwater Crayfish IX* I intend to produce an alphabetical list of papers produced in Volumes I-IX and to make some attempt at indexing them - if anybody would like to help then please contact me! I urge all members to try and attend the symposia regularly so that they can air their views - conservationists and aquaculturists alike! The resolution passed by members at the 1987 Lausanne meeting is proving a useful document and a number of European countries are now doing more to protect their indigenous stocks and to control transportation of living crayfish. Similar recommendations have now been made by the Standing Committee of the Council of Europe on "Conservation of European Wildlife and Natural Habitats" to member countries of the Bern Convention. Ironically, it is my own country which is dragging its feet on this issue and outbreaks of crayfish plague and expansion of wild signal and Turkish crayfish populations continue to the detriment of the single native species. It is hoped to review the problems caused by transplantations at the 1992 symposium. If you have any information relating to this issue which you think might be of interest then please forward it to me or, better still, write a piece for the Newsletter.

David Holdich, IAA President (Nottingham Univ. Nottingham NG7 2RD, England)

THE PRESIDENTS OF IAA

For historical perspective, it may interest members to know who the presidents of IAA have been. These have included:

1972-74	Professor Per Brinck, University of Lund, Lund, Sweden.
1974-76	Professor James W. Avault, Jr., Louisiana State University, Baton Rouge, Louisiana USA.
1978-81	Dr. John Mason, British Columbia, Canada.
1976-78	Professor Ossi Lindqvist, University of Kuopio, Kuopio, Finland.
1981-84	Mr. A. Stellan Karlsson, Simontorps Aquaculture, Blentarp, Sweden.
1984-87	Professor Pierre J. Laurent, I.N.R.A., Thonon-les-Bains, France.
1987-90	Professor James F. Payne, Memphis State Univ, Memphis, Tennessee, USA.
1990-92	Dr. David Holdich, University of Nottingham, Nottingham, England.

This beautiful crayfish was on the head of the letter received from Reinhard Spitz, Gut Hinterthal, A-5761 Maria Alm, Austria.



IAA LAPEL PINS AND 1990 SYMPOSIUM POSTERS AVAILABLE

Attractive IAA Lapel Pins are available to members at the basic cost to the association - \$4.00 each including air mail postage. The IAA Symposium Poster, 4-color, featured in the last newsletter is available for \$15.00 each including air mail postage. Direct orders in US dollars to the IAA Secretariat, P.O. Box 44650, University of Southwestern Louisiana, Lafayette, Louisiana 70504, USA.

LOST MEMBERS, NEWS FROM TURKEY & YABBIE CULTURE!!!!

Records for new memberships taken at the Lund, Sweden IAA meeting and the year following, 1984-85, were lost. As a result, some people were "lost." Unless these people subsequently contacted IAA,

they have remained lost, creating, no doubt, ill will. One such individual is Patrick Bagot (Balik Oretim Merkezi, Kurtkoy-Sapanca, P.K. II, 54600 Turkey). He sent the following information about his work in Turkey and Australia. "I am working through the School of Aquatic Products, Istanbul University, and working on restoration of 'Kerevit', *Astacus leptodactylus*, to some of the lakes in Turkey. We are building a small 'pilot' breeding unit here at the research unit at Sapanca and hope to have some results by about next May-June. My particular experience is with the Yabbie, *Cherax destructor*, in which matter, I am very fortunate to have had quite 'interesting' success. The yield from 28,000m² of still-water ponds last year, (1989-1990), was 15,256 kgm or 5.1 tonnes/ha. Most of my Australian colleagues find the yield difficult to believe, but they cannot dispute the facts. I will be utilizing my experience with the yabbie to produce good results with *Astacus leptodactylus*."

If you know of someone who was lost to IAA in 1984-85, please contact the Secretariat or ask the individual to do so.

ENGLISH CRAYFISH NEWS

IAA President David Holdich (Dept of Zoology, Univ of Nottingham, Nottingham NG7 2RD, England) advises that he is working with Australian red claw (*Cherax quadricarinatus*) and has reared them from eggs to breeding adults in 10 months. He notes that the quantities of signal crayfish (*Pacifastacus leniusculus*) are becoming very large in some English rivers. However, the government is waking up to the fact and it is hoped that measures will be taken to control their spread and conserve native species. Likewise, the Turkish crayfish, *Astacus leptodactylus* is becoming something of a nuisance, too, and similar attention is now being paid to the situation.

