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Crayfish NEWS

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1999-2000 LOUISIANA CRAWFISH SEASON LIKELY TO BE WORST EVER

by Jay Huner

All signs and early production lead observers to predict that the 1999-2000 Louisiana crawfish season will be the worst since the modern crawfish industry evolved in the early 1950s. Drought conditions from August 1999 and continuing into February 2000 seem to be the over-riding cause of the problem. Although farmers begin to add water to their crawfish ponds in September or October, crawfish will not leave burrows on levees until significant rainfall events occur. In a normal year, such rainfall events occur every 10-14 days as cold fronts pass through the area. There were, however, few rainfall events during the autumn and winter. The so-called "early" crop of pond crawfish never materialized despite unusually warm weather throughout the period.

Many people believe that crawfish burrow throughout ponds as ponds are drained in the spring/early summer. In fact, few crawfish make successful burrows during the pond draining process. Thus, burrows constructed by mature crawfish at the surface/water interface on pond levees represent the critical source of young crawfish when ponds are drained. Even if ponds are filled to the original water line, burrows are not inundated and the female crawfish will not emerge in significant numbers until rainfall events trigger the emergence.

Many crawfish ponds are flooded using surface water sources. With canals, lakes and bayous at all time low levels and coastal waterways being too salty for crawfish, a significant amount of crawfish ponds were simply not flooded. Furthermore, all farmers depend on rainfall to fill their ponds and maintain water levels. Because of the drought, even farmers with wells experienced water costs 3-4 times above normal.

The University of Louisiana at Lafayette's Crawfish Research Center maintains approximately 16 ha of earthen crawfish ponds. Through the second week in February 1999, crawfish production was 1350 kg. Through the second week in February 2000, crawfish production was 135 kg, a 90% reduction.

There are no signs that the crawfish ponds will recover before they are drained. Furthermore the floor of the Atchafalaya Basin where roughly half of the state's crawfish crop is harvested by commercial fishermen, was still dry in mid-February 2000. This crawfish nursery area is normally filled with rainwater in mid-November. Overbank flooding follows in winter from Mississippi River floodwaters that are channelled through the Basin. But, the Mississippi River has been unusually low and the Basin floor remains dry at this mid-February writing. Therefore, it appears that there will be few wild crawfish produced in the state during the 1999-2000 season.

The situation does not bode well for the 2000-2001 crawfish season because many rice/ crawfish farmers have to stock crawfish into rotational ponds each year. [Permanent crawfish ponds with or without rice crops are normally not restocked because unharvested crawfish serve as broodstock.] The normal source of "seed" crawfish is the Atchafalaya Basin fishery.

The International Association of Astacology (IAA), founded in Hintertal, Austria in 1972, is dedicated to the study, conservation, and wise utilisation 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 has a permanent secretariat managed by Jay Huner. The address is: IAA Secretariat, PO Box 44650, University of Southwestern Louisiana, Lafayette, Louisiana 70504, USA.

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President's Corner

I have requested the Newsletter Editor, Glen, to distribute this issue speedily because we want to draw members' attention to a two-day conference that we have organised in England on 26 and 27 April 2000 although we have not finalised many aspects of the conference yet.

The conference is jointly supported by two Government Agencies, the Environment Agency and English Nature, and the IAA (as a regional meeting). The organisers, from the respective organisations, are Jonathan Brickland, Maggie Robinson and myself.

Topics at the conference will include:

- Crayfish disease research;
- Conserve of native crayfish in Sweden;
- Developments on control of signal crayfish populations;
- Enforcement of conservation legislation;
- Measures to mitigate losses of native crayfish during engineering works;
- Radio tagging of crayfish;
- Re-introduction of native crayfish;
- Report on a new crayfish plague outbreak in England, the first for many years.

Also we are hoping to include a report of *Procambarus clarkii* in Lake Nevaisha and videos of crayfish business in Louisiana and Australia, plus an underwater video of crayfish attraction to light sources in the Caspian Sea.

We look forward to welcoming many members and non-members from Britain and abroad at the conference. If you would like to contact any of the organisers, they will be able to supply you with further details, travel and accommodation arrangements when they have been finalised.

