

## Current Research Monitor No.61: June—September 2003

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## Abstracts

### **Chronic fatigue link to organophosphates**

This paper reports the first scientific study documenting a link between organophosphate exposure and the development of chronic fatigue.

The UK Department of Health recently published a report from the CFS/ME Working Group concluding that chronic fatigue syndrome (CFS) is a chronic illness and should be recognised as such. They suggested a number of possible triggers for CFS including exposure to environmental toxins such as organophosphate pesticides. To investigate this link the authors examined self-reported cases of ill health submitted to the Veterinary Medicine Directive under the Suspected Adverse Reaction Surveillance Scheme (SARS). Most of these reports have been submitted by sheep farmers who regularly dip their animals in organophosphates to control ectoparasites. The authors sent questionnaires to people who had submitted reports through the SARS system. Responses to the questions allowed them to estimate exposure levels and the severity of symptoms experienced. Analysis of the results showed an association between organophosphate exposure and chronic fatigue. Higher and more prolonged exposures to organophosphates were more likely to lead to development of chronic fatigue.

The link between chronic fatigue and organophosphate exposure has been anecdotal up until now. This paper is the first scientific study to confirm this link. In the UK a number of organophosphate pesticides are still in use by professionals and chlorpyrifos is still available to both amateur and professional users. Given the number of people suffering from chronic fatigue the government should act to reduce environmental exposure to this group of pesticides.

*N. Tahmas, A. Soutar and J.W. Cherrie, Chronic fatigue and organophosphate pesticides in sheep farming: A retrospective study amongst people reporting to a UK pharmacovigilance scheme, Annals of Occupational Hygiene, 2003, 47:261-267.*

### **Testicular cancer and prenatal exposure**

Mother's exposure to chlordane pesticides and other persistent organic pollutants could increase the chance that their sons will develop testicular cancer.

Testicular cancer is on the increase in several western countries. Two other conditions of the human male reproductive system, cryptorchidism (undescended testes) and hypospadias (the urethra does not come out of the tip of the penis but somewhere between tip and base), are also increasing. Additionally, declines in sperm count have been observed in recent years.

All four of these conditions of the human male reproductive system may have a similar cause. One possible explanation is increased exposure to the female hormone oestrogen during the first three months of pregnancy. According to this theory testicular cancer has its origin in prenatal exposures of the male foetus.

Environmental chemicals either mimicking the action of oestrogen, or blocking the action of the male hormone androgen, could lead to such high oestrogen levels. This study examined blood concentrations of 38 polychlorinated biphenyls, *p,p'*-dichlorodiphenyl-dichloroethylene (DDE), hexachlorobenzene (HCB), and chlordanes in 61 cases of testicular cancer and 58 controls. The concentration of these com-

pounds was also measured in blood samples from their mothers.

Men with testicular cancer showed a significant increase in the level of *cis*-nonachlordane compared with the control group. Mothers of sons with testicular cancer showed increased levels of PCBs, HCB and chlordanes compared with mothers of the control group.

These results provide further support for the view that a mother's exposure to endocrine-disrupting chemicals may lead to defects of the male reproductive tract, most seriously to testicular cancer. Although the chemicals used in this study are now banned for use in western countries they are still pervasive in our environment due to their extreme persistence. In addition, many chemicals in current use are also suspected endocrine disruptors and may have similar health impacts particularly during sensitive stages of human development.  
*L. Hardell, B. van Bavel, G. Lindstrom, M. Carlberg, A.C. Dreifaldt, H. Wijkstrom, H. Starkhammer, M. Eriksson, A. Hallquist and T. Kolmert, Increased concentrations of polychlorinated biphenyls, hexachlorobenzene and chlordanes in mothers of men with testicular cancer, Environmental Health Perspectives, 2003, 111:930-934.*

### **Urban exposure a matter for concern**

Traditionally pesticide exposure has been assessed in relation to its use in agriculture. However, an increasing body of evidence indicates that urban residential exposure may be equally or more significant. Of particular concern are potential effects on the developing foetus or newborn child. In this study levels of pesticides detected in urban dwellers was even higher than that found in many previous studies.

The study measured exposure of 386 pregnant women to chlorpyrifos, pentachlorophenol, and to a number of pyrethroids. The group was multiethnic and mainly from Harlem, New York City. Concentrations of breakdown products of the pesticides were measured in urine samples taken from the women during their pregnancies between March 1998 and May 2001. The respective average values found were 11.3 µg/g creatinine for TCPy, (a measure of chlorpyrifos exposure), 19.3 µg/g creatinine for PBA (a measure of exposure to certain pyrethroids), 7.3 µg/g creatinine for pentachlorophenol (values are normalised to creatinine to adjust for the daily variation in dilution of the urine).

Levels of all three metabolites were higher than those found in previous studies. For example, levels of the chlorpyrifos metabolite, TCPy, were notably higher than found in the NHANES III survey (2.2 µg/g creatinine), or the NHEXAS-MD study (4.6 µg/g). It was also higher than levels found in children in an agricultural community in Washington.

These findings support a growing body of evidence pointing to the significance of urban residential exposure. Regulators need to fully acknowledge this exposure route and develop policies encouraging urban pest control methods which depend less on the use of chemical pesticides.

*G.S. Berkowitz, J. Obel, E. Deych, R. Lapinski, J. Godbold, Z. Liu, P.J. Landrigan and M.S. Wolff, Exposure to Indoor pesticides during pregnancy in a multiethnic, urban cohort, Environmental Health Perspectives, 2003, 111:79-84.*

## Questions over accuracy of new EU classification

The new European Union chemical classification has placed 15% of chemicals in a too low danger class. This underestimates the potential risk they pose to human health and the environment.

The European Union has decided on harmonised classifications for chemicals according to its own directive for classification and labelling of dangerous substances. Chemicals have been assigned to danger classes providing information on both acute and chronic effects of the chemicals. These classes are assigned according to a strict set of rules in theory eliminating doubt about their meaning and assignment.

To assess the accuracy of the classifications the authors analysed the acute oral toxicity classes assigned to 992 chemicals under this new harmonised system. They compared these to the acute oral toxicities recorded in two different databases, that of the Swedish National Chemicals Inspectorate and the Registry of Toxic Effects of Chemical Substances (RTECS)(compiled and maintained by the National Institute of Occupational Safety and Health in the USA). Only data using rats as a test species were used in the comparison.

This study found that 15% of chemicals were assigned a too low danger class and 8% were assigned a too high danger class. For example, a total of 108 chemicals should have been assigned to the highest toxicity class (very toxic) as their acute oral toxicity is equal to or below 25 mg/kg. However, only 82 of these were actually assigned to this class, the remaining 26 having been assigned to a lower class. These 26 chemicals included 11 pesticides (dichlorvos, coumarin, endosulphan, heptachlor epoxide, ethion, leptophos, methiocarb, isofenphos, endothon, dimetilane, dioxacarb).

The decisions behind the new EU classifications are not transparent and so the reasons for such a large number of anomalies are unclear. It is known that in cases where there are differing acute toxicity values there is an informal policy to apply the stricter classification. Consequently, 8% of chemicals may have been placed in a too high danger class due to data present in a database other than those mentioned above. However, the authors cannot easily explain why 15% of chemicals are assigned a too low danger class.

The new EU classification may be widely used throughout member states and as such it is vitally important that the risks to human health and the environment should not be underestimated.

*C. Ruden and S.O. Hanson, How accurate are the European Union's classifications of chemical substances? Toxicology Letters, 2003, 144:159-172.*

## Farmworker poisoning in California, US

Using California's Pesticide Use Reporting system and Pesticide Illness Surveillance Program (PISP) the authors assessed the im-

pact of pesticides on worker health. They found nearly 500 cases of pesticide poisoning in California reported annually between 1997 and 2000. Real figures are likely to be significantly higher due to under-reporting.