CHECKLIST OF AMERICAN CRAYFISHES

Honorary Life Member Dr. Horton H. Hobbs, Jr. (Dept. of Invertebrate Zoology, Smithsonian Institution, Washington, DC 20560 USA) has published a new booklength checklist of American crayfish. The reference is:

Hobbs, H. H., Jr. 1989. An Illustrated Checklist of the American Crayfishes (Decapoda: Astacidae, Cambaridae, and Parastacidae). Smithsonian Contributions to Zoology. 480:1- 236.

This text provides a key to the 379 recognized living and two fossil species and subspecies of American crayfishes recognized as of January 1, 1988. Composition and locations of type series are given as are type locality, range, and habitat of each organism. Appendix 1 provides an alphabetical list of American crayfishes and country, state, and/or province in which they live. Appendix 2 is a list of state and countries and their crayfish faunas and pertinent references. Appendix 3 provides information on 1988 and 1989 descriptions. Erroneous spellings and synonyms are given.

CONSERVATION REPORT FEATURES *AUSTROPOTAMOBIOUS PALLIPES*

Member John Foster (School of Pure and Applied Biology, University of Wales College, Cardiff, P.O. Box 915, Cardiff CF1 3TL, Great Britain) has sent a copy of a final report on the conservation and ecology of *Austropotamobius pallipes* in Wales. The report deals quantitatively with habitat and water quality factors affecting *A. pallipes*' distribution and abundance (expressed as numbers and biomass), reproductive biology, incidences of porcelain disease and rust disease, predation on *A. pallipes*, pollution effects, population studies and stockings. The reference is:

Foster, J. 1990. Conservation and Ecology of the Crayfish *Austropotamobius pallipes* (Lereboullet) in Wales and the Marches in Relation to Habitat, Water Quality and the Threat of Crayfish Plague. Final Report, Worldwide Fund for Nature/ Contract 89/87. School of Pure & Applied Biology, University of Wales, Cardiff CF1 3TL, Great Britain. 68 pages plus several appendices.

Dr. Foster has asked that the publication be made available through the Secretariat. Cost of duplication is \$6.00 US and surface postage is \$5.00 US, total \$11.00 US.

PROCAMBARUS CLARKII IN THE PHILIPPINES

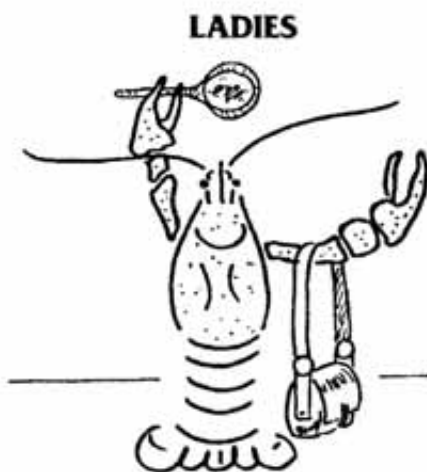
The following promotional material was found in a 4-color calendar from Bio Research (8362 Dr. A. Santos Ave. (Sucat Rd.), Sucat, Paranaque, Metro Manila, Philippines). "Louisiana Red Crayfish - easy to grow, very hardy, international delicacy in USA, Europe and Canada. Can be grown with rice. Requires low cost feeds (dried rice straw, kohol, lablab, etc.)."

If *P. clarkii* is not yet successfully introduced into the Philippines, it can only be a short time before it is widely introduced based on the commer-

cial appeal that such advertising provides.

AUSTRALIAN CRAYFISH CULTURE PUBLICATION

A "National Symposium on Freshwater Crayfish Culture" was held in Perth, Australia May 26-27, 1990. The proceedings are now available and cost is \$50 Australian. To order, contact Dr. Louis Evans, Medical Technology, Curtin University, GPOBox U 1987, Perth, Western Australia 6001, Australia. Phone:(09) 351-7423/Fax (09) 351-2342.