The book, "Freshwater Crayfish 12", the proceedings of the 12th Symposium of the International Association of Astacology, has now been published and distributed to all the

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and also outside it.

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Ing. Pavel Kozák, University of South Bohemia Ceské Budejovice, Research Institute of Fish Culture and Hydrobiology in Vodnany, Zátiší 725, 389 25 Vodnany, Czech Republic. E-mail: kozak@vurh.jcu.cz

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NEWS ON CRAYFISH FARMING IN NEW CALEDONIA

IAA Member **Jacques Arrignon** has sent the following information on farming *Cherax quadricarinatus* in New Caledonia.

The Australian crayfish "red claw" (*Cherax quadricarinatus*), introduced in 1993 in New Caledonia (Pacific) is now successfully bred by about 25 farmers with ponds on the western side of the island. The three initial animals (1993) have produced about 20 tons of commercial crayfish by the end of 1999. The yield is 3 tons/ha/year. from both the Kanak and Caldoche farms (Caldoche are Caledonian people from European origin). By the end of 2000, the expected production is 40 tons. The mean commercial size is 100 g/ piece and the mean price is 2500 FP/kg ($US 25). The market is actually a local market. A developing project is now supported by the professional structure "Syndicat des Eleveurs d'Ecrevisses", with the expertise of Jacques Arrignon, according to the rural policy of the local Government. Many professional and friendly contacts have existed for years between the Australian and the French-Caledonian crayfish farmers.

NOMINATIONS FOR IAA HONORARY MEMBERSHIP

A sub-committee, chaired by **Ossi Lindqvist**, has been formed to consider nominations for IAA Honorary membership. Nominations should be accompanied by supporting statement stating why the nominee should be awarded this status. Results will be announced in Perth, at IAA 13, August 2000.

Nominations should be completed as soon as possible and sent to Ossi Lindqvist, either by mail or e-mail, as follows:

Professor Ossi V. Lindqvist
Fisheries & Aquaculture
Institute of Applied Biotechnology
University of Kuopio
P.O.Box 1627, FIN-70211 KUOPIO
Finland

E-mail: OssiV.Lindqvist@uku.fi

CORRECT YOURSELF IN THE IAA DIRECTORY

Every member should have received the Directory of Astacologists for 1999. This is a very useful publication for finding out where people are and what their interests are. However, it can be frustrating if the information for a particular person is incorrect. Would you please check your entry for any errors and for missing details, e.g. your e-mail, your interests etc? Please send any additions and corrections to Jay Huner. Thank you.

PAPERS OF INTEREST TO ASTACOLOGISTS

1. Abdu U. Yehezkel G. Sagi A. 2000. Oocyte development and polypeptide dynamics during ovarian maturation in the red-claw crayfish Cherax quadricarinatus. Invertebrate Reproduction & Development. 37(1):75-83.
2. Anastacio PM. Lutzhoft HCH. Halling-Serensen B. Marques JC. 2000. Surfactant (Genapol OX-80) toxicity to Selenastrum

(Continued from page 2)
participants who attended the symposium in Augsburg in 1998. If you have not received your copy, please contact Max Keller. Details of how to get copies from Max appear elsewhere in this issue.

The beautifully finished copy of the hardback book, Freshwater Crayfish 12, is an excellent asset to the IAA and a product that we can be proud of. On behalf of the IAA, I am pleased to thank the editorial team, Max Keller, Max M. Keller, Rudolf Hoffmann, Birgit Oidtmann and Gunter Vogt heartily for a job well done. I recommend that anyone interested in crayfish who does not have a copy of the book buys one from Max to keep up to date with crayfish issues; it is very good value for money.

We will shortly come to the time in the biennial cycle when we have to consider nominations for candidates to the offices of this Association. I am chairperson of the Nominations Committee, therefore, if you wish to nominate a person for one of the offices, please send the nomination details to me.

As President-elect, Glen Whisson from Australia will be the write-in candidate for the post of President. Similarly as Keith Crandall from the USA is our present Secretary/Treasurer, he will be the write in candidate for the post of President-elect. The post of Secretary/Treasurer is open and it would be appropriate to fill the vacancy with a candidate from Europe to maintain global diversity. Glen Whisson, has kindly offered to continue editing the newsletter for a further two years so this will not be a duty of the incoming Secretary/Treasurer.

