

ADDRESS CHANGES:

Thomesen, Inge, Bjornekollen 7, N-1344 Haslum, Norway.

MISSING MEMBERS:

Please advise the Secretariat if you know the whereabouts of missing members:

Gamze, Turan. P.O. Box 17248, L.S.U., Baton Rouge, Louisiana 70893 USA.

FRESHWATER CRAYFISH

1. **Freshwater crayfish I (1973)** - Prof. Per Brinck, Ecology Building, Univ. of Lund, S-223 62 Lund, Sweden. Cost is US\$ 20 plus US\$ 5 surface postage.

2. **Freshwater crayfish IV (1979)** - Prof. Pierre J. Laurent, Avonnex a marin, F-74 200 Thonons les Bains Cedex, France. Payment is 63 Swiss francs (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.

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

4. **Freshwater crayfish VII (1988)** - Prof. Pierre Goeldlin, Directeur du musse Zoologique, 6 Place de Riponne, Case Postale 448, CH-1000 Lausanne17, Switzerland. Cost is 50 Swiss francs (reduced prize).

5. **Freshwater Crayfish VIII** - Freshwater Crayfish VIII will be published during the summer according to the editor Professor Robert P. Romaine (School of Forestry, Wildlife and Fisheries, Louisiana State University Agricultural Center, 227 Forestry-Wildlife-Fisheries Bldg, Baton Rouge, LA 70 803 - 6202, USA).

6. **Freshwater Crayfish IX (1993)** - Freshwater Crayfish, A Journal of Astacology Volume IX is available from the Secretariat. Basic cost is \$USD 25 plus postage and handling - North America = \$USD3 and All Other Regions - surface mail = \$USD 4/ air mail = \$USD 14.

7. **Freshwater Crayfish**. Some members have indicated a desire to obtain a complete series of Freshwater Crayfish, A Journal of Astacology. Anyone wishing to sell/purchase copies, especially of Vol. II and III, should contact the Secretariat so that the information may be presented in this newsletter.

Freshwater Crayfish II and III.

If anyone have extra copies I am interested in buying these two volumes which are missing in my collection. Jostein Skurdal, Eastern Norway Research Institute, P.O. Box 1066 Skurva, N-2601 Lillehammer, Norway.



Crayfish NEWS

IAA Newsletter

Volume 16 Number 1 May 1994

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 44 650, Univ. of Southwestern Louisiana, Lafayette, Louisiana 70504, USA; phone (318) 231-5239/ fax (318) 231-5395.

Officers:

• *Jostein Skurdal, President, Eastern Norway Research Inst., P.O.Box 1066 Skurva, N-2601 Lillehammer, Norway.*

• *Paula Henttonen, President-Elect, Dept. Appl. Zoology, Univ. Kuopio, P.O. Box 1627, SF-70211 Kuopio, Finland.*

• *Michele Wheatly, Sec./Treas., Dept. of Zool., University of Florida, Gainesville, Florida 32611, USA.*

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

FRESHWATER CRAYFISH, THE NEWSLETTER OF THE INTERNATIONAL ASSOCIATION OF ASTACOLOGICALY

Please send information to the Permanent Secretariat or to the editors. We appreciate any information on crayfish research, culture, publications a.s.f. We can not provide you with more information than we receive.

Jostein Skurdal and Jay V. Huner, Editors

HORTON H. HOBBS, JR., NOTED ASTACOLOGIST DIES

Dr. Horton H. Hobbs, Jr., noted astacologist, died at the age of 79 in March of this year. Dr. Hobbs was a long time member of IAA and was elected to Honorary Life Membership for his contributions to the science of astacology some years ago. Dr. Hobbs was best known as the premier crayfish taxonomist of the modern era. However, he was a most accomplished crayfish ecologist and zoogeographer who contributed most measurably in those fields as well. Dr. Hobbs' publications number into the hundreds and could not possibly be listed here. To choose a few to list would be a disservice to his illustrious career. Dr. Hobbs was an emeritus senior invertebrate zoologist at the Smithsonian Institution in Washington, DC when he died. He was active to the end of his days and a recent reference about troglolitic crayfish is listed in the recent publications section, below. Dr. Hobbs will be missed but his legacy will live on after him.

MEMBERSHIP RENEWAL APRIL 1994-1996

It is time to renew IAA membership. Second notices are enclosed in this newsletter. Please make sure that you fill out the forms and return them, if you have not done so already. The information on the forms is used for our Directory of Astacologists. IAA does acknowledge receipt of dues. If you have not heard from IAA within about 6-8 weeks of sending your dues, please contact the Secretariat. **IF YOU HAVE PAID YOUR DUES, PLEASE KEEP THE MEMBERSHIP FORM AND RECRUIT A NEW MEMBER.**