This figure, sent from member Reinhard Spitz (Gut Hinterthal, 5761 Maria Alm, Austria) showed the way to the "Ladies room" at the first IAA-symposia in Hinterthal, Austria, in 1972.

THE CRAYFISH SITUATION IN DENMARK

This piece is provided by Denis Neergaard (Valdemarskildevej 10, DK-4200 Slagelse, Denmark). During the years around 1910, the crayfish plague epidemic decimated the existing populations in Denmark, leaving only a small number of *Astacus astacus* in the more isolated waters. By 1940, the crayfish populations had again increased, also in the larger lakes and in many rivers. The introduction of a large eel population combined with the growing pollution of the rivers, however, resulted in a new set back for the species which could only exist in the small lakes totally free of eel. An attempt to intensify crayfish production during the 1940s was unsuccessful due to a lack of fry. Today, fry of the species *Astacus astacus* are produced commercially in Denmark, so the problem of the 40's has been somewhat relieved.

Since 1970, the population of *Pacifastacus leniusculus* - originally imported from Sweden - has increased throughout Denmark. This has occurred to the great pleasure of *Pacifastacus leniusculus* breeders but under numerous protests from proponents of *Astacus astacus* populations. Import of *Pacifastacus leniusculus* is now in reality prohibited and spreading of the species within the country is faced with many restrictions. The species may only be moved to pond farms or privately owned bodies of water where eventual outlets are blocked off.

Since 1970, the species *Astacus leptodactylus* has also been imported to, and spread throughout Denmark, especially in the eastern part of the country. A sizeable population of this less valuable and, therefore, undesirable species, is now found in that region.

The re-establishment of good, but smaller crayfish waters and the establishment of new ones, has increased greatly in the past few years. As a result, crayfish production is expected to become a lucrative niche in agricultural production.

BULGARIAN MEMBER SEEKS NEW POSITION

Dr. Raina Avramova (4, Solna, 8200 Pomorie, Bulgaria) has been a long-time member of IAA. She has done quite a lot of work in the areas of culture, marketing, and processing of *Astacus* spp. She has written to say that she and her husband, a professional aquaculturist, are seeking employment. Interested individuals may contact her at the address provided above.

LATIN AMERICAN ASTACOLOGISTS SEEK INFORMATION ABOUT FRESHWATER CRAYFISH BIOLOGY AND CULTURE

The following individuals seek to correspond with IAA members about the subjects of freshwater crayfish biology and culture:

- Dr. Daniel Roccatagliata, Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Biología, Ciudad Universitaria, 1428-Buenos Aires, Argentina.
- Xavier Romero M., P.O. Box 5554, Guayaquil, Ecuador.

YABBIE FARMING RESEARCH AT ADELAIDE UNIVERSITY

The University of Adelaide sponsored a series of information exchange seminars on 16 September 1989 entitled "An Introduction to Yabbie Farming." Topics covered included: the general biology of the

yabbie (*Cherax destructor*); a look at the potential sites in the state of South Australia and the criteria for site selection; the economic considerations when deciding whether to invest in yabbie farming; legal requirements related to fish farming in South Australia; and marketing, both local and international. Information about the publication coming from these seminars may be obtained from IAA Member Martin Smallridge, Zoology Department, University of Adelaide, P.O. Box 498, Adelaide, South Australia 5001, Australia. [Information from *Austasia Aquaculture Magazine*, Vol. 4, Number 9, April 1990].

IAA TO PARTICIPATE IN THE ANNUAL MEETING OF THE AMERICAN SOCIETY OF ZOOLOGISTS

The annual meeting of the American Society of Zoologists is scheduled for December 27-30, 1990 in San Antonio, Texas, USA. Dr. David Bechler will be IAA's representative at this meeting. Dr. Bechler's address is Dept. of Biology, P.O. Box 10037, Lamar University, Beaumont, Texas 77710, USA. Additional information about the meeting itself may be obtained from the American Society of Zoologists, 104 Sirius Circle, Thousand Oaks, California 91360 USA.

INFORMATION ABOUT NUTRITIONAL VALUE OF CRAYFISH FLESH

The following information is provided in a short publication by the Louisiana Cooperative Extension Service (Louisiana State University, Baton Rouge, Louisiana 70803, USA). It pertains to abdominal flesh from *Procambarus* spp.

