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## Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique N°43

Colette Bertrand, Christian Mougin, Annette Bérard, Céline Pelosi, Olivier Crouzet, Pascale Karmasyn-Veyrines

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# Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique



## N° 43, Février 2020

Réalisé par l'équipe de veille sur la période du 1<sup>er</sup> janvier au 29 février 2020.  
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## Edito

Voici notre 43<sup>ème</sup> bulletin de veille, le premier aux couleurs d'INRAE ! Vous y trouverez de nombreuses informations en lien avec l'écotoxicologie, la toxicologie et les activités du réseau. Moins d'informations « évaluation du risque » dans cette édition, mais ce n'est que temporaire.

Nous vous proposons dans ce bulletin une tribune libre récapitulant le bilan 2019 des activités de notre réseau. Le texte est également disponible sous forme de fiche thématique en téléchargement sur notre site ECOTOX :

<https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-25-fevrier-2020>

Vous pouvez rejoindre l'équipe de veille pour développer de nouveaux thèmes. Nous allons prochainement revenir vers vous afin de recueillir vos attentes à l'égard de ce bulletin et de préciser si besoin sa ligne éditoriale. Mais, d'ici là, n'oubliez pas de nous transmettre les informations que vous souhaitez diffuser, notamment vos publications que nous pourrions avoir oubliées.

Bonne lecture !

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## Tribune libre

### Bilan 2019 des activités du réseau ECOTOX

Nous vous présentons les activités que notre réseau d'écotoxicologie terrestre et aquatique, ECOTOX, a menées en 2019. Celles-ci s'articulent autour de 4 axes :

- Contribution à la réflexion scientifique, à la programmation et à l'animation de la recherche en écotoxicologie,
- Accroissement de la visibilité de l'écotoxicologie et de ses acteurs, dans et hors d'INRAE,
- Valorisation et dissémination des résultats de la recherche,
- Initiation de projets de recherche et le développement d'infrastructures et d'outils dédiés.

Le réseau a été co-animé jusqu'en décembre 2019 par C. Mouglin, A. Bouchez, L. Denaix et F. Martin-Laurent (INRA) ainsi que par J. Garric (Irstea). Depuis le 1<sup>er</sup> janvier 2020, dans le contexte du nouvel institut INRAE, Marie-Agnès Coutellec (ESE Rennes), Laurence Denaix (ISPA Bordeaux), Fabrice Martin-Laurent (Agroécologie Dijon), Soizic Morin (EABX Bordeaux), Juliette Faburé, Isabelle Lamy et Christian Mouglin (ECOSYS Versailles) forment sa cellule d'animation, coordonnée par Isabelle Lamy.

#### **Contribution à la réflexion scientifique, à la programmation et à l'animation de la recherche en écotoxicologie**

Le positionnement national du réseau continue à se renforcer au travers d'actions de représentation et de prise de responsabilités dans des structures d'animation nationale et de programmation de la recherche. Le réseau interagit avec les d'autres collectifs en écotoxicologie pour coordonner l'ensemble des actions et améliorer la visibilité de notre communauté scientifique. Ainsi, il ambitionne d'être la force majeure de l'animation scientifique en écotoxicologie, en partenariat avec d'autres réseaux ou groupements intervenants sur les questions plus spécifiques (écotoxicologie microbienne, écotoxicologie animale aquatique...).

Des actions et réflexions portant sur les risques ont été initiées en 2018 dans différents contextes, et ont mobilisé des membres du réseau. Ces réflexions ont été poursuivies en 2019. Nous pouvons citer :

- l'orientation pluraliste de la recherche sur les risques chroniques (ORRCH), pilotée par ALLISS Sciences Société,
- les Ateliers de Réflexion Prospective « Nexus santé-agriculture-environnement-alimentation » et « Risques ». Dans ces ARPs, des membres du réseau ont été impliqués dans l'animation de groupes de travail « Toxicologie-Ecotoxicologie », et/ou ont apporté leurs compétences scientifiques.

#### **Initiation de projets de recherche et développement d'infrastructures et d'outils dédiés**

Le réseau a interagi avec le collectif Recotox pour favoriser l'émergence de projets sur les sites du réseau. Ces interactions ont conduit au dépôt du projet « GHpest: Integrated assessment approach for global health and pesticide use in agricultural systems » coordonné par C. Topping, soumis en janvier 2019 à l'AAP H2020 SFS-04-2019. Le projet a franchi l'étape 1 de sélection du processus Européen.

## Accroissement de la visibilité de l'écotoxicologie et de ses acteurs, dans et hors de l'INRA

### *Soutien à l'organisation de colloques et séminaires*

Le réseau a été partenaire de la journée de la Fondation Rovaltain qui s'est tenue le 15 novembre au Pôle Scientifique Ecotox de Rovaltain. Plusieurs membres du réseau ont présenté des communications, et participé/animé des tables rondes.

Le réseau a également été partenaire des journées du GDR Ecotoxicologie aquatique du 18 au 21/11/2019 à Bordeaux.

### *Veille thématique ECOTOX*

La veille documentaire mise en place en 2013 par le réseau continue à se renforcer avec la prise en compte de nouvelles rubriques et l'arrivée de nouveaux veilleurs. Nous bénéficions désormais de du soutien et de la contribution d'une ingénieure de l'IST d'INRAE Versailles.

Les bulletins bimestriels sont en téléchargement sur le site du réseau, sur ProdINRA, et largement diffusés dans et hors de l'INRA. Les retours des lecteurs sont très positifs et encourageants. Outre la communauté scientifique des écotoxicologues, des agences nationales et européennes, plusieurs instituts techniques et bureaux d'étude sont abonnés au bulletin. Six bulletins ont été édités en 2019.

Bertrand C., Crouzet O., Mougin C., Sireyjol C. Février 2019. Bulletin de veille du réseau du réseau d'écotoxicologie terrestre et aquatique, N°37, 53 pages, <https://www6.inrae.fr/ecotox/Veille/Bulletins/Bulletin-37-Veille-du-01-01-2019-au-28-02-2019> ; <https://prodinra.inrae.fr/record/471352>

Bertrand C., Crouzet O., Mougin C., Sireyjol C. Avril 2019. Bulletin de veille du réseau du réseau d'écotoxicologie terrestre et aquatique, N°38, 44 pages, <https://www6.inrae.fr/ecotox/Veille/Bulletins/Bulletin-38-Veille-du-01-03-2019-au-30-04-2019> ; <https://prodinra.inrae.fr/record/471578>

Bertrand C., Crouzet O., Mougin C., Sireyjol C. Juin 2019. Bulletin de veille du réseau du réseau d'écotoxicologie terrestre et aquatique, N°39, 45 pages, <https://www6.inrae.fr/ecotox/Veille/Bulletins/Bulletin-39-Veille-du-01-05-2019-au-30-06-2019> ; <https://prodinra.inrae.fr/record/478863>

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Bertrand C., Mougin C., Bérard A., Pelosi C., Crouzet O. et Karmasyn-Veyrines P. Décembre 2019. Bulletin de veille du réseau du réseau d'écotoxicologie terrestre et aquatique, N°42, 60 pages, <https://www6.inrae.fr/ecotox/Veille/Bulletins/Bulletin-42-Veille-du-01-11-2019-au-31-12-2019>



## Valorisation et dissémination des résultats de la recherche

Les productions du réseau continuent à être enregistrées dans l'archive ouverte ProdINRA, qui sera prochainement reversée dans HAL.

### **Série « Ecotoxicologie » ISTE**

Le 5<sup>ème</sup> et dernier volume de la collection « Ecotoxicologie » a été édité en anglais : Ecotoxicology - New Challenges and New Approaches, par Elisabeth Gross (LIEC) et Jeanne Garric (Riverly), ISBN : 9781785483141, <https://www.elsevier.com/books/ecotoxicology/gross/978-1-78548-314-1>

### **Fiches thématiques**

L'édition de fiches thématiques sous la forme de 4 pages (ou plus !) sur des thèmes divers en lien avec l'écotoxicologie s'est poursuivie. Six fiches ont ainsi été rédigées, diffusées dans le bulletin de veille du réseau, et placées en téléchargement sur le site du réseau et sur ProdINRA. Six fiches ont été éditées en 2019

Bart S. Février 2019. Impacts comportementaux, démographiques et fonctionnels des pesticides sur des annélides oligochètes du sol. Fiche thématique N°19, 5 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-19-Fevrier-2019> ; <https://prodinra.inrae.fr/record/471414>

Rocchi S. Avril 2019. Utilisation des fongicides triazolés : impact non intentionnel sur une moisissure pathogène pour l'Homme. Fiche thématique N°20, 4 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-20-Avril-2019> ; <https://prodinra.inrae.fr/record/471415>

Bouchez A., Denaix L., Garric J., Martin-Laurent F., Mougin C. Juin 2019. Bilan 2018 des activités du réseau ECOTOX. Fiche thématique N°21, 4 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-21-Juin-2019> ; <https://prodinra.inrae.fr/record/478623>

Vasseur P. Aout 2019. Les fondements de l'écotoxicologie française. Fiche thématique N°22, 9 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-22-Aout-2019> ; <https://prodinra.inrae.fr/record/478866>

Chaumet B. Octobre 2019. Transfert et distribution des pesticides dans les biofilms en lien avec les effets toxiques associés. N°23, 4 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-23-October-2019>

Pelosi C., Fritsch C., Bertrand C. Décembre 2019. L'écotoxicologie dans les paysages agricoles... ou comment l'exposition de l'habitat aux pesticides renseigne des risques potentiels pour les organismes ? N°24, 4 pages – Réseau Ecotox : <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-24-decembre-2019>

### Expertise

Plusieurs membres du réseau participent aux travaux de normalisation de méthodes biologiques. Si des textes ont été publiés par l'OCDE, l'implication se poursuit essentiellement dans le cadre de la commission T95E Écotoxicologie de l'AFNOR, et de la commission TC190/SC 04 « méthodes biologiques » de l'ISO. Voir à ce sujet la fiche thématique <https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-18-Decembre-2018>.

Plusieurs normes entrant dans le champ de l'écotoxicologie ont été publiées en 2019 par l'ISO :

ISO 17616:2019. Qualité du sol - Lignes directrices relatives aux choix et à l'évaluation des essais appliqués pour la caractérisation écotoxicologique des sols et des matériaux de type sol

ISO 21285:2019. Qualité du sol - Inhibition de la reproduction de l'acarien prédateur (*Hypoaspis aculeifer*) par des contaminants du sol

ISO 21286:2019. Qualité du sol - Identification des espèces par codes-barres ADN dans les essais d'écotoxicologie

ISO 21479:2019. Qualité du sol - Détermination des effets des polluants sur la flore du sol - Composition en acides gras foliaires des plantes utilisées pour évaluer la qualité du sol

ISO/TS 22939:2019. Qualité du sol - Mesure en microplaques de l'activité enzymatique dans des échantillons de sol en utilisant des substrats fluorogènes

ISO 23611-3:2019. Qualité du sol - Prélèvement des invertébrés du sol - Partie 3: Prélèvement et extraction des enchytréides

ISO 23753-1:2019. Qualité du sol - Détermination de l'activité des déshydrogénases dans les sols. Partie 1 : Méthode au chlorure de triphényltétrazolium (CTT)

ISO 23753-2:2019. Qualité du sol - Détermination de l'activité des déshydrogénases dans les sols. Partie 2 : Méthode au chlorure de iodotétrazolium (INT)

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### Pour en savoir plus

<https://www6.inrae.fr/ecotox>

## ERA / PUBLICATIONS SCIENTIFIQUES

### Brodifacoum Toxicity in American Kestrels (*Falco sparverius*) with Evidence of Increased Hazard on Subsequent Anticoagulant Rodenticide Exposure

**Authors:** Rattner et al.

**Source:** ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY 2020, DOI: [10.1002/etc.4629](https://doi.org/10.1002/etc.4629)

**Abstract:** A seminal question in ecotoxicology is the extent to which contaminant exposure evokes prolonged effects on physiological function and fitness. A series of studies were undertaken with American kestrels ingesting environmentally realistic concentrations of the second-generation anticoagulant rodenticide (SGAR) brodifacoum. (...). To examine the hazard of sequential anticoagulant rodenticide (AR) exposure, kestrels were exposed to either the first-generation AR chlorophacinone (1.5 µg/g diet) or the SGAR brodifacoum (0.5 µg/g diet) for 7 d and, following a recovery period (...). These data provide evidence that the SGAR brodifacoum may have prolonged effects that increase the toxicity of subsequent AR exposure. Because free-ranging predatory and scavenging wildlife are often repeatedly exposed to ARs, such protracted toxicological effects need to be considered in hazard and risk assessments.

[Accès au document](#)

### Organochlorine Pesticide Residues Among Colonial Nesting Birds in Tamil Nadu, India: A Maiden Assessment from Their Breeding Grounds

**Authors:** Jayakumar et al.

**Source:** ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY 2020, DOI:10.1007/s00244-020-00709-y

**Abstract:** Use of pesticides continues to be indiscriminate, and birds are one of the worst affected non-targeted organisms. (...) there is exceedingly little data on organochlorine pesticide (OCP) residues in colonial nesting birds in sanctuaries of India. A total of 76 individuals belonging to 14 species of birds found dead between March 2008 and March 2010 were analyzed for pesticide residues in various tissues. Of all the OCPs analyzed, concentration of HCH was found to be the highest. Magnitude of contamination varied widely among species. (...) Concentrations of DDT and its metabolites, HCH and isomers, dieldrin, and heptachlor epoxide were lower than the concentrations reported for various species of birds elsewhere in India. (...) Although OCP results in this study were below threshold limits, it may be noted that the long duration exposure even to low levels of pesticides could create a significant impact at population level.

[Accès au document](#)

## ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET PESTICIDES

### Role of extracellular polymeric substance (EPS) in toxicity response of soil bacteria *Bacillus* sp. S3 to multiple heavy metals

**Authors:** Zeng, Weimin; Li, Fang; Wu, Chenchen et al.

**Source:** BIOPROCESS AND BIOSYSTEMS ENGINEERING 43(1):153-167, 2020, DOI: 10.1007/s00449-019-02213-7

**Abstract:** Heavy metal resistant bacteria are of great interest because of their potential use in

bioremediation. Understanding the survival and adaptive strategies of these bacteria under heavy metal stress is important for better utilization of these bacteria in remediation. The objective of this study was to investigate the role of bacterial extracellular polymeric substance (EPS) in detoxifying against different heavy metals in *Bacillus* sp. S3, a new hyper antimony-oxidizing bacterium previously isolated from contaminated mine soils. The results showed that *Bacillus* sp. S3 is a multi-metal resistant bacterial strain, especially to Sb(III), Cu(II) and Cr(VI). Toxic Cd(II), Cr(VI) and Cu(II) could stimulate the secretion of EPS in *Bacillus* sp. S3, significantly enhancing the adsorption and detoxification capacity of heavy metals. Both Fourier transform infrared spectroscopy (FTIR) and three-dimensional excitation-emission matrix (3D-EEM) analysis further confirmed that proteins were the main compounds of EPS for metal binding. In contrast, the EPS production was not induced under Sb(III) stress. Furthermore, the TEM-EDX micrograph showed that *Bacillus* sp. S3 strain preferentially transported the Sb(III) to the inside of the cell rather than adsorbed it on the extracellular surface, indicating intracellular detoxification rather than extracellular EPS precipitation played an important role in microbial resistance towards Sb(III). Together, our study suggests that the toxicity response of EPS to heavy metals is associated with difference in EPS properties, metal types and corresponding environmental conditions, which is likely to contribute to microbial-mediated remediation.

## Microsegmented flow-assisted miniaturized culturing for isolation and characterization of heavy metal-tolerant bacteria

**Authors:** Cao, J.; Kalensee, F.; Guenther, P. M.; Koehler, J. M.

**Source:** INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY 17(1):1-16, 2020, DOI: 10.1007/s13762-019-02424-1

**Abstract:** Soils are complex ecosystem, and their function in the environment is mainly determined by the microbial communities.

Metal-tolerant micro-organisms have an important function in the formation of soil and the development of microbial communities in all areas where heavy metals are released by natural erosion processes or by human activities. The investigation of dose-dependent growth and behaviour is an essential part of the search for heavy metal-tolerant microorganism communities and their characterization. In this study, next-generation sequencing was used for the analysis of soil sample and reduced communities and droplet-based microfluidics was used to assess the growth behaviour of unknown bacterial communities and single strains in response to different heavy metal ions. Highly resolved dose-response functions of the bacterial communities reflect the specific character in their concentration-dependent response to different culture media and heavy metals of copper, nickel and cobalt. Besides the characterization of community responses, they allowed to characterize newly isolated strains. Concentration-dependent growth patterns of the micro-organisms in the droplets could be observed. The investigation demonstrates the potential of droplet-based microfluidics for miniaturized eco-toxicological studies and their suitability for the discovery of novel strains with special tolerance features.

## Incorporation of cyclodiene pesticides and their polar metabolites to model membranes of soil bacteria

**Authors:** Wojcik, Aneta; Perczyk, Paulina; Wydro, Pawel); Broniatowski, Marcin)

**Source:** JOURNAL OF MOLECULAR LIQUIDS 298:112019, 2020, DOI: 10.1016/j.molliq.2019.112019

**Abstract:** The world-wide application of cyclodiene pesticides (CP) lead to severe pollution of arable land and because of the long half-lives they will be for many decades present in the soil. The only reasonable way of the elimination of these chemicals from the soil is bioremediation - the introduction to the soil of decomposer microorganisms strains capable of CP degradation. CP are highly hydrophobic and exhibit large membrane activity; thus, they can be incorporated to the cellular membrane and retained therein. The presence of CP and their



metabolites in the cellular membrane of the decomposer organism can lead to severe alterations of its function and in consequence to the death of the decomposer cell. Microorganisms protect themselves changing the phospholipid composition of their membranes. To shed light on the correlation between the membrane composition and its interactions with CP and their metabolites we applied Langmuir monolayers as versatile models of decomposers' membranes. By the proper selection of phospholipids we prepared different models of cellular membranes of Gram-negative and Gram-positive bacteria. The model membranes were doped by four most frequently applied CP and their common metabolite. The combined application of microscopic, diffractometric and spectroscopic methods proved that CP can be incorporated into the model membranes and that the membrane activity of endosulfan is comparable with endrin - one of the most toxic pesticides. The penetration tests and spectroscopic studies proved also the possibility of the uptake of the polar CP metabolites by the model membranes from the aqueous subphase. (C) 2019 The Authors. Published by Elsevier B.V.

## Fire Phoenix facilitates phytoremediation of PAH-Cd co-contaminated soil through promotion of beneficial rhizosphere bacterial communities

**Authors:** Dai, Y; Liu, R; Zhou, Y; Li, N; Hou, L et al.

**Source:** ENVIRONMENT INTERNATIONAL 136:UNSP 105421, 2020, DOI: 10.1016/j.envint.2019.105421

**Abstract:** Pot experiments were conducted in a growth chamber to evaluate the phytoremediation efficiency and rhizosphere regulation mechanism of Fire Phoenix (a mixture of *Festuca L.*) in polycyclic aromatic hydrocarbon-cadmium (PAH-Cd) co-contaminated soils. Plant biomass, removal rates of PAHs and Cd, soil enzyme activity, and soil bacterial community were determined. After 150 days of planting, the removal rates of the total 4 PAHs and Cd reached 64.57% and 40.93% in co-contaminated soils with low-PAH (104.79-144.87

mg.kg(-1)), and 68.29% and 25.40% in co-contaminated soils with high-PAH (169.17-197.44 mg.kg(-1)), respectively. The polyphenol oxidase (PPO) activity decreased in soils having Fire Phoenix, while the dehydrogenase (DHO) activity increased as the changes of DHO activity had a strong positive correlation with the removal rates of PAHs and Cd in the low-PAH soils ( $r = 0.862$  ( $P < 0.006$ ) and  $0.913$  ( $P < 0.002$ ), respectively). Meanwhile, successional changes in the bacterial communities were detected using high-throughput 454 Gs-FLX pyrosequencing of the 16S rRNA, and these changes were especially apparent for the co-contaminated soils with the low PAH concentration. The Fire Phoenix could promote the growth of *Mycobacterium*, *Dokdonella*, *Gordonia* and *Kaistobacter*, which played important roles in PAHs degradation or Cd dissipation. These results indicated that Fire Phoenix could effectively motivate the soil enzyme and bacterial community and enhance the potential for phytoremediation of PAH-Cd co-contaminated soils.

## Effects of pesticide residues on bacterial community diversity and structure in typical greenhouse soils with increasing cultivation years in Northern China

**Authors:** Wang, Chao-Nan; Wu, Rui-Lin; Li, Yu-Yan; Qin, Yi-Fan; Li, Yi-Long et al.

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT 710:136321, 2020, DOI: 10.1016/j.scitotenv.2019.136321

**Abstract:** The understanding of soil microbiome is important for sustainable cultivation, especially under greenhouse conditions. Here, we investigated the changes in soil pesticide residues and microbial diversity and community structure at different cultivation years under a greenhouse system. The 9-to-14 years sites were found to have the least diversity/rich microbial population as compared to sites under 8 years and over 16 years, as analyzed with alpha diversity index. In total, 42 bacterial phyla were identified across soils with different pesticide residues and cultivation ages. Proteobacteria, Acidobacteria, and Bacteroidetes represented



the dominant phyla, that accounted for 34.2-43.4%, 9.7-19.3% and 92-16.5% of the total population, respectively. Our data prove that certain pesticides contribute to variation in soil microbial community and that soil bacteria respond differently to cultivation years under greenhouse conditions. Thus, this study provides an insight into microbial community structure changes by pesticides under greenhouse systems and natural biodegradation may have an important part in pesticides soil decontamination. (C) 2019 Elsevier B.V. All rights reserved.