The "Time and Place Committee" is in the process of considering proposals for the venue of the 2002 international symposium. Unfortunately we are a little delayed in this due to communication (e-mail) difficulties last year with a bid from Spain.

Editorial

Crayfish History to be in next issue

Include Reg Form for thos who did not complete an Exp of Interest. If you have already completed a Reg Form please pass on to anyone you think may be interested in attending the conference

Please send out the small newsletter as soon as possible. Perhaps you could include a note in it saying that the next instalment of the IAA history is being composed and is taking a little time because there are many photos.

I will attach the booking programme for the IAA England conference. The cover page is a PowerPoint file and the rest is a Word file. Maybe you could include these. I have to leave it to you to organise it.
Many thanks to Bill Daniels for submitting the excellent cartoon that appears on page 9.
more info on iaa 13 tours and prices - intinerary

There is also a "Honorary Membership Committee" which Ossi Lindqvist offered to chair. Any advice on election of new Honorary Members should be sent to him.

Finally, I look forward to meeting any persons interested in crayfish at our regional meeting in Leeds, England. Support from the joint organisers will keep costs to a minimum (probably in the region of £10 for attendance), in order to encourage you to come.

David Rogers
IAA President

REGIONAL MEETING IN MEXICO

The 1st Regional meeting of IAA in Mexico was held in Cuernavaco, Mexico, from 19 to 21 October 1999. There were 12 presentations during the 2½-day meeting plus a field trip to a large ecology park just outside of Mexico City. Enthusiasm was high during the meeting with excellent presentations made by new as well as long-time students of astacology.

The variety and quality of presentations at the meeting were excellent. Keynote talks were given by David Rouse, Gabino Rodriquez and J. L. Villalobos. Many thanks are due to Ana Maria Amaya and her staff from the Universidad Autonoma Metropolitana for organizing an excellent meeting.

RED CLAW FARMING IN MEXICO

For the last 4 years, Jorge Pelaez has been farming red claw (*Cherax quadricarinatus*) in northeast Mexico. He successfully raised catfish and tilapia for over ten years but once he tried red claw, he realized it was a species with much better potential for his area. He spawns brooders in ponds and nurses the juveniles for about 3 to 6 weeks. Juveniles are then trap-harvested, hand sexed and restocked in production ponds for another 4 to 6 months of culture. Jorge's production has been averaging 3,000 to 3,500 kg/ha/yr. of 80 to 100 g red claw. He's been receiving $10 to 12/kg as fresh whole animals and says his biggest problem is having enough product to meet demand. To help expand production, he conducted a training course in November for local businessmen and government officials. Two more farms are under construction with several being planned.

by **David B. Rouse**
Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, Alabama 36849

UPDATE ON CRAYFISH IN ZAMBIA

Member **C.J. Grubb** (P.O. Box 60287, Livingstone, Zambia) sends the following notes about crayfish in Zambia.