- Par-boiled Crayfish Flesh - Per 100 grams - calories, 89; fat g, 1; protein g, 19; cholesterol mg, 139; and sodium mg, 53.
- Par-boiled Crayfish Flesh Further Cooked with Moist Heat - Per 100 grams - calories, 114; fat g, 1.35; protein g, 24; cholesterol mg, 178; and sodium mg 68 (without added salt).

Hepatopancreas material, often called "fat", is frequently packed with crayfish flesh in Louisiana at rates around 10% of the total weight. This material has a cholesterol level of 500 mg per 100 g. It should be washed away from crayfish flesh, if present, for those concerned about dietary cholesterol levels. Reference is: Patrick, R. M. and M. W. Moody. 1989. *Enjoying Louisiana Crawfish*. Louisiana Cooperative Extension Service Publication 2353, 4 pp. Louisiana State University,

Baton Rouge, Louisiana USA.

CALIFORNIA SIGNAL CRAYFISH FISHERY, AN UPDATE

"Growing Pains for California Crawdads" is the title of an article by Mick Kronman that recently appeared in National Fisherman (71(6):1990). In summary, catch is around 250 tonnes per year with most crayfish being captured in the summer. Size limit is about 93 mm (3 5/8 inches) total length. There are 35 serious trappers who fish the sloughs and main channels

of the San Joaquin-Sacramento River Delta using long lines with heavy duty traps. Favored bait is cheap canned dog food. There is concern about overfishing reducing yields and total sizes but there is apparently no regulation with the exception of a size limit. Virtually all of the crayfish are processed for the Swedish market. Price to fishermen averages \$2.75/kg. Commercial fishermen are prevented from harvesting crayfish from lakes such as Lake Tahoe for political reasons rather than sound biological ones. Recreational interests object to esthetically displeasing harvesting boats and removal of sport fish foods. Crayfish production would surely increase greatly if commercial interests were given access to those waters.

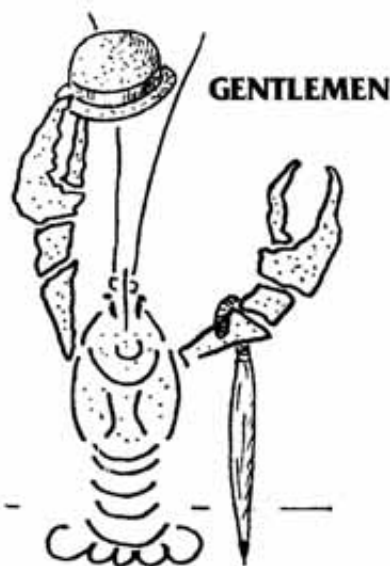
LOUISIANA CRAYFISH PRODUCTION, 1989-90 SEASON

The Louisiana crayfish 1989-90 season saw a reduction of culture area by about 10% to around 48,000 ha. Demand was steady throughout the season and farmers were able to harvest well into the spring because cheaper, competitive wild crayfish were in short supply. Large crayfish commanded prices of over \$2/kg for the Swedish export market but still represented less than 10% of total production. A very hard freeze in December 1989 apparently did little damage to the crayfish directly but destroyed much forage plant material so that stunting at very small, less valuable sizes was common. Soft-shell crayfish were available at prices around \$13.20/kg but many producers did not operate because of poor demand when the season began. Aggressive marketing, however, stabilized the situation.

INTENSIVE SOFT-SHELL CRAYFISH SYSTEM COMPUTER APPLICATION PROGRAM DESIGN MANUAL AVAILABLE

The following computer program and user's manual is available from the Louisiana Sea Grant Program

(Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana 70803 USA) for \$10 US. Thomasson, M. P. and R. F. Malone. 1989. User's Manual Computer Application Program Optimum Biofilter for Design of Soft Crab and Crawfish Shedding Systems. Louisiana Sea Grant College Program, Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana USA. It is designed for use with IBM PC's and compatible computers using DOS 2.0.



This figure, sent from member Reinhard Spitz (Gut Hinterthal, A - 5761 Maria Alm, Austria) showed the way to the "Gentlemen room" at the first IAA-symposia in Hinterthal, Austria, in 1972.