## Exploring bacterial community composition in Mediterranean deep-sea sediments and their role in heavy metal accumulation

**Authors:** Jroundi, Fadwa; Martinez-Ruiz, Francisca; Merroun, Mohamed L.; Teresa Gonzalez-Munoz, Maria

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT 712:135600, 2020, DOI: 10.1016/j.scitotenv.2019.135660

**Abstract:** The role of microbial processes in bioaccumulation of major and trace elements has been broadly demonstrated. However, microbial communities from marine sediments have been poorly investigated to this regard. In marine environments, particularly under high anthropogenic pressure, heavy metal accumulation increases constantly, which may lead to significant environmental issues. A better knowledge of bacterial diversity and its capability to bioaccumulate metals is essential to face environmental quality assessment. The oligotrophic westernmost Mediterranean, which is highly sensitive to environmental changes and subjected to increasing anthropogenic pressure, was selected for this study. A sediment core spanning the last two millennia was sampled at two intervals, with ages corresponding to 140 (S1) and 1400 (S2) yr BP. High-throughput sequencing showed an abundance of *Bacillus*, *Micrococcus*, unclassified members of Planococcaceae, Anaerolineaceae, Planctomycetaceae, *Microlunatus*, and *Microbacterium* in both intervals, with slight differences in their abundance, along with newly

detected ones in S2, i.e., *Propionibacterium*, *Fictibacillus*, *Thalassobacillus*, and *Bacteroides*. Canonical correspondence analysis (CCA) and co-occurrence patterns confirmed strong correlations among the taxa and the environmental parameters, suggesting either shared and preferred environmental conditions, or the performance of functions similar to or complementary to each other. These results were further confirmed using culture-dependent methods. The diversity of the culturable bacterial community revealed a predominance of *Bacillus*, and *Micrococcus* or *Kocuria*. The interaction of these bacterial communities with selected heavy metals (Cu, Cr, Zn and Pb) was also investigated, and their capacity of bioaccumulating metals within the cells and/or in the extracellular polymeric substances (EPS) is demonstrated. Interestingly, biomineralization of Pb resulted in the precipitation of Pb phosphates (pyromorphite). Our study supports that remnants of marine bacterial communities can survive in deep-sea sediments over thousands of years. This is extremely important in terms of bioremediation, in particular when considering possible environmentally friendly strategies to bioremediate inorganic contaminants. (C) 2019 Elsevier BM. All rights reserved.

## Responses of bacterial communities in wheat rhizospheres in different soils to di-n-butyl and di(2-ethylhexyl)phthalate contamination

**Authors:** Gao, Minling; Zhang, Ze; Dong, Youming et al.

**Source:** GEODERMA 362:114126, 2020, DOI: 10.1016/j.geoderma.2019.114126

**Abstract:** Di-n-butyl phthalate (DBP) and di(2-ethylhexyl)phthalate (DEHP) are commonly used as plasticizers to enhance the flexibility of plastic products. They are universal pollutants and well-known endocrine disruptors, and their effects on rhizosphere organisms have aroused great concern. In the present study, the effects of DBP and DEHP contamination on bacterial community structure and functions in wheat rhizospheres in fluvo-aquic, cinnamon, and brown soils were investigated using Illumina

HiSeq 2500 sequencing. Operational taxonomic unit richness and bacterial diversity were decreased in DEHP-contaminated fluvo-aquic and brown soils, but not in DEHP-contaminated cinnamon and DBP-polluted soils. The relative abundance of some families was positively associated with soil pH, total nitrogen content (TN), and soil organic matter (SOM), and negatively correlated with DBP/DEHP concentration. The relative abundances of families that can extremely effectively degrade DBP/DEHP were enhanced by DBP/DEHP pollution, whereas the relative abundances of some genera that are beneficial to soil health were reduced in the DBP/DEHP-polluted soils. Soil pH, TN, and SOM were crucial in determining the fate and effect of PAEs in the soil ecosystems. In conclusion, DBP/DEHP pollution alters the rhizosphere bacterial community structure and affects microbial metabolic behavior and functional diversity during wheat growth.

## The utilization of biomineralization technique based on microbial induced phosphate precipitation in remediation of potentially toxic ions contaminated soil: A mini review

**Authors:** Jiang, Luhua; Liu, Xueduan; Yin, Huaqun et al.

**Source:** ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY 191:110009, 2020, DOI: 10.1016/j.ecoenv.2019.110009

**Abstract:** In recent years, many studies have been devoted to investigate the application of microbial induced phosphate precipitation (MIPP) process for potentially toxic element polluted soil remediation. MIPP biomineralization technique exhibits a great potential to efficiently remediate polluted soil considering its low cost, green and ecofriendly process, and simple in operation. This paper represented a review on the state of the art of polluted soil remediation based on MIPP technique. Briefly, certain defined criteria on targeted microbe selection was discussed; an overall review on the utilization of MIPP process for toxic ions biomineralization in

soil was provided; influencing factors reported in the literature, such as pH, temperature, humic substances, coexisting ions, effective microbial population, and enzyme activity, were then comprehensively reviewed; finally; a special emphasis was given to enhance MIPP remediation performance in soil in future research.

## Effect of the veterinary ionophore monensin on the structure and activity of a tropical soil bacterial community

**Authors:** Granados-Chinchilla, Fabio; Arias-Andres, Maria de Jesus; Fernandez Montes de Oca, Maria Laura; Rodriguez, Cesar

**Source:** JOURNAL OF ENVIRONMENTAL SCIENCE AND HEALTH PART B-PESTICIDES FOOD CONTAMINANTS AND AGRICULTURAL WASTES 55(2):127-134, 2020, DOI: 10.1080/03601234.2019.1673612

**Abstract:** Monensin (MON) is a coccidiostat used as a growth promoter that can reach the environment through fertilization with manure from farm animals. To verify whether field-relevant concentrations of this drug negatively influence the structure and activity of tropical soil bacteria, plate counts, CO<sub>2</sub> efflux measurements, phospholipid fatty acids (PLFA) and community-level physiological profiling (CLPP) profiles were obtained for soil microcosms exposed to 1 or 10 mg kg<sup>-1</sup> of MON across 11 days. Although 53% (1 mg kg<sup>-1</sup>) to 40% (10 mg kg<sup>-1</sup>) of the MON concentrations added to the microcosms dissipated within 5 days, a subtle concentration-dependent decrease in the number of culturable bacteria (<1 log CFU g<sup>-1</sup>), reduced (-20 to -30%) or exacerbated (+25%) soil CO<sub>2</sub> effluxes, a marked shift of non-bacterial fatty acids, and altered respiration of amines (1.22-fold decrease) and polymers (1.70-fold increase) were noted in some of the treatments. These results suggest that MON quickly killed some microorganisms and that the surviving populations were selected and metabolically stimulated. Consequently, MON should be monitored in agronomic and environmental systems as part of One Health efforts.

## Associative effects of lignin-derived biochar and arbuscular mycorrhizal fungi applied to soil polluted from Pb-acid batteries effluents on barley grain safety

**Author:** Khan, Muhammad Asaf; Mahmood-ur-Rahman; Ramzani, Pia Muhammad Adnan; Zubair, Muhammad; Rasool, Bilal); Khan, Muhammad Kamran; Ahmed, Ammar; Khan, Shahbaz Ali; Turan, Veysel); Iqbal, Muhammad

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT 710:136294, 2020, DOI: 10.1016/j.scitotenv.2019.136294

**Abstract:** While disobeying environmental regulations of Pakistan, several Pb-acid batteries recycling and repairing units discharge their effluents into water canals that irrigate arable fields. Resultantly, serious ecological risks, as well as human health hazards through consumption of edible crops grown on such Pb-polluted soils have been reported. In this experiment, we observed associative effects of amending a soil polluted from Pb-add batteries effluents (SPB) with arbuscular mycorrhizal fungi (AMF) and lignin-derived biochar (LBC) on barley grain safety to human health. The SPB was treated with AMF inoculum (a consortium of four AMF species), lignin (LN), and 113C, as sole treatments and AMF inoculum with LN and LBC. Barley parameters involving Pb distribution in grain and other parts, grain biochemistry, and nutrition were assessed. Likewise, Pb bioavailability in SPB, AMF root colonization, soil enzymes, microbial biomass carbon (MBC), and AMP produced total glomalin related soil protein (TGSP) were also scoped. Additionally, human renal cells (HEK 293) cytotoxicity test was performed by opting barley grain-related Pb concentrations. Results show that LBC + AMF significantly reduced grain Pb concentrations below the critical limit [4.67 mg kg<sup>-1</sup>] (WHO/FAO standard), AMF colonization, MBC, soil enzymology, and TGSP, compared to control. Likewise, rest barley parameters were also improved in this treatment. Contrary to other treatments, grain produced on LBC + AMF did not result in (a) cell apoptosis, (b) cell distortion and (c) cohesion loss. Immobilization of Pb in SPB was due to the dilution effect of Pb adsorption on LBC, AMF mycelium and TGSP which resulted

in a significant drop of grain Pb concentrations below the critical limit and ultimately no harm to HEK 293 cells. Our findings endorse that grain produced at LBC + AMF treatment are safer for human consumption and will not pose health risks. The LBC + AMF application can remediate SPB for safer cereal production. (C) 2018 Elsevier B.V. All rights reserved.

## Effects of Soil Amendments on Microbial Activities in a Typical Cd-Contaminated Purple Field Soil, Southwestern China

**Authors:** Wang, Wenqiang; Zhou, Fengwu); Chang, Yajun; Cui, Jian; He, Dongyi); Du, Jimeng; Chan, Andy; Yao, Dongrui; Li, Yong); Chen, Zhiyuan et al.

**Source:** BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY 104(3):380-385, 2020, DOI: 10.1007/s00128-020-02786-0

**Abstract:** In this study, three soil amendments (inorganic, liming, or organic-inorganic materials) were used in a Cd-contaminated purple field soil to investigate their impacts on soil Cd availability, enzyme (urease, catalase, sucrase, and acid phosphatase) activities, microbial biomass (carbon/nitrogen) and type (bacteria, fungi, and actinomycetes) in mustard and corn trials. Results showed that soil amendments generally decreased soil exchangeable Cd, fungi and bacterial populations while increasing the activities of all the four soil enzymes tested, microbial biomass carbon and populations of actinomycetes ( $p < 0.05$ ). Soil pH and microbial biomass nitrogen did not exhibit any significant response ( $p > 0.05$ ) whereas stronger effects appeared in soil organic matter and available nutrients (nitrogen, phosphorous and potassium;  $p < 0.05$ ). However, only soil available phosphorous significantly correlated with soil microbial activity in both mustard and corn trails ( $p < 0.05$ ). Thus, application of phosphorous-containing amendments should be considered for promoting soil health in the remediation of the Cd-contaminated purple soils.



## Biodegradation of Organophosphorus Compounds Predicted by Enzymatic Process Using Molecular Modelling and Observed in Soil Samples Through Analytical Techniques and Microbiological Analysis: A Comparison

**Authors:** Cardozo, Monique; de Almeida, Joyce S. F. D.; avalcante, Samir F. de A.; Salgado, Jacqueline R. S.; Goncalves, Arlan S. ranca, Tanos C. C.; Kuca, Kamil; Bizzo, Humberto R.

**Source:** MOLECULES 25(1):58, 2020, DOI: 10.3390/molecules25010058

**Abstract:** Organophosphorus compounds (OP) are chemicals widely used as pesticides in different applications such as agriculture and public health (vector control), and some of the highly toxic forms have been used as chemical weapons. After application of OPs in an environment, they persist for a period, suffering a degradation process where the biotic factors are considered the most relevant forms. However, to date, the biodegradation of OP compounds is not well understood. There are a plenty of structure-based biodegradation estimation methods, but none of them consider enzymatic interaction in predicting and better comprehending the differences in the fate of OPs in the environment. It is well known that enzymatic processes are the most relevant processes in biodegradation, and that hydrolysis is the main pathway in the natural elimination of OPs in soil samples. Due to this, we carried out theoretical studies in order to investigate the interactions of these OPs with a chosen enzyme-the phosphotriesterase. This one is characteristic of some soils' microorganisms, and has been identified as a key player in many biodegradation processes, thanks to its capability for fast hydrolyzing of different OPs. In parallel, we conducted an experiment using native soil in two conditions, sterilized and not sterilized, spiked with specific amounts of two OPs with similar structure-paraoxon-ethyl (PXN) and O-(4-nitrophenyl) O-ethyl methylphosphonate (NEMP).

The amount of OP present in the samples and the appearance of characteristic hydrolysis products were periodically monitored for 40 days using analytical techniques. Moreover, the number of microorganisms present was obtained with plate cell count. Our theoretical results were similar to what was achieved in experimental analysis. Parameters calculated by enzymatic hydrolysis were better for PXN than for NEMP. In soil, PXN suffered a faster hydrolysis than NEMP, and the cell count for PXN was higher than for NEMP, highlighting the higher microbiological toxicity of the latter. All these results pointed out that theoretical study can offer a better comprehension of the possible mechanisms involved in real biodegradation processes, showing potential in exploring how biodegradation of OPs relates with enzymatic interactions.

## Enhanced bioremediation of lindane-contaminated soils through microbial bioaugmentation assisted by biostimulation with sugarcane filter cake

**Authors:** Raimondo, Enzo E; Aparicio, Juan D; Bigliardo, Ana L; Fuentes, Maria S; Benimeli, Claudia S

**Source:** ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY 190:110143, 2020, DOI: 10.1016/j.ecoenv.2019.110143

**Abstract:** Lindane is a toxic and persistent organochlorine pesticide, whose extensive use generated its accumulation in different environmental matrices. Bioremediation is a promising technology that can be used combining bioaugmentation and biostimulation processes to soil restoration. The aim of the present work was to determine the conditions of maximum lindane removal by bioaugmentation with an actinobacteria consortium and biostimulation with sugarcane filter cake (SCFC). The assays were carried out on lindane-contaminated silty loam (SLS), clayey (CS), and sandy (SS) soils. Through complete factorial designs, the effects of three abiotic factors (moisture content, proportion and size of SCFC particles) were evaluated on lindane removal. In addition, a response optimizer determined the optimal

conditions for pesticide removal in bioaugmented and biostimulated soils, in the range of levels studied for each factor. In these conditions, bioaugmentation of biostimulated soils increased the pesticide removal (SLS: 61.4%, CS: 70.8%, SS: 86.3%), heterotrophic microbial counts, and soil enzymatic activities, and decreased lindane T-1/2, regarding the non-bioaugmented biostimulated controls, after 14 days of assay. The values of these parameters confirmed the efficiency of the bioremediation process. Finally, the viability of the four strains was demonstrated at the end of the assay. The results indicate that the simultaneous application of bioaugmentation with the actinobacteria consortium and biostimulation with SCFC constitutes a promising tool for restoring soils contaminated with lindane, by using the optimal conditions obtained through the factorial designs.

## Variation in soil microbial population and enzyme activities under faba bean as affected by pentachlorophenol

**Authors:** Siczek, Anna; Frac, Magdalena; Gryta, Agata; alembasa, Stanislaw; Kalembasa, Dorota

**Source:** APPLIED SOIL ECOLOGY 150:UNSP 103466, 2020, DOI: 10.1016/j.apsoil.2019.103466

**Abstract:** Pentachlorophenol (PCP) is a widely detectable toxic chemical with a detrimental effect on the functioning of ecosystems. A field trial was undertaken to study its effects on the activities, metabolic and genetic diversifies, as well as soil bacterial and fungal community composition. The seeds of faba bean (*Vicia faba* L.) were either treated (PCP) or left untreated (Control) with pentachlorophenol before sowing. During the vegetative period, soil samples were taken three times from the rhizosphere in order to assess the influence of PCP on soil enzymatic activity, metabolic diversity (Biolog EcoPlate), community of ammonia-oxidizing archaea (DGGE and t-RFLP) and the fungal and bacterial microbiome (NGS). PCP treatment led to a considerable reduction in the activities of enzymes connected with the N cycle (protease and urease) and showed a significant negative correlation with them ( $r = -0.934$  and  $-0.716$ , respectively). Dehydrogenase and respiration

activities were also reduced by PCP. In contrast to other enzymes analysed, PCP significantly increased acid phosphomonoesterase activity compared to the Control ( $r = 0.850$ ). PCP also decreased the carbon utilization efficiency of indigenous microbes and caused the lower utilization of amines, amides and carboxylic acids. The amount of isolated DNA was lower in PCP-treated soil than in the Control. The technique of t-RFLP fingerprinting revealed the changes caused by contamination and new specific fragments were observed in PCP-contaminated soil. Additionally, pentachlorophenol changed more fungal than bacterial structures in the faba bean rhizosphere. For most of the analysis parameters, the effect of PCP was notable during the entire analysis period of faba bean growth (from 5-6 leaves to pod formation). The results demonstrated the harmful effect of PCP on soil activity and changes in soil microorganism genetic diversity, which could result in the deterioration of the environment for soil function and processes as well as for plant growth.

## Development of microbial communities in organochlorine pesticide contaminated soil: A post-reclamation perspective

**Authors:** Balazs, Helga E.; Schmid, Christoph A. O.; Podar, Dorina; Hufnagel, Gudrun; Radl, Viviane; Schroeder, Peter

**Source:** APPLIED SOIL ECOLOGY 150:UNSP 103467, 2020, DOI: 10.1016/j.apsoil.2019.103467

**Abstract:** In order to meet constantly increasing demands for land without damaging pristine environments like forests or grasslands, reclamation and re-purposing of historically contaminated areas should become a priority. Successful reclamation goes hand in hand with the soil functional recovery potential and with resilient microbial communities capable of performing the necessary ecosystem services. In this context, we designed a greenhouse pot experiment as a mock reclamation situation, where traces of lindane at hazard threshold and twice the concentration accepted for waste deposits are left in the soil after conventional

clean-up by excavation and land filling. We assessed the effects of lindane at 50 and 100 mg kg<sup>-1</sup> regarding crop growth and nutrient turnover (with focus on the nitrogen cycle) as two key parameters for soil functions. The bulk and rhizosphere soil bacterial community composition were chosen as parameters for soil resilience in lindane contamination conditions. Lindane severely affected plant growth and development. The potential nitrogen fixation, quantified as nifH gene copy number, suffered direct negative effects of lindane contamination in bulk soil, which could represent an additional obstacle for phytoremediation. Changes in rhizosphere bacterial community composition were related to lindane toxic effects towards the plants, which might have supported the growth of opportunists and saprophytes. In bulk soil, the bacterial community shifted towards lindane tolerant taxa like *Sphingomonas* and *Porphyrobacter* that are interesting with regard to their applications in bioremediation. We concluded that lindane at hazard threshold concentration left in soil after clean-up has negative effects both soil functionality, and the recovery of the bacterial communities to their original composition when lindane resistant plant crops are not involved.

## Biodegradation and biotransformation of pentachlorophenol by wood-decaying white rot fungus *Phlebia acanthocystis* TMIC34875

**Authors:** Xiao, Pengfei; Kondo, Ryuichiro

**Source:** JOURNAL OF WOOD SCIENCE 66(1):2, 2020, DOI: 10.1186/s10086-020-1849-6

**Abstract:** Pentachlorophenol (PCP) has been introduced into the environment mainly as a wood preservative and biocide. The degradation and transformation of PCP in liquid culture by wood-decaying fungus capable of degrading organochlorine pesticides was investigated in this study. The results of tolerance test showed that the tolerance level of *Phlebia acanthocystis* to PCP in potato dextrose agar medium was higher than that of other *Phlebia* species. At the end of 10 days of incubation, *P. acanthocystis* was able to remove 100% and 76% of PCP (25 µM) in low-

nitrogen and potato dextrose broth media, respectively. The decrease of PCP in *P. acanthocystis* culture is accompanied by the formation of pentachloroanisole and p-tetrachlorohydroquinone via methylation and oxidation reactions. Moreover, the p-tetrachlorohydroquinone formed is rapidly converted to methylated products including tetrachloro-4-methoxyphenol and tetrachloro-1,4-dimethoxybenzene. The activities of lignin peroxidase and manganese peroxidase were found to increase in extracellular fluid from fungal culture treated with high-concentration PCP, with maximum values of 169.6 U/L and 73.4 U/L, respectively. The in vitro degradation of PCP and p-tetrachlorohydroquinone was confirmed using extracellular fluid of *P. acanthocystis*, suggested that the methylation of both compounds is related to extracellular enzymes. Degradation of PCP was efficiently inhibited by piperonyl butoxide or 1-aminobenzotriazole, demonstrating that cytochrome P450 monooxygenase is involved in fungal transformation of PCP, particularly in the oxidation of PCP to p-tetrachlorohydroquinone. Additionally, *P. acanthocystis* mineralized 9.3% of the PCP to (CO<sub>2</sub>)-C-14 in low-nitrogen culture during 42 days. Results obtained in the present study are in favor of the use of *P. acanthocystis* as a microbial tool of remediation of PCP-contaminated sites.

