



I.A.A.  
CENTER FOR SMALL FARM RESEARCH  
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# NEWSLETTER

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SEVENTH CONGRESS OF ASTACOLOGY -- Place: Lausanne, Switzerland. Dates: 3-5 August 1987. A post congress excursion for 6-8 August will involve visits to points of interest to astacologists in German-speaking Switzerland, France (Alsace), and West Germany (Bavaria). Registration fee is 220 Swiss Francs (SF) for participants and 110 SF for accompanying persons. Hotels: 1986 prices per night, breakfast, taxes and service charges included:

	Hotels ***** to **** with bath or shower	Hotels **** to * without bath
single room	170-110 SF	55-23 SF
double room	220-150 SF	80-38 SF

Abstracts of poster or oral presentations in the areas of pathology, ecology, ethology, physiology, zoogeography, morphology and taxonomy, and aquaculture are due 30 March 1987 (1/2 page, A4, in English). For more details contact: Professor Pierre Goeldin, Directeur du musee Zoologique, 6 Place de la Riponne, CH-1005 Lausanne, Switzerland. The Tourist Office and Convention Bureau may be contacted at 60 Av. D'Ouchy, CH-1000 Lausanne, Switzerland.

MANUSCRIPTS FOR LAUSANNE IAA MEETING -- Professor Goeldin wishes to note: "All communication to the International Congress of Astacology at Lausanne will be printed and included in volume VII of Freshwater Crayfish. The text may be written in English, French, or German with English summaries. Detailed instructions will be sent to authors but we know that the manuscripts will not exceed 8 pages, figures and tables included. Manuscripts not delivered before 1 October 1987 will not be printed."

FRESHWATER CRAYFISH VI -- The proceedings of our Lund Congress are available. Cost is \$30 US plus \$5 US postage and handling. Editor Per Brinck is to be congratulated for a job well done. Order the proceedings from: Professor Per Brinck, Ecology Building, S-223 62, Lund, Sweden. IAA regrets that it is financially impossible to provide gratis copies of the book to those who attended the Lund meeting; however, this hard cover text is most reasonably priced and well worth the expenditure. Readers will not be disappointed when they receive their copies. A list of contents follows later in this newsletter.

MEMBERSHIP \*\* The following is a list of those IAA members who have, according to our records, not paid their 1984-87 dues. If you are listed and believe that you paid your dues, simply notify Dr. Payne immediately, or your name will be stricken from the mailing list. If you have not paid, please do so. Thank you for your cooperation.

AUSTRALIA - Carstairs, Cook, Lake, Moore, Pollock, I. Smith; AUSTRIA - Garimorth, Hensen,

Kanler, Unger; BELGIUM - Joncheere, Vander Putten; CANADA - Fort, France, Kerridge, Moore, Morgan; ENGLAND - Horsfall, Trenner; FINLAND - Pursiainen; FRANCE - Farges, Daguerre, de Hureaux, Fanton, Fournis, Kracht, Pauwels, Vernet; WEST GERMANY - Albrecht, von Hagen, Hauschild; GREECE - Gerogousis, Yannopoulos; ITALY - Giudici, Mancini, Peterlongo; IRELAND - Okeefe; AFRICA - Adegbeye, Germain; NORWAY - Delhi, Thomsen; SPAIN - Aguado, C. T. Fernandez, Gaudios, Salinas, Valladores; SWEDEN - Bostrum, Ellerstrom, Georgousis, Hamilton, Persson, Unestam; SWITZERLAND - Rausing; YUGOSLAVIA - Klotilda; USA - Armitage, Boudreau, Bourgeois, Broughton, Capelli, Carlson, Conte, Darrow, Fendrick, Fisher, Galante, Harden, Horns, Lemieux, Lutschg, McClain, McGriff, Nuzum, Pataine, Rundqvist, D. H. Taylor, R. Taylor, Wang, W. O. Wright.

PROCAMBARUS CLARKII IN REPUBLIC OF SOUTH AFRICA -- Your junior editor received to adult Crayfish from Dr. D. J. Coetzee, Dept. of Nature and Environmental Conservation, Research Section, Private Bag 5014, Stellenbosch 7600, Republic of South Africa, and was asked to identify them. Both were P. clarkii. According to Dr. Coetzee, they were being sold illegally to the public by pet shops in the Cape Province. They were obtained from pet dealers in Durban (Natal) who imported them from Hong Kong. No freshwater crayfish except the marron, Cherax tenuimanus, is permitted in Cape Province and, then, only under special permit. We are informed that every effort is now being made to recover the P. clarkii sold to the general public in RSA to prevent another part of the world from being added to the expanding list of places where P. clarkii has successfully invaded.

