

Invasive By Nature ?

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A large male *Cherax albidus* in the behaviour trial.

IAA Website Tip:

Did you know that you can search the IAA membership directory on the web? Just login to the IAA website and then click the *Member Search* link on the menu bar to the left of the home page. You can search by Last Name, County, or Taxonomic group.

Yabbies (*Cherax albidus*) are native to the eastern states of Australia and were first introduced to farm dams in the wheat belt of Western Australia in the 1930s. Since then, yabbies have successfully established breeding populations in a number of water bodies in the south-west of Western Australia, home to the native marron (*Cherax tenuimanus*). This co-occupancy has resulted in both species competing for resources. Consequently the Fisheries Department has placed restrictions on commercial yabby farming and further translocation of the species due to their invasive behaviour and a recognition that they displace marron. Gherardi et al. (2002) found that yabbies displayed shorter reaction times and clearer changes in their body posture

to heterospecific odours than did marron, supporting the hypothesis that invasive crayfish make faster and more appropriate use of information than those species they are displacing. Height (2002) also supported this view finding that in the presence of odour from fish predators, yabbies made significant behavioural modifications, whilst marron did not.

Following his earlier research, member **Shaun Height** recently completed a series of aquarium-based experiments, as part of his PhD at Curtin University, which investigated size-related responses of yabbies to predatory fish odour. Three size classes of yabbies (small, medium and large)

(Continued on page 3)





President's Corner

Dear IAA members:

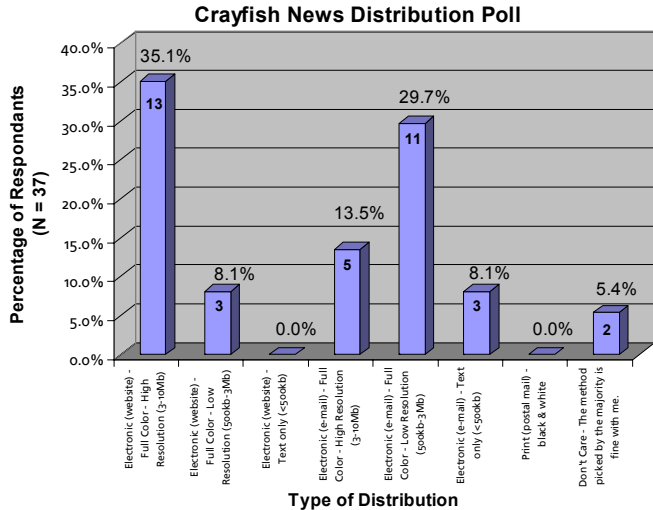
Jim Fetzner and I are trying to understand whether or not the electronic system the Society Board adopted to distribute Crayfish News would satisfy the majority of our members. A month ago we launched a poll whose results are shown in the figure.

IAA President
Francesca Gherardi (Italy)

The poll presented the following options:

- Electronic (website) - Full Color - High Resolution (3 – 10 Mb file).
- Electronic (website) - Full Color - Low Resolution (500 kb – 3 Mb file).
- Electronic (website) - Text only (<500 kb file);
- Electronic (e-mail) - Full Color - High Resolution (3 – 10 Mb file).
- Electronic (e-mail) - Full Color - Low Resolution (500 kb – 3 Mb file).
- Electronic (e-mail) - Text only (<500 kb file).
- Print (postal mail) - Black & white.
- Don't care – The method picked by the majority is fine with me.

We received 37 responses (which was definitely less than expected) but they confirmed our choice of an electronic version of the newsletter: no one



apparently prefers the printed version. However, we need to extend the poll to other members, in particular those who are not used to working online. Thus, you are invited to give your preference using either the web (<http://-147.72.68.29/crayfish/phpbb2/viewtopic-.php?t=114>) or the regular mail. While casting a choice, please keep in mind that going back to the printed format means a considerable cost for the society.

We also would like you to express your interest in participating in the next IAA symposium in Australia. Remember that the symposium will be organized by our friend **James Furse**, and we are expecting an enchanting location on the Golden

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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 **Bill Daniels**. Address: IAA Secretariat, Room 123, Swingle Hall, Department of Fisheries and Allied Aquacultures, Auburn University, AL 36849-5419, USA.