PAST PRESIDENT'S MESSAGE

I would like to take this opportunity to thank all those who have helped to make my term, 1992-1994, successful. These

include my fellow officers Jostein Skurdal, Paula Henttonen, and David Holdich, and board members, David Rogers, Julian Reynolds, Michele Wheatly, Charles Goldman, Michael Geddes, Magnus Fürst, Per Brinck, Ossi Lindqvist, Kai Westman, Walter Momot, and Aloyzas Burba. In addition, IAA received funds from several sources during my term which I wish to acknowledge. These have included the Norwegian Directorate for Nature Management, Past President Pierre J. Laurent (sales of FC IV), and The Crustacean Society. Drs. Brian McMahon and Milton Fingerman did yeoman's duty in organizing our IAA crayfish session at the December 1993 American Society of Zoologist's meeting in Los Angeles, California. The Sture Abrahamsson Memorial Foundation led by Past President Stellan Karlsson continued to support IAA through the provision of travel funds for a speaker - Kai Westman - to deliver the Sture Abrahamsson memorial lecture. David Holdich and George Warner did a wonderful job of putting together Freshwater Crayfish IX. In addition, David sent a healthy surplus from IAA IX that permitted publication of the journal. I also very much appreciate the support of our several country "IAA Correspondents" who have gone out of their ways to provide input to the newsletter and represent IAA in their countries. I realize that there is "work undone" but expect that Jostein Skurdal will provide outstanding leadership as IAA moves into the future. I leave office with IAA having over 350 members, the largest membership in IAA's 22 year history. I look forward to retention of most of those members and reaching 400, or more, by 1996.

ASSOCIATION BUSINESS

The IAA Board held two business meetings during the IAA X Symposium.

(1) **Officers** - Jostein Skurdal, President; Paula Henttonen, President-Elect; Michele Wheatly, Secretary-Treasurer; and Jay Huner, Past-President.

(2) **Financial Situation** - IAA has approximately \$US 12,000. This provides a financial cushion to ensure continued services to the membership. In addition, the modest increase in dues, \$US 10, 5, and 20 for Regular, Student, and Business/Institutional memberships, will permit additional support for student attendance at IAA Symposia and support for regional crayfish meetings.

(3) **Freshwater Crayfish, A Journal of Astacology** - FC IX has been published and is now available -

see below. The publication of FC VIII is anticipated by mid-summer 1994. An editorial committee has been formed for FC X with anticipated publication in summer 1995, if not earlier.

(4) **Position on Introductions** - President Skurdal appointed a committee to develop an amendment to IAA Bylaws to incorporate an association position on introductions. This amendment will be submitted to the membership for acceptance/rejection.

(5) **Honorary Life Members** - President Skurdal appointed a committee to develop criteria for nominating and recommending Honorary Life Memberships for the Executive Board.

(6) Future Symposia

A. President Skurdal appointed a committee to develop and organize the IAA International Symposia and benefit from the experience from those who have had the responsibility for previous symposia. The Time & Place Committee for the IAA symposia also are responsible for designing procedures to elect future symposia sites and define the requirements to be met by future organizers.

B. The Board acknowledged Thunder Bay, Ontario as the site for the IAA Symposium XI and extended thanks to organizer Walter T. Momot. The meeting will be held 6-11 August 1996.

C. The Board received an invitation from Max Keller to hold IAA Symposium XII in Germany in 1998. A decision will be made in due course.

(7) **Bibliography for Freshwater Crayfish** - David Holdich is preparing an updated and improved bibliography for Freshwater Crayfish, A Journal of Astacology which will be published in FC X.

(8) **IAA Chapters** - The issue of IAA Chapters was brought up and Australian delegates to IAA X may be the first to establish such a formal chapter. [An informal chapter was established in the People's Republic of China according to correspondent Shu Xinya.]

NEWS FROM IAA X ADELAIDE, AUSTRALIA, 10-15 APRIL 1994

The IAA X meeting was an event that saw over 50 oral and 40 poster paper presentations. Mike Geddes and his staff outdid themselves in providing Australian hospitality to astacologists from all over the world. The symposium poster featured an aboriginal style *Euastacus* which was quite a treat. The

inaugural "Crayfish Crawl" saw a number of hearty runners not only compete but complete the race.



Field trips to a yabby farm, a winery, and the South Australian Research and Development Institute were most informative and memorable. Dr. Kai Westman presented the Abrahamsson Memorial Address dealing with the introduction of signal crayfish into Finland. It was well done and especially interesting.

We will make no effort to provide a synopsis of the various sessions including the general topics of Systematics, Evolution, & Conservation; Ecology; Physiology, Anatomy & Ecotoxicology; Immunology & Disease; and Aquaculture. Members

are reminded that it is IAA's policy to provide all members with a copy of the abstracts of each symposium. These have already been mailed and members should have them upon receipt of this newsletter.

Sponsors for IAA X included: Zoology Department, University of Adelaide; Primary Industries of South Australia (Fisheries); South Australian Research and Development Institute; Farmed Yabby Company (especially Mrs. Carol Schofield); and ANZ Banking Group.

One last comment is appropriate. Honorary Life Member and IAA Founder Reinhardt Spitzzy honored IAA by attending the Adelaide meeting despite his advanced years. He presented a fossil freshwater crayfish, a very fine specimen, indeed, to President Skurdal with the understanding that this ancient crayfish will be passed from one IAA president to the next.

FRESHWATER CRAYFISH, A JOURNAL OF ASTACOLOGY VOLUME IX

Readers are reminded that Freshwater Crayfish, A Journal of Astacology Volume IX is available from the Secretariat. Basic cost is \$USD 25 plus postage and handling - North America = \$USD3 and All Other Regions - surface mail = \$USD 4/ air mail = \$USD 14. A criticism of IAA has been failure to distribute our journal more widely. However, IAA does



We have received this beautiful color print from member Max Keller. The print is from "Vögel - Fisch - und Tierbuch of Leonhard Baldner in 1666.

not have the resources for wide advertisement of our publications. We need interested readers and members to ensure that your libraries order our journal.