STATUS OF THE CRAYFISH INDUSTRY IN LOUISIANA -- According to the Feb. 26, 1987 issue of "The Louisiana Market Bulletin" (vol. 71, No. 5), the Louisiana crayfish industry has 125,000 acres of earthen ponds representing 1500 farms. Expansion could see 250,000 acres in production in the near future. Current production exceeds 100 million pounds with a value at the producer level of \$40 million. In addition, there are 3400 people employed in the crayfish processing industry.

IMPACT OF APHANOMYCES ASTACI ON IMPORTS OF ASTACUS LEPTODACTYLUS TO FRANCE -- IAA President Pierre Laurent writes that French imports from Turkey were only 600 metric tons in 1986. This compares to 1400 metric tons in 1985.

CRAYFISH SITUATION IN SPAIN -- IAA member Andreas Salvator Habsburg-Lothringen (Fuentemillanos, 2, 28035-Madrid, Spain), sends the following information about production of Procambarus clarkii in Spain: (1) Crayfish production is increasing again after the drought; (2) crayfish, as an agricultural product is highly respected and provide substantial earnings to people associated with them; (3) the number of crayfish buying centers has increased and the product leaving those centers is of high quality; (4) there are around 17 cooperatives of crayfishermen; and (5) private sources estimate that crayfish sales in 1986 were 2500 metric tons.

WEST GERMAN ASTACOLOGIST SEEKS INFORMATION ABOUT PROCAMBARUS CLARKII -- Dr. Hans-U. Dahms (Univ. Oldenburg/FB 7, D-2900 Oldenburg, FRG) writes that he had the opportunity to get some "wild" specimens of P. clarkii from an introduced stock in eastern Africa. He is especially interested in biology, postembryonic development, cohort analysis, life tables, behavior and population dynamics (field or laboratory).

MARRON BANNED IN VICTORIA, AUSTRALIA -- According to the Marron Growers Bulletin (Dec. 1986, Vol. 8, No. 4), introduction of marron, Cherax tenuimanus, has been banned by the state government of Victoria. Quoting an article in a newspaper, The West Australian (Melbourne, 20 Nov. 1986), "The Conservation, Forests and Lands Minister, Joan Kirner, said yesterday the crayfish, called marron, posed a potential threat to native fish and flora. She said concern about diseases in marron in WA had led to a total ban in Victoria. Anyone convicted of possessing marron faced fines of up to \$1000. 'The government is particularly concerned about any threat to Victoria's native yabby and freshwater crayfish,' she said. 'The possible establishment of feral populations of marron in Victoria must be avoided.'

CRAYFISH SITUATION IN BELGIUM -- The following reference addresses the subject of crayfish in Belgium: Gerard, P. 1986. Les differences especes d'ecrevisses en Belgique et leur repartition geographique. 25 pages. Station de Recherches Forestieres et Hydrobiologique, Travaux-Serie D No. 54. Groenedaal - Hoeillaart 1990 Belgique. Three species are present in natural waters including the native Astacus astacus and two exotics, Orconectes limosus and Astacus leptodactylus. Pacifastacus leniusculus is present at six fish culture sites. Restocking with native A. astacus is recommended.

CRAYFISHES IN UTAH (USA) -- (1) "An inventory of Utah crayfish with notes on current distribution" is the title of a paper by J. E. Johnson (Utah Div. Wild. Res., 1596 West North Temple, Salt Lake City, Utah 84116). It is to be published in the "Great Basin Naturalis", vol. 4, 1987. The native Pacifastacus gambelii is widespread and often abundant. Pacifastacus leniusculus and Procambarus clarkii have very limited distributions but Orconectes virilis is widely dispersed apparently as a consequence of human introductions. (2) "Crayfish in Utah: Resource and Opportunity, an Appraisal and a Proposal" is a multipage prospectus written by Joseph H. Smart (Heritage Arts, 1925 Imperial Street, Salt Lake City, Utah 84105). Mr. Smart has noted that crayfish is abundant in many areas of his state but little utilized. He is attempting to organize a promotional campaign that will lead to the wise utilization of an otherwise little used resource.

