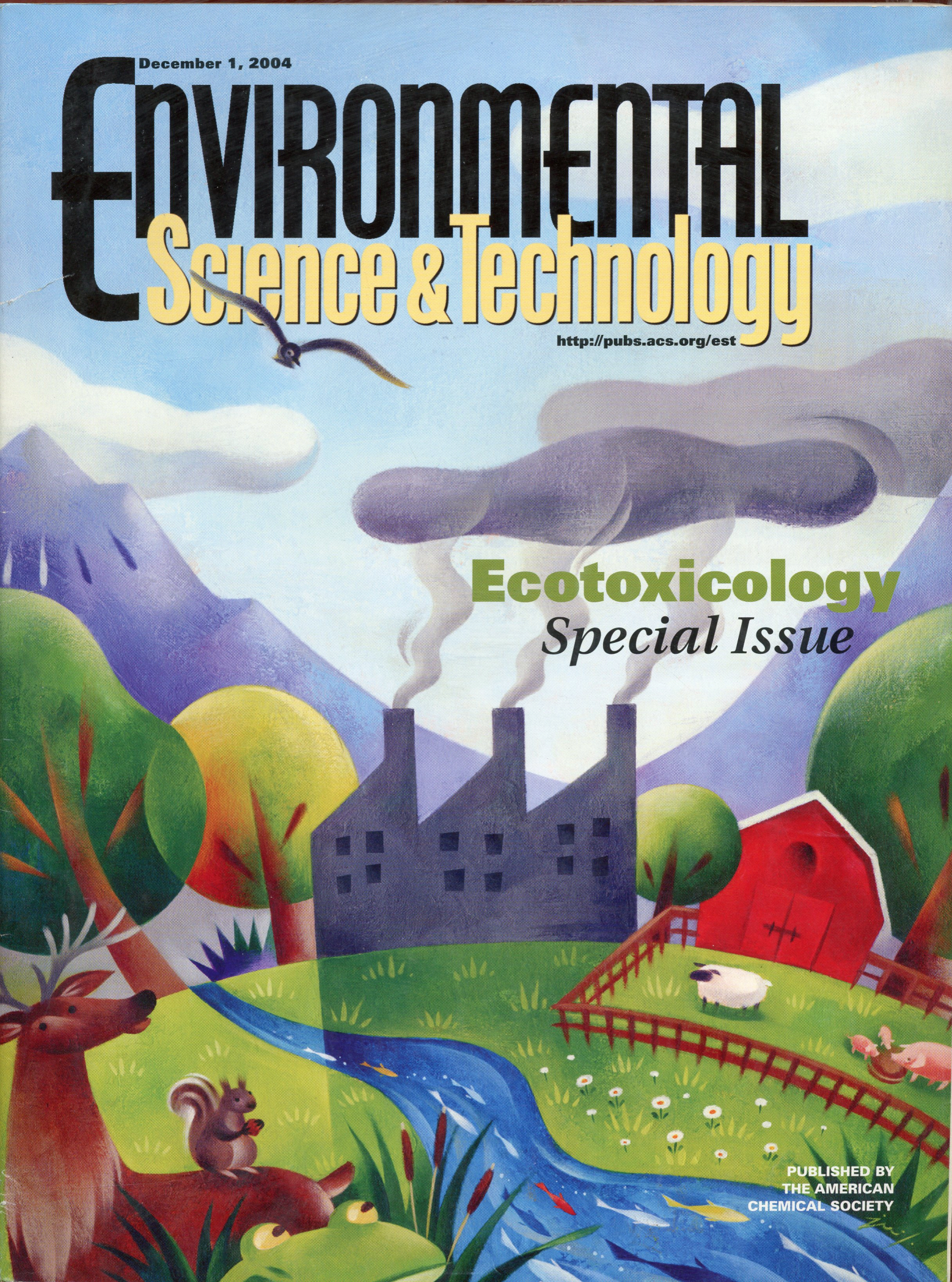


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Exposure and Bioaccumulation

6177

Biotic Ligand Model, a Flexible Tool for Developing Site-Specific Water Quality Guidelines for Metals

Soumya Niyogi and Chris M. Wood

The BLM approach has a solid scientific foundation and has the potential to be a practical tool for generating cost-effective, site-specific ambient water quality criteria for metals.