NATIONAL FRESHWATER CRAYFISH FARMING WORKSHOP HELD IN AUSTRALIA

The purpose of this meeting was to bring together Australian crayfish producers to examine the state of the art and provide direction for advancement. It was held 9 April 1994 in Adelaide. Some 200 tonnes of Yabbie, Red Claw, and Marron is produced annually with the bulk being Yabbie from Western Australia.

Participants brought up the need for ensuring product quality and consistency of supply for expansion to occur. Furthermore, it was necessary to work together for the common good and consider generic marketing of crayfish. Considerable concern was expressed about possible competition in international markets with Chinese crayfish products. A booklet of presentation summaries was published. Further information is available from member Martin Smallridge (Primary Industries South Australia (Fisheries), P.O. Box 1625, Adelaide, South Australia 5001, Australia).

SWITZERLAND ISSUES NEW REGULATIONS ABOUT IMPORTATION OF LIVING FRESHWATER CRAYFISH

According to an article in *L'Astaciculteur de France* [Bull. 16(1):10-11. 1994] a new Swiss regulation has been enacted to require a licence for the importation of live fish or crayfish. The licence is required for all importations including those destined for food, scientific purposes, pets, etc. "...Such an importation must be proved harmless for native fauna and flora...."

PROCAMBARUS CLARKII IS A VECTOR FOR THE CRAYFISH FUNGUS PLAGUE

Members J. Dieguez-Urbeondo and K. Söderhäll have published a paper in the journal *Aquaculture* in which they document that *Procambarus clarkii* can harbor the crayfish fungus plague, *Aphanomyces astaci*, in its cuticle as a benign infection. Under certain conditions such as depletion of hemocytes, the infection can become acute and can be transmitted to the susceptible European *Astacus astacus*. The scientists speculate that the crayfish fungus plague is endemic to North America. (See the literature section, below, for the reference for

this report.)

STATUS OF THE LOUISIANA (USA) CRAYFISH SEASON, MAY 1994

Louisiana's crayfish industry leads the world with 50,000 tonnes of average annual production. There is about 46,000 ha of culture ponds and a natural fisheries in the state's wetlands. The current 1993-94 season has been very odd. It follows a 1992-93 season where over 30,000 tonnes of wild crawfish was harvested, the greatest catch ever recorded. The wild catch is dependent on high waters in wetlands throughout the winter and spring which was the case for the current season. However, there was high water in the preceding summer and autumn from Mississippi River runoff. As a result, wild crayfish were abundant into early winter but have been scarce ever since. Early season (winter/early spring) pond crayfish were much more scarce than normal. This was apparently the result of a drought in the area during the late summer/early autumn which dried many burrows either killing brood crayfish or delaying their spawning prior to pond flooding.

The general scarcity of crayfish should, then, have led to higher prices. However, prices have been weak to poor. This has been the result of large volumes of very low-priced Chinese crayfish meat entering the US seafood market. Much of the meat came into Louisiana and led to a request by Mr. Bob Odom, Louisiana Commissioner of Agriculture and Forestry, that residents boycott Chinese crawfish meat in favor of that produced by the local industry. At this writing, frozen Chinese crayfish meat is available in state supermarkets for \$US 3.49 per 450 g package.

CRAYFISH PAPERS FROM THE INTERNATIONAL SENCKENBERG SYMPOSIUM - CRUSTACEA, DECAPODA, FRANKFURT, GERMANY, OCTOBER 18-22, 1993

IAA Correspondent Günther Vogt (Department of Zoology I, University of Heidelberg, Im Neuenheimer Feld 230, D-69120, Heidelberg, Germany) sent the abstracts dealing with crayfish biology. The authors and titles follow. Contact Dr. Vogt for further information. The proceedings of the conference are to be published in *Courier Senckenberg* in due course.

1. Life Cycle of the Red swamp Crayfish (*Procambarus clarkii* Girard) in the Lower

Mondego River Valley, Central Portugal. P. M. Anastacio & J. C. Marques.

2. Notes on Decapoda from Lithuania. A. Burba.

3. The Use of PCR and DNA Sequencing Techniques in the Determination of Crawfish Phylogeny (Astacoidea: Astacidae, Cambaridae, and Parastacidae). K. A. Crandall & J. F. Fitzpatrick, Jr.

4. Seasonal Changes in the Biochemical Composition and Energy Content of *Procambarus clarkii* (Girard, 1852), (Decapoda: Astacidae) in the River Mondego Bassin (Portugal). M. A. S. Fernandes, M. I. R. Mendonca, J. C. Marques, & M. C. Madeira.

5. Influence of Temperature on the Accumulation of Trace Metals by Red Swamp Crayfish *Procambarus clarkii* (Girard). P. Maranhao, J. C. Marques & V. C. Madeira.

6. The Introduction of Red Swamp Crayfish, *Procambarus clarkii* (Decapoda, Cambaridae) in Portugal - State-of-the-Art. A. M. Correia.

7. Role of Granular Haemocytes in Encapsulation of Hepatopancreas Tubules in Crayfish. M. Rug, V. Storch, & G. Vogt.

8. Distribution of Crayfish in the Upper Rhine Valley, Germany. H. J. Troschel.

9. Discrimination of Hemocytes of *Astacus leptodactylus* by Differential Spreading and Cytochemical Staining Methods. G. Ullrich, W. E. R. Xylander, L. Nevermann, & D. Eichelberg.