Most poisonings occurred as a result of soil fumigation and pesticide applications to grapes, oranges and cotton. Pesticide drift accounted for 51% cases. Violations of worker safety laws contributed to 41% of reported cases. No violations occurred in another 38% cases indicating that in these cases the law was insufficient to protect the health of farm workers.

California has some of the most stringent pesticide use and worker safety laws in the world. The problems inherent in this 'best case' scenario of pesticide use highlight the global problem of pesticide poisonings among agricultural workers.

*M. Reeves and K. S. Schafer Greater Risks, Fewer rights: U.S. farmworkers and pesticides, International Journal of Occupational and Environmental Health, 2003, 9:30-39.*

## Advertising trends of the agrochemical industry

Agrochemical companies advertise in farming magazines to sell their products. This paper analyses the changing images of advertising, showing how the agricultural industry repositions itself to reflect dominant cultural concerns. The authors identify three broad periods, science, controlling nature, and working with nature. In the first period, 1945-1965, product names and promotion emphasise the chemistry and science. Examples of names are simazine, isotox, lindane. About 95% of the pictorial metaphors analysed stressed chemical attributes of the pesticide, emphasising potency and ability to decrease yield loss by destroying pests. From the 1970s-1980s, the emphasis was on control of nature, with brand names like Prowl, Marksman, RoundUp, Lasso, Bullet, Warrior, Pounce. Visual images included a snarling feline or wolf and narrative portrayed dominance over nature, competition, and specialisation: 'there can be only one leader of the pack'. But from the 1990s, the brand names emphasise working with nature: Beacon, Permit, Frontier, Harness, Fusion, Resolve, Resource, Harmony, Accord. One ad shows silhouetted farm animals, with a woman and child at a water pump, while another carried the narrative 'Best against grass. Best for the land'. The approach addresses concern that the industry and agricultural research institutions lack sensitivity to the environmental, and to the ecological and social costs of high chemical input agriculture. Finally, the authors note recent ads for genetically engineered agricultural technologies, which continue the soft, nature-oriented approach with text like 'solutions in the seed'.

*M.M. Kroma and C.B. Flora, Greening pesticides: a historical analysis of the social construction of farm chemical advertisements, Agriculture and Human Values 2003, 20:21-35.*

# Conference proceedings

*Selection of abstracts of the 2003 North American Congress of Clinical Toxicology Annual Meeting, Published in Journal of Toxicology—Clinical Toxicology, Volume 41, Issue 5, Pages: 641–752, online <http://www.dekker.com/servlet/product/DOI/101081CLT120024368>*

An outbreak of severe rodenticide poisoning in North Vietnam caused by illegal fluoroacetate, *J. Höjer, \*H.T. Hung and N.T. Du, \*Swedish Poisons Information Centre, Stockholm, Sweden*

Transaminase elevation in pyrethroid intoxications, *J. Naumovski\* and E.P. Krenzlok et al, \*Clinic of Toxicology, Skopje, Macedonia*

Evaluation of disease severity following acute paraquat poisoning by Apache II scores, *Y.M. Hung, Kaohsiung Veterans General Hospital, Taiwan, ROC*

Not nice to lice®—not so nice to eyes, *K. Reis\* and C. Hadley, et al, \*Central Ohio Poison Center, Children's Research Institute, US*

Treatment of moderate to severe paraquat poisoning with vincristine and dexamethasone, *S. Chomchai and C. Chomchai, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Effectiveness of obidoxime in organophosphate poisoning, *H. Thiermann\* and F. Worek, et al, \*Bundeswehr Institute of Pharmacology and Toxicology, Munich, Germany*

Cross-sectional exposure assessment of environmental contaminants in Churchill County, Nevada, *M. Belson and A. Holmes, et al, Centers for Disease Control and Prevention, National Center for Environmental Health, Atlanta, Georgia, US*

Household product labeling—Inadequacies abound, *F.L. Cantrell and A.S. Manoguerra, California Poison Control System—San Diego, California, US*

Transdermal penetration of the herbicide 2,4-D is enhanced by UV absorbers found in commercial sunscreens, *A.R. Pont\*, A.R. Charron and R.M. Brand, \*Biological Systems Engineering, UNL, Lincoln, Nebraska, US*

Carbaryl inhibition of plasma cholinesterase activity, *H. Long and B. Kirrane, et al, New York City Poison Center, New York City, New York, US*

Exposure assessment of children exposed to arsenic in an urban playlot, *M.B. Mycyk and M. Crulcich, et al, Center for Children's Environmental Health at Cook County Hospital, Chicago Department of Public Health, Toxikon Consortium, Chicago, Illinois, US*

Darkness on the edge of town: a rural family maliciously poisoned by thallium, *K.L. Cumpston and M. Burk, et al, Toxikon Consortium, Cook County Hospital, University of Illinois at Chicago, Illinois Poison Center, Chicago, Illinois, US*

Functional MRI assessment of organophosphate poisoning, *S.B. Bird\* and E.W. Dickson, \*Departments of Emergency Medicine, University of Massachusetts, Medical School, Worcester, Massachusetts, US*

## AGRICULTURE

Pesticide provision in liberalised Africa: out of control?  
S. Williamson, *Network Paper*, Agricultural Research & Extension Network, January 2003, 126:15pp, available online at:  
[www.odi.org.uk/agren/papers/agrenpaper\\_126.pdf](http://www.odi.org.uk/agren/papers/agrenpaper_126.pdf)

**Benin / Ethiopia / Ghana / Senegal / cotton / vegetables / pineapple / cereal / legume / trade / export / market / policy**

### Integrated Pest Management

Aspects of cotton and vegetable farmers' pest management decision-making in India and Kenya  
S. Williamson, and A. Little, et al, *International Journal of Pest Management*, 2003, 49, 3:187-198.

**extension / farmer / training / cotton / vegetables / India / Kenya**

### Biological Control

Field experiments using the rhabditid nematode *Phasmarhabditis hermaphrodita* or salt as control measures against slugs in green asparagus

A. Ester, K. van Rozen and L.P.G. Molendijk, *Crop Protection*, 2003, 22, 5:689-695.

**nematode / asparagus / slug / Netherlands**

Optimum timing and placement of a supplementary food spray Envirofeast® for the establishment of predatory insects of *Helicoverpa* spp. in cotton systems in Australia

R.K. Mensah and A. Singleton, *International Journal of Pest Management*, 2003, 49, 2:163-168.

**predatory insects / cotton / Australia**

### Organic

Producing the natural fiber naturally: technological change and the US organic cotton industry

M. Ingram, *Agriculture and Human Values*, 2003, 19, 4:325-336.

**cotton / US**

### Reduction policies

Pesticide indicators

V. Van Bol and S. Claeys, et al, *Pesticide Outlook*, 2003, 14, 4:159-163.

**usage / indicators / risk assessment / health / environment / Europe**

## DEVELOPMENT

Pest and pesticide management in Swedish development co-operation  
G. Ekström, B. Dinham and H. Kylin, *Pesticide Outlook*, 2003, 14, 3:115-119.

**Sweden**

## ECONOMY, TRADE AND POLICY ISSUES

### Corporate watch

Accountability in the pesticide industry

P. Riggs and M. Waples, *International Journal of Occupational and Environmental Health*, 2003, 9:74-77, available online at:  
[www.ijoe.com/pdfs/0901\\_riggs\\_accountability.pdf](http://www.ijoe.com/pdfs/0901_riggs_accountability.pdf)

**agrochemical industry / economics / accountability / public health**

Greening pesticides: a historical analysis of the social construction of farm chemical advertisements

M.M. Kroma and C.B. Flora, *Agriculture and Human Values*, 2003, 20, 1:21-35.