6193

Dynamic Model for the Accumulation of Cadmium and Zinc from Water and Sediment by the Aquatic Oligochaete *Tubifex tubifex*

Erik Steen Redeker, Lieven Bervoets, and Ronny Blust

A dynamic model depicts sediment-dwelling organisms as three compartmental structures and allows the analysis of metal accumulation kinetics under different exposure scenarios.

6201

Bioavailability and Chronic Toxicity of Zinc to Juvenile Rainbow Trout (*Oncorhynchus mykiss*): Comparison with Other Fish Species and Development of a Biotic Ligand Model

Karel A. C. De Schampelaere and Colin R. Janssen

Chronic zinc toxicity to rainbow trout depends on pH and concentrations of calcium, magnesium, and sodium; this dependence is modeled using a biotic ligand model.

■ 6210

Effects of Sediment Characteristics on the Toxicity of Chromium(III) and Chromium(VI) to the Amphipod *Hyalella azteca*

John M. Besser, William G. Brumbaugh, Nile E. Kemble, Thomas W. May, and Christopher G. Ingersoll

Chromium toxicity in freshwater sediments is decreased or eliminated when Cr(VI) is reduced to Cr(III) by reaction with acid volatile sulfide and organic matter.

■ 6217

Magnification and Toxicity of PCBs, PCDDs, and PCDFs in Upriver-Migrating Pacific Salmon

Adrian M. H. deBruyn, Michael G. Ikonou, and Frank A. P. C. Gobas

Field and model studies show a migration-related magnification of lipid-normalized concentrations of POPs in prespawning Pacific salmon stocks to levels that cause egg mortality.

■ 6225

Applications of Contaminant Fate and Bioaccumulation Models in Assessing Ecological Risks of Chemicals: A Case Study for Gasoline Hydrocarbons

Matthew MacLeod, Thomas E. McKone, Karen L. Foster, Randy L. Maddalena, Thomas F. Parkerton, and Don Mackay

A model framework for assessing risks to ecological species on the basis of internal residue concentrations is applied to hydrocarbons present in gasoline.

6234

Bioenergetics-Based Modeling of Individual PCB Congeners in Nestling Tree Swallows from Two Contaminated Sites on the Upper Hudson River, New York

John W. Nichols, Kathy R. Echols, Donald E. Tillitt, Anne L. Secord, and John P. McCarty

A model can describe PCB congener patterns in nestling tree swallows but provides no evidence for metabolic biotransformation.

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6240

Accumulation of PCB Congeners in Nestling Tree Swallows (*Tachycineta bicolor*) on the Hudson River, New York

Kathy R. Echols, Donald E. Tillitt, John W. Nichols, Anne L. Secord, and John P. McCarty

PCB congener patterns in nestlings reflect their diets, and accumulation occurs at predictable rates.

■ 6247

Time-Dependent Toxicity of Fluoranthene to Freshwater Invertebrates and the Role of Biotransformation on Lethal Body Residues

Lance J. Schuler, Peter F. Landrum, and Michael J. Lydy

Hyalella azteca, *Chironomus tentans*, and *Diporeia* spp. exhibit time-dependent body residues for 50% mortality, and biotransformation accounts for the higher sensitivity of the midge.

6256

Method for Testing the Aquatic Toxicity of Sediment Extracts for Use in Identifying Organic Toxicants in Sediments

Larry J. Heinis, Terry L. Highland, and David R. Mount

A semipermeable-membrane device is used as a partitioning-driven exposure method for testing the aquatic toxicity of sediment extracts for use in sediment evaluation.

■ 6263

Toward More Useful In Vitro Toxicity Data with Measured Free Concentrations

Minne B. Heringa, Richard H. M. M. Schreurs, Frans Busser, Paul T. van der Saag, Bart van der Burg, and Joop L. M. Hermens

Measurement of free concentrations in in vitro assays with "negligible depletion" solid-phase micro-extraction creates data that are independent of assay conditions such as protein content.

Mechanisms of Effect

6271

Involvement of the Retinoid X Receptor in the Development of Imposex Caused by Organotins in Gastropods

Jun-ichi Nishikawa, Satoru Mamiya, Tomohiko Kanayama, Tomohiro Nishikawa, Fujio Shiraishi, and Toshihiro Horiguchi

Gastropod imposex caused by organotins (tributyltin and triphenyltin) could be mediated by the retinoid X receptor.