## Impacts of Cu and sulfadiazine on soil potential nitrification and diversity of ammonia-oxidizing archaea and bacteria

**Authors:** Liao, Qiang; Li, Mingzhu; Dong, Yuanpeng; Wu, Mi; Meng, Zilin; Zhang, Qian; Liu, Aiju

**Source:** ENVIRONMENTAL POLLUTANTS AND BIOAVAILABILITY 31(1):60-69, 2019, DOI: 10.1080/26395940.2018.1564629

**Abstract:** Soil potential nitrification rate (PNR) and diversity of ammonia-oxidizing microbes were investigated in spiked soils with Cu and Sulfadiazine (SDZ). An obvious decrease of PNR was observed with the increase of Cu and SDZ concentrations in the soil. Real-time fluorescence quota PCR result showed that AOA

and AOB were slightly stimulated at the gene level in both contaminated soils. Sequential analysis indicated that 200 mg kg<sup>-1</sup> Cu could improve AOA diversity but reduce AOB diversity, but 5 mg kg<sup>-1</sup> SDZ caused a decrease of both AOA and AOB diversity. Microbial community's analysis also found that 200 mg kg<sup>-1</sup> Cu and 5 mg kg<sup>-1</sup> SDZ had different influence on the populations of AOA and AOB. It could be concluded that Cu and SDZ might have a different ecological effect mechanism on soil potential nitrification and ammonia-oxidizing microbial communities.

## Hydrogeochemical and microbiological effects of simulated recharge and drying within a 2D meso-scale aquifer

**Authors:** Regnery, Julia; Li, Dong; Lee, Jonghyun; Smits, Kathleen M.; Sharp, Jonathan O.

**Source:** CHEMOSPHERE 241:UNSP 125116, 2020, DOI: 10.1016/j.chemosphere.2019.125116

**Abstract:** Oscillating cycles of dewatering (termed drying) and rewetting during managed aquifer recharge (MAR) are used to maintain infiltration rates and could also exert an influence on subsurface microbial structure and respiratory processes. Despite this practice, little knowledge is available about changes to microbial community structure and trace organic chemical biodegradation potential in MAR systems under these conditions. A biologically active two-dimensional (2D) synthetic MAR system equipped with automated sensors (temperature, water pressure, conductivity, soil moisture, oxidation-reduction potential) and embedded water and soil sampling ports was used to test and model these important subsurface processes at the meso-scale. The fate and transport of the antiepileptic drug carbamazepine, the antibiotics sulfamethoxazole and trimethoprim, and the flame retardant tris (2-chloroethyl) phosphate were simulated using the finite element analysis model, FEFLOW. All of these compounds exhibit moderate to poor biodegradability in MAR systems. Within the operational MAR scenario tested, three episodic drying cycles spanning between 18 and 24 days

were conducted over a period of 184 days. Notably, cessation of flow and partial dewatering of the 2D synthetic aquifer during dry cycles caused no measurable decrease in soil moisture content beyond the near-surface layer. The episodic flow introduction and dewatering cycles in turn had little impact on overall trace organic chemical biotransformation behavior and soil microbial community structure. However, spatial differences in oxidation-reduction potential and soil moisture were both identified as significant environmental predictors for microbial community structure in the 2D synthetic aquifer. (C) 2019 Elsevier Ltd. All rights reserved.

## Association between antibiotic residues, antibiotic resistant bacteria and antibiotic resistance genes in anthropogenic wastewater - An evaluation of clinical influences

**Authors:** Voigt, A. M.; Zacharias, N.; Timm, C.; Wasser, F.; Sib, E.; Skutlarek, D.; Parcina, M.; Schmithausen, R. M.; Schwartz, T.; Hembach, N. et al.

**Source:** CHEMOSPHERE 241:UNSP 125032, 2020, DOI: 10.1016/j.chemosphere.2019.125032

**Abstract:** The high use of antibiotics in human and veterinary medicine has led to a wide spread of antibiotics and antimicrobial resistance into the environment. In recent years, various studies have shown that antibiotic residues, resistant bacteria and resistance genes, occur in aquatic environments and that clinical wastewater seems to be a hot spot for the environmental spread of antibiotic resistance. Here a representative statistical analysis of various sampling points is presented, containing different proportions of clinically influenced wastewater. The statistical analysis contains the calculation of the odds ratios for any combination of antibiotics with resistant bacteria or resistance genes, respectively. The results were screened for an increased probability of detecting resistant bacteria, or resistance genes, with the simultaneous presence of antibiotic residues. Positive associated sets were then compared, with regards to the detected median

concentration, at the investigated sampling points. All results show that the sampling points with the highest proportion of clinical wastewater always form a distinct cluster concerning resistance. The results shown in this study lead to the assumption that ciprofloxacin is a good indicator of the presence of multidrug resistant *P. aeruginosa* and extended spectrum beta-lactamase (ESBL)-producing *Klebsiella spec.*, *Enterobacter spec.* and *Citrobacter spec.*, as it positively relates with both parameters. Furthermore, a precise relationship between carbapenemase genes and meropenem, regarding the respective sampling sites, could be obtained. These results highlight the role of clinical wastewater for the dissemination and development of multidrug resistance. (C) 2019 Elsevier Ltd. All rights reserved.

## Antibiotic Residues and Antibiotic-Resistant Bacteria in Pig Slurry Used to Fertilize Agricultural Fields

**Authors:** Rasschaert, Geertrui; Van Elst, Daan; Colson, Lander; Herman, Lieve; De Carvalho Ferreira, Helena Cardoso; Dewulf, Jeroen; Decrop, Johan; Meirlaen, Jurgen; Heyndrickx, Marc; Daeseleire, Els

**Source:** ANTIBIOTICS-BASEL 9(1):34, 2020, DOI: 10.3390/antibiotics9010034

**Abstract:** Pig manure may contain antibiotic residues, antibiotic-resistant bacteria or pathogens, which may reach the environment upon fertilization. During this study, 69 antibiotic residues belonging to 12 classes were quantified in 89 pig slurry samples. These samples were also studied for the presence of *Salmonella* and for *E. coli* resistant to meropenem, colistin, ciprofloxacin, or cefotaxim. The obtained isolates were further tested for antibacterial susceptibility. No antibiotic residues were detected in four samples, whereas in the other samples, up to 12 antibiotics were found. The most frequently detected antibiotic residues were doxycycline, sulfadiazine, and lincomycin. Doxycycline was found in the highest concentration with a mean of 1476 µg/kg manure (range: 18-13632 µg/kg). Tylosin and oxytetracycline were found with mean concentrations of 784 µg/kg (range: 17-5599 µg/kg) and 482 µg/kg (range: 11-3865

mg/kg), respectively. Lincomycin, had a mean concentration of 177 µg/kg manure (range: 9-3154 µg/kg). All other 18 antibiotic residues were found with mean concentrations of less than 100 µg/kg manure. Fifty-one slurry samples harbored *Salmonella*; 35% of the *Salmonella* isolates were sensitive to a panel of 14 antibiotics, whereas the other 65% were resistant up to five antibiotics. For *E. coli*, 52 manure samples contained *E. coli* isolates which were resistant to ciprofloxacin and 22 resistant to cefotaxime. All ciprofloxacin and cefotaxime-resistant isolates were multi-resistant, with resistance up to nine and eight antibiotics, respectively. This research indicates that pig slurry used for fertilization often contains antibiotic residues and antibiotic-resistant bacteria, including pathogens.

## Characterization of tetracycline effects on microbial community, antibiotic resistance genes and antibiotic resistance of *Aeromonas* spp. in gut of goldfish *Carassius auratus* Linnaeus

**Authors:** Jia, Jia; Cheng, Mengqian; Xue, Xue; Guan, Yongjing; Wang, Zaizhao

**Source:** ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY 191:110182, 2020, DOI: 10.1016/j.ecoenv.2020.110182

**Abstract:** The gut of aquatic animals was a significant niche for dissemination of antibiotic resistance genes (ARGs) and direct response of living conditions. In this study, the gut microbiota of goldfish *Carassius auratus* Linnaeus was sampled at 7 days and 21 days after treatment with tetracycline at 0.285 and 2.85 µg L<sup>-1</sup> to investigate the influences on the microbial structure and antibiotic resistance. The proportion of tetracycline resistance bacteria was 1.02% in the control group, while increased to 23.00%, 38.43%, 62.05% in groups of high concentration for 7 days (H7), low concentration for 21 days (L21) and high concentration for 21 days (H21), respectively. Compared to the control group, the diversity of

isolated *Aeromonas* spp. was decreased in the treatment groups and the minimal inhibitory concentration (MIC) of resistant isolates was enhanced from 32 to 256  $\mu\text{g mL}^{-1}$  with the treatment of tetracycline in time- and dose-dependent manners. Furthermore, the abundance of most genes was increased in treatment groups and efflux genes mainly responded to the stress of tetracycline with an average level of  $1.0 \times 10^{-2}$ . After treatment with tetracycline, the predominant species were changed both at phylum and genus levels. The present study explored the impact of tetracycline on gut microbiota of goldfish at environmentally realistic concentrations for the first time and our findings will provide a reference for characterizing the microbiome of fish in the natural environment.

## APPELS A PROJET

### Appel à projets Transnational Conjoint 2020 Aquatic Pollutants sur les risques liés aux polluants et pathogènes présents dans l'eau pour la santé humaine et l'environnement

Les Initiatives de Programmation conjointe dédiées à l'eau (Water JPI), à l'océan (JPI Oceans) et à la résistance antimicrobienne (JPI AMR) ont le plaisir de vous présenter le premier appel conjoint pour le financement de projets de recherche et innovation transnationaux sur les risques pour la santé humaine et l'environnement liés à la présence de polluants et de pathogènes dans l'eau.

Cet appel commun, qui sera ouvert dans le cadre de l'ERA-NET Cofund AquaticPollutants, vise plus particulièrement à soutenir des projets de recherche et d'innovation qui établissent des approches intégrées, transdisciplinaires et intersectorielles dans les domaines liés aux contaminants émergents, aux agents pathogènes et à la résistance aux antimicrobiens dans les milieux aquatiques. Le cycle de l'eau dans son ensemble, depuis la source aux bassins fluviaux, aux estuaires et océans, doit être pris en

compte. Les micro-plastiques sont exclus de cet appel. [...]

[Accès au document](#)

### Antibiorésistance : comprendre, innover, agir

Suite au plan d'action mondial pour combattre la résistance aux antimicrobiens adopté par l'OMS en 2015 et suite à la publication en Novembre 2016 de la feuille de route interministérielle pour la maîtrise de l'antibiorésistance en France, le Gouvernement par l'entremise du Secrétariat Général pour l'Investissement a décidé de mettre en place un programme prioritaire de recherche (PPR) sur l'antibiorésistance doté de 40 M€ sur dix ans.

La France demeure un pays sur-consommateur d'antibiotiques et apparaît comme l'un des pays européens les plus touchés par la résistance aux antibiotiques. La multi-résistance aux antibiotiques est donc un problème majeur de santé publique dans notre pays. [...]

[Accès au document](#)

### Agriculture à bas niveau d'intrants : l'Agence de l'eau Seine-Normandie lance un appel à projets

Actu-environnement 06/02/20

L'agence de l'eau Seine-Normandie lance un appel à projets pour développer les filières agricoles à bas niveau d'intrants.

Il vise ainsi l'agriculture biologique, la production de chanvre, de luzerne et sainfoin, l'herbe et les prairies ainsi que la biomasse et le bocage énergie. Le budget accordé en 2020 sera de 4 millions d'euros pour un financement des actions jusqu'à 40 %.

Les conditions pour y accéder ? S'engager à atteindre, au bout de cinq ans, un objectif de 25 % des surfaces en production bas niveau d'intrants grâce au projet, dans les zones à enjeu pour l'agence de l'eau. Les territoires visés en priorités sont les aires d'alimentation de captages, les zones humides ou littorales, les

zones soumises à érosion ou ruissellement des sols.

Deux sessions de candidature : les dossiers devront être transmis à la direction territoriale de l'agence de l'eau Seine-Normandie soit avant le 31 mars 2020, soit avant le 30 juin 2020.

[Accès au document](#)

## REGLEMENTATION

### Distances de sécurité pour les traitements phyto-pharmaceutiques à proximité des habitations

La France s'est dotée au 1er janvier 2020 de nouvelles mesures pour la protection des populations riveraines des zones de traitement par les produits phytopharmaceutiques. Sur la base des recommandations de l'Anses, des distances de sécurité ont été instaurées entre les zones traitées et les bâtiments habités par l'[arrêté du 27 décembre 2019 relatif aux mesures de protection des personnes lors de l'utilisation de produits phytopharmaceutiques](#).

Certaines de ces distances peuvent être adaptées lorsque le traitement est effectué dans le cadre d'une charte d'engagement de l'utilisateur conformément aux modalités du [décret n° 2019-1500 du 27 décembre 2019 relatif aux mesures de protection des personnes lors de l'utilisation de produits phytopharmaceutiques à proximité des zones d'habitation](#). [...]

[Accès au document](#)

### Drinking water in the EU: better quality and access

Europarl 19/02/20

The environment committee has backed new rules to further improve the quality and access to drinking water for everyone and ensure plastic waste from water bottles is reduced.

Most people in the EU have good access to high quality drinking water. According to a [report by](#)

[the European Environment Agency \(2016\)](#), more than 98.5% of tests carried out on drinking water samples between 2011 and 2013, met EU standards.

The EU Drinking Water Directive sets minimum quality standards for water intended for human consumption (drinking, cooking, other domestic purposes), in order to protect us from contamination.

On 18 February 2020, the environment and public health committee approved a provisional agreement reached between Parliament and the Council in December 2019 on an update of the rules to increase consumer confidence and the use of tap water for drinking. [...]

[Accès au document](#)

### Zones de non traitement (ZNT) : comprendre l'application du dispositif

Depuis le 1er janvier 2020, des distances minimales de traitement à proximité des habitations sont instaurées en fonction des cultures et des matériels utilisés. Les ministères de la Transition écologique, de la Santé, de l'Économie et de l'Agriculture ont communiqué aux préfets une instruction visant à préciser les conditions de déploiement du dispositif.

Objectif : privilégier, dans les premiers mois, la pédagogie et l'appropriation du contenu des dispositions réglementaires, tant par les agriculteurs que par les riverains, et favoriser le déploiement des chartes départementales.

Pour tout comprendre de la mise en application de ce dispositif, consultez les réponses aux questions ci-dessous :

#### Définitions

1. À qui s'appliquent les distances de sécurité ?
2. Qu'est-ce qu'une distance de sécurité au sens de l'arrêté du 27 décembre 2019 ?
3. Qu'est-ce qu'une culture emblavée au titre d'un cycle cultural ?
4. Peut-il y avoir plusieurs chartes dans le même département ?
5. Que recouvre la notion de concertation ?
6. Quelles sont les modalités de la concertation sur le projet de charte ?

7. Que recouvre la notion d'information ?
8. Quelles sont les « modalités d'information préalable, y compris des délais de prévenance des résidents » qui peuvent figurer dans les chartes ?
9. Quelles sont les distances de sécurité qui doivent figurer dans les chartes ?
10. Comment les chartes sont-elles évaluées et approuvées ?
11. Comment les résidents peuvent-ils avoir connaissance des chartes du département ?
12. Quelles sont les obligations de l'utilisateur de produit phytopharmaceutique pour réaliser un traitement à proximité d'un bâtiment habité ?
13. Quels sont les lieux à protéger par les distances de sécurité ? [...]

[Accès au document](#)

## Groundwater protection: first voluntary initiative to develop a pollutant watch list

Over the past two decades, concern has grown globally about the occurrence of anthropogenic organic contaminants in the environment, such as substances used in pharmaceuticals, food production and manufacturing. Many of these compounds are not sufficiently monitored or regulated in groundwater – a critical water resource in Europe. A recent paper proposes an approach to developing the first voluntary Groundwater Watch List (GWWL) : an initiative with which to identify, monitor, and characterise substances that have the greatest potential to pollute this water resource.

[Accès au document](#)

## AVIS / EXPERTISES / NORMES

### Glyphosate : l'Anses fait le point sur les données de surveillance

L'Anses publie ce jour une synthèse des données de surveillance relatives à la substance

glyphosate et dresse un état des connaissances disponibles en France concernant sa présence dans les eaux, les aliments ainsi que les niveaux d'imprégnation chez l'Homme.

Dans le cadre de son dispositif de phytopharmacovigilance pour détecter d'éventuels effets indésirables des produits phytosanitaires, l'Anses collecte un ensemble de données de surveillance relatives à la présence de résidus de substances dans les milieux, les expositions et les impacts sur la santé humaine et les écosystèmes. Ces informations sont résumées dans des fiches de synthèse « phytopharmacovigilance » par substance, afin d'être utiles à tous les acteurs notamment les services de contrôle et les administrations concernées. [...]

[Accès au document](#)

### L'Anses annonce le retrait de 36 produits à base de glyphosate

ANSES 28/02/20

Suite à la réapprobation pour cinq ans de la substance active par l'Union européenne en 2017, l'Anses procède au réexamen des autorisations de mise sur le marché des produits à base de glyphosate commercialisés en France et a lancé une évaluation comparative avec les alternatives disponibles. Sans attendre la fin du processus en cours, l'Agence a notifié le retrait des autorisations de 36 produits à base de glyphosate et le refus d'autoriser 4 nouveaux produits, les données fournies par les industriels ne permettant pas de statuer sur leur éventuelle génotoxicité. Ces produits représentaient en 2018 près des trois quarts des tonnages de produits à base de glyphosate vendus en France, pour des usages agricoles et non agricoles. [...]

[Accès au document](#)



## Outcome of the Public Consultation on the existing Guidance on the risk assessment for birds and mammals



EFSA was tasked by the European Commission to update the Guidance Document on the risk assessment for Birds and Mammals. An open consultation on the existing EFSA Guidance Document was held for identifying areas which need update, revision and/or correction in the current approaches and risk assessment. A total of 410 comments were received by different stakeholders.

[Accès au document](#)

## Human risk assessment of multiple chemicals using component-based approaches: A horizontal perspective



This technical report implements the EFSA MIXTOX guidance document for human risk assessment of combined exposure to multiple chemicals (i.e. regulated compounds and contaminants) using component-based

approaches. A low tier risk assessment methodology for regulated compounds and contaminants with non-cancer effects, is described using available harmonised methods, tools and data sources. [...]

[Accès au document](#)

## Animal Health Risk assessment of multiple chemicals in essential oils for farm animals



This technical report implements the EFSA MIXTOX guidance document for animal health risk assessment of combined exposure to multiple chemicals in essential oils using whole mixture and component-based approaches (WMA and CBA). The harmonised step wise approaches from the MIXTOX guidance are applied to the problem formulation, exposure assessment, hazard assessment and risk characterisation using conservative scenarios, available data and tools. Options for the refinement of the CBA are proposed for the exposure assessment and hazard assessment (toxicity and toxicokinetic data and models) steps as well as for the application of risk characterisation methods. [...]

[Accès au document](#)

## Préfiguration de l'application du dispositif de certificats d'économie de produits phytopharmaceutiques (CEPP) aux Outre-mer

Le dispositif des certificats d'économie de produits phytosanitaires (CEPP) expérimenté en

métropole depuis 2016 destiné à favoriser la réduction de l'utilisation de ces produits, repose sur des actions standardisées estimées, par une commission spécialisée d'experts, en unités de compte : nombre de doses unités (NODU). À un NODU économisé correspond globalement un CEPP. Si dans le dispositif expérimental, tous les acteurs de la sphère agricole sont fondés à soumettre des fiches actions, ce sont aux distributeurs de produits phyto-pharmaceutiques qualifiés d'«obligés» du dispositif que sont fixés, au terme d'une période de cinq ans donnée, des objectifs de diffusion de ces actions. Leur réalisation permet aux obligés d'obtenir des CEPP acquis soit directement via les actions qu'ils mettent en œuvre directement soit indirectement auprès des acteurs non distributeurs du dispositif qualifiés d'«éligibles». La non atteinte des objectifs en fin de période se traduit par une sanction financière à l'encontre des « obligés ». La loi EGALIM du 30 octobre 2018 a prévu la pérennisation du dispositif CEPP avant la fin de la période expérimentale en 2021, en l'étendant aux Outre-mer. Le nouveau dispositif étend la notion d'«obligés », supprime celle d' « éligibles » et modifie le régime de sanctions en cas de non-respect des obligations. Les particularités de la production agricole Outre-mer font que, voisine de 335 tonnes en 2017, la consommation globale de produits phytopharmaceutiques peut apparaître modeste au regard de la consommation métropolitaine d'environ 73 000 tonnes, rapportée à l'unité de surface agricole ; mais elle place certains départements, comme la Réunion, dans le trio de tête des plus gros consommateurs français d'herbicides. [...] Auteurs : Patrick Lavarde, CGEDD ; Carol Buy, Henri-Luc Thibault, CGAER

[Accès au document](#)

## REACH et la maîtrise du risque chimique : un bilan positif, un outil à améliorer

La maîtrise des risques liés aux substances et mélanges chimiques constitue un enjeu majeur de santé publique et d'environnement, pour les entreprises comme pour les particuliers.