**agriculture / agrochemical industry / advertising**

### Country studies

Pesticides in central and eastern European countries: usage, registration, identification and evaluation - Part 1: Poland

L. Leumeister and E. Hajduk, PAN Germany, 2003, 119pp.

**pesticide / usage / registration / classification / health / environment / Poland / Europe**

Pesticides in central and eastern European countries: usage, registration, identification and evaluation - Part 2: Hungary

L. Leumeister, PAN Germany, 2003, 116pp.

**pesticide / usage / registration / classification / health / environment / Hungary / Europe**

Pesticides in central and eastern European countries: usage, registration, identification and evaluation - Part 3: Czech Republic

L. Leumeister and B. Sarapatka, et al, PAN Germany, 2003, 122pp.

**pesticide / usage / registration / classification / health / environment / Czech Republic / Europe**

Pesticides in central and eastern European countries: usage, registration, identification and evaluation - Part 4: Slovenia

L. Leumeister, PAN Germany, 2003, 100pp.

**pesticide / usage / registration / classification / health / environment / Slovenia / Europe**

## Toxic waste

Toxic disputes and the rise of environmental justice in Australia  
M.E. Lloyd-Smith and L. Bell, *International Journal of Occupational and Environmental Health*, 2003, 9:14-23, available online at:  
[www.ijoe.com/pdfs/0901\\_lloydSmith\\_australia.pdf](http://www.ijoe.com/pdfs/0901_lloydSmith_australia.pdf)

**environment / risk assessment / right to know / persistent organic pollutants (POPs) / waste / human rights / Australia**

## ENVIRONMENT

### Air pollution

A preliminary investigation of persistent organic pollutants in ambient air in Hong Kong

P.K.K. Louie and D. Wai-mei Sin, *Chemosphere*, 2003, 52, 9:1397-1403.

**transport / persistent organic pollutants (POPs) / Hong Kong**

Distribution of organochlorine pesticides in pine needles of an oceanic island: the case of Tenerife (Canary Islands, Spain)

S. Villa and A. Finizio, et al, *Water, Air and Soil Pollution*, 2003, 146, 1-4:365-377.

**transportation / tree / residues / DDT / HCH / HCB / Tenerife / Canary Islands / Spain**

### Biodiversity

#### Non-target effects – plants

Stress reactions in *Vitis vinifera* L. following soil application of the herbicide flumioxazin

G. Saladin, C. Magné and C. Clément, *Chemosphere*, 2003, 53, 3:799-206.

**grapevine / flumioxazin**

#### Non-target effects – Invertebrate

Toxic effects of chlorpyrifos on morphology and acetylcholinesterase activity in the earthworm, *Eisenia foetida*

J. Venkateswara Rao, Y. Surya Pavan and S.S. Madhavendra, *Ecotoxicology and Environmental Safety*, 2003, 54:296-301.

**earthworm / chlorpyrifos / toxicity**

The biocide tributyltin reduces the accumulation of testosterone as fatty acid esters in the mud snail (*Ilyanassa obsoleta*)

M.P. Gooding and V.S. Wilson, et al, *Environmental Health Perspectives*, 2003, 111, 4:426-430.

**mud snail / imposex / tributyltin**

Insecticidal juvenile hormone analogs stimulate the production of male offspring in the crustacean *Daphnia magna*

A.W. Olmstead and G.A. LeBlanc, *Environmental Health Perspectives*, 2003, 111, 7:919-924.

**endocrine disruption / methoprene / mixtures / pyriproxyfen**

Different sensitivity of Ca<sup>2+</sup>-ATPase and cholinesterase to pure and commercial pesticides in nervous ganglia of *Phyllocaulis soleiformis* (Mollusca)

R. Souza da Silva and G. de Paula Cognato, et al, *Comparative Biochemistry and Physiology Part C*, 2003, 135, 2:215-220.

**molluscs / carbofuran / glyphosate / malathion**

### Soil pollution

Ozone treatment of soil contaminated with aniline and trifluralin

A.C. Pierpointa, C.J. Hapemanb and A. Torrents, *Chemosphere*, 2003, 50, 8:1025-1034.

**aniline / trifluralin / degradation / ozone**

Changes in microbial properties associated with long-term arsenic and DDT contaminated soils at disused cattle dip sites

B.B. Edvantoro and R. Naidu, et al, *Ecotoxicology and Environmental Safety*, 2003, 55:344-351.

**arsenic / DDT / sheep-dip / Australia**

Trace organic contaminants, including toxaphene and trifluralin, in cotton field soils from Georgia and South Carolina, USA

K. Kannan and S. Battula, et al, *Archives of Environmental Contamination and Toxicology*, 2003, 45:30-36.

**residues / DDT / toxaphene / trifluralin / cotton / US**

Biodegradability of atrazine, cyanazine and dicamba under methanogenic condition in three soils of China

J-G. Gu, Y. Fan and J-D. Gu, *Chemosphere*, 2003, 52, 9:1515-1521.

**biodegradation / atrazine / cyanazine / dicamba / China**

### Water

The role of herbicides in the erosion of salt marshes in eastern England

C.F. Mason and G.J.C. Underwood, et al, *Environmental Pollution*, 2003, 122:41-49.