MISLEADING INFORMATION ABOUT CRAYFISH QUALITY

One of us (JVH) was asked by Greenpeace in Sweden to comment about the quality of Louisiana crayfish exported to Sweden. Without going into specific detail the following excerpts from the message sent to Greenpeace are presented for the membership to review. "...The crayfish exported to Scandinavia represent the best quality produced in Louisiana. All processors are carefully checked by public health services for cleanliness and sanitation. Those exporting to Scandinavia, as far as I know, employ their own sanitation specialists to monitor

microbiological contamination."

"...The Scandinavian consumer should judge the products exported to them on the basis of quality and cost. To the best of my knowledge, all crayfishes processed under Swedish quality control standards, regardless of species and national origin, are palatable and wholesome. I wish to assure you that this, most certainly, applies to products originating in the state of Louisiana, USA..."

The commercial crayfish business is just like any other. There is competition. The relative merits of any product must be based on facts, not hearsay. The IAA will not be a party to the perpetuation of unfair trade tactics.

CRAYFISH VS CRAWFISH

Are the editors confused or are the use of crayfish and crawfish following definite rules? In general we use crayfish, however, when we present information from the Crawfish Tasting and Trade Show we use crawfish. Likewise, crawfish is used whenever it refers to a name of an organization or event where crawfish is part of that name.



Illustration from the Finnish crayfish symposium brochure showing a medieval crayfish party.

CRAYFISH SYMPOSIUM IN FINLAND

August 23 - 24, 1990, Finnish and Swedish crayfish experts were gathered in Tavastehus, Finland, to discuss different aspects on the crayfish or rapu in Finnish. Subjects included biology, management and



IAA-secretariat
P.O.Box 44 650
Univ. of Southwestern Louisiana
Lafayette
Louisiana 70 504
USA

Membership application 1990 - 1992

Name:

Address:

Field of interest & species:.....
Fees: Regular US\$25 Student US\$12.50 Business US\$50

Orders
IAA Label pins US\$4
8th IAA symposia poster(signed) US\$15

No
No

Must be paid in US\$ to secretariat. Check in USA or international money order or draft drawn on an American bank.

aquaculture. For more information contact Kai Westman (Finnish Game & Fisheries Research, POBox 202, SF - 00151 Helsinki, Finland)

CRAYFISH PLAGUE MEDICINE

Kenneth Söderhäll (Inst. Physiol. Bot., Univ. of Uppsala, POBox 540, S-751 21 Uppsala, Sweden) reports to Fiskvård no 3, 1990 that an agency has been developed which can prevent the spread of crayfish plague in aquaculture. A salt-mixture is added to the water and the crayfish plague fungus on noble crayfish is killed. The cure is not yet effective on signal crayfish. Söderhäll hopes that the mixture will be ready for commercial use this autumn.

NOBLE CRAYFISH VS SIGNAL CRAYFISH

Björn Söderbäck (Inst. of Limnology, Univ. of Uppsala, POBox 557, S-751 22 Uppsala, Sweden) reports to Fiskvård no 3, 1990 on his studies of coexisting noble and signal crayfish. The two species have coexisted for nearly 20 years. The lake were infested by crayfish plague in 1970 and signal crayfish were released in 1973. Ten years later noble and signal crayfish were equally abundant, however, in recent years signal crayfish outnumber noble crayfish by a factor of 5. Why? This is the question Söderbäck will try to solve in his three year research programme.

SWEDISH CRAYFISH REGULATIONS

Magnus Fårst (Institute of Freshwater Research, Drottningholm, S-170 11 Drottningholm, Sweden) has given the following information on Swedish crayfish regulation changes. It is allowed to import live noble crayfish from some European countries, e.g. from Greece which is exporting 5 - 7 tonnes per year. These crayfish are cooked at night on the day the season starts and come on the market in Stockholm quickly and before the Swedish crayfish which must be trapped first. The foreign crayfish arrives at Arland Airport outside Stockholm in a sealed container which is transported to a safe place where the sealing is broken and the crayfish boiled. Nobody but the cooks and the border veterinary is allowed to stay in the room and the doors are locked. All the material used is disinfected and put back in the container which is sealed by the border veterinary and sent back.