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Statements and opinions expressed in Crayfish News are not necessarily those of the International Association of Astacology

This issue edited by James W. Fetzner Jr. and Francesca Gherardi



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Coast, new areas to explore and crayfish to meet. As you know, organizing a conference is a difficult business; many of us have lived through that experience and know that a lot of preliminary information is necessary to be able to make informed decisions and

make the symposium as pleasant as possible. So, please, express your interest by writing to J.Furse@griffith.edu.au. Thanks for your help. ♪

Francesca Gherardi
IAA President

Short Articles

When a predator becomes a prey

Research student **Prayadt Wangpen** is working on the role of shelter in decapod crustacean behaviour at Curtin University in Western Australia. Prayadt investigated the prior residence and shelter competition of yabbies, *Cherax albidus* (Clark), at Curtin's new Aquatic Research Laboratory. He used juvenile yabbies (~ 2 g) plus a dozen predatory silver perch *Bidyanus Bidyanus* (Mitchell) (150-200 mm TL) who were looking for a good home. Following on from the work of his supervisor, **Dr. Glen Whisson**, with silver perch and marron (*C. tenuimanus*), Prayadt put 120 yabbies in six 350 L tanks (20 yabbies per tank) that formed part of a recirculating system - three tanks included shelter and three had no shelter. He then stocked three silver perch in each of the six tanks.

During the first few days both animals seemed to enjoy each other's company, but on the sixth day, one fish in tanks 1, 2, 4 and 5 was killed and had ripped fins when retrieved. Prayadt quickly checked water quality (ammonia and nitrite) but that was not the problem. He then removed two fish from the tanks in which fish didn't die so that all the tanks were left with two silver perch.

Over the next few days he lost another three fish from three tanks – same story. He took out the remaining silver perch, leaving one fish in each tank. In the following two weeks no fish loss occurred, but they were not in good shape - so he gave up the pilot trial. The survival of yabbies was close to 100 % in all tanks, but the mystery about the loss of seven silver perch remained unclear. The yabbies and perch were originally from the Eastern States where yabbies form part of the silver perch diet – but not so in this situation! Conclusion: do not underestimate juvenile yabbies! Research needs to be done to understand more about the conditions under which yabbies will eat silver perch. NOTE: This pilot trial used animals in unfed condition and water temperature was 20°C. ♪

Prayadt Wangpen

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Prayadt Wangpen conducting his crayfish interaction trials.

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were exposed to odour from silver perch (*Bidyanus bidyanus*) and crayfish behavioural responses recorded. It was expected that adult yabbies would display different behavioural modifications than juveniles. Although statistical analysis of results is still being undertaken, preliminary analysis indicates that all three sizes of yabbies used in the trials displayed the same behavioural modifications when exposed to odour from silver perch, suggesting that the response is not learned, but an innate plasticity of the species.

Literature Cited:

Gherardi F, Acquistapace P, Hazlett BA, and Whisson G (2002). Behavioural responses to alarm odours in indigenous and non-indigenous crayfish species: a case study from Western Australia. *Marine and Freshwater Research* 53(1): 93-98.

Height S (2002). Behavioural responses of freshwater crayfish (*Cherax tenuimanus* and *Cherax albidus*) to predatory fish odours. Honours thesis. Curtin University of Technology, Perth, Western Australia. ♪

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New Books

CANADA BAITFISH BOOKS PUBLISHED

The books on crayfish I coauthored (and we advertised several issues ago [CN 26(4):22]) are now out and available to order online at the University of Toronto Press: <http://www.utppublishing.com>



- 1) **The Essential Bait Field Guide for Eastern Canada, the Great Lakes Region and Northeastern United States:** Featuring Baitfish, Minnows, Small Fishes, Crayfishes, Frogs and Leeches. Edited by Guy Winterton, 200 pages, Full colour illustrations throughout. ISBN: 0973714808 (Paper) \$29.95.
- 2) **The Comprehensive Bait Guide for Eastern Canada, the Great Lakes Region and Northeastern United States:** Identifying, Harvesting and Culturing of Baitfishes, Crayfishes, Frogs and Leeches. Edited by Guy Winterton, 444 pages, Full colour illustrations throughout. ISBN: 0973714816 (Paper) \$69.95. ♣

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Crustaceans in the Sea and the Lakes

A new book has just appeared in Sweden (and in Swedish) about "Crustaceans in the Sea and the Lakes" by Hans Ackefors, Stockholm University, Sweden. It covers 384 pages and is illustrated with more than 150 figures, of which most are in colour. A translation to English is required, as is its enlargement to include Mediterranean species.