**water / salt marshes / pollution / simazine / atrazine / UK**

- Antifouling herbicides in the coastal waters of western Japan  
H. Okamura and I. Aoyama, et al, *Marine Pollution Bulletin*, 2003, 47, 1-6:59-67.  
**coastal / residues / antifouling paints / diuron / Irgarol 1051 / Japan**
- Analysis of diazinon monitoring data from the Sacramento and Feather River watersheds: 1991-2001  
L.W. Hall, Jr. *Environmental Monitoring and Assessment*, 2003, 86, 3:233-253.  
**water / river / diazinon / monitoring / US**
- Herbicides and herbicide degradation products in upper midwest agricultural streams during August base-flow conditions  
S.J. Kalkhoff and K.E. Lee, et al, *Journal of Environmental Quality*, 2003, 32:1025-1035.  
**atrazine / metolachlor / cyanazine / degradation / US**
- Wildlife**
- Aquatic**
- The use of a non-lethal tool for evaluating toxicological hazard of organochlorine contaminants in Mediterranean cetaceans: new data 10 years after the first paper published in MPB  
M. Cristina Fossi and L. Marsili, et al, *Marine Pollution Bulletin*, 2003, 46, 8:972-982.  
**cetaceans / organochlorines / DDT / endocrine disruptors / Mediterranean Sea / risk assessment**
- Economic and environmental impacts on ports and harbors from the convention to ban harmful marine anti-fouling systems  
M.A. Champ, *Marine Pollution Bulletin*, 2003, 46, 8:935-940.  
**environment / antifouling paints / tributyltin / ban / pollution / regulation / economic / Finland / US**
- Bioaccumulation of lead, cadmium, and lindane in zebra mussels (*Dreissena polymorpha*) and associated risk for bioconcentration in tufted duck (*Aythya fuligula*)  
P.J. Berny, A. Veniat and M. Mazallon, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:90-97.  
**zebra mussel / bird / tufted duck / lindane / bioaccumulation / Lake Geneva / Europe**
- Effects of cypermethrin on the freshwater crab *Trichodactylus borellianus* (crustacea: decapoda: braquiura)  
W. Veronica and P.A. Collins, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:106-113.  
**crab / cypermethrin / toxicity**
- Dissipation, distribution, and uptake of 14<sup>C</sup>-chlorpyrifos in a model tropical seawater/sediment/fish ecosystem  
J.O. Lalah and D. Ondieki, et al, *Bulletin of Environmental Contamination and Toxicology*, May 2003, 70, 5:883-890.  
**oyster / fish / chlorpyrifos / toxicity**
- Impact of the herbicides 2,4-D and diuron on the metabolism of the coral *Porites cylindrica*  
S. Råberg, and M. Nyström, et al, *Marine Environmental Research*, 2003, 56, 4:503-514.  
**coral / 2,4-D / diuron / toxicity / Philippines**
- Histological effects of low atrazine concentration on zebra mussel (*Dreissena polymorpha* Pallas)  
I. Zupan and M. Kalafati', *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:688-695.  
**zebra mussel / atrazine / toxicity**
- Comparative study of the toxicity of molinate for freshwater organisms  
E. Sancho and M. Sanchez, et al, *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:723-730.  
**ecosystem / zooplankton / algae / molinate / toxicity**
- Impact of fipronil on crustacean aquatic organisms in a paddy field-fishpond ecosystem  
Z. Shan and L. Wang, et al, *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:746-752.  
**ecosystem / shrimp / crab / fipronil / toxicity / China**
- Delayed gametogenesis and progesterone levels in soft-shell clams (*Mya arenaria*) in relation to in situ contamination to organotins and heavy metals in the St. Lawrence River (Canada)  
A. Siah and J. Pellerin, et al, *Comparative Biochemistry and Physiology Part C*, 2003, 135, 2:145-156.  
**river / clams / endocrine disruptors / tributyltin / Canada**
- Monitoring of diazinon concentrations and loadings, and identification of geographic origins consequent to stormwater runoff from orchards in the Sacramento River watershed, U.S.A.  
R.W. Holmes and V. de Vlaming, *Environmental Monitoring and Assessment*, 2003, 87, 1:57-79.  
**river / runoff / agriculture / orchards / diazinon / US**
- Aquatic toxicity of glyphosate-based formulations: comparison between different organisms and the effects of environmental factors  
M.T.K. Tsui and L.M. Chu, *Chemosphere*, 2003, 52, 7:1189-1197.  
**toxicity / glyphosate / surfactant**
- Persistent organic pollutants in environment of the Pearl River Delta, China: an overview  
J. Fu and B. Mai, et al, *Chemosphere*, 2003, 52, 9:1411-1422.  
**river / water / soil / air / environmental fate / persistent organic pollutants (POPs) / China**
- Fate and assessment of persistent organic pollutants in water and sediment from Minjiang River Estuary, Southeast China  
Z.L. Zhang and H.S. Hong, et al, *Chemosphere*, 2003, 52, 9:1423-1430.  
**estuary / sediment / environmental fate / persistent organic pollutants (POPs) / lindane / DDE / heptachlor / endosulfan / methoxychlor / risk assessment / China**
- Persistent organochlorine pollutants in the aquatic ecosystem of Lake Manzala, Egypt  
M.S. Abbassy, H.Z. Ibrahim and H.M. Abdel-Kader, *Bulletin of Environmental Contamination and Toxicology*, June 2003, 70, 6:1158-1164.  
**ecosystems / birds / fish / persistent organic pollutants (POPs) / DDD / DDT / Egypt**
- Specific accumulation of polychlorinated biphenyls and organochlorine pesticides in Japanese common squid as a bioindicator  
D. Ueno and S. Inoue, et al, *Environmental Pollution*, 2003, 125, 2:227-235.  
**squid / organochlorines / DDT / Japan**
- Accumulation of organotin compounds in Pacific oysters, *Crassostrea gigas*, collected from aquaculture sites in Taiwan  
M-P. Hsia and S-M. Liu, *The Science of the Total Environment*, 2003, 313, 1-3:41-48.  
**butyltin / phenyltin / oyster / Taiwan**
- Susceptibility of black fly larvae (Diptera: Simuliidae) to lawn-care insecticides individually and as mixtures  
J.P. Overmyer, K.L. Armbrust and R. Noblet, *Environmental Toxicology and Chemistry*, 2003, 22, 7:1582-1588.  
**blackfly / urban / streams / mixtures / synergistic effects / chlorpyrifos / carbaryl / malathion / toxicity / US**
- Joint acute toxicity of diazinon and copper to *Ceriodaphnia dubia*  
K.E. Banks and S.H. Wood, et al, *Environmental Toxicology and Chemistry*, 2003, 22, 7:1562-1567.  
**urban / synergistic effects / mixtures / diazinon / copper / toxicity / US**
- Integrated assessment of the impacts of agricultural drainwater in the Salinas River (California, USA)  
B.S. Anderson and J.W. Hunt, et al, *Environmental Pollution*, 2003, 124, 3:523-532.  
**river / runoff / agriculture / chlorpyrifos / diazinon / toxicity / sediment / macroinvertebrates / US**
- Trophic transfer of persistent organochlorine contaminants (OCs) within an Arctic marine food web from the southern Beaufort-Chukchi Seas  
P.F. Hoekstra and T.M. O'Hara, et al, *Environmental Pollution*, 2003, 124, 3:509-522.  
**cetaceans / fish / pinnipeds / bioaccumulation / organochlorines / DDT / HCH / oxylordane / Arctic**
- Organochlorine pesticide residues in sediments of a tropical mangrove estuary, India: implications for monitoring  
B. Bhattacharya, S.K. Sarkar and N. Mukherjee, *Environment International*, 2003, 29, 5:587-592.  
**estuary / sediment / organochlorine / residues / HCH / DDT / endosulfan / mangrove / India**
- Effects of exposure duration of herbicides on natural stream periphyton communities and recovery  
K. Gustavson, F. Mohlenber and I. Schluter, *Archives of Environmental Contamination and Toxicology*, 2003, 45:48-58.  
**herbicides / metribuzin / hexazinone / isoproturon / pendimethalin / Denmark**
- Birds**
- Accumulation features of persistent organochlorines in resident and migratory birds from Asia  
T. Kunisue and M. Watanabe, et al, *Environmental Pollution*, 2003, 125, 2:157-172.  
**organochlorines / Asia / lindane / DDT**
- Organochlorine contaminants in body tissue of free-ranging white-tailed eagles from northern regions of Germany  
N. Kennntner and O. Krone, et al, *Environmental Toxicology and Chemistry*, 2003, 22, 7:1457-1464.  
**eagle / organochlorines / Germany**
- Organochlorine pesticides in eggs of birds of prey from the Stavropol region, Russia  
C.J. Henny and V.M. Galushin, et al, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:163-169.  
**organochlorines / Russia**
- Fish**
- Sublethal effects of diazinon on the structure of the testis of bluegill, *Lepomis macrochirus*: a microscopic analysis

H.M. Dutta and H.J.M. Meijer, *Environmental Pollution*, 2003, 125, 3:355-360.

**reproductive effects / diazinon / US**

Acute toxicity of carbofuran to a freshwater teleost, *Clarias batrachus*

R.K. Singh, R.L. Singh and B. Sharma, *Bulletin of Environmental Contamination and Toxicology*, June 2003, 70, 6:1259-1263.

**carbofuran / toxicity / India**

Effect of sub-lethal concentrations of endosulfan on hematological and serum biochemical parameters in the carp *Cyprinus carpio*

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**toxicity / blood / haemoglobin / India**

Toxicity of chlorpyrifos to the fish *Oreochromis mossambicus*

J.V. Rao and C.H.S. Rani, et al, *Bulletin of Environmental Contamination and Toxicology*, May 2003, 70, 5:985-992.