Thus the association of the landowners also wants to be able to catch crayfish before the start of the fishing season. The Swedish government are therefore now planning to change the law and remove

regulations on fishing season and size limits. These regulations should be locally adapted by local landowners.

CRAYFISH RESEARCH IN NORWAY

Trond Taugbøl and Jostein Skurdal (County Environmental Administration, Statsetatenes hus, N-2600 Lillehammer, Norway) are involved in several ongoing projects.

1. Crayfish plague. Management strategies to impede better control on those fishing crayfish as well as local landowners. Presently all crayfish trapping is forbidden in the south-eastern part of Norway (this is where we have our crayfish populations) and those who want to catch crayfish have to apply for a licence from the county veterinary authorities. Restocking areas where crayfish have been wiped out, ie the Glomma river, were initiated in 1989, and will continue in 1991. Establishing population in areas outside the natural distribution area to secure material for potential re-stocking were started last year and we plan to secure nearly 10 live-stocks. We are also monitoring areas with crayfish plague and neighbouring areas, as well as new outbreaks of crayfish plague.
2. Establishing new crayfish localities and follow the population development.
3. Electrophoretic and morphometric examination of some 10 populations.
4. Habitat improvements in a lake area with homogeneous bottom substrate, ie introducing 10 cm plastic pipes.

RECENT PUBLICATIONS

Ackefors, H. and R. Gydemo, and L. Westin. 1989. Growth and survival of juvenile crayfish, *Astacus astacus*, in relation to food and density. *Aquaculture - A Biotechnology in Progress*. N. De Pauw, E. Jaspers, H. Ackefors, N. Wilkins (eds.), European Aquaculture Society, Bredene, Belgium. 365- 373.

Alderman, D. & Wickins, J. F. 1990. Crayfish culture. Ministry of Agriculture, Fisheries & Food, Directorate of Fisheries Research, Laboratory Leaflet 62: 16 pp. Lowstoft.

J. Bikuna de, B. G., Docampo, L. & Asensio, R. 1989. Distribution et autoécologie de l'écrevisse à pattes blanches, *Austropotamobius pallipes* (Ler.) à Bizkaia (Pays Basque, Espagne) *Annls Limnol.* 25 (3): 219 - 229.

Bohl, E. 1989. Untersuchungen an Flusskrebsbeständen. Bayerische Landesanstalt für Wasserforschung, 8021 Weilenbach, R. F. A.: 237 pages.

Chambers, P. A. 1990. Aquatic plant chemistry and morphology in determining feeding selectivity in the crayfish *Orconectes virilis*. *Bulletin of the Ecological Society of America* 71(2):116-117. abstract.

Crowl, T. A. 1989. Effects of crayfish size, orientation, and movement on the reactive distance of largemouth bass foraging in clear and turbid waters. *Hydrobiologia* 183:133- 140.

D'Abramo, L. R. and E. H. Robinson. 1989. Nutrition of crayfish. *Reviews in Aquatic Sciences* 1:711-728.

Dellenbarger, L. E., A. R. Schupp, and H. O. Zapata. 1990. Consumer and grocery store experience with crawfish in four selected U.S. cities. Department of Agricultural Economics and Agribusiness A.E.A. Information Series No. 81, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana.

Duris, Z. 1989. Freshwater crayfish (Crustacea Decapoda) distribution on the Ostravice River drainage area (Norther Moravia), and its preliminary ecological evaluation. *Studia Oecologica* 2:29-36.

Duvic, B. and K. Soderhall. 1990. Purification and characterization of a beta-1,3-Glucan binding protein from plasma of the crayfish *Pacifastacus leniusculus*. *The Journal of Biochemical Chemistry* 265: 9327-9332.

Escosa, R. 1990. L'écrevisse rouge (*Procambarus clarkii*), problèmes dans le delta de l'Ebre. *L'Astaciculteur de France* 23:2-4.

Fenouil, E. and P. J. Laurent. 1990. Le congrès international d'astacologie de Baton Rouge. [Includes an informative description of the Louisiana crayfish industry in French.] *L'Astaciculteur de France* 23:4-9.

Gydemo, R. and L. Westin. 1989. Growth and survival of juvenile *Astacus astacus* L. at optimized water temperature. *Aquaculture - A Biotechnology in Progress*. N. DePauw, E. Jaspers, H. Ackefors, N.