10. Histology and Cytology of the Hepatopancreas of Decapod Crustacea. G. Vogt.

11. Histological Characterization of Psorospermium haeckeli in the crayfish *Astacus astacus*. G. Vogt & M. Rug.

CULTIVATING CRAYFISH, ESPECIALLY RED CLAW, IN ZAMBIA

Member C. J. Grubb (The Crawfish Farm, P.O. Box 60287, Livingstone, Zambia) has been a pioneer crayfish farmer in Zambia. He has been successfully cultivating red swamp crayfish, *Procambarus clarkii*, for many years now with good specialty markets in his country. Mr. Grubb has been experimenting

with red claw crayfish, *Cherax quadricarinatus* for several years now. He has sent some interesting information comparing red swamp and red claw crayfish. In one test, Mr. Grubb had a red swamp crayfish female hatch out a brood of about 200 young in a 90 cm x 45 cm x 45 cm maintained with about 38 cm of water. When they reached 4 cm total length there were only 17 left. A similar red claw hatching in the same aquarium resulted in 50 juveniles roughly 7.5 cm total length. Mr. Grubb had actually counted out 43 of the red claw crayfish and then found 7 more, one with eggs, as the aquarium was very filled with very cloudy, green water. Mr. Grubb has no filtration in his aquaria, adding mesh vegetable (onion) sacks, sand, rocks, and a mass of pipes for substrate. Aeration is provided by a small air pump. A successful food was frozen freshwater sardine with egg yolk. Mr. Grubb refers to yabby, *Cherax destructor*, which he also cultivates as a "real savage" in an aquarium. He also reports that crocodiles are a real problem in his red swamp crayfish ponds.

STATUS OF CHERAX INTRODUCTION IN NEW ZEALAND

Member Ossi Lindqvist (University of Kuopio, Box 1627, FIN-70211 Kuopio, Finland) sent the following information about the status of the *Cherax* introduction in New Zealand (see past newsletters) from Dr. G. W. Coulter (Camus, Oruanui Road, Tauop, R.D.1., New Zealand). "...I have been in touch with Ewen Cameron at the Auckland Institute and Museum, and he informs me that a freshwater crayfish species [*Cherax tenuimanus*] was in fact imported from Australia and kept in ponds at a site in the north of New Zealand. However, permission to keep the species in the country was denied because of the fear of ecological impacts that it might have. The stock was ordered, by the Minister, to be destroyed. Later investigation showed some crayfish individuals had survived in the ponds, so these also were destroyed and hopefully none are left now. Environmental pressure groups are very sensitive about possible introductions, and official attitudes are cautious...."

DEAKIN UNIVERSITY, WARRNAMBOOL, VIC., AUSTRALIA, CRAYFISH STUDIES

The School of Aquatic Science and Natural Resources Management at Deakin University, Warrnambool, Victoria, Australia, offers both undergraduate and graduate degrees in various aspects of aquaculture. Parastacid crayfish are important speci-

es studied in the program with main research fields in Culture Systems, Pond Dynamics, Artificial Propagation, Nutrition, Diseases, Native Species in Aquaculture, and Genetics.

A post IAA X tour included the Warnambool facilities as a stop. Participants were very impressed with those facilities and the enthusiastic staff that took pains to explain their projects on a Sunday morning. Leading the crayfish studies at Deakin are Drs. Brad Mitchell and Chris Austin (both IAA members). Contact them at P.O. Box 423, Warnambool, Victoria 3280 Australia.

MARRON GROWERS ASSOCIATION FIELD DAY INCLUDES TOPICS OF INTEREST TO ASTACOLOGISTS

The Marron Growers Association [P.O. Box T818, Perth, Western Australia 6001 Australia] held a field day on March 13, 1994. Some interesting topics included: Genetic studies in marron - M. Henryon, Univ. Western Australia; Economic analysis of small scale marron farming - P. Smythe, Curtin Univ. & Univ. Western Australia; Application of DNA fingerprinting to identification of marron strains - J. Ingram, Curtin Univ.; Investigation of influence of stocking densities on marron growth rates - J. Roe, Curtin Univ.; and Polyculture of marron and silver perch - G. Whisson, Curtin Univ.

FREEZING CRAYFISH TAIL MEAT METHODS

The following directions were excerpted from "Cameron/Calcasieu Aquaculture Newsletter" - P.O. Drawer H, Cameron, Louisiana 70631 USA - K. Savoie. (1) Blanch live, washed crayfish by putting live crayfish in enough boiling water to cover them. Return to a boil - usually takes 7-8 minutes. (2) Quickly remove from water. Cool enough to handle. Pull off tails, peel and de-vein. Warm tails are easiest to peel. (3) Wash the meat thoroughly in cool water to remove all traces of hepatopancreas - locally called "fat." (4) Dip peeled tails in a weak solution of lemon juice and water for about a minute. Use 1/3 cup regular strength lemon juice to a quart of water - about 33 ml in 1000 ml. This helps prevent a "blue" color which often develops when frozen crayfish meat is cooked. (5) Drain and package in freezing containers or freezer bags. Remove all air. Seal airtight. Freeze at -15 C or lower.

CRAYFISH PINS AVAILABLE FROM THE NATIONAL SHELLFISHERIES ASSOCIATION, INC.