Après avoir été négocié entre 2001 et 2007, le règlement européen REACH, acronyme anglais qui signifie «Enregistrement, évaluation, autorisation et restriction des substances

chimiques », est entré en vigueur le 1er juin 2007 pour répondre à cette attente.

REACH a institué un renversement de la charge de la preuve, en obligeant les entreprises, qu'elles soient productrices, importatrices ou utilisatrices d'une substance, à déposer un dossier d'enregistrement pour chaque substance à l'Agence européenne des produits chimiques.

Plus de 10 ans après, dans quelle mesure a-t-il atteint ses objectifs ? A partir d'une analyse centrée sur la gouvernance, le CESE analyse les forces et les axes de progrès du dispositif REACH.

[https://www.lecese.fr/sites/default/files/pdf/Avi/s/2020/2020\\_02\\_REACH.pdf](https://www.lecese.fr/sites/default/files/pdf/Avi/s/2020/2020_02_REACH.pdf)

[Accès au document](#)

## PUBLICATIONS DU RESEAU ECOTOX

### *In Situ Reproductive Bioassay with Caged *Gammarus fossarum* (Crustacea): Part 1- Gauging the Confounding Influence of Temperature and Water Hardness*

**Authors:** Chaumot A, Coulaud R, Adam O, Queau H, Lopes C, Geffard O

**Source:** ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY 00:1-11, 2020, DOI: 10.1002/etc.4655

**Abstract:** Monitoring the adverse effects of environmental contaminants on the reproduction of invertebrate species in the field remains a challenge in aquatic ecotoxicology. To meet the need for reliable tools for in situ toxicity assessment, we present the first part of a methodological study of the in situ implementation of a reproductive bioassay in *Gammarus* previously developed for screening the toxicity of chemical compounds during laboratory exposure. To ensure the correct interpretation of the modulation of reproductive markers (molting, fecundity, follicle growth, and embryonic development) in uncontrolled environmental conditions, we experimentally assessed and statistically modeled the variability

in the female reproductive cycle during laboratory exposure under several temperature and water hardness conditions. Whereas water hardness did not influence the reproductive cycle, the significant accelerating effect of temperature on the dynamics of molting and marsupial development was finely modeled, by detailing the influence of temperature on the probability of transition between all molt and embryonic stages along the female cycle. In addition, no effect of temperature or water hardness was detected on the number of oocytes and embryos carried by females. Furthermore, the finding that the relative durations of the first 4 molt and embryonic stages are constant whatever the temperature makes it possible to predict the molting dynamics in fluctuating temperature conditions. Because this could allow us to take into account the confounding influence of temperature on the measurement of reproductive markers, the implications of these findings for an optimal in situ implementation of the reproductive bioassay with *G. fossarum* are discussed. The relevance of this modeling approach during in situ implementation is tested in a companion study.

## Assessment of graphene oxide ecotoxicity at several trophic levels using aquatic microcosms

**Authors:** Evariste L, Mottier A, Lagier L, Cadarsi S, Barret M, Sarrieu C, Soula B, Mouchet F, Flahaut E, Pinelli E, Gauthier L

**Source:** CARBON 156:261-271, 2020, DOI: 10.1016/j.carbon.2019.09.051

**Abstract:** Extensive development of new applications using graphene based materials such as graphene oxide (GO) increases its potential release and occurrence into aquatic environments, raising the question of its biological and ecological risks. As standardized single-species-based assays fail to highlight toxicological pathways implying interactions between organisms, the use of micro/mesocosms appears as a good solution to fill the lack of environmental realism inherent to these tests. In this work, experiments were achieved using microcosm systems to expose a reconstituted food chain to GO at environmentally-relevant concentrations (0.05 and 0.1 mg L<sup>-1</sup>). The

trophic chain was composed of a consortium of algae and bacteria as primary producers, chironomid larvae as primary consumers and decomposers while larvae of the amphibian *Pleurodeles waltii* constituted the secondary consumers. Monitoring of multiple ecotoxicological and ecological endpoints allowed to observe changes in bacterial communities while no toxic effects were noticed in chironomids. However, chironomids feeding behaviour changed as a consequence of GO contamination, leading to an increase in leaf litter consumption. Genotoxic effects were noticed in *Pleurodeles* larvae. This study highlights the importance of using such experimental systems to better encompass the ecotoxic potential of GO through the determination of toxicological routes and consequences on ecosystem's functioning. (C) 2019 Elsevier Ltd. All rights reserved.

## Critical review of the role of PPE in the prevention of risks related to agricultural pesticide use

**Authors:** Garrigou A, Laurent C, Berthet A, Colosio C, Jas N, Daubas-Letourneux V, Jackson JM, Jouzel JN, Samuel O, Baldi I, Lebailly P, Galey L, Goutille F, Judon N

**Source:** SAFETY SCIENCE 123:104527, 2020, DOI: 10.1016/j.ssci.2019.104527

**Abstract:** Personal protection equipment (PPE) holds a privileged position in safety interventions in many countries, despite the fact that they should only be used as a last resort. This is even more paradoxical because many concerns have arisen as to their actual effectiveness under working conditions and their ability to provide the protection attributed to them by certain occupational safety strategies and marketing authorisation procedures. Are these concerns justified? This article is intended to provide an update on what we know of the issue based on a critical analysis of the literature to date.

Analysis focuses on the assessment of the effectiveness of coveralls used to protect from plant protection products in OECD countries. All forms of assessment were retained: discussion of the observed effectiveness of PPE in relation to the underlying assumptions of marketing



authorisation procedures, laboratory tests of equipment, practical field tests in which PPE-wearing practices were controlled and uncontrolled, analyses of the efficiency of preventive instructions based on wearing such coveralls.

Findings show that recommending the use of PPE is key to the granting of marketing authorisation. Some dangerous products only get marketing authorisation because it is assumed that wearing PPE will considerably limit exposure. They would be banned if it were not for this assumption of protection. However the actual effectiveness of PPE in working conditions may be over-estimated. In addition many factors (cost, availability, thermic and mechanical discomfort) may make instructions to wear PPE inapplicable. Advising the use of PPE does not always mean effective protection.

## Single and combined effects of insecticides on multi-level biomarkers in the non-target amphipod *Gammarus fossarum* exposed to environmentally realistic levels

**Authors:** Lebrun JD, De Jesus K, Rouillac L, Ravelli M, Guenne A, Tournebize J

**Source:** AQUATIC TOXICOLOGY 218:105357, 2020, DOI: 10.1016/j.aquatox.2019.105357

**Abstract:** Aquatic media are ultimate recipients of various contaminants including pesticides pervasively applied in agrosystems. Characterizing the ecotoxicity of pesticides and their mixtures to aquatic wildlife at field-realistic levels is thus crucial for environmental risk assessment. This study aims at assessing the effects of two current-use insecticides, imidacloprid and chlorpyrifos, on *Gammarus fossarum* using multi-level biomarkers. In microcosms, gammarids were exposed for 72 h to insecticides tested individually or in mixture at 0.01, 0.1 and 1  $\mu\text{g/L}$  of each chemical. Multi-metric responses were assessed at the individual level (behavioural traits: locomotion, respiration and amplexus formation) and the cellular level (enzymes involved in growth, moulting, digestion and cell stress). The results showed insecticide-

elicited behavioural and biochemical responses from the lowest concentration of 0.01  $\mu\text{g/L}$ . Overall, single exposures stimulated behavioural traits and inhibited enzymatic activities, highlighting subtle impacts at different organizational levels but these were not dose related. For binary mixtures, antagonistic effects (i.e. less-than-additive) on biomarkers were mainly observed when compared with single exposures. Multi-variable analyses indicated the complementarity of behavioural and biochemical biomarkers in identifying sublethal biological alterations and dose-dependent multiple action sites of insecticides. Besides, the mortality observed only for the mixture at 1  $\mu\text{g/L}$  demonstrated a high lethal potential of insecticides in a simple binary combination. To conclude, this study demonstrates disturbances in individual performances and cellular impairments occurring at environmentally realistic exposure levels in a non-target wild species. Since the sublethal effects, such as those identified with this multi-biomarker approach, could lead to long-term alterations in population dynamics of agricultural areas, they constitute promising early endpoints for risk assessment of insecticides.

## Advances and limits of two model species for ecotoxicological assessment of carbamazepine, two by-products and their mixture at environmental level in freshwater

**Authors:** Desbiolles F, Moreau X, de Jong L, Malleret L, Grandet-Marchant Q, Wong-Wah-Chung P, Laffont-Schwob I

**Source:** WATER RESEARCH 169:115267, 2020, DOI: 10.1016/j.watres.2019.115267

**Abstract:** In order to evaluate the environmental impacts associated with the presence of low-level of pharmaceuticals in waters, chronic ecotoxicity of carbamazepine (CBZ), oxcarbazepine (OxCBZ) and acridine 9-carboxylic acid (9-CAA) and their mixture was investigated using two species from different trophic levels. Innovative approaches were developed by monitoring: (i) phytometabolites in the



duckweed *Lemna minor* L and, (ii) alterations at the population, cellular and molecular levels on the cnidarian *Hydra circumcincta* Schulze 1914, to assess the effects of 14-day chronic exposure. On *H. circumcincta*, the approach was conducted at 19.5 degrees C, the optimal growth temperature, and at 23 degrees C, to simulate global warming impact.

In *L. minor*, results showed alterations of the nitrogen balance and the chlorophyll indices for OxCBZ and 9-CAA separately at environmental concentrations and for the mixture of the three studied products. However, phenolic compound index deeply varied depending on pharmaceuticals and time of exposure with no specific trend. In *H. circumcincta*, effects on morphology, reproduction and lipid peroxidation were observed at low level of CBZ. OxCBZ impacted the total antioxidant capacity of *H. circumcincta*, whereas exposure to 9-CAA affected all parameters, except the reproduction rate. Finally, 14-day exposure to the mixture of the three products also slowed the reproduction rate and altered the morphology of this cnidarian. Higher damages were detected when experiments were conducted at a temperature 3.5 degrees C above the optimum for *Hydra* growth, suggesting the relevance of taking into account possible ecotoxicological consequences of global warming. Our results confirmed the necessity of selecting sensitive organisms at different trophic levels to better assess ecotoxicity of pharmaceuticals and their mixture, especially at environmental levels and facing global changes. (C) 2019 Elsevier Ltd. All rights reserved.

## Effects of tritiated water on locomotion of zebrafish larvae: a new insight in tritium toxic effects on a vertebrate model species

**Authors:** Arcanjo C, Adam-Guillermin C, El Houdigui SM, Loro G, Della-Vedova C, Cavalie I, Camilleri V, Floriani M, Gagnaire B

**Source:** AQUATIC TOXICOLOGY 219:105384, 2020, DOI: 10.1016/j.aquatox.2019.105384

**Abstract:** Tritium (H-3), a radioactive isotope of hydrogen, is ubiquitously present in the environment. In a previous study, we highlighted

a mis-regulation of genes involved in muscle contraction, eye transparency and response to DNA damages after exposure of zebrafish embryo-larvae from 3 hpf to 96 hpf at 0.4 and 4 mGy/h of tritiated water (HTO). The present study aimed to link this gene mis-regulation to responses observed at higher biological levels. Analyses on spontaneous tail movement, locomotor activity and heart rate were performed. Histological sections of eyes were made to evaluate the impact of HTO on eye transparency and whole embryo immunostainings were realized to assess DNA double strand breaks repair using gamma-H2AX foci. We found a decrease of basal velocity as well as a decrease of response in 96 hpf larvae exposed at 0.4 mGy/h after a tactile stimulus as compared to controls. Histological sections of larvae eyes performed after the exposure to 4 mGy/h did not show obvious differences in lens transparency or retinal development between contaminated and control organisms. Gamma-H2AX foci detection revealed no differences in the number of foci between contaminated organisms and controls, for both dose rates. Overall, results highlighted more detrimental effects of HTO exposure on locomotor behavior in 96 hpf larvae exposed at the lowest dose rate. Those results could be linked to mis-regulation of genes involved in muscle contraction found in a previous study at the same dose rate. It appears that not all effects found at the molecular scale were confirmed using higher biological scales. These results could be due to a delay between gene expression modulation and the onset of physiological disruption or homeostatic mechanisms to deal with tritium effects. However, crossing data from different scales highlighted new pathways to explore, i.e. neurotoxic pathways, for better understanding HTO effects on organisms.

## Light and temperature influence on diuron bioaccumulation and toxicity in biofilms

**Authors:** Chaumet B, Mazzella N, Neury-Ormanni J, Morin S

**Source:** ECOTOXICOLOGY, Early Access, 2020, DOI: 10.1007/s10646-020-02166-8

**Abstract:** Variations of temperature and photoperiod throughout different seasons can affect aquatic communities such as biofilms. Biofilms, generally present at the base of trophic chains in freshwaters, are also subject to organic contamination, and are especially affected by herbicides. Many studies have investigated the effect and interactions of herbicides and environmental factors on biofilms, but never with a toxicokinetic point of view. The objective of this study was to assess structural and functional changes in biofilms exposed to diuron, and to link them with contaminant accumulation, under the influence of temperature and light variations. To this aim, biofilms were exposed to all possible combinations of three concentrations (0, 5 and 50  $\mu\text{g L}^{-1}$ ) of diuron, two temperatures (10 and 26 degrees C), and two light/dark photoperiods (16/8, 10/14), for durations of 0, 1 and 3 days. Diuron accumulation in biofilms was quantified and structural descriptors (protein and polysaccharide contents, dry weight) and functional endpoints (photosynthetic and enzymatic activities) were analyzed. The results obtained mainly highlighted the influence of temperature on diuron bioaccumulation and the associated toxic impact on biofilms. Bioaccumulation in biofilms exposed during three days at 10 degrees C, at the highest diuron concentration, was in average 1.4 times higher than bioaccumulation on biofilms exposed to 26 degrees C. Accordingly, the photosynthetic yield was more inhibited at lower than at higher temperatures. Temperature was also the highest impacting factor for metabolism regulation ; for example, at 26 degrees C after three days of exposure, polysaccharide production was boosted under both photoperiods tested.

## A systems biology approach reveals neuronal and muscle developmental defects after chronic exposure to ionising radiation in zebrafish

**Authors:** El Houdigui SM, Adam-Guillermin C., Loro G, Arcanjo C, Frelon S, Floriani M, Dubourg N, Baudalet E, Audebert S, Camoin L, Armant O

**Source:** SCIENTIFIC REPORTS 9:20241, 2019, DOI: 10.1038/s41598-019-56590-w

**Abstract:** Contamination of the environment after the Chernobyl and Fukushima Daiichi nuclear power plant (NPP) disasters led to the exposure of a large number of humans and wild animals to radioactive substances. However, the sub-lethal consequences induced by these absorbed radiological doses remain understudied and the long-term biological impacts largely unknown. We assessed the biological effects of chronic exposure to ionizing radiation (IR) on embryonic development by exposing zebrafish embryo from fertilization and up to 120 hours post-fertilization (hpf) at dose rates of 0.5 mGy/h, 5 mGy/h and 50 mGy/h, thereby encompassing the field of low dose rates defined at 6 mGy/h. Chronic exposure to IR altered larval behaviour in a light-dark locomotor test and affected cardiac activity at a dose rate as low as 0.5 mGy/h. The multi-omics analysis of transcriptome, proteome and transcription factor binding sites in the promoters of the deregulated genes, collectively points towards perturbations of neurogenesis, muscle development, and retinoic acid (RA) signaling after chronic exposure to IR. Whole-mount RNA in situ hybridization confirmed the impaired expression of the transcription factors *her4.4* in the central nervous system and *myogenin* in the developing muscles of exposed embryos. At the organ level, the assessment of muscle histology by transmission electron microscopy (TEM) demonstrated myofibers disruption and altered neuromuscular junctions in exposed larvae at 5 mGy/h and 50 mGy/h. The integration of these multi-level data demonstrates that chronic exposure to low dose rates of IR has an impact on neuronal and muscle progenitor cells, that could lead to motility defects in free swimming larvae at 120 hpf. The mechanistic understanding of these effects allows us to propose a model where deregulation of RA signaling by chronic exposure to IR has pleiotropic effects on neurogenesis and muscle development.

## Editorial: New Challenges in Marine Pollution Monitoring

**Authors:** Bellas J., Hylland K., Burgeot T.

**Source:** FRONTIERS IN MARINE SCIENCE 6:820, 2020, DOI: 10.3389/fmars.2019.00820

**Edito:** There is abundant evidence that anthropogenic activities have polluted all compartments of the oceans, from the poles to

the tropics, by different physical, chemical, and biological stressors. Chemical pollution is particularly tackled here with focus on legacy pollutants and newly emerging man-made compounds (xenobiotics) or anthropogenic forcing in the increase of natural chemical substances. It has been estimated that more than 100,000 chemicals are currently on the market [ECHA (European Chemicals Agency), 2017], and thousands of new substances are being introduced every year due to industrialization, intensive agriculture, and urban development. This has led to a continuous flow of chemical products to the oceans that have the potential to alter the structure of ecosystems by causing changes in the biotic communities that constitute them...

## Towards a better understanding of the life cycle of the earthworm *Aporrectodea caliginosa*: New data and energy-based modelling

**Authors:** Bart S., Pelosi C., Pery A.R.R.

**Source:** PEDOBIOLOGIA 77:150592, 2019, DOI: 10.1016/j.pedobi.2019.150592

**Abstract:** Earthworms have a major role in soils and are used as biological indicators for ecological risk assessment. *Aporrectodea caliginosa* s.s. is one of the dominant earthworm species in agroecosystems and a good candidate for ecotoxicological testing. In order to improve knowledge on its life cycle, we performed growth and reproduction experiments. These data were used to calibrate an energy-based model that displayed good descriptions of *A. caliginosa* life cycle parameters under different feeding conditions (ad libitum, food limitations, or absence of food). Here we showed that the maintenance costs were negligible, resulting in a linear growth in length when food was provided ad libitum (i.e., without any restriction). We also found that the switch from the juvenile to adult stage depended on the individual weight, and that the threshold weight was not influenced by the amount of provided food (horse dung). Moreover, we provided evidence that once adults, if they were not isolated from other individuals, the energy was entirely allocated to

cocoon production, which only depended on the available food amount, without any effect of the earthworm density. Finally, we discussed the usefulness of our energy-based model to support the set up and analyses of ecotoxicological tests and experiments.

## A Bayesian network approach for the identification of relationships between drivers of chlordecone bioaccumulation in plants

**Authors:** Liber Y., Cornet D., Tournebize R., Feidt C., Mahieu M., Laurent F., Bedell J.P.

**Source:** ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH, Early Access 2020, DOI: 10.1007/s11356-019-07449-0

**Abstract:** Plants were sampled from four different types of chlordecone-contaminated land in Guadeloupe (West Indies). The objective was to investigate the importance of biological and agri-environmental parameters in the ability of plants to bioaccumulate chlordecone. Among the plant traits studied, only the growth habit significantly affected chlordecone transfer, since prostrate plants concentrated more chlordecone than erect plants. In addition, intensification of land use has led to a significant increase in the amount of chlordecone absorbed by plants. The use of Bayesian networks uncovers some hypothesis and identifies paths for reflection and possible studies to identify and quantify relationships that explain our data.

## Imidacloprid-induced hormesis effects on demographic traits of the melon aphid, *Aphis gossypii*

**Authors:** Ullah F., Gul H.N., Desneux N., Gao X.W., Song D.L.

**Source:** ENTOMOLOGIA GENERALIS 39(3-4):325-337, 2019, DOI: 10.1127/entomologia/2019/0892

**Abstract:** Imidacloprid is a largely commercialized neonicotinoid insecticide, and it is used effectively against a variety of sap-

sucking insect pests including melon aphid, *Aphis gossypii*. In this study, the inhibitory and stimulatory effects of low and sublethal concentrations of imidacloprid were investigated on two successive generations of *A. gossypii*. The initial bioassay results showed that imidacloprid exhibited high toxicity against adult melon aphids with a LC50 of 0.42 mg/l after 72 h exposure. The low lethal (LC15) and sublethal (LC5) concentrations of imidacloprid reduced adult longevity and fecundity in exposed aphids (F-0). By contrast, hormesis effects were observed on the biological traits of progeny generation (F-1) exposed to both concentrations of imidacloprid. Substantial increases were noted for the adult longevity and fecundity of F-1 aphids. Consequently, the demographic indexes such as intrinsic rate of increase ( $r$ ) and finite rate of increase ( $\lambda$ ) were enhanced by both concentrations whereas the net reproductive rate ( $R_0$ ) and gross reproduction rate (GRR) were increased only by the LC15 of imidacloprid. Nonetheless, the mean generation time ( $T$ ) of F-1 *A. gossypii* was extended by the LC5 and LC15 of imidacloprid. These results indicated that low or sublethal concentrations of imidacloprid, while negatively affecting biological traits of directly exposed aphids, could induce hormesis effects in the progeny of exposed individuals in the aphid *A. gossypii*. Therefore, the occurrence of potential hormesis should be taken into consideration when using imidacloprid against aphid pests.