**chlorpyrifos / toxicity / India**

Investigation of acute toxicity of deltamethrin on guppies (*Poecilia reticulata*)

R. Viran and F.Ü. Erkoç, et al, *Ecotoxicology and Environmental Safety*, 2003, 55:82-85.

**deltamethrin / acute toxicity / behavioural effects**

The organochlorine o,p'-DDD disrupts the adrenal steroidogenic signaling pathway in rainbow trout (*Oncorhynchus mykiss*)

M. Lacroix and A. Hontela, *Toxicology and Applied Pharmacology*, 2003, 190, 3:197-300.

**rainbow trout / DDD**

Contamination by organochlorine compounds in sturgeons from Caspian Sea during 2001 and 2002

N. Kajiwarra and D. Ueno, et al, *Marine Pollution Bulletin*, 2003, 46, 6:741-747.

**organochlorines / DDT / Caspian Sea**

Effect of dichlorvos on cholinesterase activity of the European sea bass (*Dicentrarchus labrax*)

I. Varò and J.C. Navarro, et al, *Pesticide Biochemistry and Physiology*, 2003, 75:61-72.

**dichlorvos / toxicity**

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Effects of carbaryl-treated bait on maternal behavior and sprint performance in the meadow jumping mouse, *Zapus hudsonius*

F. Punzo, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:37-41.

**mice / carbaryl / behavioural effects / US**

### **Reptiles**

Toxicity and pathogenicity of *Metarhizium anisopliae* var. *Acridum* (deuteromycotina, hyphomycetes) and fipronil to the fringe-toed lizard *Acanthodactylus dumerilii* (squamata: lacertidae)

R. Peveling and S.A. Demba, *Environmental Toxicology and Chemistry*, 2003, 22, 7:1437-1447.

**lizard / fipronil / toxicity / Africa**

## **FOOD RESIDUES**

Carbofuran residue in water chestnut

B.S. Dixit and R. Banerji, *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:789-791.

**water chestnut / fenvalerate / India**

POPs in edible clams from different Italian and European markets and possible human health risk

A. Binelli and A. Provini, *Marine Pollution Bulletin*, 2003, 46, 7:879-886.

**clams / wildlife / aquatic / persistent organic pollutants (POPs) / health effects (human) / Italy / Europe**

Pesticides residues in vegetables in and around Delhi

I. Mukherjee, *Environmental Monitoring and Assessment*, 2003, 86, 3:265-271.

**vegetables / organochlorines / organophosphates / synthetic pyrethroids / herbicides / carbamates / India**

Magnitude of pesticidal contamination in winter vegetables from Hisar, Haryana

B. Kumari and R. Kumar, et al, *Environmental Monitoring and Assessment*, 2003, 87, 3:311-318.

**vegetables / organophosphates / carbamates / India**

Assessment of dietary exposure to some persistent organic pollutants in the Republic of Karakalpakstan of Uzbekistan

N. Muntean and M. Jermini, et al, *Environmental Health Perspectives*, 2003, 111, 10:1306-1311.

**exposure analysis / organochlorines / persistent organic pollutants (POPs) / Uzbekistan**

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O.K. Chun and H.G. Kang, *Food and Chemical Toxicology*, 2003, 41, 8:1063-1076.

**Acceptable Daily Intake (ADI) / dietary exposure / cancer / risk assessment / Korea**

## **HEALTH**

Smoking as a determinant of high organochlorine levels in Greenland

B. Deutch and H.S. Pedersen, et al, *Archives of Environmental Health*, January 2003, 58, 1:30-36.

**residues / diet / persistent organic pollutants (POPs) / inuit / Greenland**

Exposure assessment of residents living near a wood treatment plant

J. Dahlgren and R. Warshaw, et al, *Environmental Research*, 2003, 92, 2:99-109.

**residential exposure / timber treatments / production / creosote / pentachlorophenol / environment / pollution / US**

Pesticide residues in rivers of a Brazilian rain forest reserve: assessing potential concern for effects on aquatic life and human health

R. Moraes and S. Elfvendahl, et al, *Ambio*, June 2003, 32, 4:258-263.

**drinking water / surface water / aquatic / fish / residues / forest / Brazil**

Multi-generation health risks of persistent organic pollution in the far north: use of the precautionary approach in the Stockholm Convention

A. Godduhn and L.K. Duffy, *Environmental Science & Policy*, 2003, 6, 4:341-353.

**Arctic / persistent organic pollutants (POPs) / air / transportation / endocrine disruptors / risk assessment / precautionary principle**

Transferable chlorpyrifos residue from turf grass and an empirical transfer coefficient for human exposure assessments

R.L. Williams and M.R. Oliver, et al, *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:644-651.

**turf / residues / chlorpyrifos / exposure analysis**

Evaluation of a cold-water hand-washing regimen in removing carbaryl residues from contaminated fabrics

T.A. Phillips and J.B. Belden, et al, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:6-10.

**residues / clothing / hygiene / carbaryl / South Africa**

### **Acute effects**

Pesticides initiative: basic training for health care providers

J. Wakefield, *Environmental Health Perspectives*, 2003, 111, 10:A520-A522.

**poisoning / treatment / US**

Surveillance for acute insecticide-related illness associated with mosquito-control efforts - nine States, 1999-2002

From the Centers for Disease Control and Prevention, *Journal of the American Medical Association*, 2003, 290, 5:591-592.

**mosquito control / malathion / naled / sumithrin / US**

### **Children**

Aggregate exposures of nine preschool children to persistent organic pollutants at day care and at home

N.K. Wilson and J.C. Chuang, et al, *Journal of Exposure Analysis and Environmental Epidemiology*, May 2003, 13, 3:187-202.

**persistent organic pollutants (POPs) / residues / exposure / urban / household / school / US**

Poisoning by an illegally imported Chinese rodenticide containing tetramethylenedisulfotetramine - New York City, 2002

From the Centers for Disease Control and Prevention, *Journal of the American Medical Association*, 2003, 289, 20:2640-2642.

**poisoning / infant / tetramethylenedisulfotetramine / illegal use / US**

The tragedy of Taucamarca: a human rights perspective on the pesticide poisoning deaths of 24 children in the Peruvian Andes

E. Rosenthal, *International Journal of Occupational and Environmental Health*, 2003, 9:53-58, available online at: [www.ijoe.com/pdfs/0901\\_rosenthal\\_taucamarca.pdf](http://www.ijoe.com/pdfs/0901_rosenthal_taucamarca.pdf)

**poisoning / death / human rights / methyl parathion / Peru**

### **Chronic effects**

#### **Cancer**

Organochlorines and risk of prostate cancer

Justine M. Ritchie, Scott L. Vial, Laurence J. Fuortes, Haijun Guo, V.E. Reedy and E.M. Smith, *Journal of Occupational and Environmental Medicine*, 2003, 45:692-702.

**prostate / gender: men / organochlorines / dieldrin / DDE / trans-nonachlor / oxychlorane / heptachlor epoxide / US**

Use of agricultural pesticides and prostate cancer risk in the Agricultural Health Study Cohort

M.C.R. Alavanja and C. Samanic, et al, *American Journal of Epidemiology*, 2003, 157, 9:800-814.

**prostate / occupational exposure / farm workers / US**

Cancer and developmental exposure to endocrine disruptors

L.S. Birnbaum and S.E. Fenton, *Environmental Health Perspectives*, 2003, 111, 4:389-394.

**children / development / endocrine disruptor / atrazine / dioxin**

Increased concentrations of polychlorinated biphenyls, hexachlorobenzene, and chlordanes in mothers of men with testicular cancer

L. Hardell and B. van Bavel, et al, *Environmental Health Perspectives*, 2003, 11, 7:930-934.

**testicular / foetal effects / chlordanes / hexachlorobenzene / persistent organic pollutants (POPs) / gender: men / Sweden**

#### **Cytotoxicity**

Brief exposure to triphenyltin produces irreversible inhibition of the cytotoxic function of human natural killer cells  
M.M. Whalen and S. Wilson, et al, *Environmental Research*, 2003, 92, 3:213-220.

**exposure / triphenyltin / diphenyltin / US**

#### **Genotoxicity**

Genotoxicity of pesticides: a review of human biomonitoring studies

C. Bolognesi, *Mutation Research*, 2003, 251-272.

**poisoning / occupational exposure / biomonitoring / risk assessment**

Sister chromatid exchange induction by the herbicide 2,4-dichlorophenoxyacetic acid in chick embryos

E. Arias, *Ecotoxicology and Environmental Safety*, 2003, 55:338-343.

**genetic effects / 2,4-D / wildlife / animal testing**

Benzo(a)pyrene induced micronucleus formation was modulated by persistent organic pollutants (POPs) in metabolically competent human HepG2 cells

X-J. Wu, W-Q. Lu and V. Mersch-Sundermann, *Toxicology Letters*, 2003, 144, 2:143-150.