Sweden has long traditions of consuming fresh-



ISBN: 91-973515-4-7.

Price: ~ 37 euro

The book can be purchased from the publisher in Sweden: Kivikgårdens AB, Gullregnsvägen 5, SE-260 41 Nyhamnsläge, Sweden.

FAX: ++46-42-345382, Tel: ++46-42-345360

water crayfish, but also marine crustaceans such as lobsters, shrimps and crabs. The intentions of this book are to describe in a popular way, along with many scientific facts, the crustaceans held in high regard by the public. Separate chapters deal with the freshwater crayfish species that are consumed in Sweden; Noble crayfish (*Astacus astacus*) and Signal crayfish (*Pacifastacus leniusculus*) are sold fresh at the market while imported species, such as the Narrow-clawed crayfish (*A. leptodactylus*) and the Red Swamp crayfish (*Procambarus clarkii*) are sold deep frozen. The latter species nowadays are mostly imported from China. There are lots of statistics on production and imports in various countries.

One chapter describes the origin of freshwater crayfish in a marine environment more than hundred million years ago. Separate chapters deal with the many crayfish species in North America and Australia in contrast to the five (or six) species in Europe (and Asia). The large diversity of species in the two former continents with individuals as small as 10 mm to species bigger than 4 kg in Australia is illustrated. In the latter continent, there are also species with social behaviour.

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Special chapters deal with the cultivation of crayfish. Lots of information is given on water quality and methods used in Europe, North America and Australia. Interesting details on the feed technology and nutritional requirements are described for many species, along with details on growth rates. There is a great diversity among continents on how the animals are raised.

There are special sections which describe anatomy, physiology, and reproduction of the freshwater crayfish species. The marine species on the Swedish west coast, which are exploited include lobsters (*Homarus gammarus*), crabs (*Cancer pagurus*), Norway lobsters (*Nephrops norvegicus*), and Northern prawns (*Pandalus borealis*). These species, with their particular reproductive behaviour, are particularly interesting to the public because they have such spectacular planktonic larval forms and are generally not known by people. Most of the planktonic stages are described. The fishing gear for these species are illustrated and the national and international regulations are elucidated.

A special chapter describes the life-cycle of the various freshwater and marine species in Swedish waters and the time of the year they are best to consume.

Nowadays, tropical shrimp species are imported into Sweden. They are *Penaeus* species and also *Macrobrachium rosenbergii*. The latter is mainly a freshwater species and is mostly used in Chinese restaurants. The life-cycles of various important species are described and the differences in reproductive behaviour between coastal and oceanic species are also elucidated. The environmental impact of the former species on the mangrove belt is also discussed.

The importance of crustacean species as plankton and as bottom animals in the food web are described as is the evolution of crustacean species. It is likely that the general public does not know the importance of such non commercial species. They constitute the link between phytoplankton (and the macroplants) and the fish species in lake and sea areas.

Spectacular photos of many species have kindly been supplied by colleagues all over the world, who are acknowledged for their contributions. ♪

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Meeting Reports

Report from the 2. International crayfish meeting of the forum flusskrebse, 1. thru 4. September 2005 in Baden, Switzerland

The second regional crayfish meeting organized by the German speaking organization *forum flusskrebse* in early September 2005 was a big success. The meeting took place in the mediaeval city of Baden in the northern part of Switzerland (Canton of Aargau). 51 scientists, fishermen, authorities and naturalists interested in crayfish from Germany, Austria, Italy and Switzerland enjoyed three half-days of lectures, two fieldtrips and three roundtable sessions in Baden and its surrounding area. The main topics of the lectures and roundtable discussions were news on the biology and ecology of freshwater crayfish, measures and projects for the conservation of the native European species and the management of crayfish populations of native and non native species. German was the official language of the meeting. Also the presentations from the French speaking part of Switzerland were held in German, which was appreciated very much by the audience. The lectures and roundtable discussion were held in the art nouveau-hall in the Hotel Blume in the thermal area of Baden.