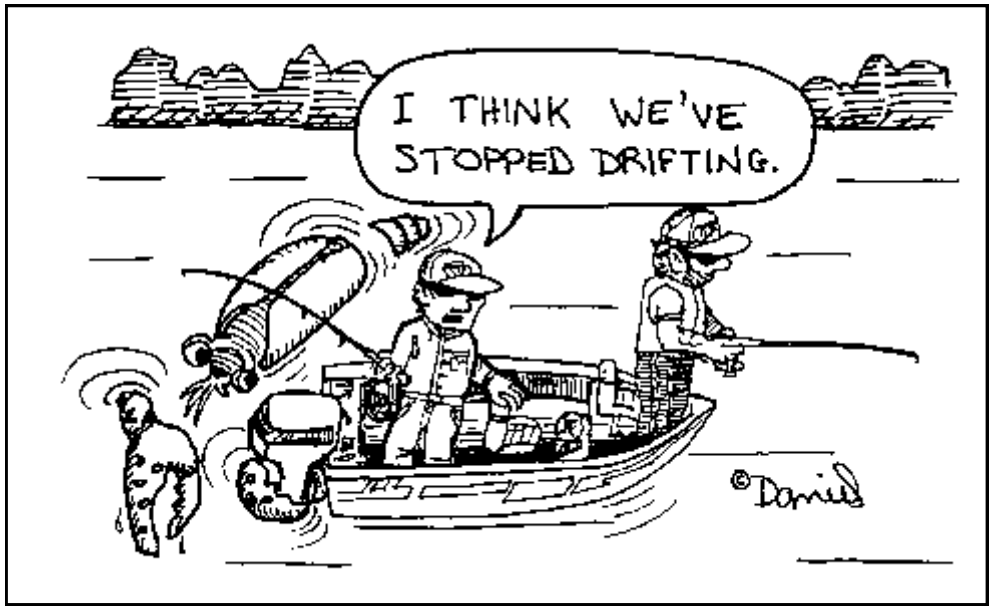
Procambarus clarkii, the great traveller, is on the move busy hitch hiking over the Victoria Falls on the tons of water hyacinth that is being washed out of our river. When we pick up the plants, just about every root system seems to have more than one juvenile crayfish on it and sometimes adult crayfish are found. This introduction is a welcome addition to the food chain - human and otherwise.

A nearby tourist operator has three ponds stocked with *Procambarus clarkii* and has had a lot of predators including monitor lizards, kingfishers, and cormorants. The man was sure that his crawfish were finished but soon found that enough had survived to permit harvesting for local sales. Interestingly, the fellow has both red swamp crayfish and yabby, *Cherax destructor*, in his ponds having apparently stocked some yabby that were originally destined for the kitchen into the ponds. The two species seem to be living in harmony together!

Mr Grubb reports that he has had yabby and red claw, *Cherax quadricarinatus*, living together in apparent harmony on his farm for 8 years. He catches both together in traps. Mr Grubb believes that the two species are not aggresive towards each other nor to the red swamp crayfish. One hears of native crayfish species being eliminated by introduced species, but in Livingstone, Mr Grubb has tropical species seemingly living together without problems. He notes that he watches small yabby and red claw crawling together like relatives yet juvenile yabby are very aggressive crayfish. Even a tiny yabby will bite a finger and hang on yet a juvenile red claw pretends to be dead and lies lifeless in a hand until it is put in the water and it shoots off.

WORLD AQUACULTURE SOCIETY
U.S. Chapter Meeting - February 2000

IAA Member **W. Ray McClain** (LSU Rice Research Station, P.O. Box 1429, Crowley, Louisiana 70527 USA/rmcclain@agctr.lsu.edu) organized the "Freshwater Crustacean Culture: Production Perspectives" session for the World



here. Some first steps have been taken by us. An acting group of Czech astacologists has been established with the aims of evaluating the recent state of the European 'crayfish crisis' in the Czech Republic, and developing, in co-operation with foreign specialists, projects on the conservation and restoration of native crayfish and limiting the negative effect of alien species in the Central European region. Czech names were established for the alien species, and the manual to distinguish all native and invasive species has been published (Kozak et al, 1998). A project on conservation of the highly endangered rock crayfish is being prepared. The third national Workshop on Crayfish is being organized by the University of South Bohemia Ceské Budejovice, Research Institute of Fish Culture and Hydrobiology in Vodnany, for May 2000.

The first workshop was held in Vodnany in May 1998, under the leadership of Ing. Pavel Kozak, and dealt the state of recent research, conservation and attempts at crayfish farming in this country. A co-operation between three Czech universities - Olomouc, Ostrava and Ceské Budejovice (RIFH Vodnany) and an acting group of astacologists has been established. The second workshop, held in May 1999, was directed mainly at the problem of alien crayfish and conservation of native species in the Czech Republic, and to initialize the preparation of an adequate research project. The project covers research on the state of five species recently documented in this country, conservation and restoration of native species, limiting the expansion of alien crayfish, and the educational activities directed to the wider public.