Sandra Shumway is editor of the Journal of Shellfish Research published by the National Shellfisheries Association, Inc. She writes that her association is selling a selection of shellfish pins to generate funds for its student endowment fund. The crayfish pin is a very well done and morphologically accurate *Procambarus*. Prices are: pewter version, \$USD 5, 24 K gold-plated, pewter version, \$USD 10, and painted pewter version, \$15. Contact Dr. Shumway at Natural Science Division, Southampton College, LIU, Southampton, New York 11968 USA.

IAA XI Canada



International Astacology Association

ELEVENTH SYMPOSIUM

Thunder Bay, Ontario
Canada
August 11-16, 1996

You may as well start planning for the eleventh IAA symposia in Beautiful Thunder Bay, Canada.

PSOROSPERMIUM RESEARCH CONFIRMS SELECTIVE INFECTION IN SYMPATRIC POPULATIONS OF *PROCAMBARUS CRAYFISH*

Member David Klarberg (146 Manor Parkway, Uniondale, New York 11533 USA) has been studying infection of cultured, sympatric Louisiana populations of *Procambarus clarkii* and *Procambarus zonangulus* by *Psorospermium* sp. with Jay Huner (University of Southwestern Louisiana). Klarberg examined mature, adult crayfish from over 10 sympatric pond populations in two consecutive years, 1992 and 1993. He found no appreciable difference in overall infection rates for the two species which averaged 97% in *P. clarkii* and 39% *P. zonangulus*. This study followed earlier studies involving Huner and their collaborator Paula Henttonen (University of Kuopio, Kuopio, Finland) that demonstrated this trend with fewer animals.

GENETIC DIVERSITY IN CRAYFISH FUNGUS PLAGUE

The genetic diversity in the crayfish plague fungus, *Aphanomyces astaci*, and a possibility to use DNA-probes to follow the spread and origin of this parasitic fungus.

Tien-sheng Huang, Lage Cerenius, and Kenneth Söderhäll have recently finalized a study in which they have by random amplification of polymorphic DNA analysed genetic diversity of several strains of the crayfish plague fungus, *Aphanomyces astaci* which have been isolated from the signal crayfish, *Pacifastacus leniusculus*, and two species of European crayfish namely *Astacus astacus* and *Astacus leptodactylus*. By using 8 different primers of 15 tested, it is possible to group the different fungal strain into 2 main groups. The first group A consists of strains isolated from *A. astacus* before 1970 and in the other group, B, strains isolated after 1970 and from *P. leniusculus*. During 1970 and afterwards, the introduction of *P. leniusculus* started quite extensively in Sweden. This provides also evidence that crayfish plague outbreaks in Sweden after 1970 are likely the result of legal and illegal introductions of *P. leniusculus*, since this crayfish carries the plague fungus in its cuticle and can thus spread this parasite to native European crayfish. In other words, it is now quite evident that in Sweden, the signal crayfish, *P. leniusculus*, has been responsible for the spread of this pathogen to several uninfected waters through introductions of signal crayfish. It will not also be possible to determine wherefrom a

crayfish plague outbreak originates and whether or not it is due to strains from *P. leniusculus*. [For further information, contact: Kenneth Söderhäll, Department of Physiological Botany, University of Uppsala, Villavägen 6, S-752 36 Uppsala, Sweden. Fax 46-18-559885.

TRAPS AND BAIT: A NOTE

Member Robert Cope (Northwoods Center, Route 1, Ishdaming, Michigan 49849 USA) has been collecting and using recreational crayfish traps throughout North America. These include eel traps from Southeast Asia and Europe. Corn is his most effective bait. He invites IAA members to send him sketches/pictures of traps used commercially or recreationally anywhere in the world. He offers to prepare an exhibit of ecologically sound and un-sound traps, methods of trapping, and baits for the Thunder Bay IAA Symposium in August 1996.

CRAYFISH IDENTIFICATION GUIDE FOR THE BRITISH ISLES

The United Kingdom's National Rivers Authority has published a color guide to the crayfish found in the British Isles. The publication, "A Guide to Identifying Freshwater Crayfish in Britain and Ireland," is well illustrated and includes the following sections: The Native Crayfish; Introduced Species; Crayfish Plague; National Database; Legislation and Protection; The NRA and Crayfish Conservation; and Further Reading. Inquiries should be directed to: David Holdich, Department of Life Sciences, University of Nottingham, Nottingham NG7 2RD, United Kingdom.

NEWS FROM THE YABBY GROWERS ASSOCIATION OF AUSTRALIA

The Yabby Growers Association of Australia (P.O. Box 273, Deniliquin, New South Wales 2710, Australia) has recently initiated a series of YGAA Fact Sheets. The association has also published a list of its membership along with a list of contacts in the areas of government, research, industry, and education. The available fact sheets include:

Smallridge, M. 1994. Water quality in yabbie aquaculture. YGAA Fact Sheet Series 1 No. 1, 2pp.

Ingerson, T. 1994. Dissolved oxygen: how important is it to yabbies? YGAA Fact Sheet Series 1, 2pp.

Smallridge, M. 1994. Production systems for freshwater crayfish. YGAA Fact Sheet Series 2 No. 1,

2pp.

Gray, L. 1994. Pond design: the South Australian experience. YGAA Fact Sheet Series 2 No. 2, 4pp.

Smallridge, M. 1994. Management of freshwater crayfish farms. YGAA Fact Sheet Series 3 No. 1, 2pp.