CRAYFISH BIBLIOGRAPHY TO BE AVAILABLE SOON -- IAA member C. W. Hart, Jr. (National Museum of Natural History, Smithsonian Institution, Washington, DC 20560 USA) writes that over the past 6 years, his colleague Janice Clark and he have been compiling a computerized, interdisciplinary bibliography of freshwater crayfish literature. They have attempted to cover all aspects of crayfish knowledge from Aristotle to the present. To date the bibliography consists of 11,000+ annotated and indexed references. The compilation is due to be published soon. Forward inquiries and/or references to Dr. Hart.

CRAYFISH PROMOTION IN CALIFORNIA -- Procambarus clarkii is abundant in California, especially in the rice growing areas of the Sacramento River Delta. Little effort has been made to promote the exploitation of this resource. Bill Sands (1007-A Meier Dr., Chico, California 95926 USA) is working with area farmers and seafood dealers to make use of the resource. He has authored a proposal entitled "Development of a Crayfish Industry in California: A Compelling Agricultural Alternative". Mr. Sands advertises crayfish as "Cajun Finger Lobsters"

CRAYFISH CULTURE IN SWEDEN -- IAA Past President Stellan Karlsson (Simontorp Aquaculture AB, S-270 35 Blentarp, Sweden) sends the following information about crayfish culture in Sweden. "Crayfish production is growing rapidly here. In this province alone there is at least 100 permits for pond production of Pacifastacus! Some projects are rather big, and many uses the narrow, canal-type ponds with great success. The results are naturally different from pond to pond and from year to year. With a pond width of 5-6 meters, we find results between 200-1400 grammes per meter pond and year. (Some exceptional cases are better still :) With a whole-sale price of SEK 150:-/kg this is good business, provided that you can stay alive those hard years between investment and full production! The biggest project so far of this kind has about 15 miles of such ponds on one spot!"

CRAYFISH GENETIC STUDIES IN MISSISSIPPI (USA) -- Dr. Craig Busack (Dept. of Biology, University of Mississippi, University, Mississippi) has been comparing stocks of Procambarus acutus acutus and Procambarus clarkii through electrophoresis of selected enzymes. He reports surprisingly little variation among geographically distinct stocks of P. clarkii. However, he did demonstrate quite a bit of variation among geographically separated P. a. acutus stocks. A hypothesis to explain the situation with P. clarkii involves recent evolution and rapid colonization of its range. Dr. Busack expects to compare several species of the genus Cambarellus and other Procambarus spp.

EXTENDING THE CRAWFISH SEASON -- This is the title of a paper by D. D. Culley, L. F. Duobinis-Gray, T. B. Lawson, G. R. Baskin, and E. Rejmankova which appeared in Louisiana Agriculture (vol. 30, no. 2, 1986-87, pp. 3 & 24). Most southern USA Procambarus clarkii ponds are dry in the hot summer and filled in the cooler autumn-winter-spring period. Culley et al. drained ponds from December into April and obtained average production of 975 kg per ha. They conclude "...Based upon the results of the present study, by alternating flooding patterns; different ponds, year-round production of crayfish may be possible."

CONTENTS OF L'ASTACICULTEUR DE FRANCE BULL. NO. 9, JAN. 1987 -- This is the publication of l'Association des Astaciculteur de France. Contents of the Jan. 1987 issue are: Commercialisation des Ecrevisses par P. Laurent; Un Peu de Lecture par P. Laurent; Congres D'Astacologie en Suisse; Repeuplement du Perigord en Ecrevisses; Bibliography; Compte Rendu de l'Assemblee Generale du 23 Octobre 1986; and Convocation a l'Assemblee Generale du 5 Mars 1987. For further information, contact IAA President Pierre J. Laurent.

LOUISIANA CRAWFISH FARMERS' ASSOCIATION HOLDS ANNUAL MEETING -- The annual LCFA meeting was held 27 Feb. 1987 in Lafayette, Louisiana in conjunction with the Fourth International Crayfish Tasting and Trade Fair. Eighteen seminars on all facets of the industry were presented during the day. A synopsis of each seminar will be published in the official LCFA Journal "Crayfish Tales". This 40+ page magazine is published quarterly and subscription rates are \$15 US (USA) and \$30 US (Overseas). For information about the LCFA, write to LCFA, P.O. Box 91544, Lafayette, Louisiana 70509 USA.

CRAYFISH TRANSPLANTATIONS IN NEW ZEALAND -- IAA member Brian Jones (Fish. Res. Div., P.O. Box 297, Wellington, New Zealand) sends the following commentary about New Zealand's position on crayfish transplantations "...There are two recognized species of freshwater crayfish in New Zealand which are (or were) geographically isolated. Inter in farming these species seems to have died down to be replaced with a desire to import Australian species...."