## Neonicotinoid-induced mortality risk for bees foraging on oilseed rape nectar persists despite EU moratorium

**Authors:** Wintermantel D., Odoux J.F., Decourtye A., Henry M., Allier F., Bretagnolle V.,

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT 704:135400, 2020, DOI: 10.1016/j.scitotenv.2019.135400

**Abstract:** The implication of neonicotinoids in bee declines led in 2013 to an EU moratorium on three neonicotinoids in bee-attractive crops. However, neonicotinoids are frequently detected in wild flowers or untreated crops suggesting that neonicotinoids applied to cereals can spread

into the environment and harm bees. Therefore, we quantified neonicotinoid residues in nectar from winter-sown oilseed rape in western France collected within the five years under the EU moratorium. We detected all three restricted neonicotinoids. Imidacloprid was detected in all years with no clear declining trend but a strong inter- and intraannual variation and maximum concentrations exceeding reported concentrations in treated crops. No relation to non-organic winter-sown cereals was identified even though these were the only crops treated with imidacloprid, but residue levels depended on soil type and increased with rainfall. Simulating acute and chronic mortality suggests a considerable risk for nectar foraging bees. We conclude that persistent imidacloprid soil residues diffuse on a large scale in the environment and substantially contaminate a major mass-flowering crop. Despite the limitations of case-studies and risk simulations, our findings provide additional support to the recent extension of the moratorium to a permanent ban in all outdoor crops. (C) 2019 Elsevier B.V. All rights reserved.

## Elucidating the fate of perfluorooctanoate sulfonate using a rainbow trout (*Oncorhynchus mykiss*) physiologically-based toxicokinetic model

**Authors:** Vidal A., Babut M., Garric J., Beaudouin R.

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT 691:1297-1309, 2019, DOI: 10.1016/j.scitotenv.2019.07.105

**Abstract:** Per- and poly-fluorinated substances (PFAS) are widely found in freshwater ecosystems because of their resistance to degradation. Among them, several long-chain perfluoroalkyl acids bioaccumulate in aquatic vertebrates, but our understanding of the mechanisms of absorption, distribution and elimination is still limited in fish. For this purpose, we developed a 10-compartment physiologically-based toxicokinetic (PBTK) model to elucidate perfluorooctane sulfonate (PFOS) kinetics in adult rainbow trout. This PBTK model included various physiological characteristics:





blood perfusion to each organ, plasmatic fraction, PFOS free fraction, and growth of individuals. The parameters were optimized using Bayesian inferences. First, only PFOS absorption by diet was considered in the model as well as its elimination by urine, bile and feces. Then two mechanistic hypotheses, assumed to govern PFOS toxicokinetics in fish, namely the enterohepatic cycle and the absorption and elimination through gills, were tested. Improvement of the model's fit to the data was studied in each organ by comparing predictions with observed data using relative error. The experimental data set was obtained from an exposure experiment, where adult rainbow trout were fed with a PFOS-spiked diet for 42 days, followed by a 35-day depuration period. In all cases, PFOS concentrations were accurately predicted in organs and feces by the model. The results of this PBTK model demonstrated that feces represented the major elimination route for PFOS while urine was a minor route. Also, PFOS branchial uptake can be substantial despite low concentrations of the compound in water, and elimination through gills should not be neglected. Finally, the enterohepatic cycle is likely to play a minor role in PFOS toxicokinetics. Overall, this PBTK model accurately described PFOS distribution in rainbow trout and provides information on the relative contribution of absorption and elimination pathways. (c) 2019 Elsevier B.V. All rights reserved.

## Towards simple tools to assess functional effects of contaminants on natural microbial and invertebrate sediment communities

**Authors:** Pesce S., Campiche S., Casado-Martinez C., Ahmed A.M., Bonnineau C., Dabrin A., Lyautey E., Ferrari B.J.D.

**Source:** ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH, eraly access, 2020, DOI: 10.1007/s11356-019-07331-z

**Abstract:** Surface sediments can accumulate contaminants that affect microorganisms and invertebrates and disturb benthic ecological functions. However, effects of contaminants on ecological functions supported by sediment

communities are understudied. Here, we tested the relevance of two simple tools to assess the ecotoxicological effects of metal contamination on natural sediment communities using particulate organic matter breakdown and decomposition as a functional descriptor. To this aim, we performed a 21-day laboratory microcosm experiment to assess the individual and combined effects of Cu and As (nominal concentration of 40 mg kg<sup>-1</sup> dw each) using the bait-lamina method (cellulose, bran flakes, and active coal in PVC strips) as well as artificial tablets (cellulose, bran flakes and active coal embedded in an agar matrix). Sediment toxicity was also evaluated using the standardized ostracod toxicity test. Both the bait-lamina and artificial tablet methods showed low effects of As on organic matter breakdown and decomposition but strong effects of Cu on this important ecological function. Both also showed that the presence of Cu and As in mixture in the sediment induced total inhibition of organic matter breakdown and decomposition. The ostracod toxicity test also showed high toxicity of Cu-spiked and Cu-plus-As-spiked sediments and low toxicity of As-spiked sediments. Besides confirming that artificial organic matter substrates are relevant and useful for assessing the functional effects of contaminants on sediment micro- and macro-organism communities, these results suggest that the proposed methods offer promising perspectives for developing tools for use in assessing functional ecotoxicology in the sediment compartment.

## Towards solving a scientific controversy - The effects of ionising radiation on the environment

**Authors:** Beresford N.A., Horemans N., Copplestone D., Raines K.E., Orizaola G., Wood M.D., Laanen P., Whitehead H.C., Burrows J.E., Tinsley M.G., Smith J.T., Bonzom J.M., Gagnaire B., Adam-Guillermin C., Gashchak S., Jha A.N., de Menezes A., Willey N., Spurgeon D.

**Source:** JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 211:106033, 2020, DOI: 10.1016/j.jenvrad.2019.106033

**Edito:** Human use of radioactivity is increasing in fields such as nuclear power generation and



nuclear medicine. Nuclear power continues to be a part of many countries' energy portfolios and may increase dramatically in some Asian countries and Russia, with up to 300 new reactors are currently proposed; other countries without existing nuclear power programmes are beginning to develop them (e.g. some African nations and Persian Gulf states). Worldwide there are c.450 operating nuclear power plants (NPPs) and 60 under construction (World Nuclear Association, 2019)...

## More than thirty years after the Chernobyl accident: What do we know about the effects of radiation on the environment?

**Authors:** Lecomte-Pradines C., Adam-Guillermin C., Gashchak S., Bradshaw C., Copplestone D., Beresford N.A.

**Source:** JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 211:106108, 2020, DOI: 10.1016/j.jenvrad.2019.106108

**Edito:** The year 2016 was the 30th anniversary of the world's worst nuclear accident at the Chernobyl nuclear power plant (Ukraine). To mark this anniversary, a workshop was held in Chernihiv (Ukraine) to discuss what we have learnt from studies of the effects of radiation on the environment (i.e. wildlife) in the Chernobyl Exclusion Zone (CEZ), and what questions remain...

## The importance of deriving adequate wildlife benchmark values to optimize radiological protection in various environmental exposure situations

**Authors:** Rea A., Garnier-Laplace J.

**Source:** JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 211:105902, 2020, DOI: 10.1016/j.jenvrad.2019.01.014

**Abstract:** The actions to be taken to demonstrate that the environment is adequately protected against the detrimental effects of ionising radiation, and if needed to protect it, must be commensurate with the overall level of risk to non-human biota. To judge the level of risk, the estimated dose rates absorbed by animals and plants need to be compared with dose criteria, a benchmark or reference value.

A variety of aspects will influence the final value of the derived benchmark, including: the aim of the application of the benchmark, the protection goals of the assessment, the data on radiation-induced biological effects considered, and the methodology used.

Benchmark values have been proposed by several international organizations (UNSCEAR, ICRP, IAEA), countries (USA, Canada) and research projects (ERICA, PROTECT), for different application purposes and protection goals and using a variety of methodologies.

This paper describes the aspects that need to be considered in the derivation of numerical benchmarks, the approaches used by different organizations and the benchmark values they have proposed for the radiation protection of the environment. The benchmark values proposed are compared with the dose-rates at which radiation-induced biological effects have been described in animals and plants.

## Barrage fishponds, a funnel effect for metal contaminants on headwater streams

**Authors:** Le Cor F., Slaby S., Gaillard J., Dauchy X., Feidt C., Banas D.

**Source:** ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH, Early Access, 2019, DOI: 10.1007/s11356-019-07195-3

**Abstract:** Fishponds are man-made shallow water bodies that are still little studied because of their small size. They represent high value ecosystems, both environmentally (biodiversity hotspot) and economically (fish production). They can have a high place on the hydrographic network, so their influence on water quality is of first importance for rivers and water bodies located downstream and monitored under the

Water Framework Directive. These small water bodies can be a source of contaminants during draining period or an efficient buffer for pesticides. We wanted to evaluate whether these ponds could also be a remediation tool against metals by following the annual evolution of upstream/downstream flows. Cadmium, copper, lead and zinc concentrations were quantified in the dissolved phase upstream and downstream of three ponds, each one having a specific agricultural environment (traditional or organic). Metal concentration was quantified in sediments and water. For the dissolved phase, the predictive non-effect concentration was often exceeded, suggesting an environmental risk. Results highlighted also greater quantity of metals at the downstream of the pond compared to the upstream, suggesting remobilization into the ponds or direct cross-sectional contributions from the watershed (e.g. runoff from crops) or even remobilization. Regarding sediments, minimal contamination was shown but a high mineralogical variability. No buffer effect of ponds, which could reduce the risk of acute or chronic toxicity, was detected.

## Calibration and field application of an innovative passive sampler for monitoring groundwater quality

**Authors:** Pinasseau L., Wiest L., Volatier L., Fones G.R., Mills G.A., Mermillod-Blondin F., Vulliet E.

**Source:** TALANTA 208:120307, 2020, DOI: 10.1016/j.talanta.2019.120307

**Abstract:** This study describes the development of a novel Empore (TM) disk-based passive sampler specially adapted to groundwater monitoring. The sampler was calibrated in the laboratory using conditions that corresponded to groundwater (i.e. matrix medium, water temperature, flow rate and water flow across the disks). The retention and elution performance for sixteen semi-polar and polar pollutants on the Empore (TM) disk (47 mm diameter, SDB-XC) was evaluated. Recoveries were similar to 80% for the majority of compounds. Sampler uptake kinetics were measured over fourteen days at three

concentrations (10, 100 and 500 ng L<sup>-1</sup>) and the sampling rate (R-S) calculated for four compounds. There was no influence of concentration of the test analyte on the uptake profile; with mean R-S varying between 0.018 +/- 0.007 L day<sup>(-1)</sup> and 0.047 +/- 0.001 L day<sup>(-1)</sup>. Passive samplers were deployed in twelve characterized groundwater wells near Lyon (France). Atrazine, atrazine-desethyl and diuron were the main pollutants found with a maximum time-weighted concentration of 61 +/- 3, 62 +/- 24 and 127 +/- 49 ng L<sup>-1</sup> respectively.

## Estimating radiological exposure of wildlife in the field

**Authors:** Beaugelin-Seiller K., Garnier-Laplace J., Beresford N.A.

**Source:** JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 211:105830, 2020, DOI: 10.1016/j.jenvrad.2018.10.006

**Abstract:** The assessment of the ecological impact due to radionuclides at contaminated sites requires estimation of the exposure of wildlife, in order to correlate radiation dose with known radiological effects. The robust interpretation of field data requires consideration of possible confounding effects (e.g., from the tsunami at Fukushima) and an accurate and relevant quantification of radiation doses to biota. Generally, in field studies the exposure of fauna and flora has often been characterised as measurements of the ambient dose rate or activity concentrations in some components of the environment. The use of such data does not allow the establishment of a robust dose-effect relationship for wildlife exposed to ionising radiation in the field. Effects of exposure to radioactivity depend on the total amount of energy deposited into exposed organisms, which is estimated by adding doses (or dose rates) for all radionuclides and exposure pathways.

Realistic dose estimation needs to reflect the entire story of the organisms of interest during their whole exposure period. The process of identifying and collecting all the related information should allow the "W" questions (Which organisms are exposed, Where, When and how) to be answered. Some parameters are well known to influence dose (rate): the organism life



stage, its ecological characteristics (e.g. habitat, behaviour), the source term properties (e.g. discharging facility, nature of radiation), etc. The closer the collated data are to the ideal data set, the more accurate and realistic the dose (rate) assessment will be. This means characterising each exposure pathway (internal and external), the activity concentration in each exposure source, the time each organism spends in a given place, as well as the associated dose. In this paper the process of data collation in view of dose reconstruction is illustrated for Japanese birds exposed to radioactive deposition following the Fukushima accident. With respect to the Chernobyl Exclusion Zone we will also consider variability under field conditions, availability of relevant datasets and options for better estimating internal and external doses received by wildlife.

## Inventing Prediction for Regulation: The Development of (Quantitative) Structure-Activity Relationships for the Assessment of Chemicals at the US Environmental Protection Agency

**Authors:** Boullier H., Demortain D., Zeeman M.

**Source:** SCIENCE AND TECHNOLOGY STUDIES 32(4):137-157, 2019, DOI: <https://doi.org/10.23987/sts.65062>

**Abstract:** In policies targeting environmental and health hazards, an effort is frequently made to anticipate and avert more or less probable adverse events. In this context, computerized models are often portrayed as superior knowledge tools, for their capacity to extrapolate from existing data and predict hazards. This paper looks at the historical development and use of such models in regulation, with the specific example of structure-activity relationships (SARs) in the regulation of new industrial chemicals at the US Environmental Protection Agency (EPA). It asks how evidential culture(s) in a regulatory organization change, in particular how new methods and forms of knowledge find their place alongside others to forge regulatory decisions. The development and application of, first, a

qualitative approach to structure-activity relationships, and then of quantitative models, show that the EPA had the necessary autonomy to imagine and adjust a method emerging in the research environment to respond to regulatory needs. This can be understood from a coproductionist perspective, if adjusted to take into account the bureaucratic knowledge that mediates the imagining and application of prediction in regulatory practice.

## Identification of new microbial functional standards for soil quality assessment

**Authors:** Thiele-Bruhn S, Schloter M, Wilke BM, Beaudette LA, Martin-Laurent F, Cheviron N, Mouglin C, Rombke J

**Source:** SOIL 6(1):17-34, 2020, DOI: 10.5194/soil-6-17-2020

**Abstract:** The activity of microorganisms in soil is important for a robust functioning of soil and related ecosystem services. Hence, there is a necessity to identify the composition, diversity, and function of the soil microbiome in order to determine its natural properties, functioning, and operating range as well as to assess ecotoxicological effects due to anthropogenic activities. Numerous microbiological methods currently exist in the literature and new, more advanced methods continue to be developed; however, only a limited number of these methods are standardised. Consequently, there is a need to identify the most promising non-standardised methods for assessing soil quality and to transform them into standards. In agreement with the "Ecosystem Service Approach", new methods should focus more on soil microbial functions, including nutrient cycling and greenhouse gas emission, pest control and plant growth promotion, carbon cycling and sequestration, as well as soil structure development and filter function. The few existing standardised methods available that focus on the function of the soil microbiome mostly include measurements, like basal respiration, enzyme activities, and biodegradation of organic matter, under well-defined conditions in the lab. This paper sets out to summarise and expand on recent discussions within the International Organization for



Standardization (ISO), Soil Quality - Biological Characterization sub-committee (ISO TC 190/SC 4), where a need was identified to develop scientifically sound methods which would best fulfil the practical needs of future users for assessing soil quality, going beyond the existing test systems. Of particular note is the current evolution of molecular methods in microbial ecology that use quantitative real-time PCR (qPCR) to produce a large number of new functional endpoints which are more sensitive as compared to "classical" methods. Quantitative PCR assesses the abundance of microbes that catalyse major transformation steps in nitrogen and phosphorus cycling, greenhouse gas emissions, chemical transformations including pesticide degradation, and plant growth promotion pathways based on the assessment of marker gene sequences that drive the related processes. In the assessment of soil quality methods, it was found that most methods focus on bacteria and related endpoints. Techniques to describe fungal communities as well as their functional traits are far less represented. As such, techniques to analyse fungal enzyme activities are proposed. Additionally, methods for the determination of microbial growth rates and efficiencies, including the use of glomalin as a biochemical marker for soil aggregation, are discussed. Furthermore, field methods indicative of carbon turnover, including the litter bag test and a modification to the tea bag test, are presented. However, it is obvious that with increasing developments in high throughput sequencing technologies and big data analyses, including metagenomics analysis, it will be possible to implement these technologies into the standardisation process for assessing the functions of the soil microbiome. Overall, it is suggested that endpoints should represent a potential function of soil microorganisms rather than actual activity levels, as the latter can largely be dependent on short-term variable soil properties such as pedoclimatic conditions, nutrient availability, and anthropogenic soil cultivation activities.

## Azadirachtin, a natural pesticide with multiple effects

**Authors:** Aribi N, Denis B, Kilani-Morakchi S, Joly D

**Source:** M S-MEDECINE SCIENCES 36(1):44-49, 2020, DOI: 10.1051/medsci/2019268

**Abstract:** There are many studies devoted to the negative impact of conventional pesticides that effectively control pests, but cause widespread environmental pollution. As a result, interest is growing in pesticides of a natural origin with a lower environmental impact. Among them, azadirachtin, sold under various formulations (neem oil, Neem-Azal, Bioneem, etc.), is still the most widely recommended molecule in agricultural ecosystems. Azadirachtin has also been used in traditional medicine for centuries, and studies published over the past few years have tended to support its therapeutic use. Yet the argument that azadirachtin is harmless to the environment has been offset by its notable collateral and controversial effects on non-target organisms. The present paper summarizes the work already done in this field.

## Tritiated Water Exposure in Zebrafish (*Danio rerio*): Effects on the Early-Life Stages

**Authors:** Gagnaire B, Arcanjo C, Cavalie I, Camilleri V, Simon O, Floriani M, Orjollet D, Adam-Guillermin C

**Source:** ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 2020, DOI: 10.1002/etc.4650

**Abstract:** Tritium, a radioactive isotope of hydrogen of natural and anthropogenic origin, is ubiquitously present in the environment. Effluents of nuclear centers of production are significant anthropogenic sources. With the upcoming project of thermonuclear fusion, tritium releases in the environment may increase. It is therefore important to characterize the ecological risk linked to tritium. The effects of tritiated water (HTO) were therefore studied in zebrafish larvae exposed for 10 d to different dose rates,  $1.1 \times 10(2)$ ,  $4.1 \times 10(2)$ , and  $3.8 \times 10(3)$   $\mu\text{Gy/h}$  for larvae corresponding, respectively, to a water contamination of  $10(4)$ ,  $10(5)$ , and  $10(6)$  Bq/mL of HTO. Those dose rates were higher than 10  $\mu\text{Gy/h}$ , which is the threshold recommended to start monitoring ecosystems where radiological contaminants are present. Mortality, embryolary development, immune toxicity,

genotoxicity, neurotoxicity, and alterations of tissues were investigated. The results showed that HTO exposure induced DNA damage and reactive oxygen species production and modulated the expression of genes involved in detoxification processes. Moreover, modifications of the muscular tissues (degradation of myofibrils at 4 d post fertilization and disorganization of mitochondria at later stages) were observed. The results differed with HTO dose rates and with developmental stages. These results will drive future research for the development of new HTO-sensitive biomarkers and will allow us to progress in the characterization of the modes of action of tritium in fish. Environ Toxicol Chem 2020;00:1-11. (c) 2019 SETAC

## ***In Situ* Reproductive Bioassay with Caged *Gammarus fossarum* (Crustacea): Part 2- Evaluating the Relevance of Using a Molt Cycle Temperature-Dependent Model as a Reference to Assess Toxicity in Freshwater Monitoring**

**Authors:** Lopes C, Chaumot A, Xuereb B, Coulaud R, Jubeaux G, Queau H, Francois A, Geffard O

**Source:** ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 2020, DOI: 10.1002/etc.4656

**Abstract:** Active biomonitoring approaches are now recognized as relevant for monitoring water contamination and toxicity. Nevertheless, due to the confounding influence of variable and uncontrolled environmental conditions such as temperature, biological markers measured on transplanted individuals to assess water quality are difficult to interpret. The purpose of the present study is to propose a methodology for adapting a laboratory test of chronic sublethal toxicity based on the molting cycle of *Gammarus fossarum* to in situ assays. To this end, we 1) adapted the molt cycle temperature-dependent model developed in Part 1 (Chaumot et al. 2020, this issue) to the fluctuating temperatures measured in the field; 2) assessed the predictive power of our approach as a "reference value"

from gammarids caged in 9 nonimpacted sites at different seasons; and 3) tested the relevance of our tool to interpret in situ reproductive bioassays from 5 upstream/downstream studies and a large-scale deployment in 12 sites. Our approach based on modeling the progress of gammarid molting cycle as a function of temperature appeared to be a relevant and robust tool for interpreting in situ observations in different environmental contexts in time and space. By avoiding using a "reference" or upstream situation as a baseline from which water quality could be assessed, this approach provides a real added value to water quality diagnosis in biomonitoring programs. Environ Toxicol Chem 2020;00:1-14. (c) 2019 SETAC

## **Metabolome response to anthropogenic contamination on microalgae: a review**

**Authors:** Gauthier L, Tison-Rosebery J, Morin S, Mazzella N

**Source:** METABOLOMICS 16(1):8, 2019, DOI: 10.1007/s11306-019-1628-9

**Abstract:** Background Microalgae play a key role in ecosystems and are widely used in ecological status assessment. Research focusing on such organisms is then well developed and essential. Anyway, approaches for a better comprehension of their metabolome's response towards anthropogenic stressors are only emerging. Aim of review This review presents the biochemical responses of various microalgae species towards several contaminants including metals and chemicals as pesticides or industrial compounds. We aim to provide a comprehensive and up-to-date overview of analytical approaches deciphering anthropogenic contaminants impact on microalgae metabolome dynamics, in order to bring out relevant biochemical markers that could be used for risk assessment. Key scientific concepts of review Studies to date on ecotoxicological metabolomics on microalgae are highly heterogeneous in both analytical techniques and resulting metabolite identification. There is a real need for studies using complementary approaches to determine biomarkers usable for ecological risk assessment.