Smallridge, M. 1994. Marketing farmed freshwater crawfish. YGAA Fact Sheet Series 4 No. 1, 2pp.

STATUS OF CRAYFISH IN SPAIN DISCUSSED IN PAMPLONA, SPAIN

Member Ossi Lindqvist (Box 1627, University of Kuopio, FIN-70211 Kuopio, Finland) participated in a symposium on 17 and 18 March 1994 in Pamplona, Spain to discuss the status of native and introduced crayfish species. The symposium was sponsored by the Departamento de Ordenacion del Territorio y Medio Ambiente (C/Aihondiga, 1 - 2o, E-31002 Pamplona, Spain). Presentations and presenters included: Restocking with Signal Crayfish in Sweden and Interaction with the Native Species - Stellan Karlsson (Sweden); Restoration of the Native European Crayfish Stocks - Ossi Lindqvist (Finland); Management Strategies in Norway; Legislation, Crayfish Plague and Yield - Trond Taugbøl (Norway); Crayfish Plague and Other Crayfish Diseases - Kenneth Söderhäll (Sweden); and The Present Situation of the Crayfish Species in Navarra: A Plan of Restoration - Javier Dieguez-Urbeondo (Sweden/Spain).

INTEGRATION OF CRAYFISH AND FRESHWATER PRAWNS IN CULTURE

Member Louis D'Abramo (Department of Wildlife & Fisheries Sciences, Mississippi State University, Mississippi State, Mississippi 39762 USA) has been developing methods to "double crop" red swamp crayfish, *Procambarus clarkii*, and the freshwater prawn, *Macrobrachium rosenbergii*. A management schedule was published in Water Farming Journal (July 1992):

- (1) October-January - Ponds are stocked with juvenile crayfish at 100,000 juveniles/ha taken from separate brood ponds;
- (2) October-July - Crayfish are fed a formulated feed;
- (3) March-July - Crayfish are seined from the pond;
- (4) May - Ponds are stocked with juvenile freshwater prawns at 40,000/ha.
- (5) May-October - Prawns are fed a formulated

feed;

(6) October - Prawns are seined and drain-harvested. Ponds are refilled for crayfish.

NEW CRAYFISH AVAILABLE FOR THE AQUARIUM PET TRADE

Angels Hatchery (16375 S. W. 256th Street, Homestead, Florida 33031 USA) has issued a press release stating that the subterranean "Miami Crayfish," *Procambarus milleri*, is now available for sale. A color photo accompanying the news release shows an orange crayfish resembling the white river crayfish, *Procambarus zonangulus*, in morphology - long chelae with narrow carapace and abdomen. The crayfish apparently has functional eyes but they are much reduced compared to non-troglobitic crayfishes.

COURSE ON PROTOCOLS FOR CRAYFISH PATHOGEN METHODOLOGY

The referenced course will be held August 9-18, 1994 at Jyväskylä and Konnevesi, Finland. Sponsors are the University of Jyväskylä and the University of Kuopio, Finland and NorFA, Nordic Academy for Advanced Study. Topics are: Comparative Immunology; Parasitic and Pathogenic Organisms on Economically Valuable Aquatic Arthropods; Epidemiology; Identification Methods of Parasites and Pathogens of Aquatic Arthropods; and Nordic Network on Crayfish Research. Speakers include: Kenneth Söderhäll (Sweden), Jay Huner (USA), Trond Taugbøl (Norway), Tarja Pohjanvirta (Finland), Ilmari Jokinen (Finland), Ronald Thune (USA), Lage Cerenius (Sweden), Ossi Lindqvist (Finland), and Tellervo Valtonen (Finland). Organizers are IAA members Jari Rantamäki and Paula Henitonen. Participants will have been selected by the time this newsletter is received but inquiries about the course may be sent to: Jari Rantamäki, Department of Biology, University of Jyväskylä, P.O. Box 31, FIN-40351 Jyväskylä, Finland. e-mail: Internet: rantamak@jyu.fi.

SOUTHERN REGIONAL AQUACULTURE CENTER PROGRESS REPORT

The Southern Regional Aquaculture Center (P.O. Box 197, Stoneville, Mississippi 38776 USA) supports aquaculture research in the southern USA. Projects involving crayfish pond management including harvesting and water management - in pond and effluents have been funded by "SRAC." SRAC also supports the publication of extension

service bulletins and videos. Contact SRAC for a listing of publications and videos as well as project summaries.

DOUBLE-CRESTED CORMORANT CONFIRMED AS CRAYFISH PREDATOR IN THE USA

Jay Huner (Crawfish Research Center, University of Southwestern Louisiana, Lafayette, Louisiana 70504 USA) has confirmed that the Double-Crested Cormorant has adapted to consume crayfish in south Louisiana crayfish ponds. Furthermore, this cormorant species, formerly considered to be an obligate fish eater, uses emergent crayfish traps as resting areas. As a result, the traps are often turned over and the trapped crayfish are released. While the Double-Crested Cormorant has not yet become a major problem in the Louisiana crayfish culture industry, the numbers of migratory cormorants using ponds during the winter have increased very dramatically in the past two years, a pattern observed in the region's catfish industry roughly 5 years ago!