**persistent organic pollutants (POPs) / DDT / toxaphene / Aroclor-1254**

#### **Hormal/endocrine**

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H. Kojima and M. Iida, et al, *Environmental Health Perspectives*, 2003, 111, 4:497-502.

**chlornitrofen**

Hepatic CYP1A, 2B, 2C, 2E and 3A regulation by methoxychlor in male and female rats

L.F. Oropeza-Hernández, R. López-Romero and A. Albores, *Toxicology Letters*, 2003, 144, 1:93-103.

**methoxychlor / animal testing / rats / male / female / liver**

Possible effects of polychlorinated biphenyls and organochlorinated pesticides on the thyroid after long-term exposure to heavy environmental pollution

P. Langer and A. Koan, et al, *Journal of Occupational and Environmental Medicine*, 2003, 45:526-532.

**thyroid / organochlorines / hexachlorobenzene / DDE / Poland**

#### **Immunotoxicity**

Determination of the immunotoxic potential of pesticides on functional activity of sheep leukocytes in vitro

J. Pistl and N. Kovalkovicová, et al, *Toxicology*, 2003, 188, 1:73-81.

**animal testing / sheep**

Immune alterations in mice exposed to the herbicide simazine

K-R. Kim and E-W. Son, et al, *Journal of Toxicology and Environmental Health, Part A*, January 2003, 66, 12:1159-1173.

**simazine / animal testing / mice**

Immunotoxicity of epicutaneously applied anticoagulant rodenticide warfarin: evaluation by contact hypersensitivity to DNCB in rats

M. Kataranovski and M. Vlaski, et al, *Toxicology*, 2003, 188, 1:83-100.

**warfarin / animal testing / rats**

#### **Mutagenicity**

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**cypermethrin / animal testing / mice**

Micronucleus formation in 3-day mouse embryos associated with maternal exposure to chlorpyrifos during the early preimplantation period

Y. Tian and T. Yamauchi, *Reproductive Toxicology*, 2003, 17, 4:401-405.

**chlorpyrifos / animal testing / mice**

#### **Neurotoxicity**

Neurobehavioral evaluations of mixtures of trichloroethylene, heptachlor, and di(2-ethylhexyl)phthalate in a full-factorial design  
V.C. Moser, R.C. MacPhail and C. Gennings, *Toxicology*, 2003, 188, 1:125-137.

**trichloroethylene / heptachlor / mixtures / animal testing / rats**

Neurobehavioral effects of pesticides: state of the art

C. Colosio, M. Tiramani and M. Maroni, *NeuroToxicology*, 2003, 24, 4-5:577-591.

**occupational exposure / DDT / fumigants / organophosphates**

Parkinson's disease and exposure to infectious agents and pesticides and the occurrence of brain injuries: role of neuroinflammation

B. Liu, H-M. Gao, and J-S. Hong, *Environmental Health Perspectives*, 2003, 111, 8:1065-1073.

**Parkinson's disease**

Thiram and ziram stimulate non-selective cation channel and induce apoptosis in PC12 cells

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**thiram / ziram / zineb**

Effect of lindane on hepatic and brain cytochrome P450s and influence of P450 modulation in lindane induced neurotoxicity  
D. Parmar and S. Yadav, et al, *Food and Chemical Toxicology*, 2003, 41, 8:1077-1087.

**lindane / liver / brain / toxicity**

Fetal chlorpyrifos exposure: adverse effects on brain cell development and cholinergic biomarkers emerge postnatally and continue into adolescence and adulthood

D. Qiao and F.J. Seidler, et al, *Environmental Health Perspectives*, 2003, 111, 4:536-544.

**foetal effects / chlorpyrifos / animal testing / rats**

#### **Reproductive toxicity**

DDT and DDE exposure in mothers and time to pregnancy in daughters

B.A. Cohn and P.M. Cirillo, et al, *The Lancet*, 2003, 361, 9376:2205-2206.

**gender: women / DDT / DDE / US**

Dibromochloropropane inhibits spermatogonial development in rats  
M.L. Meistrich and G. Wilson, et al, *Reproductive Toxicology*, 2003, 17, 3:263-271.

**fertility / DBCP / animal testing / rats / male**

Male reproductive hormones and thyroid function in pesticide applicators in the Red River Valley of Minnesota

V.F. Garry and S.E. Holland, et al, *Journal of Toxicology and Environmental Health, Part A*, January 2003, 66, 11:965-986.

**worker / agriculture / occupational exposure / hormonal effects / gender: men / US**

Assessment of antifertility activities of abamectin pesticide in male rats  
A. Elbetieha, and S.I. Da'as, *Ecotoxicology and Environmental Safety*, 2003, 55:307-313.

**abamectin / animal testing / rats / male**

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Birth malformations and other adverse perinatal outcomes in four U.S. wheat-producing States

D.M. Schreinemachers, *Environmental Health Perspectives*, 2003, 111, 9:1259-1264.

**chlorophenoxy herbicides / endocrine effects / wheat / US**

Exposure to indoor pesticides during pregnancy in a multiethnic, urban cohort

G.S. Berkowitz, J. Obel, et al, *Environmental Health Perspectives*, 2003, 111, 1:79-84.

**children / chlorpyrifos / exposure analysis / biomarkers / pregnancy / ethnicity / indoor / urban / US**

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Workplace carcinogen and pesticide exposures in Costa Rica  
T. Partanen and J. Chaves, et al, *International Journal of Occupational and Environmental Health*, 2003, 9:104-111.

**carcinogens / paraquat / diquat / mancozeb / maneb / zineb / chlorothalonil / benomyl / chlorophenoxy herbicides / Costa Rica**

Human rights, environmental justice, and the health of farm workers in South Africa

L. London, *International Journal of Occupational and Environmental Health*, 2003, 9:59-68, available online at: [www.ijoe.com/pdfs/0901\\_london\\_southAfrica.pdf](http://www.ijoe.com/pdfs/0901_london_southAfrica.pdf)

**agriculture / human rights / South Africa**

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C.J. Hines and J.A. Deddens, et al, *Annals of Occupational Hygiene*, 2003, 47, 6:503-517.

**biological monitoring / atrazine / alachlor / metolachlor / 2,4-D / cyanazine / US**

Greater risks, fewer rights: U.S. farmworkers and pesticides  
M. Reeves and K.S. Schafer, *International Journal of Occupational and Environmental Health*, 2003, 9:30-39, available online at: [www.ijoe.com/pdfs/0901\\_reeves\\_farmworkers.pdf](http://www.ijoe.com/pdfs/0901_reeves_farmworkers.pdf)

**agriculture / poisoning / human rights / US**

Health impacts of pesticide exposure in a cohort of outdoor workers  
J. Beard and T. Sladden, et al, *Environmental Health Perspectives*,

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**DDT / leukaemia / pancreatic cancer / Australia**

Multi-endpoint biological monitoring of phosphine workers  
J.D. Tucker and D.H. Moore II, et al, *Mutation Research*, 2003, 536, 1-2:7-14.

**worker / application / phosphine / biological monitoring / personal protective equipment (PPE) / US**

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Acute pancreatitis: an obscure complication of organophosphate intoxication

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**poisoning / pancreas / Turkey**

### **Sheep dips**

Chronic fatigue and organophosphate pesticides in sheep farming: a retrospective study amongst people reporting to a UK pharmacovigilance scheme

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**organophosphates / exposure / dermal / multiple chemical sensitivity (MCS) / UK**

### **Suicide**

Paraquat and suicide

PAN Germany, 2003:4pp, available online at: [www.pan-germany.org/download/fact\\_paraquat2.pdf](http://www.pan-germany.org/download/fact_paraquat2.pdf)

**paraquat / poisoning / campaign**

### **Gender**

#### **Women**

Organochlorine pesticide residues in human milk from primiparous women in Indonesia

E.R. Burke and A.J. Holden, et al, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:148-155.