"This presents us with a problem. The main species which several companies wish to import is the Marron Cherax tenuimanus which we know is capable of surviving in New Zealand. However, there is no information available on it's potential impact on the environment should it (inevitably) escape.

"The government policy is not to block imports which are likely to have an economic benefit to the country. After all, almost all New Zealand's animal product exports, from kiwifruit to mutton and wool are exotic. With marron, however, there is no good economic appraisal available...."

"It would be a big help if there could be a central register of information on crayfish species which documents their known ecological interaction.... A register of disease investigation would be of help too. Applications to import Marron always state 'There are no known diseases of Marron' or words to that effect...."

NEW DEVELOPMENTS IN MARRON CULTURE AND MANAGEMENT IN WESTERN AUSTRALIA -- The marron, Cherax tenuimanus, is a large parastacid crayfish native to Western Australia that may exceed 2 kg in size. It is one of the most heavily promoted candidates for crayfish aquaculture in the world. However, despite 10 years of effort, only minimal quantities are produced in its native Western Australia. A recent report - "Fisheries Management Discussion Paper No. 2, The Report of the Fish Farming Legislative Review Committee, Oct. 1986, Fish. Dept. Perth, Western Australia 6000, Australia" - addresses constraints to development of marron culture there. Recommendations provide for a reduction in legal size for cultured marron to 40 g from 120 g with strict controls to assure minimal, illegal commerce in wild marron from the state's natural stocks, exploited legally, only by licensed sports fishermen. Combined production from 50 ha of semi-intensively managed ponds could, according to the report, exceed the sport fisheries catch. A detailed economic analysis of semi-intensive aquaculture of marron is provided

(Appendix I. Morrissy et al. Bioeconomic model for semi-intensive pond grow-out of marron [*Cherax tenuimanus*]). The entire report is very well written and contains considerable information about the status of crayfish culture and crayfish sport fisheries in Western Australia. IAA member Noel Morrissy is thanked for supplying a copy of the report to the newsletter staff.

**CRAWFISH IN THE CLASSROOM** -- This five page brochure is designed to serve as a resource reference for classroom teachers at all levels, kindergarten to university. It deals principally with the red swamp crayfish, *Procambarus clarkii*, the species most commonly encountered in North American classrooms and the most cosmopolitan crayfish species in terms of international distribution. Authored by J. V. Huner and J. E. Barr, it is available from the Louisiana Department of Education, Science Education Division, Capitol Station, Baton Rouge, Louisiana 70804 USA.

**CRAWFISH IN MISSOURI (USA)** -- William L. Pflieger (Missouri Dept. of Conservation, Fish & Wildlife Res. Center, 1110 College Ave, Columbia, Missouri 65201) is studying crayfish in his state. The research has dealt with a survey of native species with the goal of producing a handbook to the Missouri species. Although this had not been published yet, a popular article on Missouri crayfish will appear soon in his department's magazine. Dr. Pflieger mentioned *Orconectes longidigitus* as being one of several species endemic to the Ozark Mountain region. Although it is primarily a stream species, it has become established in Table Rock Reservoir. There are reports of specimen up to 33 cm in length from tip of the telson to the tips of the outstretched chelae. An interesting species, Dr. Pflieger notes that the suitability of the species for pond culture is unknown.

**PROCAMBARUS CLARKII CULTURED IN NORTHWESTERN FLORIDA (USA)** -- IAA member Jim Norrocky (Rt. 1, 10 Duchess St., Vickery, Ohio USA) has traveled extensively in the state of Florida during the past winter. He reports finding *P. clarkii* being sold both for food and fish bait in the northwestern region of the state where it is now being cultured. [Editor's note: It is illegal to culture *P. clarkii* east of the Appalachian River in the state of Florida. Those individuals now culturing the species in Florida are apparently adhering to this statute.]