The third workshop will be held on 12 May 2000. The aims will be focused on conservation of the most endangered species, *A. torrentium*, and the preparation of a small international workshop on limiting alien crayfish expansion, and co-operative action in the Central European region. The Czech Republic is a country in the initial stages of alien crayfish introduction. Closer co-operation is needed with Poland which is highly 'occupied' by spiny-cheek crayfish, and also with Germany where wider conservation activities have been run recently. It would be beneficial to communicate with specialists from other countries in the region

Delegates should arrive in Cairns on Sunday. Accommodation check-in at 2pm.

Day 1
Monday 14 August

9.30am Full day cruise on the Great Barrier Reef. Coach pick up from accommodation; cruise from Cairns to a luxury 3 level pon toon on the Outer Reef. Snorkel or dive among the Reef's spectac ular coral gardens and beautiful marine life.

5.30pm Arrive back in Cairns; coach back to accommodation.

DAY 2
15 August 2000

8.40am Continental Tropical Breakfast
9.30am Kuranda Skyrail/Tjapukai Aboriginal Park;
4.00pm Return to Cairns via the famous Kuranda Scenic Railway.

DAY 3
16 August 2000

8.30am Breakfast
9.00am Kuranda Range/Mareeba journey
11.30am Guided tour of crayfish farm by Max Wingfield
1.30pm Aussie Barbecue Lunch.
2.30pm Walkamin Research Station tour
5.30pm Accommodation at Tinaroo Terraces, Lake Tinaroo.

DAY 4
17 August 2000

8am Breakfast; trapping redclaw in Lake Tinnaroo
11am Visit two crayfish farms
12pm Light picnic lunch served on the banks of Lake Eacham
6pm Arrive back at Cairns accommodation

THE "GOLDEN CRAYFISH" IN CZECH REPUBLIC

The recent state of crayfish is grey in Central Europe, rather than golden, as used in the title of Vladimir Krupauer's (1968) booklet "Zlaty rak" (*The Golden Crayfish*), which provided the wider Czech public with the most complex information on local crayfish species, their biology, history, farming and trade. The latter was the reason why the term "golden" was used given the fact that this country was among the traditional exporters of the highly valued noble crayfish in the past. The trade fell down in the beginning of the 20th century, crayfish disappeared from many waters, and, even worse, it disappeared from the consciousness of the wider public and of responsible institutions. Strong legislation without any effective conservation actions has led to the fact that about 80% of young people have never seen crayfish in natural waters.

The native noble crayfish, *Astacus astacus,* although deeply affected by previous plague, dense damming of streams and diminishing but continuous pollution, may occur fairly frequently in small populations in secondary waters (dam reservoirs, dis-used pits after coal mining, flooded quarries, drainage or old mill channels, etc.). The mud crayfish, *A. leptodactylus,* introduced in the 19th century, is less common, and the second native species, the stone crayfish, *Austropotamobius torrentium*, is a highly endangered animal known to exist in only two brooks in Central Bohemia. One unsuccessful attempt to breed the signal crayfish, *Pacifastacus leniusculus,* occurred in the 70s. While this species still remains in some ponds, it only inhabits a restricted area in the Southern Moravia. The spiny-cheek crayfish, *Orconectes limosus,* however, spontaneously invaded Bohemia during the 80s from Germany, upstream the Elbe River, and now it is distributed within the lower and middle parts of the Elbe and Vltava River watersheds. The second, potential way of introduction, is upstream the Odra River from Poland, where the species is about 15-20 km off the frontier. However, the actual distribution in Bohemia is still unknown, and some reports from isolated localities suggest that the species may be transferred by local inhabitants and fisherman to new water bodies as the 'native' species.

Wider education is necessary for the public

(Continued from page 4)

Aquaculture Society – U.S. Chapter Meeting. Venue was New Orleans, Louisiana USA and date was 4 February 2000. Titles and authors of crayfish papers follow:

Aquaculture perspectives of the Australian red claw – **David B. Rouse**

Procambarid crawfish aquaculture in forage-based systems – **Robert P. Romaire**

Management and production characteristics of the culture of the red swamp crayfish *Procambarus clarkii* in earthen ponds without planted forage – **Louis R. D'Abramo**, **Cortney L. Ohs**, and **Kathleen C. Elgarico**

Soft-shell freshwater crawfish aquaculture in North America: the past, the present, and the future – **Jay V. Huner**

Field production perspectives: finfish versus crustacean culture – Albert P. Gaude' III

Commercial juvenile production of the Australian freshwater redclaw crayfish *Cherax quadricarinatus* in gravel-lined ponds – Humberto Villarreal, Jose Naranjo, Patricia Hinojosa, and Edilmar Cortes.