Reply form - Information request

Name:

Address:

Current research:

Recent publication:

Personnel news (transfer, appointments, etc):

Information on forthcoming meetings, conferences, etc:

General:

Remember to mail your new address to the IAA-secretariat!

Wilkins (eds.) European Aquaculture Society, Bredene, Belgium, 383-391.

Gydemo, R., L. Westin, and A. Nissling. 1990. Predation on larvae of the noble crayfish, *Astacus astacus* L. Aquaculture 86:155-161.

Hazlett, B. A. 1990. Source and nature of distribution. Chemical systems in crayfish. J. Chem. Ecol. 16(7): 2263 - 2276.

Huner, J. V. 1990. Biology, fisheries, and cultivation of freshwater crawfishes in the U.S. Reviews in Aquatic Sciences 2:229-254.

Huner, J. V., K n nen, H. & Lindqvist, O. V. 1990. Variation in body composition and exoskeleton mineralization as functions of the molt and reproductive cycles of noble crayfish, *Astacus astacus* L. (Decapoda, Astacidae), from a pond in central Finland. Comp. Biochem. Physiol. 96A (1): 235 - 240.

Kawai, T. 1990. The color variation of the crayfish *Cambaroides japonicus* (De Haan). Nankiseibun: The Nanki Biological Society. 32(1):20. [Although this short publication is in Japanese, it includes color plates of *C. japonicus* which are quite striking.]

Kobayashi, M., M. W. Johansson, and K. S derh ll. 1990. The 76 kD cell-adhesion factor from crayfish haemocytes promotes encapsulation in vitro. Cell and Tissue Research 260:13-18.

Kronman, M. 1990. Growing pains for California crawdads. National Fisherman. 71(6):20-22 & 76.

Mather, M. E. and R. A. Stein. 1990. Habitat-specific mortality and size-selective fish predation influence the replacement of *Orconectes sanborni* by *O. rusticus*. Bulletin of the Ecological Society of America 71(2):241. abstract.

Munkhammar, T., R. Gydemo, L. Westin, and H. Ackefors. 1989. Survival of noble crayfish (*Astacus astacus* L.) larvae alone and in the presence of females. Aquaculture - A Biotechnology in Progress. N. DePauw, E. Jaspers, H. Ackefors, N. Wilkins (eds.), European Aquaculture Society, Bredene, Belgium, 409-414.

Papadopol, M. and G. Diaconu. 1987. Contributions

to the knowledge of the astacid crayfishes from Romania. Extrait des Travaux du Museum d'Histoire Naturelle Grigore Antipa 29:55-62.

Orta, J., R. Barrera, I. de la Rosa, R. Gines, and C. Saduno. 1987. Descripci n del cangrejo de r o comercial en la especie *Procambarus clarkii*. Actas del II Congreso Nacional de Acuicultura, Santiago de Compostela, 1-4 Diciembre 1987:325- 330.

Reeve, I. D. 1990. Aspects of the biology of an introduced and a native species of freshwater crayfish. Ph. D. thesis. 381 pp. University of Nottingham, England

Sheely, M. R. J. 1990. Individual variation in, and effect of rearing temperature and body size on, the concentration of fluorescent morphological lipofuscin in the brains of freshwater crayfish, *Cherax cuspideatus* (Crustacea, Parastacidae). Comp. Biochem. Physiol. 96 (2): 281 - 286.

Taketomi, Y., M. Murata, and M. Miyawaki. 1990. Androgenic gland and secondary sexual characters in the crayfish *Procambarus clarkii*. Journal of Crustacean Biology 10:492-497.

Taugb l, T. and J. Skurdal. 1990. Reproduction, molting and mortality of female noble crayfish, *Astacus astacus* (L., 1758), from five Norwegian populations subjected to indoor culture conditions (Decapoda, Astacoidea). Crustaceana 58(2):114-123.

Thompson, A. 1990. Demand stays high for this choice of the gourmets. Fish Farmer 13(2): 105 - 108.

Thompson, A. 1990. A signal dilemma - how to get UK stocks moving. Fish Farmer 13(2): 60 - 61.