6277

Modulation of the Hepatic CYP1A1 System in the Marine Fish *Gobius niger*, Exposed to Xenobiotic Compounds

Francesca Maradonna, Valeria Polzonetti, Stelvio M. Bandiera, Beatrice Migliarini, and Olliana Carnevali

AhRR is a novel signal involved in exposure to environmental toxic compounds.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

6283

Cadmium Detoxification in Earthworms: From Genes to Cells

Stephen R. Stürzenbaum, Oleg Georgiev, A. John Morgan, and Peter Kille

The genetic, molecular, and cellular basis are described of a metallothionein pathway that facilitates the uptake, accumulation, transport, and excretion of cadmium in the earthworm *Lumbricus rubellus*.

6290

Dietary Retinoic Acid Induces Hindlimb and Eye Deformities in *Xenopus laevis*

Derek H. Alsop, Scott B. Brown, and Glen J. van der Kraak

Tadpoles fed diets supplemented with retinoic acid develop smaller eyes and various hind-limb deformities, some of which resemble deformities observed in wild frogs.

6300

2,3,7,8-TCDD Effects on Visual Structure and Function in Swim-Up Rainbow Trout

Paulo S. M. Carvalho and Donald E. Tillitt

Sublethal doses of dioxin in rainbow trout fry cause reductions in retinal ganglion cells that correspond with deficiencies in visual activity and feeding behavior.

6307

Photosensitizers Neutral Red (Type I) and Rose Bengal (Type II) Cause Light-Dependent Toxicity in *Chlamydomonas reinhardtii* and Induce the *Gpxh* Gene via Increased Singlet Oxygen Formation

Beat B. Fischer, Anja Krieger-Liszky, and Rik I. L. Eggen

Toxicity mechanisms of the photosensitizers neutral red (type I) and rose bengal (type II) are investigated and linked to the genetic response in *Chlamydomonas reinhardtii*.

6314

Cloning and In Vitro Expression and Characterization of the Androgen Receptor and Isolation of Estrogen Receptor α from the Fathead Minnow (*Pimephales promelas*)

Vickie S. Wilson, Mary C. Cardon, Joseph Thornton, Joseph J. Korte, Gerald T. Ankley, Jeffery Welch, L. Earl Gray, Jr., and Phillip C. Hartig

Cloning and in vitro binding characteristics of the recombinant fathead minnow androgen receptor and isolation of estrogen receptor α are discussed.

6322

Evaluation of the Model Anti-Androgen Flutamide for Assessing the Mechanistic Basis of Responses to an Androgen in the Fathead Minnow (*Pimephales promelas*)

Gerald T. Ankley, David L. Defoe, Michael D. Kahl, Kathleen M. Jensen, Elizabeth A. Makynen, Ann Miracle, Phillip Hartig, L. Earl Gray, Mary Cardon, and Vickie Wilson

In vitro and in vivo studies demonstrate that the mammalian anti-androgen flutamide is also an androgen receptor antagonist in the fathead minnow.

6328

Disruption of Rapid, Nongenomic Steroid Actions by Environmental Chemicals: Interference with Progestin Stimulation of Sperm Motility in Atlantic Croaker

Peter Thomas and Kelly Doughty

Environmental chemicals interfere with a "nonclassical" membrane-initiated action of progestin hormones to stimulate sperm motility in Atlantic croaker.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

6333

Use of Trout Liver Slices To Enhance Mechanistic Interpretation of Estrogen Receptor Binding for Cost-Effective Prioritization of Chemicals within Large Inventories

Patricia K. Schmieder, Mark A. Tapper, Jeffrey S. Denny, Richard C. Kolanczyk, Barbara R. Sheedy, Tala R. Henry, and Gilman D. Veith
Trout receptor binding and tissue slice vitellogenin assays are used together to enhance interpretation of the endocrine-disrupting potential of chemicals.

Multiple Stressors

6343

Deviation from Additivity with Estrogenic Mixtures Containing 4-Nonylphenol and 4-*tert*-Octylphenol Detected in the E-SCREEN Assay

Nissanka Rajapakse, Elisabete Silva, Martin Scholze, and Andreas Kortenkamp

Multicomponent estrogenic mixtures containing 4-nonylphenol and 4-*tert*-octylphenol produce effects in the E-SCREEN that deviate from additivity expectations.