Commercial semi-intensive production in clay ponds of the freshwater redclaw crayfish *Cherax quadricarinatus* in Tamaulipas, Mexico – Humberto Villarreal and Jorge Pelaez.

Influence of astaxanthin on color, growth, and survival of Australian red claw *Cherax quadricarinatus* – David B. Rouse and John K. Rash.

The effect of plastic substrate on production of red swamp crayfish *Procambarus clarkii* cultured in earthen ponds without planted forage – Kathleen C. Elgarico, Louis R. D'Abramo, and Cortney L. Ohs.

Effect of pond levee reconstruction on emergence of the crawfish *Procambarus* from summer burrows – W. Ray McClain.

FRESHWATER CRAYFISH 12

It seems that there are a few copies of Freshwater Crayfish 12 missing - especially those into the USA. If an IAA XII participant has not received his/her copy by mid-March we would like them to e-mail the conference organisers a short note they can try to track the parcel.

E-mail: Keller-Krebs@newsfactory.net

COMMON NAMES IN AQUACULTURE
by **J. F. Fitzpatrick, Jr**.

The USA offers two members of *Procambarus* as major items for aquaculture. The more commonly used species, *P. clarkii*, is known as the "red swamp crayfish" and represents a species that taxonomists regard as stable.

Quite a different situation confronts those who utilise the "white river crayfish". Taxonomic research begun by the late Horton Hobbs, Jr, demonstrates that the old series of populations that bore the name *P. acutus* actually represents a complex of several species. Three major populations seem to exist. The eastern US, from New England to the Mobile Bay drainage, is populated by genuine *P. acutus*. From Houston to Mobile Bay, in the Lower Gulf Coastal Plain, one finds the recently described species, *P. zonangulus*. Most of the area west of the Mississippi River, including Mexican populations, and the Midwest is occupied by *P. cuevachicae*, much more widely distributed than previously thought. Other populations, representing discrete species, are considerably more restricted in distribution.

Most of the stocks distributed for aquaculture seem to have been drawn from populations of *P. acutus* and *P. zonangulus*. I have personally examined samples from the stockponds at Lafayette, Louisiana, and from Clemson, South Carolina. The Louisiana animals are clearly *P. zonangulus*, while

those from South Carolina are true *P. acutus*. Thus, both species obviously have been used for aquaculture. It is difficult, indeed impossible, to identify any given stock without actual examination of specimens.

In the near future, the American committee that provides common names for decapod crustaceans will meet again and revise the list of accepted names. The 'acutus question' will certainly be considered by them. It seems almost certain certain that the name "white river crayfish" will be retained for *P. acutus*, with a new name proposed for *P. zonangulus*.

None of the names in use locally in the Atchafalaya River basin are appropriate for use, so a new one will probably be proposed. Once that is done, unfortunately, individual stocks will have to be examined by taxonomists and many will require the use of a new name to identify them. At present, no data exist to suggest that either species is more desirable for use than the other, but later study may indicate this.

TURKISH CRAYFISH HARVESTING
by **Patrick Bagot**
As far as I know there is no production, as such, in all of Turkey. Anyway, I checked to see what is happening and, a few days ago, I saw some *Astacus leptodactylus* in a local "upmarket" supermarket. The asking price was 2 million nine hundred and ninety thousand Turkish lira. The supermarket only had about two kg, as crayfish are a bit of a novelty here in Turkey (OK, about $US 6/kg!, forget the "huge" price. I have been a millionaire here for quite a few years, now!!). Well, the origin was Aydin which is in the West of Anatolia. It will be very difficult to get accurate figures for even last year's harvest, as DIE, which translates to State Institute of Statistics, haven't published them yet, and harvesters are always a bit suspicious; but projections on my part suggest that this year's figures will be about 1,000 tonnes for all of Turkey. The bulk of production still comes from Bursa, which seems to enjoy a kind of "protected status" due to the presence of magnesium in the lake water (so people say!). Plague is present in Bursa lake, but survival rates are high amongst *A. leptodactylus*.