Thompson, A. 1990. Plague - some lessons to be learned. Fish Farmer 13(2): 54 - 56.

Thompson, A. 1990. Crayfish - a candidate for culture in British Columbia. World Aquaculture 21(2): 92 - 94.

Communications Presented at the 34th Congress National de l'Association Francaise de Limnologie a Metz, 28-31 May 1990. (Ces communications paraissent dans la Revue des Sciences de l'Eau apres con-

trole d'un Cmite de Lecture.)

Arrignon, J. Astaciculture et societe: l'intervention de l'ecrevisse rouge *Procambarus clarkii*.

Degjorgi, F. Elevage semi-intensif d'ecrevisse "pied rouge" (*Astacus astacus*) en milieu acide.

Fenouil, E. Predominance du facteur thermique dans la gestion des populations d'ecrevisses dans le milieu naturel, et la definition de techniques d'aquaculture.

Laurent, P. J. and J. Nicolas. La reimplantation d'*Astacus astacus* L. en etangs lorrains.

Chaisemartin, C. La microsporidiose a *Thelohania* chez l'ecrevisse pallipe: relations metaboliques: hote, parasite, complexe hote-parasite milieu.

NEW MEMBERS

Michael A Blake, Dept. of Zoology, Adrian Building, The University, University Road, Leicester LE1 7RH, England.

A. G. Thomson, 15 Meadoway Church, Accrington, Lancashire BB5 4AT, England.

E. W. Taylor, School of Biological Sciences, University of Birmingham, Birmingham B15 2TT, England.

N. M. Whiteley, School of Biological Sciences, University of Birmingham, Birmingham B15 2TT, England.

W. D. Rogers, 26 Cambrian Avenue, Chichester, W. Sussex, PO19 2JY, England

Asbj rn V llestad, Chr. Kroghsv. 38, N - 1415 Oppeg rd, Norway.

Eivind Aarseth, Bj rge, N - 6057 Ellings y, Norway.

Tore H stein, Veterinary institute, POBox 8156 Dep., 0033 Oslo , Norway.

Wu Xingyong, Department of Biology, Nanjing Normal University, Nanjing 210024, People's Republic of China.

BUSINESS MEMBERS

KREBSEFORENINGEN - This is a Danish crayfish association with 50 members. Established in January 1990, it is dedicated to production and perpetuation of crayfishes in Denmark. Chairman is Denis Neergaard, Valdemarskillevej 10, DK-4200 Slagelse, Denmark - Phone 53 54 40 60. Information about the Danish crayfish situation sent by Mr. Neergaard is presented elsewhere in the newsletter.

MINISTERE DE L'AGRICULTURE PECHERIES DE ALIMENTATION - Boulevard W. Harrel Ouest, Edifice 21 Etage, Quebec G1N 3X7, Canada. Phone: (418) 643-3846. Contact: Ms. Brigitte Portelance. The ministry is developing crayfish resources in Quebec especially *Orconectes* spp.

DIRECTORATE FOR NATURE MANAGEMENT - Tungasletta 2, 7004 Trondheim, Norway. Phone (07)- 58 05 00. Contact: Mr Steinar Sand y. The Directorate is actively promoting natural crayfish production by anti-crayfish plague regulations, liming of acidified lakes and supporting studies on crayfish biology and management.

BUSINESS MEMBERSHIP ACKNOWLEDGEMENTS

Business memberships are \$50.00 and help to offset the cost of free memberships made to astacologists from countries with currency exchange problems. Each is acknowledged in the newsletter immediately after receipt and in the Directory Astacologists published between international symposia.

ACKNOWLEDGEMENT

The secretariat has received NOK 5 000 (~\$US 850) from the Norwegian Directorate of Nature Management to support the IAA Newsletter. We are very grateful for the contribution which help us to print and mail the newsletter to all members. The Directorate are active in the conservation of the noble crayfish *Astacus astacus* in Norway.

FRESHWATER CRAYFISH, A JOURNAL OF ASTACOLOGY - AVAILABLE VOLUMES

1. Freshwater crayfish IV(1979) - Prof. Pierre J. Laurent, Avonnex a marin, F-74200 Thonons les Bains Cedex, France. Payment is 63 Swiss francs