**residues / human / breast milk / organochlorines / DDT / Indonesia**

Contemporary-use pesticides in personal air samples during pregnancy and blood samples at delivery among urban minority mothers and newborns

R.M. Whyatt and D.B. Barr, et al, *Environmental Health Perspectives*, 2003, 111, 5:749-756.

**chlorpyrifos / diazinon / bendiocarb / propoxur / dicloran / folpet / captan / captafol / residential / urban / residues / blood / infants / US**

Comparison of organochlorine pesticide levels between abdominal and breast adipose tissue

S.M. Waliszewski and S. Gomez-Arroyo, et al, *Bulletin of Environmental Contamination and Toxicology*, 2003, 71:156-162.

**residues / human / tissue / breast / organochlorines / gamma-HCH / DDT / DDE / hexachlorobenzene / Mexico**

Dietary and reproductive determinants of plasma organochlorine levels in pregnant women in Rio de Janeiro

P.N. Sarcinelli and A.C.S. Pereira, et al, *Environmental Research*, 2003, 91, 3:143-150.

**pregnancy / residues / human / blood / DDE / organochlorines / dietary exposure / reproductive effects / Brazil**

Serum organochlorine levels and history of lactation in Egypt

A.S. Soliman and X. Wang, et al, *Environmental Research*, 2003, 92, 2:110-117.

**residues / human / breast milk / organochlorines / exposure / infants / Egypt**

## **PESTICIDE SCIENCE & TECHNOLOGY**

### **Application technology**

A survey of pesticide application in Cameroon

G. Matthews, T. Wiles and P. Baleguel, *Crop Protection*, 2003, 22, 5:707-714.

**knapsack sprayer / controlled droplet application (CDA) / Cameroon**

### **Resistance**

Herbicide resistance in weeds: current status in Europe and guidelines for management

S. Moss, *Pesticide Outlook*, 2003, 14, 4:164-167.

**herbicides / weeds / Europe / management**

### **Risk assessment**

EPA's pioneering response to FQPA mandate: assessing the cumulative effects of pesticides

E. Zager, B. Tarplee and W. Wooge, *Pesticide Outlook*, 2003, 14, 3:133-135.

**cumulative effects / health effects (human) / organophosphates / US**

How accurate are the European Union's classifications of chemical substances

C. Rudén and S.O. Hansson, *Toxicology Letters*, 2003, 144, 2:159-172.

**regulation / toxicology / classification / labelling / European Union**

### **Toxicity studies/toxicology**

Dermal and oral toxicity of malathion in rats

S. Tos-Luty and D. Obuchowska-Przebirowska, et al, *Annals of Agricultural and Environmental Medicine*, 2003, 10, 1:101-106.

**malathion / dermal / oral / animal testing / rats**

Defects in cervical vertebrae in boric acid-exposed rat embryos are associated with anterior shifts of hox gene expression domains

N. Wéry and M.G. Narotsky, et al, *Birth Defects Research Part A: Clinical and Molecular Teratology*, 2003, 49, 1:59-67.

**borax / animal testing / rats**

Assessment of comparative hemotoxicity of cybil and fenvalerate in *Rattus norvegicus*

P.N. Saxena and V. Tomar, *Bulletin of Environmental Contamination and Toxicology*, April 2003, 70, 4:839-846.

**fenvalerate / blood / haemoglobin / animal testing / rat**

The herbicide dicamba (2-methoxy-3,6-dichlorobenzoic acid) interacts with mitochondrial bioenergetic functions

F. Peixoto, J.A.F. Vicente and V.M.C. Madeira, *Archives of Toxicology*, July 2003, 77, 7:403-409.

**dicamba / animal testing / rat / liver**

Sumithrin (d-phenothrin)

C. Cox, *Journal of Pesticide Reform*, Summer 2003, 23, 2:10-14, available online at: [www.pesticide.org/sumithrin.pdf](http://www.pesticide.org/sumithrin.pdf)

**diuron / health effects (human) / wildlife / environment / factsheet**

Toxic effects of chemical mixtures

H.I. Zeliger, *Archives of Environmental Health*, January 2003, 58, 1:23-29.

**pesticide / mixtures / synergistic effects**

Suppression of decidual cell response induced by dibutyltin dichloride in pseudopregnant rats: as a cause of early embryonic loss

A. Harazono and M. Ema, *Reproductive Toxicology*, 2003, 17, 4:393-399.

**dibutyltin dichloride / organotin / animal testing / rat**

Experimental hepatic uroporphyrin induced by the diphenyl-ether herbicide fomesafen in male DBA/2 mice

J. Krijt and O. Pensák, et al, *Toxicology and Applied Pharmacology*, 2003, 189, 1:28-38.

**fomesafen / animal testing / rats**

Diuron

C. Cox, *Journal of Pesticide Reform*, Spring 2003, 23, 1:12-20, available online at: [www.pesticide.org/diuron.pdf](http://www.pesticide.org/diuron.pdf)

**diuron / health effects (human) / wildlife / environment / factsheet**

Interaction of organophosphate pesticides and related compounds with the androgen receptor

H. Tamura and H. Yoshikawa, et al, *Environmental Health Perspectives*, 2003, 111, 4:545-552.

**fenitrothion**

Toxicology digital sources produced and available in the United Kingdom

S. Pantry, *Toxicology*, 2003, 190, 1-2:75-91.

**toxicology / information technology / UK**

Consecutive administration of paraquat to rats induces enhanced cholesterol peroxidation and lung injury

J. Adachi and K. Ishii, et al, *Archives of Toxicology*, July 2003, 77, 6:353-357,

**paraquat / lung / animal testing / rat**

## **URBAN**

Protecting U.S. schoolchildren from pests and pesticides

A. Fournier and F. Whitford, et al, *Pesticide Outlook*, 2003, 14, 1:36-40, available online at: [www.rsc.org/](http://www.rsc.org/)

**pesticide / health / children / integrated pest management (IPM) / school / US**

Saving our treasures - controlling museum pests with temperature extremes

D. Pinniger, *Pesticide Outlook*, 2003, 14, 1:10-11, available online at: [www.rsc.org/](http://www.rsc.org/)

**integrated pest management (IPM) / urban / UK**

### **Timber treatment**

Dislodgeable copper, chromium and arsenic from CCA-treated wood surfaces

D. Stilwell, M. Toner and B. Sawhney, *The Science of the Total Environment*, 2003, 312, 1-3:123-131.

**chromated copper arsenate (CCA) / residues / copper / chromium / arsenic**

## 2003 September

IBC'S 10<sup>TH</sup> ANNUAL CONFERENCE: THE NEW CHEMICALS POLICY - THE REGISTRATION, EVALUATION AND AUTHORISATION OF CHEMICALS (REACH), September 30 - 1 October, Brussels, Belgium. Contact: Laura Beachus, Informa UK Limited, Tel: +44 (0)1932 893856, Fax: +44 (0) 20 7017 4749, Email: cust.serv@informa.com, www.ibc-lifesci.com/chemicals

## October

INTERNATIONAL CONFERENCE ON AIR POLLUTION FROM AGRICULTURAL OPERATIONS, October 12-15, Durham, North Carolina, USA. Contact: Brent W Auvermann, b-auvermann@tamu.edu, www.asae.org/meetings/index.html

THE 6<sup>TH</sup> CONFERENCE OF THE AFRICAN CROP SCIENCE SOCIETY: HARNESSING CROP TECHNOLOGIES TO ALLEVIATE HUNGER AND POVERTY IN AFRICA, 12 - 17 October, Nairobi, Kenya. Contact: ACSS Organizing Committee, Fax: +254 2 226673/632121/631957, Email: mwangombe@kenyaweb.com