CRAYFISH PUBLICATIONS AND PRODUCTS AVAILABLE FROM PRIMARY INDUSTRIES, SOUTH AUSTRALIA FISHERIES

A series of crayfish culture publications are available from Primary Industries, South Australia Fisheries ((GPO Box 1625, Adelaide, South Australia 5001 Australia). Price is \$A 7 each. Titles include: Biology and Farming of the Yabbie; Aquaculture Potential of the Yabbie; An Introduction to Yabbie Farming; Water Quality Management in Freshwater Ponds; A Case Study in Aquaculture: Economic Considerations and Marketing of the Yabbie; Economics of Commercial Aquaculture of the Yabbie; Parasites and Ectocommensals of Yabbies and Marron in SA; and Marron and Yabbie Farming in South Australia. Products include heavy duty Yabbie "ball" caps at \$A 5 and Yabbie T-shirts at \$A 15.

CRAYFISH STOCKINGS IN DENMARK

According to Ferskvandsfiskeribladet 4, 1994 some 47 300 noble crayfish juveniles were stocked in natural waters in 1993 in Denmark.

EIFAC WORKING PARTY ON CRAYFISH

The Working Party on Crayfish held its 12th meeting in Rome, Italy May 21 in conjunction with the Eighteenth Session of The European Inland Fisheries Advisory Commission (EIFAC). The Working Party on Crayfish is convened by IAA-

member Kai Westman. Westman reported on the activities of the working party which include the Proceedings of the EIFAC workshop on Crayfish Management and Stocking in Kuopio (August 1990, Published in Finnish Fisheries Research 14, 1992) and the publication of an overview of Institutes, Research workers and Programmes related to research on Crayfish in Europe (To be published soon). The Working Party plan to arrange a Workshop on Catching and Sampling Methods in Crayfish Fisheries and Research in Dublin, Ireland in April 1995. The Workshop will be convened by IAA-member Julian Reynaolds. Furthermore a future Workshop on the importance of crayfish in aquatic ecosystems was proposed. The contact between the EIFAC Working Party on Crayfish and IAA is very good and the work of the two bodies meet the different demands for cooperation and activities. Those interested in more information should contact convenor Kai Westman, Finnish Game and Fisheries Research Institute, Aquaculture Division, P.O.Box 202, FIN-00151 Helsinki, Finland.

RECENT PUBLICATIONS OF INTEREST TO ASTACOLOGISTS

To present the latest in the newsletter we need current information from all of you. We do a lot of detective work to try to find out what and where you are publishing but we would appreciate more help from you. If you forward reprints and copies of your recent publications we can pass this information to all our members. We are also interested in reports and other printed matter that you produce or know of. Do not hesitate, mail them to day.

Please note: IAA is not able to provide copies of these publications to members. Please use traditional Library services.

1. Anonymous. 1994. Building the Deakin Juvenile yabby counter. Faculty of Aquatic Sciences, Deakin University, Warnambool, Victoria 3280 Australia, 6pp.
2. Badough, M. C. & T. L. Arsuffi. 1994. Predator avoidance by a guild of freshwater snails prey selection by crayfish: comparison of different predators and prey. Bull. North Amer. Bentholological Soc. 11(1):208.
3. Blake, M. A. & P. J. B. Hart. 1993. The behavioral responses of juvenile signal crayfish,