6353

What Contributes to the Combined Effect of a Complex Mixture?

Rolf Altenburger, Helge Walter, and Matthias Grote

Concentration and response addition are used to model the combined algal toxicity of sediment contaminants; the effect contributions of fewer components already explain observable effects.

6363

Toxicity of a Mixture of Dissimilarly Acting Substances to Natural Algal Communities: Predictive Power and Limitations of Independent Action and Concentration Addition

Thomas Backhaus, Åsa Arrhenius, and Hans Blanck

IA accurately predicts mixture toxicities of dissimilarly acting substances in algal communities, and CA shows a lower predictive power. Both fail to adequately address hormesis-like effects.

6371

Influence of Total Organic Carbon and UV-B Radiation on Zinc Toxicity and Bioaccumulation in Aquatic Communities

Donna R. Kashian, Blair A. Prusha, and William H. Clements

Measures of zinc accumulation in periphyton, macroinvertebrate drift, and abundance of sensitive taxa reveal complex interactions among UV-B, zinc, and dissolved organic carbon.

Field-Oriented Studies

■ 6377

Dairy Wastewater, Aquaculture, and Spawning Fish as Sources of Steroid Hormones in the Aquatic Environment

Edward P. Kolodziej, Thomas Harter, and David L. Sedlak

Water samples collected near dairy farms and aquaculture facilities often contain steroid hormones at concentrations comparable with those detected in municipal wastewater effluent.

6385

Reproductive Responses of Common Carp (*Cyprinus carpio*) Exposed in Cages to Influent of the Las Vegas Wash in Lake Mead, Nevada, from Late Winter to Early Spring

Erin M. Snyder, Shane A. Snyder, Kevin L. Kelly, Timothy S. Gross, Daniel L. Villeneuve, Scott D. Fitzgerald, Sergio A. Villalobos, and John P. Giesy

Reproductive end points are examined in common carp (*Cyprinus carpio*) exposed in cages to municipal wastewater effluent entering Lake Mead, Nev.

6396

Gene Expression Profiles for Detecting and Distinguishing Potential Endocrine-Disrupting Compounds in Environmental Samples

Dong-Yu Wang, Bruce McKague, Steven N. Liss, and Elizabeth A. Edwards

Gene expression profiles generated by DNA microarray analysis of MCF-7 breast-cancer cells exposed to known and suspected estrogenic compounds are compared.

6407

Population Consequences of Fipronil and Degradates to Copepods at Field Concentrations: An Integration of Life Cycle Testing with Leslie Matrix Population Modeling

G. Thomas Chandler, Tawnya L. Cary, Adriana C. Bejarano, Jack Pender, and John L. Ferry

UV and biologically mediated degradation products of the phenylpyrazole insecticide fipronil cause copepod developmental and reproductive toxicity, with population-level consequences.

6415

Identification of Estrogenic Compounds in Fish Bile Using Bioassay-Directed Fractionation

Corine J. Houtman, Annemiek M. van Oostveen, Abraham Brouwer, Marja H. Lamoree, and Juliette Legler

Natural and xenobiotic estrogens are identified in fish bile with chemical analysis directed by an in vitro bioassay.

6424

Detection of Genistein as an Estrogenic Contaminant of River Water in Osaka

Masanobu Kawanishi, Takeji Takamura-Enya, Rahyanj Ermawati, Chiaki Shimohara, Michiyo Sakamoto, Kazuki Matsukawa, Tomonari Matsuda, Tsuyoshi Murahashi, Saburo Matsui, Keiji Wakabayashi, Tetsushi Watanabe, Yutaka Tashiro, and Takashi Yagi

Estrogenicity of surface water in Japan is measured, and genistein is identified as one of the causal estrogenic compounds.

6430

Structural and Functional Responses of Plankton to a Mixture of Four Tetracyclines in Aquatic Microcosms

Christian J. Wilson, Richard A. Brain, Hans Sanderson, David J. Johnson, Ketut T. Bestari, Paul K. Sibley, and Keith R. Solomon

Interactions between phyto- and zooplankton communities in microcosms are measured to assess the effects of a mixture of commonly prescribed tetracycline pharmaceuticals on ecosystem structure and function.