**CONTENTS OF FRESHWATER CRAYFISH VI** -- (1) Highlights of a half century of crayfishing [Hobbs]; (2) The nervous system and its transmitters in the crayfish [Elofsson]; (3) Crayfish immunity: the importance of the prophenoloxidase activating system in non-self recognition and cellular defence [Söderhäll and Smith]; (4) The paragnaths of *Austropotamobius pallipes* [Thomas]; (5) The freshwater crayfish of New Guinea [Holthius]; (6) The adaptable crayfish: mechanisms of physiological adaptation [McMahon]; (7) Behavior of crayfish juveniles during early stages of ontogenesis [Cukerzis]; (8) Aggressive interaction between *Pacifastacus leniusculus* and *Orconectes virilis* under laboratory conditions [Momon and Leering]; (9) The effect of river engineering works and diseases on a population of *Austropotamobius pallipes* in the river Lea, UK [Lowery and Hogger]; (10) Factors influencing patterns of crayfish distribution [Payne]; (11) Ecology and production of Louisiana red swamp crayfish *Procambarus clarkii* in southern Spain [Gaude]; (12) The status of the *Procambarus clarkii* population in Spain [Habsburgo-Lorena]; (13) A report on some of the first introductions of *Pacifastacus leniusculus* into the UK [Hogger]; (14) The acclimation of *Pacifastacus leniusculus* in lake Divonne [Laurent and Vey]; (15) A stunted crayfish *Astacus astacus* population in central Finland [Huner and Lindqvist]; (16) Population structure and gut contents of the crayfish *Astacus astacus* in two Finnish rivers [Westman et al.]; (17) *Astacus astacus* in Lake Steinsfjorden, S. E. Norway [Skurdal et al.]; (18) Growth, maturity, and fecundity of *Astacus astacus* in Lake Steinsfjorden, S. E. Norway [Skurdal and Qvenild]; (19) Analysis of food utilized by *Astacus astacus* in Lake Steinsfjorden, S. E. Norway [Hessen and

Skurdal]; (20) The yield of a heavily exploited population of *Astacus astacus* in Lake Steinsfjorden, S. E. Norway [Qvenild and Skurdal]; (21) Crayfish pathology: an overview [Smith and Söderhäll]; (22) Disease problems during aquaculture of freshwater Crustacea [Vey]; (23) The effects of the crayfish plague fungus *Aphanomyces astaci* on the haemolymph of *Astacus astacus* and *Pacifastacus leniusculus* [Järvenpää et al.]; (24) Crayfish mortalities in the UK rivers [Lowery et al.]; (25) Synergisms in crayfish farming [Avault et al.]; (26) Mark and recapture of the red swamp crayfish *Procambarus clarkii* [Rhodes and Avault]; (27) Crayfish *Procambarus clarkii* production in ponds receiving varying amounts of soybean stubble or rice straw as forage [Day and Avault]; (28) Crayfish *Procambarus clarkii* production under two rice varieties, two levels of nitrogen fertilization, and two crayfish stocking rates [Rhodes and Avault]; (29) Evaluation of eighteen artificial crayfish baits [Cange et al.]; and (30) Pilot study on prawn/catfish polyculture with rice/crayfish rotation [Cange et al.].

**RECENT LITERATURE --**

Culley, D. D., L. F. Duobinis-Gray, T. B. Lawson, G. R. Baskin, and E. Rejmankova. 1986-87. Extending the crayfish season. *Louisiana Agriculture* 30(2):3 & 24.

Frazer, T. 1985. Crayfish: Louisiana's new cash crop. *Seafood leader*, 5(4):40-62.

Huner, J. V. 1987. Crayfish, the heart of Louisiana. *Seafood Int.* 2(1):40-45.

Huner, J. V. and O. V. Lindqvist. 1987. Crayfish aquaculture in Finland. *Aquaculture Magazine* 13(1):22-26.

Huner, J. V. and J. E. Barr. 1987. Crayfish in the classroom. *Education Bull., Louisiana Sea Grant Prog., Center for Wetland Res., Louisiana State Univ., Baton Rouge, Louisiana USA*, 5 pp.

Hubbard, D.M., E. H. Robinson, P. B. Brown, and W. H. Daniels. 1986. Optimum ratio of dietary protein to energy for red swamp crayfish (*Procambarus clarkii*). *The Progressive Fish-Culturist* 48(4):233-237.

Head, G. and J. Baldwin. 1986. Energy metabolism and the fate of lactate during recovery from exercise in the Australian crayfish *Cherax destructor*. *Aust.J.Mar.Freshw.Res.* 37:641-646.

Roldan, B. M. and R. R. Shivers. 1987. The uptake and storage of iron and lead in cells of the crayfish (*Orconectes propinquus*) hepatopancreas and antennal gland. *Comp. Biochem. Physiol.* 86C:201-214.