## Bioaccessibility of metal(loid)s in soils to humans and their bioavailability to snails: A way to associate human health and ecotoxicological risk assessment?

**Authors:** Louzon M, Pelfrene A, Pauget B, Gimbert F, Morin-Crini N, Douay F, de Vaulfleur

**Source:** JOURNAL OF HAZARDOUS MATERIALS 384:121432, 2020, DOI: 10.1016/j.jhazmat.2019.121432

**Abstract:** Human health risk assessment (HHRA) and ecotoxicological risk assessment (ERA) of contaminated soils are frequently performed separately and based on total soil concentrations without considering the concepts of mobility, bioaccessibility and bioavailability. However, some chemical and biological assays rarely used in combination can be applied to more accurately assess the exposure of organisms to metal(loid)s and thus to better estimate the links between soil contamination and effects. For humans, the unified bioaccessibility method (UBM) assesses oral bioaccessibility, while for soil fauna such as land snails, the bioaccumulation test reflects the bioavailability of contaminants. The aim of this study is to explore the relationship between oral bioaccessibility and the bioavailability of arsenic, cadmium and lead in twenty-nine contaminated soils. The results show a modulation of bioaccumulation and bioaccessibility of metal(loid)s by soil physicochemical parameters (organic matter especially). For the three metal(loid)s studied, strong relationships were modelled between the UBM and snail tests ( $0.77 \leq r(\text{adj}) \leq 0.95$ ), depending on the parameters of the linear regressions (contaminant and phases of the UBM test). The original models proposed demonstrate the feasibility of linking bioaccessibility to humans and bioavailability to snails and the relevance of their association for an integrative risk assessment of contaminated soils.

## Influence of the properties of 7 micro-grain activated carbons on organic micropollutants removal from wastewater effluent

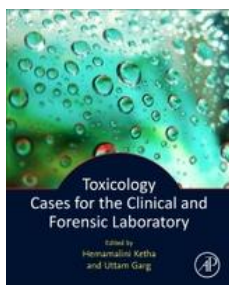
**Authors:** Guilloso R, Le Roux J, Mailler R, Morlay C, Vulliet E, Nauleau F, Rocher V, Gasperi

**Source:** CHEMOSPHERE 243:UNSP 125306, 2020, DOI: 10.1016/j.chemosphere.2019.125306

**Abstract:** Most studies dedicated to organic micropollutants (OMPs) removal from wastewater effluents by adsorption onto activated carbon (AC) only consider a few conventional AC properties. The link between OMPs removal and these properties is often missing, which limits the understanding of the adsorption process and the interpretation of the results. The chemical, physical and textural properties of seven newly commercialized micro-grain activated carbons ( $\mu$  GACs) were determined to assess their influence on the removal of 28 OMPs. Conventional batch tests with wastewater effluent showed that a high percentage of microporous volume (>65%) was detrimental for the removal of 10 OMPs, probably due to a higher blockage of micropores by dissolved organic matter (DOM). The removal of 5 OMPs was correlated with  $\mu$  GACs surface chemistry properties (i.e. charge) which were potentially modified by DOM adsorption or inorganic species, thus favoring the adsorption of positively-charged compounds. A combination of OMPs properties including their charge, hydrophobicity and minimal projection area could explain their removal. Correlations were found between the removal of several OMPs and UV254, suggesting that DOM and OMPs interacted with each other or followed similar adsorption mechanisms. A decrease in  $\mu$  GACs particle size had a positive impact on UV254 removal under continuous-flow conditions in columns representative of a large-scale pilot due to better expansion. (C) 2019 Elsevier Ltd. All rights reserved.

## OUVRAGES / RAPPORTS / ACTES DE CONGRES

### Toxicology Cases for the Clinical and Forensic Laboratory



Toxicology Cases for the Clinical and Forensic Laboratory brings together carefully selected case studies to teach important principles relating to drug and toxin exposures. Each case study includes contemporary clinical and forensic toxicologist studies that include a comprehensive analytical and clinical approach to patient management and address overdoses from designer drugs, to NSAIDs, to opioids, to stimulants. These cases present a comprehensive, analytical and clinical approach to managing a drug overdose. This is a must-have reference for clinical and forensic laboratory scientists, along with toxicology and pathology residents who need to know aspects of both.

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##### SECTION I - Basic Principles

1. An Introduction to Clinical and Forensic Toxicology
2. Pharmacokinetics and Pharmacodynamics
3. Laboratory Methods in Toxicology
4. Management of an Overdose Patient
5. Alcohols: Volatiles and Glycols

##### SECTION II - Overview and Case Studies

6. Analgesics and Anti-inflammatory Drugs
7. Antibiotics
8. Antidepressants and Antipsychotics
9. Anticonvulsants
10. Antineoplastic Drugs
11. Cannabinoids
12. Cardiotoxicity

13. CNS Depressants: Benzodiazepines and Barbiturates
14. CNS Stimulants
15. Designer Drugs
16. Hallucinogens and Psychedelics
17. Immunosuppressive Drugs
18. Opioids
19. Toxic Herbals and Plants in U.S.
20. Toxic Gases
21. Toxic Metals
22. Venoms and Pesticides
23. Case Studies on Other Drugs

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### Sustainable Reviews 40

### Agriculture



This book reviews recent research advances in sustainable agriculture, with focus on crop production, biodiversity and biofuels in Africa and Asia.

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- [Mycotoxins Occurrence, Toxicity and Detection Methods](#) Mohamed Amine Gacem, Aminata Ould El Hadj-Khelil, Badreddine Boudjemaa, Hiba Gacem Pages 1-42
- [Nanopesticides for Pest Control](#) Saheli Pradhan, Damodhara Rao Mailapalli Pages 43-74
- [Synthesis of Nanofertilizers by Planetary Ball Milling](#) Chwadaka Pohshna, Damodhara Rao Mailapalli, Tapas Laha Pages 75-112
- [Materials and Technologies for the Removal of Chromium from Aqueous Systems](#) Fayyaz Salih Hussain, Najma Memon Pages 113-177
- [Water Quality Assessment Techniques](#) Priti Saha, Biswajit Paul Pages 179-216
- [Effect of Emerging Contaminants on Crops and Mechanism of Toxicity](#) Bansh Narayan Singh, Akash Hidangmayum, Ankita Singh, Akankhya Guru, Bhudeo Rana Yashu, Gopal Shankar Singh Pages 217-241

DOI <https://doi.org/10.1007/978-3-030-33281-5>

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## Premature mortality related to United States cross-state air pollution

Outdoor air pollution adversely affects human health and is estimated to be responsible for five to ten per cent of the total annual premature mortality in the contiguous United States. Combustion emissions from a variety of sources, such as power generation or road traffic, make a large contribution to harmful air pollutants such as ozone and fine particulate matter (PM<sub>2.5</sub>). Efforts to mitigate air pollution have focused mainly on the relationship between local emission sources and local air quality. Air quality can also be affected by distant emission sources, however, including emissions from neighbouring federal states. This cross-state exchange of pollution poses additional regulatory challenges. Here we quantify the exchange of air pollution among the contiguous United States, and assess its impact on premature mortality that is linked to increased human exposure to PM<sub>2.5</sub> and ozone from seven emission sectors for 2005 to 2018. On average, we find that 41 to 53 per cent of air-quality-related premature mortality resulting from a state's emissions occurs outside that state. We also find variations in the cross-state contributions of different emission sectors and chemical species to premature mortality, and changes in these variations over time. Emissions from electric power generation have the greatest cross-state impacts as a fraction of their total impacts, whereas commercial/residential emissions have the smallest. However, reductions in emissions from electric power generation since 2005 have meant that, by 2018, cross-state premature mortality associated with the commercial/residential sector was twice that associated with power generation. In terms of the chemical species emitted, nitrogen oxides and sulfur dioxide emissions caused the most cross-state premature deaths in 2005, but by 2018 primary PM<sub>2.5</sub> emissions led to cross-state premature deaths equal to three times those associated with sulfur dioxide emissions. These reported shifts in emission sectors and emission species that contribute to premature mortality may help to guide improvements to air quality in the contiguous United States.

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## EchosCGEDD



Numéro 89, Juillet 2019

**Actualités** > Sécuriser les passages à niveau

**Dossier** > Réduire les usages, les risques et les expositions aux **produits phytosanitaires**

**Perspective** > TGV : comment réduire les nuisances sonores ?

**Regard sur...** > MRAe : vers une gouvernance renforcée

[Accès au document](#)

## Environmental Metabolomics



**Editors:** Diana Alvarez-Munoz  
Marinella Farre

**Paperback ISBN :** 9780128181966

**Imprint:** Elsevier

**Published Date :** 1st June 2020

Environmental Metabolomics Applications in Field and Laboratory Studies: From the Exposome to the Metabolome presents an overview of the current state of aquatic environments and problems caused by human pressure and daily life. The presence of contaminants in nature and their effects are evaluated, along with recommendations for preservation. This book not only shows readers how to implement techniques, it also guides them through the process. As metabolomics becomes a more routine technique for environmental studies and future perspectives, a guide for validation and globalization of current approaches is needed.

## Table of Contents

Environmental exposure to contaminants and the role of metabolomics

2. Metals
3. Legacy Persistent Organic Contaminants
4. Pesticides
5. Contaminants of industrial origin
6. Pharmaceutical and Personal Care Products
7. Nanomaterials
8. Environmental mixtures
9. Biomarkers snapshot
10. Future trends and conclusions

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## Ecotoxicological QSARs



This volume focuses on computational modeling of the ecotoxicity of chemicals and presents applications of quantitative structure-activity relationship models (QSARs) in the predictive toxicology field in a regulatory context. The extensive book covers a variety of protocols for descriptor computation, data curation, feature selection, learning algorithms, validation of models, applicability domain assessment, confidence estimation for predictions, and much more, as well as case studies and literature reviews on a number of hot topics. Written for the Methods in Pharmacology and Toxicology series, chapters include the kind of practical advice that is essential for researchers everywhere.

Authoritative and comprehensive, Ecotoxicological QSARs is an ideal source to update readers in the field with current practices and introduce to them new developments and should therefore be very

useful for researchers in academia, industries, and regulatory bodies.

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## Atmospheric chemistry, pollution and climate change

CanalU 9/01/20

Atmospheric chemistry, pollution and climate change - Solène Turquety

- How do atmospheric pollutants impact on the climate ?
- What is the radiative impact of aerosols ?
- Budget of the radiative impacts.
- What is the benefit to the climate of improving air quality ?
- What impact does climate change have on air pollution ?

[Accès au document](#)

## REVUE DE PRESSE / ALTERNATIVES / BIOPESTICIDES

### Alternatives aux pesticides chimiques : 24 organismes de recherche européens s'engagent sur une feuille de route ambitieuse

Mobiliser les efforts de recherche pour accélérer la transition agroécologique répond à une forte demande des pouvoirs publics, des professionnels et de la société, en France comme en Europe. Pour faire face à ce défi majeur, repenser la manière dont la recherche doit être conduite et développer une stratégie commune de recherche et d'expérimentation non plus à une échelle uniquement nationale mais européenne est l'objet de la déclaration d'intention « Pour une agriculture sans pesticide chimique\* ». Cette déclaration a été signée aujourd'hui par 24 organismes de recherche de 16 pays européens.

Sous l'impulsion de l'institut français INRAE et de ses homologues allemands ZALF et JKI, cet engagement sans précédent permet la mobilisation de toute une communauté de recherche autour d'une vision partagée d'une agriculture sans pesticide chimique. Cette déclaration formalisée à l'occasion du Salon International de l'Agriculture le 23 février, avec le soutien des ministères français en charge de l'agriculture et de la recherche, et en présence d'Amélie de Montchalin, Secrétaire d'Etat aux Affaires Européennes, assoit la mise en place d'une alliance européenne de recherche qui finalisera une feuille de route et la présentera prochainement à la Commission Européenne pour contribuer au Pacte Vert pour l'Europe. [...]

[Accès au document](#)

## Terre-net Le Magazine : Lutte intégrée, jouer la carte du biocontrôle



Terre-Net 10/02/20

La décennie 2020-2030 sera décisive pour le développement de l'utilisation du biocontrôle, indique le dossier du numéro 84 de Terre-net Le Magazine. Parmi les autres sujets qui devraient vous intéresser : un décryptage de l'engagement civique des agriculteurs dans la perspective des prochaines élections municipales, la gestion des apports d'azote après des semis perturbés, la levée de boucliers des exploitants contre les ZNT ou encore l'essor des robots en agriculture, prédit à court ou moyen terme selon les spécialistes. [...]

[Accès au document](#)

## UV BOOSTING : une innovation de rupture destinée à réduire de moitié l'utilisation des intrants en vigne

Depuis plusieurs années déjà, Euralis s'engage à accompagner les agriculteurs vers une agriculture raisonnée : il les aide notamment à diminuer l'utilisation des produits phytopharmaceutiques. Dans cette logique, le Groupe coopératif collabore avec la start-up UV Boosting pour développer une solution de protection des cultures à terme sans intrants. Cette alternative aux pesticides est unique en France et s'adresse dans un premier temps aux viticulteurs. Le Pôle Agricole du Groupe coopératif Euralis en assure la distribution exclusive sur son territoire. [...]

[Accès au document](#)

## Globe artichoke and cardoon could manage weeds in sustainable, eco-friendly way

Crop rotation is gaining increasing research- and policy attention as an environmentally friendly way to manage weeds. In such rotations, crops are introduced that release chemicals into the environment known to inhibit weed germination or growth (so-called allelopathic crops). Previous studies have identified *Cynara cardunculus* L., a perennial thistle, including varieties of globe artichoke and cardoon, as a potential allelopathic candidate. This study conducted field experiments using three botanical varieties of *C. cardunculus* to evaluate their effect on weeds within an ecosystem. The results confirm that *C. cardunculus* has an allelopathic effect in monoculture, reducing the amount of weed seeds present in soil. This paves the way for its inclusion in crop rotation as part of eco-friendly, sustainable weed-management strategies.

"Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

[Accès au document](#)

## Alternatives aux phytosanitaires : la collaboration au sein du Contrat de solutions

### Anjou-agricole 21/01/20

Vegepolys Valley a lancé lors du Sival l'Appel à idées de projets innovants. L'initiative devrait permettre de trouver des alternatives concrètes et efficaces pour réduire l'utilisation de produits phytosanitaires.

La chrysope, une solution de biocontrôle. Ses larves consomment les pucerons.

Si l'utilisation des produits phytosanitaires cristallise de nombreuses tensions entre les agriculteurs et la société civile, c'est que les enjeux sont primordiaux. Ainsi, si des améliorations ont déjà été engagées, les attentes sociétales demeurent importantes. Les citoyens souhaiteraient passer à la vitesse supérieure dans la transition, et les agriculteurs, s'ils ne s'y opposent pas, font parfois face à un manque de solutions pour préserver la viabilité économique de leur exploitation dans ce changement.

C'est dans ce contexte que le Contrat de solutions a vu le jour en 2017. 41 organisations sont partenaires dans cette démarche, collective, permettant de produire des fiches actions basées sur des solutions concrètes et applicables sur le terrain. 69 fiches ont été réalisées, sur des sujets aussi variés que les techniques agronomiques, la robotique, le biocontrôle, l'amélioration des plantes ...

### Un appel à Idées

Dans ce cadre, la nouvelle présidente de Vegepolys Valley, Séverine Darsonville, a lancé un Appel à idées de projets Innovants (APII). Derrière le constat que « certaines innovations ont du mal à percoler dans les exploitations agricoles », la présidente invite "tous les acteurs du monde agricole à proposer des idées de solutions alternatives aux produits phytosanitaires jusqu'au 15 mars". Les dossiers, à déposer sur le site du Contrat de solutions, seront sélectionnés selon 3 critères. Les projets devront être innovants, collaboratifs et présenter une approche marché.

### Des larves protectrices

La société IfTech fait partie du Contrat de solutions. Basée à Angers, elle fournit des solutions de biocontrôle aux agriculteurs. Son "produit" phare est un insecte, la chrysope. Si au stade adulte c'est un simple pollinisateur, "la larve est très vorace et généraliste, elle consomme 50 à 60 pucerons par jour", constate Agnès Chanteau-Foucher, commerciale chez IfTech.

[Accès au document](#)

## REVUE DE PRESSE / ASSOCIATIONS

Dans un mois ce sera le début de la 15<sup>ème</sup> Semaine pour les alternatives aux pesticides !

### Génération futures 20/02/20

Ce rendez-vous annuel incontournable est coordonné au niveau national par l'association Générations Futures et rassemble [50 organisations nationales partenaires](#) ainsi que de multiples acteurs locaux. Plus de 1000 événements en France et à l'étranger sont organisés chaque année par les citoyens, les associations, les entreprises ou encore les collectivités territoriales.

Nous avons tous un rôle à jouer en tant que citoyens, quelque soit notre activité. Au quotidien, préserver l'environnement et assurer un cadre sain passent par de nombreux gestes que nous pouvons réaliser, encore faut-il les connaître. En effet, il existe des solutions, des techniques, des astuces pour se passer des pesticides chimiques de synthèse dans notre vie de tous les jours, dans notre mode de production, dans notre mode de consommation. Une centaine d'événements sont déjà prévus sur le territoire français et à l'étranger. [...]

[Accès au document](#)

## Didier Guillaume : « On va continuer l'agriculture de conservation des sols avec du glyphosate »

Alerte-Environnement 21/02/20

«Réchauffement climatique» ou glyphosate, les écolos sont priés de choisir. Le ministre de l'Agriculture Didier Guillaume n'hésite pas un instant, il prend le glyphosate, en attendant une solution alternative (inexistante pour le moment :

Enfin un discours de bon sens ! [@dguillaume26](#) . Supprimer le glyphosate est une aberration écologique. <https://t.co/EnxIDa9DQv>

[Accès au document](#)

## Recours juridique : Épandage des pesticides à proximité des habitations

Génération futures 25/02/20

8 ONG attaquent le décret et l'arrêté devant le Conseil d'Etat

Notre collectif regroupant 9 ONG\* dépose ce jour des recours très étayés au Conseil d'Etat contre l'Arrêté définissant des distances de protection pour l'épandage ridiculement faibles au regard des dangers des pesticides et le Décret organisant la mainmise de la profession agricole dans la rédaction des Chartes censées protéger les riverains. [...]

[Accès au document](#)

## Les perturbateurs endocriniens

CRIIGEN 26/02/20

Depuis le début du 21e siècle, on parle de plus en plus des perturbateurs endocriniens et de leurs effets. Ils suscitent des inquiétudes bien légitimes, des scientifiques jusqu'aux pouvoirs publics. Même si des interrogations persistent à leur sujet, aujourd'hui on en sait davantage sur leurs modes d'action et sur leur impact, qui est surtout déterminant durant la périnatalité. Joël Spiroux, médecin environnementale (à la

retraite) et président du CRIIGEN, fait une mise au point dans les colonnes du magazine « Le Généraliste ». [...]

[Accès au document](#)

## Bader farms wins \$265 Million in lawsuit against Bayer's Monsanto, BASF

Beyond Pesticides, February 20, 2020

Missouri's largest peach farm, Bader Farms, is set to receive \$265 million in compensation from two multinational agrichemical companies after the companies' dicamba-based weed killers caused widespread damage to the farm's fruit trees. Bayer's Monsanto and BASF were found to be responsible for negligence in the design of their dicamba herbicides, and failure to warn of farmers about the dangers of their products. The jury determined that the joint venture between the two companies amounted to a conspiracy to create an "ecological disaster" in the name of profit. [...]