On the first fieldtrip the participants of the meeting had the chance to visit populations of *Austropotamobius pallipes* and *Austropotamobius torrentium* and got information on the running protection-programme for these two species in the Canton of Aargau. In a pond we caught *Astacus astacus* with traps while we had dinner in the castle Habsburg, the birth place of King Rudolph from Habsburg. On the second fieldtrip we visited two locations with the American species *Pacifastacus leniusculus* and *Procambarus clarkii* and got information on the measures taken against the dispersal of these two species. Fortunately the weather was a big supporter of the event and the fieldtrips and cultural parts of the meeting showed the Canton of Aargau from its best side.

The abstracts of the lectures (in German) can be ordered through the secretariat of *Forum flusskrebse*: **Forum flusskrebse**, Bahnhofstraße 39/2, A-9020 Klagenfurt, Austria.

Mail: forum.flusskrebse@ebundp.at ♪

Report made by:

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AN OLD MENACE IS BACK: CRAYFISH PLAGUE IN CZECHIA

Crayfish species native in Czechia (noble crayfish *Astacus astacus* and stone crayfish *Austropotamobius torrentium*) were rare and even threatened with extinction locally before the 1980s. During the last decade, water quality of Czech rivers and streams improved significantly and crayfish populations have been on the increase. However, another threat to indigenous crayfish — the crayfish plague — appears to be on the rise again, with its effects being drastically underestimated in our country. Primary sources of this dangerous disease are the much more resistant American crayfish. The main plague vector in Czechia is the spiny-cheek crayfish *Orconectes limosus*, a widespread species, especially in some larger rivers in the western parts of the country.

Until recently, nobody in our country focused on crayfish plague research. A year ago, in a close cooperation with the team at Ludwig Maxmillians University in Munich, we started a project to monitor the distribution of *Aphanomyces astaci*, the causal agent of the crayfish plague, in Czechia. Initial results confirmed our expectations that *A. astaci* is common in Czech *O. limosus* populations. What is more alarming, however, is that this pathogen was diagnosed as the cause of four crayfish mass mortalities within just a few months. This stands in stark contrast to the fact that in the whole second half of 20th century there were only two cases of mass mortalities where the plague was suspected as the cause.

Recent cases of the crayfish plague have probably not been caused by a direct transmission of the plague pathogen from vectors, as American crayfish do not occur in the affected localities. Much more likely is the transmission by human activities — at least in one case there was a well-founded suspicion that live zoospores of *A. astaci* were transferred with wet fishing gear or boots from one locality with the plague outbreak to another.

Crayfish plague seems to be a significant threat to a successful recovery of native crayfish populations, even in areas that do not contain the non-native American crayfishes. It seems likely that confirmed crayfish plague outbreaks are only the “tip of the iceberg”, and the real number of affected populations may be much higher. The crayfish carcasses decay quickly, so we presume that most cases of plague-caused mass mortalities escape detection. Czechia is

probably not exceptional in this aspect – it is likely that the situation in other Central European countries is similar, so that plague monitoring deserves more attention. ♀

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Zaccara S, Stefani F, and Crosa G (2005). Diversity of mitochondrial DNA of the endangered white-clawed crayfish (*Austropotamobius italicus*) in the Po River catchment. *Freshwater Biology*, 50(7): 1262-1272.

1). The strong contraction of the European populations of white-clawed crayfish has stimulated research of its population genetics. As part of a conservation project to introduce and improve Italian populations of *Austropotamobius italicus*, the genetic diversity of 16 populations from 10 tributaries of the Po River drainage was evaluated by sequencing a 494 bp length of cytochrome oxidase subunit I (COI mtDNA). 2). The evolutionary tree topologies and the parsimony network of 26 haplotypes separated into two clusters, on the basis of high average genetic distance (6.51±0.42%). This finding indicated the presence of distinct evolutionary lineages, other than different allopatric sources. 3). An ancestral haplotype (*Nav*) was identified and 13 haplotypes, found mainly as singletons, were independently connected to *Nav* by short branches with one mutation site. Unimodal mismatch distribution and the goodness-of-fit of the observed data reflected a model of sudden population expansion, after the last glacial bottleneck event. 4). A general moderate level of genetic variability ($h=0.22-0.7$ and $\pi=0.045-0.27\%$) was highlighted within *A. italicus* populations inhabiting Alpine and Apennine tributaries of the Po River. Analysis of molecular variance (AMOVA) revealed significant genetic structuring across all hierarchical levels, indicating that a major proportion of genetic variance is structured among localities within drainages. Multiple adjacent localities, strictly connected by the Po River, shared the two most frequent haplotypes (*Nav* and *Laz*), while remote populations, far from the Po River inflow, move towards a mtDNA fixation. 5). The results of this study indicate that distinct populations should be treated as separate entities for management. The key implication of the data is that *ad hoc* measures for successful programs of recovery and management strategies for *A. italicus* conservation, such as the phylogeographic study of haplotype distribution at a local scale and the genetic variability of populations used as stock breeders, should be considered. ♀