Most of the Turkish harvest is exported to France and Germany and, perhaps of course, cooked and processed and boxed (as 20 to 30 g individuals) to Sweden for the "kraeftfest" in early August as a cheaper substitute for "the real thing", *Astacus astacus*.

IAA 13 UPDATE
Preparations for IAA 13 are in full swing. The local crayfish industry has provided terrific support with many sponsors coming forward to help stage the conference and aquaculture workshop.

Approximately 100 abstracts have been received to date with many more expressions of interest. The Australian Crayfish Aquaculture Workshop, to be held on Saturday 5 August, is also shaping up as an excellent event. It will include a trade display and participants will be treated to some delicious aquaculture produce from Western Australia.

Following is a brief itinerary for each of the post-conference tours. When finalised, the complete programmes will be posted on the WEB page.

1. South West tour: Cost: AUD$250
Guides: Brenton Knott & Ravi Fotedar

Day 1
Sunday 13 August
8:00am Depart Fremantle for Albany
10:30am Travel to Albany via Narrogin
Tour brief; visit yabby farms
1:00pm Lunch on the road
3:30pm Arrive in Albany
6:30pm Dinner

Day 2
Monday 14 August
8:00am Travel to Pemberton via Donnelly River (crayfish site)
1:00pm Lunch
3:30pm Arrive in Pemberton; Dinner

Day 3
Tuesday 15 August
8:00am Travel to Margaret River via Nannup (crayfish sites)
9:30am Arrive in Nannup
1:00pm Lunch; Depart for Margaret River
2:30pm Arrive in Margaret River
3:00pm Visit local wineries, etc
Visit crayfish sites
6:30pm Dinner

Day 4
Wednesday 16 August
8:00am Crayfish sampling in Margaret River
1.00pm Lunch
3:00pm Arrive back in Perth
Arrange airport transfers/hotel dropoffs

2. Tasmanian Tour Cost: AUD$550
Participants to make their own way to Hobart and will be responsible for their accommodation on the nights of Saturday 12 and/or Sunday 13 August (depending on arrival time).

Guides: Alastair Richardson, Roy Swain, Brita Hansen and Niall Doran.

Day 1
Monday 14 August
- Hobart to Mt Wellington summit (Panoramic views of south eastern Tasmania, or a lot of mist, but definitely *Astacopsis franklinii, Anaspides tasmaniae*);
- Bonorong Wildlife Park (native marsupials).

Overnight: Bronte Park Highland Village

Day 2
Tuesday 15 August
- Donaghey's Hill Scenic Lookout (Short walk through native forest to scenic views);
- Victoria Pass (or King River Valley) (Peat sedgelands with *Parastacoides* spp.);
- Queenstown (old mining town);
- Strahan Visitors Centre (Displays and interpretation of the history and environment of Tasmania's west coast).

Overnight: Strahan Village Motel

Day 3
Wednesday 16 August
- Gordon River cruise (Half-day cruise across Macquarie Harbour and up the Gordon River through dense rainforest; short boardwalk through rainforest with *Engaeus fossor* and *E. cisternarius* burrows);
- Zeehan Museum (History of mining on the west coast).

Overnight: Stanley (Dovecote Motel)

Day 4
Thursday 17 August
- Habitat and live specimens of *Astacopsis gouldi* (Todd Walsh);
- *Engaeus yabbimunna*: endangered crayfish (Niall Doran);
- Asbestos Range National Park: evening excursion spotlighting native wildlife.

Overnight: Shearwater Country Club

Day 5
Friday 18 August
- Lilydale; Engaeus orramakunna: rare burrowing crayfish in rainforest habitats (Niall Doran);
- Lunch at a winery (Good white wines produced in north east Tasmania);
- Return to Hobart, perhaps via Central Plateau, depending on weather;
- Return to Hobart by 5.00 pm. (It may also be possible to drop people at Launceston Airport in the early afternoon for flights to Melbourne).

3. North Queensland Tour Cost: $AUD550
Guides Max Wingfield & Clive Jones