[Accès au document](#)

## Longest Field Trials Show Organic Practices Yield Higher Returns than Chemical-Intensive Agriculture

Beyond Pesticides, February 24, 2019

With more than 90% of total pesticide use deployed in agriculture, organic farming is the keystone solution to the myriad health, environmental, and biodiversity harms of pesticides. A transition to organic and regenerative farming practices – across which there is great overlap – is critical and a tall order, given the entrenched, chemically intensive practices that currently dominate in the U.S. and much of the world. A long-standing research effort by the storied Rodale Institute – the Farming Systems Trial, which began in 1981 – is demonstrating that organic agriculture is not only a nontoxic solution, but also, an

economically viable one that is critical to a sustainable future. [...]

[Accès au document](#)

## Report Finds Top Chemical Companies Making Billions Off Poisoning the Earth

**Beyond Pesticides, February 27, 2020**

A new report finds that as birds and pollinators continue to decline, and chronic diseases remain on the rise, the global agrichemical industry is raking in billions of dollars from hazardous pesticides that contribute to these crises. A joint investigation from Unearthed and Public Eye finds that 35% of pesticide sales from the largest agrichemical corporations are made from the most toxic pesticides on the market.[...]

[Accès au document](#)

## Toxic Herbicide Atrazine Causes Wasp Gut Microbiome to Develop Pesticide Resistance Across Generations

**Beyond Pesticides, February 11, 2020**

A new study, published in the journal *Cell Host & Microbe*, homes in on the impact of the toxic herbicide atrazine on wasp gut microbiology and pesticide resistance. Intriguingly, researchers found that exposure to atrazine changed the composition of gut bacteria in individual wasps and shifts in gut flora were heritable. This study not only represents one of the first evolutionary studies on symbiont-mediated pesticide resistance, it also provides fodder for future research regarding the implications of exposure to xenobiotics (i.e., chemical substances like toxic pesticides foreign to an organism or ecosystem) for other gut bacteria hosts - such as honey bees and humans. [...]

[Accès au document](#)

## EPA Fails to Follow Congressional Mandate to Protect Children from Pesticide Exposure

**Beyond Pesticides, February 13, 2020**

Congress unanimously passed the Food Quality Protection Act (FQPA) in 1996 to increase protections for children from pesticide exposure. Unfortunately, according to a new study published in *Environmental Health*, the law is not being employed by the Environmental Protection Agency (EPA) to its full capacity. For most of the 59 pesticides reviewed by the study, EPA did not apply an additional FQPA safety factor and thereby missed an opportunity to protect children's health. In fact, FQPA solidified EPA's reliance on risk assessment calculations and mitigation measures that consistently fall short of adequate levels of protection because of serious data gaps, a failure to consider exposure to mixtures and synergistic effects, and a bias against consideration of alternatives (alternatives assessment) that show toxic pesticides to be unnecessary. [...]

[Accès au document](#)

## “Hey Farmer Farmer, Put Away that” Dicamba Weed Killer

**Beyond Pesticides 14/02/20**

The weed killer dicamba has been blamed for killing or damaging millions of acres of non-genetically modified crops and other plants that have no protection against the compound. Litigation, legislation, and manufacturer machination abound as dicamba damage mounts. The trial in a suit filed in 2016 by a Missouri peach farmer against dicamba manufacturers Bayer and BASF has just begun; an Indiana state laboratory struggles to keep up with demand to evaluate dicamba damage; Idaho lawmakers are poised to weaken rules that protect farmworkers who apply dicamba (and other pesticides) aerially; agricultural officials in Missouri are pressuring the state legislature to increase funding to handle the exploding numbers of



dicamba complaints; and Indiana's legislature is considering two bills aimed at curtailing dicamba drift that kills neighboring crops. This Daily News Blog will round up the plethora of recent news on dicamba – the toxic and destructive culprit behind each of these stories. [...]

[Accès au document](#)

## Scandale : Selon un nouveau rapport un laboratoire allemand ayant réalisé des études sur le glyphosate pour l'industrie aurait manipulé des études sur d'autres substances !

Génération-futures 11/02/20

Génération Futures demande une profonde réforme du processus d'évaluation des pesticides qui doit être basé sur des études réellement indépendantes !

Notre système d'autorisation pour les produits chimiques est basé sur le principe selon lequel les fabricants doivent prouver, au moyen d'études scientifiques, que leurs produits ne présentent pas de risques inacceptables pour la santé publique et l'environnement. Il incombe donc aux fabricants de commissionner des laboratoires sous contrat certifiés pour réaliser les études toxicologiques nécessaires à la procédure d'approbation. Comme garantie contre la manipulation et la falsification de ces études « réglementaires », les autorités réglementaires du monde entier s'appuient sur la norme certifiée « Good Laboratory Practice » (GLP) = « Bonne pratique de laboratoire » (BPL). [...]

[Accès au document](#)

## Glyphosate : et si on en parlait (enfin) sérieusement ?

Alerte-environnement 14/02/20

Ce vendredi 13 février, paraît le livre Glyphosate : l'impossible débat signé Gil Rivière-Wekstein, aux éditions Le Publieur.

« Il y a dans cette affaire du glyphosate une forte similitude avec le contenu du film Douze hommes en colère où, d'emblée, les douze personnes réunies sont toutes convaincues que le jeune homme est effectivement coupable. Sauf un qui demande simplement une chose : peut-on en discuter ? Je vous pose la même question. En ce qui concerne le glyphosate, est-ce qu'on peut simplement prendre le temps d'en discuter ? »

[Accès au document](#)

## Sortie du glyphosate : un impact de 5 % sur la rentabilité des exploitations viticoles

Actu\_environnement 16/01/20

Dans le cadre du plan de sortie du glyphosate d'ici 2021, les solutions alternatives et les impacts économiques pour chaque filière sont étudiés afin d'éclairer les décisions du Gouvernement. Celui-ci pourrait en effet accorder des dérogations lorsque des alternatives à un coût acceptable ne sont pas disponibles. L'Inrae a publié, le 15 janvier, une évaluation économique des pratiques de désherbage alternatives au glyphosate en viticulture. [...]

[Accès au document](#)

## Forever chemicals no more: Belgian premiere of Hollywood movie "Dark Waters" highlights reality of PFAS pollution and the urgency to address it through ambitious regulation

HEAL 03/02/20

Award-winning actor Mark Ruffalo and director Todd Haynes are visiting the European Parliament this Wednesday (5 February) to present the film 'Dark Waters', inspired by the true story of an environmental attorney who took on the DuPont company in an environmental suit exposing decades of pollution of drinking water with PFAS [1]. The movie shows the harsh consequences of chemicals pollution, which is a reality in the EU too, and should urgently be

addressed as a chemical priority under the European Green Deal.

The event in the European Parliament will see panel debates with representatives of the EU Commission, Members of EU Parliament, health and environment groups and Robert Bilott, an American environmental attorney on whose real-life story the film is based. [...]. The events are supported by TFIP, the European Environmental Bureau (EEB), the Health and Environment Alliance (HEAL), ChemSec and CHEM Trust. [...]

[1] Dark Waters is a “legal thriller” inspired by the true story of Robert Bilott and stars Mark Ruffalo as the attorney who took on the DuPont company in an environmental suit exposing a decades-long history of chemical pollution in drinking water by perfluorinated substances (e.g. teflon). [...]

[Accès au document](#)

## Save mayflies and the ecosystems that depend on them

### Beyondpesticides 03/02/20

Ephemeroptera to entomologists - “mayflies” to the rest of us - is an insect order comprising keystone species, on which other species in an ecosystem are very dependent, and without which, the ecosystem would undergo drastic change. The plummeting mayfly “count” is especially alarming because mayflies are a critical, primary food source in aquatic and terrestrial ecosystems, and provide an important ecological service. As the research study notes, “Seasonal animal movement among disparate habitats is a fundamental mechanism by which energy, nutrients, and biomass are transported across ecotones. A dramatic example of such exchange is the annual emergence of mayfly swarms from freshwater benthic [lake or river bottom] habitats. Annual emergences represent the exchange of hundreds of tons of elemental nutrients, thousands of tons of biomass, billions of organisms, and trillions of calories worth of energy to the surrounding terrestrial habitat. A single emergence event can produce 87.9 billion mayflies, releasing 3,078.6 tons of biomass into the airspace over several hours.” According to Purdue University ecologist Jason Hoverman, PhD, “Mayflies serve critical functions in both aquatic

and terrestrial ecosystems. Because of their important role as prey, reductions in their abundance can have cascading effects on consumers throughout the food web.” Without this critical keystone species, an important food source and nutrient recycler would be lost. [...]

[Accès au document](#)

## EPA Set to Reapprove Cancer-Causing Glyphosate and Bee-Toxic Neonicotinoids

### Beyond Pesticides, February 4, 2020

It was a good day for Bayer/Monsanto. The chemical company’s weed killer glyphosate and its neonicotinoid insecticides are set for reapproval by the U.S. Environmental Protection Agency (EPA), according to interim decisions published last week. EPA reapproval of human carcinogens and chemicals contributing to the pollinator crisis is disappointing for health and environmental advocates, but not surprising to those watchdogging the agency during the current administration. “This is how a captured agency behaves,” said Beyond Pesticides community resource and policy director Drew Toher. “When EPA’s decision making repeatedly reflects the exact wishes of the chemical industry, public trust erodes, and we must look to new policy mechanisms that support the protection of health and the environment.” [...]

[Accès au document](#)

## If chlorpyrifos is out, what's in?

### Panna 07/02/20

This week marks the end of chlorpyrifos sales in California. After the exhausting saga of pesticide industry influence and ignored science that resulted in EPA reversing the planned national ban of the brain-harming chemical in 2017, this concrete step forward for California is momentous.

It’s also having ripple effects across the country. Several states have chlorpyrifos ban bills moving forward this session, and just today Corteva (formerly Dow) announced it will stop producing





chlorpyrifos by the end of the year. Corteva is the largest producer of this pesticide worldwide.

But when a dangerous chemical like chlorpyrifos that has been widely used for pest management is eliminated, what takes its place ? [...]

[Accès au document](#)

## The Black Institute Shows Higher Pesticides Use in Low-Income Neighborhoods in New York City, Calls for Pesticide Ban in Parks

**Beyond Pesticides, February 7, 2020**

Toxic pesticide use in New York City (NYC) parks would get the boot if a bill – Intro 1524 – being considered by the New York City Council passes. The bill “would ban all city agencies from spraying highly toxic pesticides, such as glyphosate (Roundup), and be the most far-reaching legislation to implement pesticide-free land practices in New York City parks,” according to a press release from its sponsors, New York City Council members Ben Kallos and Carlina Rivera. The January 29 hearing on the bill in the council’s Committee on Health was preceded by release of an important report from The Black Institute: Poison Parks, which calls out the NYC Parks Department for, in particular, its continued use of glyphosate-based herbicides. It also notes, “Minority and low-income communities suffer from the use of this chemical and have become victims of environmental racism.” [...]

[Accès au document](#)

## EU fitness check on endocrine disruptors, another delay or potential game changer?

**Chemtrust 20/01/20**

At the end of 2019 the European Commission opened a stakeholder consultation on a fitness

check on European Union legislation on endocrine disruptors.

The fitness check aims to look at the coherence of different regulatory approaches to the assessment and management of endocrine disruptors; asking if the current legislation delivers its objectives to protect human health and the environment.

Here at CHEM Trust we are busy preparing our response to the consultation, which ends at the end of January. In the following article (first published in ChemicalWatch) we describe the key elements that need to be addressed to better protect people and wildlife from endocrine disruptors.

The EU has worked on legislative controls for endocrine disrupting chemicals (EDCs) for 20 years, with a range of delaying tactics from industry successfully slowing down the processes at various stages. As a result, despite some progress, the EU’s framework for controlling EDCs remains patchy. [...]

[Accès au document](#)

## SDHI - Justice : Nos organisations demandent l’abrogation immédiate de 3 pesticides commerciaux

**Génération futures 21/01/20**

Les associations GENERATIONS FUTURES, NOUS VOULONS DES COQUELICOTS et FNE demandent l’abrogation de l’autorisation de mise sur le marché de trois pesticides à base de SDHI : le Keynote et l’Aviator Xpro, produits par Bayer et le Librax, produit par BASF.

Un courrier à l’ANSES. Ces produits, qui s’attaquent à la fonction respiratoire des champignons pathogènes, s’attaquent également à celle des vers de terre, des abeilles et de l’homme. Ils sont donc particulièrement dangereux. Les associations demandent dans un premier temps à l’ANSES (Agence qui évalue et autorise les pesticides), par courrier du 21 janvier, d’abroger les autorisations de mise sur le marché (AMM) de ces trois pesticides contenant des SDHI. [...]

[Accès au document](#)

## Pisseurs volontaires ? Désinformateurs volontaires !

Alerte environnement 17/01/20

France Bleu revient sur une nouvelle affaire de pissieurs volontaires (militants écologistes puis agriculteurs) dans les Landes. L'occasion pour ce média de faire correctement les choses en interrogeant le professeur Jean-François Narbonne, ainsi présenté :

« Il est toxicologue de l'université de Bordeaux à la retraite mais travaille toujours pour l'université de Beyrouth. Il est le référent pesticides pour l'association Toxicologie-Chimie et, dans ce cadre, a été dernièrement expert judiciaire dans l'affaire Paul François. Cet agriculteur qui a fait condamner en appel, en France, Monsanto pour un autre herbicide que le glyphosate. Monsanto a décidé de se pourvoir en cassation. Il affirme ne plus être en lien de recherche avec l'industrie de la chimie depuis les années 70. »

Bref, quelqu'un d'autrement plus sérieux que Jean-Patrick, activiste bénévole chez Greenpeace, dont le principal problème est d'avoir du temps à tuer, temps qu'il passe sur YouTube à ingérer chaque jour de la propagande végane et anti-phyto. Or « Pour le toxicologue, quels que soient les résultats des analyses d'urine, ceux des écologistes ou ceux des agriculteurs, ils ne sont pas significatifs si l'on veut parler de toxicité : « C'est du bruit de fond ». Pour étalonner leurs résultats, les écologistes ont décidé de les comparer au seuil qui est acceptable dans l'eau potable (1 microgramme par litre). Une référence qui n'a pas lieu d'être pour le toxicologue qui explique que les autorités ont pris ce seuil car c'est le seuil de détectabilité. Autrement dit, les autorités considèrent qu'il ne doit pas y avoir de glyphosate dans l'eau potable, donc, le seuil de référence, c'est celui qui permet de le détecter. »

Rappelons que le seul seuil sanitaire qui existe pour le glyphosate, c'est l'ANSES qui le rappelle, est de 900 microgrammes par litre pour l'eau potable : donc les tests des Landais, écologistes ou agriculteurs, seraient, au moins, 1 000 fois en dessous.

Les restes de pesticides dans le corps (Attention, le laboratoire allemand fondé par une militante

écologiste ouvertement anti-glyphosate BioCheck est systématiquement à l'origine des résultats spectaculaires qui permettent à des associations ou médias militants d'angoisser des populations !) ?

« Ce n'est pas un scoop, cela fait 25 ans qu'on le sait, se désole le professeur Narbonne pour qui tout le battage qui est fait autour du glyphosate, est du délire médiatique. C'est un symbole, il y a des substances bien plus problématiques comme les organophosphorés ».

Le scientifique rappelle qu'aucune étude n'a établi le lien entre le glyphosate détecté à faible taux dans les urines et des cancers et que dans les affaires judiciaires où Monsanto a été condamné, c'est le solvant du Roundup, et non le glyphosate, qui a été mis en cause. Selon lui, si on voulait faire des tests utiles, il aurait fallu tester les solvants et non le glyphosate.

[Accès au document](#)

## Study Links Pyrethroid Insecticides to Cardiovascular Disease and Other Health Hazards

Beyond Pesticides, January 10, 2020

A new study by researchers out of the University of Iowa College of Public Health, published in JAMA (the Journal of the American Medical Association) Internal Medicine, demonstrates that greater exposure to pyrethroid insecticides is associated with higher risks of death from all causes and from cardiovascular disease. These compounds can be inhaled, ingested, or absorbed through the skin; they are highly neurotoxic, and have also been linked to certain cancers, endocrine disruption, and suppression of the immune system, as well as respiratory and reproductive impacts. [...]

[Accès au document](#)

## Forte hausse des ventes de pesticides en France !

Génération futures 07/01/20

Le gouvernement vient de présenter ce soir, au ministère de l'Agriculture lors d'un Comité d'Orientation et de Suivi d'Ecophyto auquel a pris part Génération Futures, les nouvelles données de suivi du plan de réduction des produits phytosanitaires pour 2018.

Elles sont catastrophiques avec une augmentation de 21% de la Quantité de Substances Actives vendues par rapport à 2017 ! Devant ce nouveau constat d'échec Génération Futures demande la mise en place urgente de mesures contraignantes ! [...]

[Accès au document](#)

## REVUE DE PRESSE / RECHERCHE ET MEDIAS

### How pest management strategies affect the bottom line

EurekaAlert! 29/02/20

A study out of Mississippi State University evaluated the impact insect pest management strategies have on the economic return of small-scale tomato production. The results of this evaluation are published in the article "Economic Effect of Insect Pest Management Strategies on Small-scale Tomato Production in Mississippi" in the open access online journal HortTechnology.

Ronald Stephenson and a team of researchers scrutinized strategies including management based on a calendar spray schedule, conventional pesticide management based on action thresholds, and management based on action thresholds using organic controls in order to better determine the effects of these strategies on economic return for growers of tomatoes. [...]

[Accès au document](#)

### L'Anses interdit 36 herbicides à base de glyphosate

Vitisphere 28/02/20

L'autorité de santé vient de retirer l'autorisation de mise sur le marché de 36 produits à base de glyphosate. Beaucoup étaient homologués en viticulture. Les viticulteurs ne pourront plus les utiliser au-delà du 29 novembre 2020.

Le grand ménage dans les produits à base de glyphosate a commencé. Dans un communiqué daté du 9 décembre, l'Agence Nationale de Sécurité Sanitaire (Anses) a annoncé avoir retiré l'autorisation de mise sur le marché de 36 d'entre eux « en raison de l'insuffisance ou de l'absence de données scientifiques permettant d'écartier tout risque génotoxique ». Selon l'Agence, ces produits représentaient en 2018 près des trois quarts des tonnages des produits à base de glyphosate pour des usages agricoles et non agricoles. Plusieurs de ces produits étaient utilisés en vigne : Azural Xpress, Buggy Greenline, Chikara duo, Cosmic, Guild, Katana duo, Roundup 720, Roundup Innov... [...]

[Accès au document](#)

### Des ZNT dès 2020 nécessitent argumentation et compensations dans le vignoble

Vitisphere 28/02/20

En vigueur dès le premier janvier, le mécanisme de zones de non traitement aux pesticides va fortement impacter la viticulture en termes économiques et techniques. Qui exprime moins son insatisfaction que sa volonté de co-construction dans la raison.

Confirmant les derniers échos, le nouveau dispositif gouvernemental de « renforcement de la protection des riverains lors de l'utilisation des produits phytosanitaires » vient d'être dévoilé ce 20 décembre : dès le premier janvier 2020, « les utilisateurs sont encouragés à déployer des chartes d'engagements en concertation avec les riverains et des mesures de protection devront

être mises en place, incluant des distances minimales à proximité des lieux d'habitation ». Devant être rapidement publié, l'arrêté interministériel va compléter les Autorisations de Mise sur le Marché (AMM) des pesticides en imposant des Zones de Non Traitement (ZNT) aux phytos qui ne sont pas « à faible risque » ou de biocontrôle (voir détail en encadré). [...]

[Accès au document](#)

## Phytoprotecteurs : l'élaboration des chartes de protection des riverains en marche forcée

Actu-environnement 12/02/20

La Direction générale de l'alimentation (DGA) a publié une instruction technique, à destination des directions régionales et des préfets, sur les mesures de protection des riverains susceptibles d'être exposés aux traitements phytopharmaceutiques entrées en vigueur le 1er janvier 2020.

Pour rappel, fin 2019, deux textes réglementaires fixant le cadre ont été publiés. Le premier définit des distances de sécurité minimales avec les zones d'habitation, selon le type de culture. Le second prévoit la possibilité de réduire ces distances dans le cadre de chartes d'engagements, élaborées après concertation entre utilisateurs et riverains. Ces chartes doivent définir « *les mesures les plus adaptées à la situation départementale* ». [...]

[Accès au document](#)

## Sortie du glyphosate : les usages qui posent problème se précisent

Actu-environnement 13/02/20

À un peu moins d'un an de l'échéance de sortie du glyphosate pour la majorité des usages, la mission d'information parlementaire sur la stratégie de sortie du glyphosate a fait le point avec l'agence de sécurité sanitaire (Anses) et l'Institut de recherche agronomique (Inrae), sur l'avancée de leurs travaux respectifs [...]. Vers

une réduction des doses pour certains usages ? L'Inrae a planché sur l'évaluation de l'impact économique pour trois filières directement touchées par la sortie du glyphosate : la viticulture, l'arboriculture et les grandes cultures. [...]