Meeting & Conference Announcements

CRAYFISH MEETING - NORTHERN ENGLAND

The Environment Agency and the North Yorkshire Moors National Park Authority are hosting an open meeting to discuss crayfish issues in Northern England. This area contains some of the best populations of *Austropotamobius pallipes* in the UK but populations of *Pacifastacus leniusculus* threaten the area. The day will be an informal exchange of information and ideas through presentations and workshops. It is planned for the 24th November 2005 in Hawes, North Yorkshire. ☿

For further information contact
martin.christmas@environment-agency.gov.uk



14th INTERNATIONAL CONFERENCE ON AQUATIC INVASIVE SPECIES

May 14-19 Key Biscayne, FL, USA

The introduction and spread of non-native species in freshwater and marine environments is a worldwide problem that is increasing in frequency. There are numerous alien invertebrate, fish, and plant species that are being introduced through various pathways, and are causing significant damage to coastal and freshwater ecosystems, and to the economies that depend upon them.

The International Conference on Aquatic Invasive Species is widely considered the most comprehensive international forum for the review of accumulated scientific knowledge, presentation of the latest field and laboratory research, introduction of new technological developments for species control and mitigation, discussion of policy and legislation to prevent new introductions, ballast water and other shipping-related issues, and public education and outreach initiatives to raise awareness about aquatic invasive species. ☿

More information at: <http://www.icaais.org/>

EVOLUTION OF INNATE IMMUNITY

Open Symposium and PhD student course financed by "Centrum för dynamiska processer, Uppsala Universitet".

7 December 2005 — All three lectures in Lindahlsalen, EBC

10:30 :: **Paul Schmid-Hempel**, Ecology & Evolution, ETH, Zürich, Switzerland. "Variation in innate immune defense - some ecology and lots of questions" <http://www.eco.ethz.ch/>

13:00 :: **Joachim Kurtz**, Experimental Ecology, ETH, Zürich, Switzerland. "How adaptive is innate immunity?" <http://www.mpil-ploen.mpg.de/english/evoleco/staff/kurtz.htm>

14:00 :: **Tom Little**, Inst of Cell, Animal & Population Biol, Univ of Edinburgh, UK. "Parasite-Host Coevolution: From Genes to Ecology" <http://www.icapb.ed.ac.uk/people/little.html>

8 December 2005 — All three lectures in B41, BMC

10:30 :: **Jean-Marc Reichhart**, CNRS, Strasbourg, France. "Drosophila Innate Immune system: Lessons and Questions" <http://www-ibmc.u-strasbg.fr/ridi/index.shtml>

13:00 :: **Jonathan Ewbank**, Centre d'Immunologie, Université de la Méditerranée, Marseille, France "Specificity in *C. elegans* innate immunity" http://www.ciml.univ-mrs.fr/EWBANK_jonathan/JE-PRES-Ao1.htm

14:00 :: **Martin Flajnik**, Dep of Microbiol & Immunology, Univ of Maryland, USA. "Evolutionary history of immunoglobulins" <http://medschool.umaryland.edu/flajniklab/>

This symposium is also a PhD-course (1p). Contact Kenneth Söderhäll for registration and further information. ☿

E-mail: Kenneth.Soderhall@ebc.uu.se

Telephone: 018-471 28 18.