- Pacifastacus leniusculus*, to stimuli from perch and eels. *Freshwater Biology* 12(1).
4. Collins, B. & B. Mitchell. 1994. Yabbie culture: notes for prospective growers. School of Aquatic Science and Natural Resources Management, Deakin University, Warrnambool, Victoria 3280 Australia, 8pp.
5. Collins, R. O., L. M. Goodwin, & T. M. McRae. 1993. A practical system for counting yabby hatchlings. *Austasia Aquaculture* 7(4):22-23.
6. Costa, A. C., A. M. Correia, & J. M. Azevedo. 1994. L'ecrevisse rouge des marais, *Procambarus clarkii*, aux Açores. Le point. [Red swamp crayfish in the Azores]. L'Astaciculture de France. Bull. 38:2-9. [Avonnes a Marin, F-74200 Thonon, France]
7. Deng, X.H., D.L. Bechler & K.R. Lee. 1994. Comparative life history studies of 2 sympatric *Procambarus* crawfishes. *J Shellfish Res* 12(2):343-354.
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9. Eversole, A. G. & C. J. Kempton. 1994. Production of crawfish in earthen ponds of different depths. *Progressive Fish-Culturist* 56:117-122.
10. Fleury, B. 1994. Crisis in the crawfish ponds: crawfish farms are a boon to Louisiana wading birds, but how much longer will farmers provide a free lunch? *Living Bird* 13(1):28-34.
11. France, R. L. 1993. Influence of lake pH on the distribution, abundance and health of crayfish in Canadian Shield lakes. *Hydrobiologia* 271:65-70.
12. Garvey, J.E., R.A. Stein & H.M. Thomas. 1994. Assessing how fish predation and interspecific prey competition influence a crayfish assemblage. *Ecology* 75(2):532-547.
13. Groff, J. M., T. McDowell, C. S. Friedman, & R. P. Hedrick. 1993. Detection of a nonoccluded baculovirus in the freshwater crayfish *Cherax quadricarinatus* in North America. *J. Aquatic Animal Health* 5:275-279.
14. Henttonen, P., J. V. Huner, & O. V. Lindqvist. 1994. Occurrence of *Psorospermium* sp. in several North American crayfish species, with comparative notes on *Psorospermium haeckeli* in the European crayfish, *Astacus astacus*. *Aquaculture* 120:209-218.
15. Hobbs, H. H., Jr. 1993. *Cambarus* (*Jugicambarus*) *subterraneus*, a new cave crayfish (Decapoda: Cambaridae) from northeastern Oklahoma, with a key to the troglotic members of the subgenus *Jugicambarus*. *Proc. Biological Soc. Washington* 106(4):719-727.
16. Hobbs, H. H., III. 1993. Trophic relationships of North American freshwater crayfishes and shrimps. Contributions in Biology and Geology, Milwaukee Public Museum (Milwaukee, Wisconsin USA) No. 85:1-110.
17. Huner, J. V. 1994. Methods to reduce wading bird numbers in crawfish ponds. Louisiana Crawfish Farmers Assoc. Newsletter, May 1994:1-2.
18. Huner, J. V. 1994. Cangrejo de Rio en Louisiana - Spanish translation of "Crawfish Culture in Louisiana." Crawfish Research Center, University of Southwestern Louisiana, Lafayette, Louisiana USA Fact Sheet No. 6, 2pp. Translated Jorge Aravena.
19. Huner, J. V. 1994. Soft-Shell Crawfish in Louisiana. Crawfish Research Center, University of Southwestern Louisiana, Lafayette, Louisiana USA Fact Sheet No. 7, 2pp.
20. Huner, J. V. 1994. Freshwater crawfish in the USA. *Farm Pond Harvest* 28(2):20-22 & 31-32.
21. Jorhem, L., J. Engman, B. Sundström, & A. M. Thim. 1994. Trace elements in crayfish: regional differences and changes induced by cooking. *Arch. Environmental Contamination Toxicology* 26:137-142.
22. Jones, P. B. Collins, & T. McRae. 1994. An inexpensive, compact but adaptable recirculating aquarium system for hatchery, breeding or experimental research. Faculty of Aquatic Science, Deakin University, Warrnambool, Victoria 3280 Australia, 10pp.
23. Kopacek, P. L. Brubhoffer, & K. Söderhäll. 1993. Isolation and characterization of a hemagglutinin with affinity for lipopolysaccharides from plasma of the crayfish *Pacifastacus leniusculus*. *Developmental and Comparative Immunology* 17:407-418.
24. Krema, P. B. & N. C. Tuchman. 1994. Secondary production and dietary preference in *Orconectes propinquus* (Girard): growth and dietary preference. *Bull. North Amer. Benthological Soc.* 11(1):209.
25. Ladewig, K. F. & S. L. Schaefer. 1993. Crawfish. A healthy coice. Southern Regional Aquaculture Center Publication No. 243, Stoneville, Mississippi USA.
26. Loya-Javellana, G. N., D. R. Fielder, & M. J. Thorne. 1993. Food choice by free-living stages of the tropical freshwater crayfish, *Cherax quadricarinatus* (Parastacidae: Decapoda). *Aquaculture* 118:299-308.
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29. O'Brien, B. 1994. Gut dynamics and purging [marron]. Marron Growers Association Bull. 16(1):7-8. [P.O. Box T818, Perth, Western Australia 6001 Australia].
30. RoederiguezAlmaraz, A., M.A. Coronado-Magdaleno & E. Campos. 1993. Distribution and ecology of crayfish of the genus *Procambarus* (ACambaridae) in Tamalipas (Mexico). *Southwestern Naturalist* 38(4):390-392.
31. Sarver, R.G., M.A. Flynn & C.W. Holliday. 1994. Renal Na,K-ATPase and osmoregulation in the crayfish, *Procambarus clarkii*. *Comp Biochem Physiol PT A* 107(2):349-356.
32. Skorupski, P., P.J.Vescovi & B.M.H. Bush. 1994. Integration of positive and negative feedback loops in a crayfish muscle. *J Exp Biol* 187:305-314.
33. Spaziani, E.P., G.W. Hinsch & S.C. Edwards. 1993. Changes in prostaglandin E(2) and F-2a during vitellogenesis in the Florida crayfish *Procambarus paeninsularis*. *J Comp Physiol B* 541-545.
34. Stelzer, R.S. & T.M. Burton. 1993. growth and abundance of the crayfish, *Orconectes propinquus* in a hard water and soft water stream. *J Freshw Ecol* 8(4):329-340.
35. Stone, E. L. 1993. Soil burrowing and mixing by a crayfish. *Soil Science Soc. Amer. J.* 57:1096-1099.
36. Swannell, T. 1994. The puzzle of pond size. Marron Growers Association Bull. 16(1):5. [GPO Box T818, Perth, Western Australia 6001 Australia]
37. Söderhäll, K., J. Rantamäki, & O. Constantinescu. 1993. Isolation of *Trichosporon beigelii* from the freshwater crayfish *Astacus astacus*. *Aquaculture* 116:25-31.
38. Tacon, A. G. J. 1993. Feed ingredients for crustaceans. Natural foods and processed feedstuffs. FAO Fisheries Circular No. 866. Food & Agricultural Organization of the United Nations, Rome, Italy.
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NEW MEMBERS:

Gonul, Murat, P.O. Box 16738, L.S.U., Baton Rouge, Louisiana 70893-6738 USA.
 Klarberg, David P., 146 Manor Parkway, Uniondale, New York 11558 USA.

NOTE: ALL NEW MEMBERS ENROLLED AT THE ADELAIDE MEETING WILL BE INCLUDED IN THE BOOKLET OF IAA MEMBERS THAT WILL BE MAILED IN JULY OF THIS YEAR.