THE POTENTIAL FOR ALTERNATIVE APPROACHES TO PEST CONTROL, 15 October, York, UK. Contact: ACP Secretariat, Pesticides Safety Directorate, Room 202, Mallard House, Kings Pool, 3 Peasholme Green, York, YO1 7PX, UK, Email: a.c.p@psd.defra.gsi.gov.uk

PESTICIDE RESIDUES IN BABY FOOD - SCIENTIFIC, COMMERCIAL AND POLITICAL CHALLENGES TO THE INDUSTRY, 17 October, Harpenden, UK. Contact: Association of Applied Biologists, c/o Horticulture Research International, Tel: +44 (0)1789 472020, Fax: +44 (0)1789 470234, Email: carol.aab@hri.ac.uk, www.aab.org.uk

THE BIOCIDAL PRODUCTS DIRECTIVE, 28 - 29 October, Brussels, Belgium. Contact: Laura Beachus, Informa UK Limited, Tel: +44 (0)1932 893856, Fax: +44 (0) 20 7017 4749, Email: cust.serv@informa.com, www.ibc-lifesci.com/biocides

PESTICIDE RESIDUES COMMITTEE (PRC) ANNUAL OPEN MEETING 2003, 30 October, Glasgow, Scotland, UK. Contact: PRC, Secretariat, Tel: +44 (0)1904 455756, Email: jane.simcock@psd.defra.gsi.gov.uk, www.pesticides.gov.uk/committees/PRC/prc.htm

## November

CHEMICAL SAFETY IN A VULNERABLE WORLD - FOURTH SESSION OF THE INTERGOVERNMENTAL FORUM ON CHEMICAL SAFETY (FORUM IV), 1 - 7 November, Bangkok, Thailand. Contact: IFCS Secretariat, c/o World Health Organization, Tel: +41 (22) 791 3873/3650, Fax: +41 (22) 791 4875, Email: ifcs@who.int, www.who.int/ifcs/Documents/Forum/ForumIV/Meeting\_docs/2INF\_AcronymsCh.pdf

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS (FAO) AND IFOAM'S SEMINAR: PRODUCTION AND EXPORTS OF ORGANIC FRUIT & VEGETABLES IN ASIA, 3 - 5 November, Bangkok, Thailand. Contact: Conference Manager, Earth Net Foundation, Tel: +66 (0) 2 651 9055, Fax: +66 (0) 2 651 9072, Email: event@greenetorganic.com, www.greenetorganic.com

THE 7<sup>TH</sup> IFOAM INTERNATIONAL CONFERENCE ON ORGANIC TRADE: MAINSTREAMING ORGANIC TRADE - NEW FRONTIERS, OPPORTUNITIES & RESPONSIBILITIES, 6 - 8 November, Bangkok, Thailand. Contact: Conference Manager, Earth Net Foundation - as above.

EU ACCESSION AND AGRICULTURE: MAKING CAP WORK FOR PEOPLE AND THE ENVIRONMENT, 7 - 8 November, Krakow, Poland. Contact: Martin Konecny, Friends of the Earth Europe, Tel: +32 2 542 01 85, Fax: +32 2 537 55 96, Email: martin.konecny@foeeurope.org, www.foeeurope.org/events/krakow/home.htm

INTERNATIONAL CONFERENCE ON CHEMICALS MANAGEMENT, PREPCOM 1, TO ESTABLISH A STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT (SAICM), 9-13 November, Bangkok,

## PAN EVENTS

PAN EUROPE ANNUAL CONFERENCE FOR NETWORK MEMBERS, 21 - 22 November 2003, Copenhagen, Denmark. Contact: Stephanie Williamson, PAN Europe Co-ordinator, Tel: +44 (0)20 7274 8895, Fax: +44 (0)20 7274 9084, Email: Stephanie-paneurope@pan-uk.org, www.pan-europe.net

1<sup>ST</sup> RACHEL CARSON LECTURE: CONTAMINATED WITHOUT CONSENT - WHY OUR EXPOSURE TO CHEMICALS IN AIR, FOOD AND WATER VIOLATES HUMAN RIGHTS (SPEAKER - SANDRA STEINGRABER), 3 December, London, UK. Contact: Kate Bootle, PAN UK, Tel: +44 (0)20 7274 8895, Fax: +44 (0)20 7274 9084, Email: katebootle@pan-uk.org, www.pan-uk.org

COTTON 2004: A EUROPEAN CONFERENCE ON DEVELOPING THE ORGANIC COTTON MARKET, 10 - 13 February, Hamburg, Germany, (TBC). Contact: Simon Ferrigno, PAN UK, Tel: +44 (0)20 7274 8895, Fax: +44 (0)20 7274 9084, Email: simonferrigno@pan-uk.org, www.pan-uk.org

Thailand. Contact: Email: chemicals@unep.ch, www.chem.unep.ch/saicm

BCPC 2003: CROP SCIENCE & TECHNOLOGY, 10 - 12 November, Scottish Exhibition and Conference Centre, UK. Contact: Event Organisation Company, Tel: +44 (0)20 7940 5367, Fax: +44 (0)20 7940 5577, Email: bcpc@event-org.com, www.bcpc.org/

AQUATIC AND TERRESTRIAL ECOTOXICOLOGY AND RISK MANAGEMENT, 24 - 25 November, Mainz, Germany. Contact: Die Akademie Fresenius GmbH, Tel: +49 (0)2 31 / 7 5896-48, Fax: +49 (0)2 31 / 7 5896-53, Email: mstratmann@akademie-fresenius.de, www.akademie-fresenius.de

EU SUSTAINABLE CHEMICALS MANAGEMENT, 24 - 25, November, Brussels, Belgium. Contact: Mark Kinloch, EU Conferences Ltd, Tel: +44 1873 830 724, Fax: +44 1873 830 692, Email: mark.kinloch@euconferences.com, http://www.euconferences.com/frachemical.htm

PUBLIC SECTOR SUSTAINABLE FOOD PROCUREMENT INITIATIVE (PSFPI), 26 November, London, UK. Contact: Louise Waters on Freephone: 0800 542 9590, www.sustainablefoodprocurement.org

## 2004 January

INTERNATIONAL ADVANCES IN PESTICIDE APPLICATION, January 5 - 6 2004, Egham, UK. Contact: Richard Glass, Central Science Laboratory, Tel: +44 (0)1904 462235, Fax: +44 (0)1904 462000, Email: r.glass@csl.gov.uk, http://aab.org.uk/meetings/mtgs2004/pest2004.htm

## February

CROP PROTECTION IN NORTHERN BRITAIN, February 24-25, Dundee, UK. Contact: Tim Heilbronn, CPNB Administrator, Tel: +44 (0)1382 562517, Fax: (0)1382 562426, T.Heilbronn@cpnb.org, www.cpnb.org/

## April

BIOCIDAL PRODUCTS DIRECTIVE: OVERCOMING THE CHALLENGES OF THE REGULATORY REVIEW PROCESS, 9 - 11 April, Antwerp, Belgium. Contact: IIR, Ltd, Tel: +44 (0)20 7915 5000, Fax: +44 (0)20 7915 5001, www.iir-conferences.com

SUSTAINING PUBLIC HEALTH IN A CHANGING WORLD: VISION TO ACTION, 19 - 22 April, Brighton, UK. Contact: Conference Secretariat, Tel: +44 (0)20 8977 0011, Fax: +44 (0)20 8977 0055, Email: publichealth@hamptonmedical.com, www.ukpha.org.uk

## May

56<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON CROP PROTECTION, 4 May, Gent, Belgium. Contact: K. De Jonghe, Department of Crop Protection, University of Gent, Tel: +32 9 264 6022, Fax: +32 9 264 6238, Email: Kris.DeJonghe@rug.ac.be