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International Society for Developmental and Comparative Immunology — 10th International Congress

Tentative Plenary Topics & Speakers

ORIGINS OF IMMUNE RECOGNITION

Louis Du Pasquier,
University of Basel
Margaret McFall-Ngai,
University of Wisconsin, Madison

ARTHROPOD IMMUNITY

Fotis Kafatos, EMBL

INNATE IMMUNITY

Bruce Beutler, Scripps Research Institute

COMPARATIVE IMMUNOGENOMICS

Stephan Beck, Sanger Institute

SCIENTIFIC SESSIONS AND WORKSHOPS

The Congress will be organized with a set of broad Themes, and within each theme a group of more focused Sessions will be planned. The Sessions within any one Theme will be organized to run sequentially (rather than in parallel) to facilitate continuity and minimize potential conflicts between presentations dealing with the same Theme. The Themes (and especially the Sessions) may be adjusted as the Congress draws closer, depending on the volume of abstracts received in each area.

THEMES

1) Recognition of Non-Self

Sessions:

- Major Histocompatibility Complex
- Rearranging Ag receptors
- PAMPS/PRR/TLR/Lectins
- NK cell receptors

2) Signal Transduction and Transcription Factors

3) Organism /Pathogen Interactions

Sessions:

- Mucosal Immunity
- Parasite immunity

— Intracellular pathogens

4) Immune Effector Mechanisms

Sessions:

- Cytotoxic reactions
- Antimicrobial peptides
- Immunoglobulins and Complement
- RNA interference

5) Immune Regulation

Sessions:

- T cell function
- Gene Expression and Transcription Factors
- Cytokines

6) EcoImmunity

7) Marine Mammals

8) Enhancing Immune Reactions

Sessions:

- DNA Vaccines
- Immune stimulation

ISDCI 2006 CHARLESTON

10th International Congress

International Society For Developmental and Comparative Immunology

July 1-6, 2006

Charleston Place Hotel

Charleston, South Carolina USA

CHARLESTON IS A GREAT SITE FOR THE CONFERENCE!

Historic Charleston will be a most exciting venue to enjoy festivities and fireworks of the US independence day! Repeatedly voted the most polite city in America, Charleston has many cultural attractions. The Charleston Place hotel is the city's most luxurious, located in the heart of downtown near many great evening and dining spots to enjoy after the sessions are over. We have been fortunate to get once in a lifetime rates for our attendees.

The International Program with plenary lectures, contributed sessions and workshops will cover the latest research on mechanisms of immunity, host pathogen relationships, and environmental impacts on immune function across the phylogenetic spectrum.

For More Information
Conference Manager
2423 Fallbrook Place
Dunsmuir, CA 95927 USA
Tel: (530) 432-4279
Fax: (530) 432-4279
Email: www.isdci.org

Stay in touch with the developments for the 10th International Congress at:
www.isdci.org



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Orange *Austropotamobius pallipes* Found in Switzerland

During a survey on the distribution of native crayfish species in Switzerland in the Autumn of 2004, an interesting and surprising observation was made by **Peter Jean Richard**. In a normally-colored (brown) crayfish population, several bright orange individuals were detected (see photo).

It was previously known that some specimens of this crayfish species can have a distinct blue coloration. Orange animals, however, have not been observed or caught previously, or so we thought. It turns out that this recently noticed orange color form is just a rediscovery of an unusual, previously mentioned, orange color form. An old Swiss crayfish book makes reference to an orange crayfish species near Kanton Solothurn. Exact locations were not mentioned, however.



Stream habitat where the orange color form was found. Photo by Chris Lukhaup.



Orange color morph of *Austropotamobius pallipes*. Photo by Chris Lukhaup.

When I went down to look at the population myself it took me just 30 minutes to spot several orange individuals, small ones and adult ones. The crayfish are abundant in this small creek and out of 30 crayfish we counted 6 orange ones. The creek is about 1 — 1.5 meters wide and from 10 cm to 70 cm deep. ♪

Chris Lukhaup
(www.crusta10.de)



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Abstract

In experiments performed in aquariums, the daily consumption of *Chara vulgaris* alga by crayfish (*Astacus astacus* L.) has been determined. These quantitative data have been used to make a prognosis of the effect of the *A. astacus* population on the biomass of macrophytes in Lake Berezovo (Pskov oblast). The density of the crayfish population and the biomass of higher aquatic vegetation in the lake have been determined in field studies. Extrapolation of the results of laboratory experiments to a natural water body has shown that crayfish are capable of controlling no less than 40% of submersed macrophytes in the area used by their population. A PDF file is available from Dr. Fedotov.

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