Torreblanca, A., J. Diaz-Mayans, J. Del Ramo, and A. Nunez. 1987. Oxygen uptake and gill morphological alterations in *Procambarus clarkii* after sublethal exposure to lead. *Comp. Biochem. Physiol.* 86:219-224.

Huner, J. V. and V. A. Pfister. 1987. Crayfish farming-is it for you? Center for Small Farm Research, Southern University, Baton Rouge, Louisiana, 3 pp.

Fish Farming Legislative Review Committee. 1986. Fisheries Management Discussion Paper No. 2, The Report of the Fish Farming Legislative Review Committee. Fisheries Dept., Perth, Western Australia, 170 pp.

Morrissy, N. M., N. Hall, and N. Caputi. 1986. Bioeconomic model for semi-intensive pond grow-out of marron (*Cherax tenuimanus*). pp. 94-140 in: Previous reference.

Brown, P. B., C. D. Williams, E. H. Robinson, D. M. Akiyama, and A. L. Lawrence. 1986. Evaluation of methods for determining in vivo digestion coefficients for adult red swamp crayfish *Procambarus clarkii*. *J. World Aquaculture Soc.* 17:19-24.

Lutz, C. G. and W. R. Walters. 1986. The effect of five stocking densities on growth and yield of red swamp crayfish *Procambarus clarkii*. *J. World Aquaculture Soc.* 17:33-36.

Davis, D. A. and E. H. Robinson. 1986. Estimation of the dietary lipid requirement level of the white crayfish *Procambarus acutus*. *J. World Aquaculture Soc.* 17:37-43.

Witzig, J. F., J. V. Huner, and J. W. Avault, Jr. 1986. Predation by dragonfly naiads *Anax junius* on young crayfish *Procambarus clarkii*. *J. World Aquaculture Soc.* 17:58-63.

Anato, G. 1986. Elevage d'écrevisses. Association Regionale pour la promotion et le développement de l'astaciculture. 4 Promenade Madame de Seigne, F-14 040 Caen Cedex, France, 14 pp.

- Coste, P. and C. Chaisemartin. 1986. Action de la microsporidie Thelohania contejeani sur la charge energetique adenylique de l'ecrevisse hote: Austropotamobius pallipes L., 1858. C. R. Acad. Sc. Pais, 303, Serie III, 5:171-174.
- Chaisemartin, C. 1985. Aspect des phenomenes de bioaccumulation et de transfert des fluorures dans les milieux dulcaquicoles perturbes. Revue francaise des Sciences de l'Eau, 4:17-33.
- Gerard, P. 1986. Les differentes especes d'ecrevisses en Belgique et leur repartition geographique. Station de Recherces Forestieres et Hydrobiologiques, Travaux-Serie D No 54. Groenedaal-Hoellaart 1990 Belgium, 25 pp.
- Ollier, J. 1986. Sur la presence de l'ecrevisse americaine Orconectes limosus (Raf. 1817) dans la riviere l'Allier (Massif Central, France). Bulletin Mensuel de la Societe Linneenne de Lyon, 55, 7:255-256.
- Wintersteiger, M. R. 1985. Zur Besiedlungsgeschichte und Verbreitung der Flusskrebse im Land Salzburg. Osterreichs Fischerei, 38:220-233.

TITLES FROM AQUACULTURE EUROPE -- This meeting is scheduled for 1-5 June 1987 in RAI Exhibition and Conference Center, Amsterdam, Holland.

- Ackefors, H. R. Gydemo, and L. Westin. Growth and survival of juvenile crayfish, Astacus astacus, in relation to food and density.
- Gydemo, R. and L. Westin. Growth of Astacus astacus in a pond stocking experiment.
- Gydemo, R. and L. Westin. Growth and survival of juvenile Astacus astacus L. in optimized water temperature.
- Munkhammar, T., R. Gydemo, L. Westin, and H. Ackefors. Survival of noble crayfish, Astacus astacus L. in the presence of females.

INFORMATION ABOUT VEGETATIVE FORAGES FOR CRAYFISH CULTURE -- Dr. Martin Brunson (Louisiana Agricultural Experiment Station, Crowley Rice Station, Crowley, Louisiana USA) has been conducting research into the suitability of various cultivated grasses as vegetative forages in culture of Procambarus spp. A number of useful progress reports are available from Dr. Brunson. His work has involved a number of rice cultivars, several sorghum cultivars, and several millet cultivars.

IAA MEMBERSHIP -- Membership fee remains \$20 US for the period between international congresses (2 or 3 years). Direct funds and/or inquiries to:

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