[Accès au document](#)

## Bruxelles sous pression pour autoriser, dans les produits importés, des pesticides interdits

Le Monde 17/02/20

Des pesticides jugés trop dangereux pour être autorisés dans l'Union européenne (UE) pourraient être à nouveau tolérés pour épargner le commerce international. C'est le résultat de plusieurs années de lobbying des fabricants, renforcé par les manœuvres diplomatiques d'un groupe d'une quinzaine de pays, dont les Etats-Unis et le Canada, pour que Bruxelles ouvre une brèche dans sa propre réglementation. Une marge de tolérance pourrait ainsi être accordée aux substances interdites dans les produits alimentaires importés. Fruits, noix, épices ou encore café pourraient contenir des résidus de pesticides que la loi proscribit pourtant. [...]

[Accès au document](#)

## Paris va subventionner les agriculteurs pour améliorer la qualité de l'eau du robinet

Le Monde 17/02/20

C'est une première en France. La Ville de Paris s'apprête à verser des aides aux agriculteurs qui exploitent des terres situées dans ses zones de captage d'eau et font un effort en matière d'environnement, par exemple en utilisant moins de pesticides. Objectif : améliorer la qualité de l'eau du robinet qui, dans la capitale, provient pour moitié de sources souterraines. Le projet a été validé le 13 janvier par la Commission européenne.

« Si on peut agir pour que l'eau soit plus pure dès le départ, c'est mieux que d'avoir à la traiter ensuite, non ? », plaide Célia Blauel.

L'adjointe écologiste qui préside la régie municipale Eau de Paris est très fière du lancement de ce dispositif, qui tombe politiquement à point, à un mois des élections municipales. Dernière action notable de la maire Anne Hidalgo durant ce mandat, cette création est en phase avec ses nouvelles promesses d'agir pour une alimentation de qualité. [...]

[Accès au document](#)

## Des pesticides suspectés d'être des perturbateurs endocriniens ou cancérigènes dans l'air

**Le Monde 18/02/20**

Les pesticides ne contaminent pas seulement les fruits et légumes que mangent les Français ou l'eau (et le vin) qu'ils boivent, ils polluent aussi l'air qu'ils respirent. Et parmi les herbicides, fongicides et autres insecticides présents dans l'atmosphère, une majorité de ces substances particulièrement dangereuses pour la santé sont suspectés d'être des perturbateurs endocriniens (PE) ou cancérigènes, mutagènes et reprotoxiques (CMR). Tel est le constat alarmant dressé par l'association Générations futures dans un rapport publié mardi 18 février. [...]

[Accès au document](#)

## Qualité de l'air : Générations futures réclame une norme sur les pesticides

**Actu-environnement 18/02/20**

L'ONG Générations futures recense plusieurs dizaines de substances actives pesticides présentes dans l'air, en se basant sur les données d'ATMO France. Plus de la moitié sont des perturbateurs endocriniens suspectés, et environ un tiers sont cancérigènes.

Ce mardi 18 février, l'ONG Générations futures a publié un rapport qui alerte sur la présence « importante » de substances pesticides dans l'air ambiant, suspectées d'être des perturbateurs endocriniens (PE) ou cancérigènes, mutagènes et reprotoxiques (CMR). Générations futures s'est d'abord appuyée sur la base des données « PhytAtmo », établies en décembre 2019 par

ATMO France, la fédération des associations régionales de surveillance de la qualité de l'air (AASQA). [...]

[Accès au document](#)

## Des associations portent plainte contre EDF pour pollution radioactive dans la Loire

**Actu-environnement 19/02/20**

Mardi 18 février, le réseau Sortir du nucléaire et le collectif Loire Vienne zéro nucléaire, ont déposé plainte, auprès du procureur du parquet de Paris, contre l'énergéticien EDF et contre X, suite à la pollution radioactive au tritium mesurée, en janvier 2019, dans la Loire à Saumur (Maine-et-Loire), qui est située à 20 km de la centrale nucléaire de Chinon.

Un prélèvement a été effectué, le 21 janvier 2019, dans la commune de Saumur, par un réseau de préleveurs volontaires, puis analysé par un laboratoire agréé de l'Association pour le contrôle de la radioactivité dans l'Ouest (ACRO). Les résultats des analyses, présentés le 18 juin 2019, ont relevé une concentration de 310 becquerels par litre (Bq/l) de tritium dans l'eau de la Loire. Soit trois fois plus que « le seuil d'alerte de 100 Bq/l dans l'eau potable, qui doit déclencher des investigations », soulignent les associations plaignantes dans leur lettre adressée au procureur de Paris. [...]

[Accès au document](#)

## Les chiffres noirs des ventes de pesticides « extrêmement dangereux »

**Le Monde 20/02/20**

« Nous nous soucions de notre planète et gérons intelligemment ses ressources limitées », ou encore « nous nous engageons pour une agriculture durable et l'utilisation responsable des technologies phytosanitaires dans le monde entier », clame CropLife International sur la page d'accueil de son site Internet. CropLife [...] n'est pas une association écologiste. Il s'agit de la

puissante et méconnue fédération internationale qui œuvre dans l'ombre sur tous les continents pour défendre les intérêts des géants de l'agrochimie. Son conseil d'administration est trusté par les multinationales qui ont fait fortune dans la vente de pesticides : les allemandes Bayer et BASF, les américaines Corteva Agriscience et FMC, la suisse Syngenta. Ces cinq sociétés contrôlent 65 % du marché mondial, estimé en 2018 à la somme vertigineuse de 57,6 milliards de dollars (53,3 milliards d'euros). [...]

[Accès au document](#)

## Vingt-neuf « pisseurs involontaires de glyphosate » portent plainte à Quimper

Actu-environnement 20/02/20

Vingt-neuf membres du collectif breton des « pisseurs involontaires de glyphosate » ont déposé plainte au palais de justice de Quimper, mardi 18 février, contre des responsables politiques et institutionnels, des fabricants de pesticides et des laboratoires. Ces plaintes s'appuient sur l'analyse de leurs urines, réalisée en septembre 2019 grâce à la méthode de test immunologique Élisa (pour dosage d'immunoabsorption par enzyme liée). Les résultats montraient que chacun d'entre eux avaient des traces de l'herbicide dans leur urine. En moyenne, lesdites traces s'élevaient à 1,32 microgramme par litre d'urine ( $\mu\text{g}/\text{l}$ ), soit un taux supérieur au seuil autorisé dans l'eau potable, fixé à 0,10  $\mu\text{g}/\text{l}$  par un arrêté datant de 2007. [...]

[Accès au document](#)

## Quelle est cette agriculture "agroécologique" qui aura le droit de continuer à utiliser du glyphosate ?

Huffingtonpost 21/02/20

Les agriculteurs pratiquant l'agriculture de conservation des sols pourront continuer de désherber avec un peu de glyphosate malgré l'interdiction de cet herbicide en 2021, a indiqué

ce vendredi 21 février le ministre de l'Agriculture, Didier Guillaume, sur LCI.

"Ma position est claire : on va continuer l'agriculture de conservation des sols avec du glyphosate", a dit le ministre. "S'il n'y a pas de glyphosate", l'agriculture de conservation des sols, "pratique agroécologique vertueuse", ne "peut pas se faire", a jugé le ministre. [...]

[Accès au document](#)

## Pesticides dans l'agriculture : la recherche publique européenne veut en finir

Huffingtonpost 24/02/20

"Pour une agriculture sans pesticide chimique". Le ton est on ne peut plus clair : ce dimanche 23 février, 24 organismes européens de recherche lancent une initiative qui vise à façonner et à donner naissance au futur de l'agroécologie. Un avenir qui se veut, donc, sans pesticides.

Originaires de seize pays européens, les organismes signataires s'engagent dans une vision commune, prenant un engagement déterminant en marge du Salon de l'Agriculture. Formée avec le soutien du ministère français de l'agriculture, cette initiative vise à "asseoir la mise en place d'une alliance européenne de recherche qui finalisera une feuille de route et la présentera prochainement à la Commission européenne pour contribuer au Pacte vert pour l'Europe". [...]

[Accès au document](#)

## Marseille : des taux anormalement élevés de chrome VI dans les eaux souterraines

Actu-environnement 24/02/20

Pendant six ans, les 9 000 habitants du quartier Saint-Louis, à Marseille, ont vécu sans savoir que les nappes phréatiques de leur territoire étaient polluées par du chrome hexavalent, également connu sous le nom de chrome VI. Contrairement au chrome III, abondamment présent dans la croûte terrestre, le chrome VI provient généralement de rejets industriels. Il est classé



comme agent cancérogène pour l'homme par inhalation. Par voie orale, il peut s'avérer toxique pour l'estomac, le foie, les reins et les cellules sanguines. [...]

[Accès au document](#)

## Effets des faibles doses dans l'évaluation du risque des pesticides sur l'abeille : un workshop organisé par l'ITSAP

Itsap-Com, le 19 février 2020

La soumission de la méthode de vol de retour à la ruche à l'OCDE en 2020 clôturera 5 années de test circulaire européen coordonné par l'ITSAP. Pour préparer la défense de la méthode à l'OCDE, nous avons organisé un Workshop international réalisant l'état des lieux des méthodes mesurant les effets des faibles doses de pesticides et des verrous empêchant leur inscription dans les procédures officielles d'évaluation des risques.

Depuis 5 ans, l'ITSAP coordonne la validation internationale d'une méthode permettant d'évaluer les effets de doses sublétales de pesticides sur le retour à la ruche des butineuses en conditions naturelles<sup>1</sup>. La finalité de ce travail est l'inscription de cette méthode dans les lignes directrices internationales de l'OCDE<sup>2</sup> pour qu'elle soit employée dans le cadre des procédures d'évaluation du risque des pesticides avant leur mise sur le marché. Cette méthode est très attendue car il n'y a pas dans la procédure actuelle de test permettant d'évaluer de tels effets sur les abeilles. [...]

[Accès au document](#)

## Les pesticides en France devaient baisser de 50 %, ils ont augmenté de 25 %

Futura-sciences 21/02/20

La quantité de produits phytosanitaires pour l'agriculture utilisée en France a augmenté de 25 % entre 2011 et 2018, là où le plan Écophyto prévoyait une réduction de 50 %. Comment

expliquer cette utilisation accrue de pesticides, alors que les agriculteurs et l'État assurent faire beaucoup d'efforts pour réduire la consommation ?

En 2009, la loi de programmation relative à la mise en œuvre du Grenelle de l'environnement s'était fixée pour objectif une réduction de 50 % de l'usage des pesticides en dix ans. Un chiffre bien loin d'être atteint, malgré les 371 millions d'euros dépensés chaque année dans le plan Écophyto, principal outil de cette politique depuis 2012. [...]

[Accès au document](#)

## Annnonce de Didier Guillaume L'agriculture de conservation des sols pourra continuer à utiliser du glyphosate

Terre-net 21/02/20

Les agriculteurs pratiquant l'agriculture de conservation des sols pourront continuer de désherber avec un peu de glyphosate malgré l'interdiction de cet herbicide en 2021, a indiqué vendredi le ministre de l'agriculture, Didier Guillaume, sur LCI.

« Ma position est claire : on va continuer l'agriculture de conservation des sols avec du glyphosate » a dit le ministre. « S'il n'y a pas de glyphosate », l'agriculture de conservation des sols, « pratique agro-écologique vertueuse », ne « peut pas se faire », a jugé le ministre.

« Si on veut protéger les sols, garder le carbone dans les sols et lutter contre le réchauffement climatique, il faut des couvertures de sol, il faut arrêter ces grands champs labourés vides pour capter l'azote, le carbone », a expliqué le ministre. [...]

[Accès au document](#)

## USask computer-based simulator tests insects for effects of new pesticide

EurekaAlert! 24/02/20

SASKATOON-University of Saskatchewan (USask) researchers have used a novel combination of



techniques to compare the effects of two families of pesticides used in agriculture, and found that at low dosages the newer pesticide is less toxic than a currently used neonicotinoid one.

USask biology professor Jack Gray's research on locusts, published in the [Proceedings of the National Academy of Sciences](#) (PNAS), may have implications for understanding the link between these pesticides and mortality in other species such as the "colony collapse disorder" responsible for the deaths of millions of bees worldwide.[...]

[Accès au document](#)

## 'Grand Challenge' review stresses global impact of microplastics

EurekAlert! 24/02/20

Professor Rob Hale of William & Mary's Virginia Institute of Marine Science is lead author of a new "Grand Challenges" paper commissioned to mark the 100th anniversary of the American Geophysical Union [...].

The paper, "A Global Perspective on Microplastics," is co-authored by VIMS doctoral student Meredith Seeley and senior research scientist Dr. Mark LaGuardia, along with Drs. Lei Mai and Eddy Zeng of Jinan University in Guangzhou, China.

"Microplastics" are microscopic particles fabricated for products like facial scrubs, or produced when physical, chemical, and biological forces break down larger pieces of plastic debris. There has been widespread concern among scientists and the public that these minute synthetic fragments are impacting marine ecosystems. [...]

[Accès au document](#)

## Instrument may enable mail-in testing to detect heavy metals in water

EurekAlert! 25/02/20

Lead, arsenic, and other heavy metals are increasingly present in water systems around the

world due to human activities, such as pesticide use and, more recently, the inadequate disposal of electronic waste. Chronic exposure to even trace levels of these contaminants, at concentrations of parts per billion, can cause debilitating health conditions in pregnant women, children, and other vulnerable populations.

Monitoring water for heavy metals is a formidable task, however, particularly for resource-constrained regions where workers must collect many liters of water and chemically preserve samples before transporting them to distant laboratories for analysis.

To simplify the monitoring process, MIT researchers have developed an approach called SEPSTAT, for solid-phase extraction, preservation, storage, transportation, and analysis of trace contaminants. The method is based on a small, user-friendly device the team developed, which absorbs trace contaminants in water and preserves them in a dry state so the samples can be easily dropped in the mail and shipped to a laboratory for further analysis. [...]

[Accès au document](#)

## Comparing PFAS exposures in female firefighters and office workers

EurekAlert! 26/02/20

Firefighters have higher rates of some cancers than the general population, which might not be surprising given the many potential carcinogens they encounter while battling blazes. However, previous studies of chemical exposures in this occupation have focused almost exclusively on men. Now, researchers reporting in ACS' Environmental Science & Technology have compared poly- and perfluorinated substances (PFAS) in the serum of female firefighters and female office workers, finding higher levels of three compounds in the firefighters. [...]

[Accès au document](#)

## Adding sewage sludge on soils does not promote antibiotic



## resistance, Swedish study shows

EurekAlert! 10/02/20

Adding sewage sludge on soils does not promote antibiotic resistance, a study from University of Gothenburg shows.

Some of the antibiotics we use end up in sewage sludge, together with a variety of antibiotic resistant bacteria present in feces. Therefore, there is a widespread concern that spreading sludge on farmland would contribute to the development or spread of antibiotic resistance.

In a new scientific study, researchers from the Centre for Antibiotic Resistance Research, CARE, at the University of Gothenburg investigated effects of over thirty years of regular spread of sludge to soils. [...]

[Accès au document](#)

## Bayreuth researchers discover new arsenic compounds in rice fields

EurekAlert! 11/02/20

University of Bayreuth researchers, together with scientists from Italy and China, have for the first time systematically investigated under which conditions, and to what extent, sulphur-containing arsenic compounds are formed in rice-growing soils. To date, these thioarsenates have not been taken into account in assessments of the health effects of rice consumption. In the journal *Nature Geoscience* the scientists present their results and identify the urgent need for research with a view to protecting consumers from health risks. [...]

[Accès au document](#)

## Microplastics are new homes for microbes in the Caribbean

EurekAlert! 12/02/20

With 5 trillion pieces of plastic in the oceans, the dynamics of marine environments are shifting in ways that are yet to be discovered. Over time

discarded plastics, such as sandwich bags and flip-flops, have degraded into small particles, called microplastics, which are less than 5 mm long. Cassandra Dudek, a former Smithsonian Tropical Research Institute (STRI) fellow and doctoral student at Arizona State University, looked at how marine microbial communities colonize microplastics in Panama. [...]

[Accès au document](#)

## Modified clay can remove herbicide from water

EurekAlert! 12/02/20

By creating neatly spaced slits in a clay mineral, University of Groningen Professor of Experimental Solid State Physics Petra Rudolf was able to filter water to remove a toxic herbicide. After removing the pollutant by heating the material, the clay can be reused. Together with colleagues from Greece, Rudolf presents this proof of principle study in the journal *Environmental Science Nano*.

In the Netherlands, a lot of sugar beets are grown. On these fields, the herbicide chloridazon is widely used. This compound is toxic to humans, does not break down in nature and will eventually seep into the groundwater. Chloridazon concentrations in groundwater are currently below the safety threshold but as it is persistent in the environment, they are expected to increase. 'Water purification plants can break down chloridazon using UV light - but the breakdown products of chloridazon are also toxic,' explains Rudolf. [...]

[Accès au document](#)

## New potential cause of Minamata mercury poisoning identified

EurekAlert! 13/02/20

One of the world's most horrific environmental disasters--the 1950 and 60s mercury poisoning in Minamata, Japan--may have been caused by a previously unstudied form of mercury discharged directly from a chemical factory, research by the University of Saskatchewan (USask) has found.

"By using state-of-the-art techniques to re-investigate a historic animal brain tissue sample, our research helps to shed new light on this tragic mass poisoning," said USask professor Ingrid Pickering, Canada Research Chair in Molecular Environmental Science. "Mercury persists for a long time in nature and travels long distances. Our research helps with understanding how mercury acts in the environment and how it affects people." [...]

[Accès au document](#)

## Air pollution's tiny particles may trigger nonfatal heart attacks, Yale study finds

EurekAlert! 14/02/20

Yale-affiliated scientist finds that even a few hours' exposure to ambient ultrafine particles common in air pollution may potentially trigger a nonfatal heart attack.

Myocardial infarction is a major form of cardiovascular disease worldwide. Ultrafine particles (UFP) are 100 nanometers or smaller in size. In urban areas, automobile emissions are the primary source of UFP.

The study in the journal [Environmental Health Perspectives](#) is believed to be the first epidemiological investigation of the effects of UFP exposure and heart attacks using the number of particles and the particle length and surface area concentrations at hourly intervals of exposure. [...]

[Accès au document](#)

## Quelle agriculture nous voulons pour demain ?

Agriculture-environnement 13/02/20

Aujourd'hui c'est la rentrée et j'ai envie de pousser un coup de gueule. Ça fait des jours et des jours qu'on nous parle des pesticides, des zones de non-traitement. Tous les médias se sont emparés de ces arrêtés, de ces quelques maires qui ont décidé de faire de la politique politicienne avec un sujet agricole alors que le vrai sujet, celui dont personne ne parle, c'est quand même le fait que pour la première fois

depuis 1945 la France n'exporte plus autant de produits agricoles qu'elle n'en importe des autres pays européens. [...]

[Accès au document](#)

## Koppert collaborates to launch free biocontrol tool

AG news 17/02/20

The CABI\* BioProtection Portal - an online resource to raise awareness of biological crop protection options for growers - has been launched in Kenya. Koppert Biological Systems is one of the partners to share its expertise to produce an innovative free-to-use tool to help growers reduce their reliance on chemical pesticides and produce safer and healthier food.

The launch comes as CABI and its partners mark the inaugural International Year of Plant Health which aims to raise awareness of the importance of plant health in addressing world hunger, poverty, threats to the environment and economic development. [...]

[Accès au document](#)

## ZNT La Coordination rurale saisit le Conseil d'État

Terre-Net 12/02/20

La Coordination rurale a saisi mardi le Conseil d'État pour faire annuler l'arrêté qui règlemente depuis le 1er janvier les distances minimales d'épandage des pesticides, a annoncé mercredi le syndicat agricole.

« Cet arrêté entraîne une réduction significative des surfaces cultivées sur l'ensemble du territoire national », explique la Coordination Rurale. (©Pixabay)

« La Coordination rurale a déposé hier (mardi) devant le Conseil d'État une requête en annulation contre [l'arrêté du 27 décembre 2019](#) instaurant les Zones de non traitement (ZNT) », a-t-elle indiqué dans un communiqué. [...]

[Accès au document](#)

## Moët Hennessy arrêtera l'utilisation des herbicides en Champagne fin 2020

Terre-Net 13/02/20

Moët Hennessy arrêtera « fin 2020 » l'utilisation des herbicides dans tous ses vignobles de Champagne, et en 2021 dans ceux de la région de Cognac, a annoncé son PDG Philippe Schaus lors du salon Wine Paris-Vinexpo.

« Fin 2020 en Champagne, nous allons complètement arrêter les herbicides, et nous allons construire un nouveau centre de recherche et développement en Champagne d'une valeur de 20 millions d'euros », a déclaré Philippe Schaus lors d'un entretien avec l'AFP. « Pour le cognac, nous arrêterons un an plus tard », a précisé le dirigeant, qui a succédé en 2017 à Christophe Navarre à la tête de la filiale vins et spiritueux du groupe de luxe LVMH. « Nous remplaçons les herbicides par le désherbage mécanique grâce notamment à des tracteurs électriques et des robots » a-t-il dit. [...]

[Accès au document](#)

## Distances d'épandage Rejet du recours d'urgence des maires anti-pesticides

Terre-Net 14/02/20

Le Conseil d'État a rejeté vendredi une demande de suspension en urgence des textes fixant les distances minimales d'épandage des pesticides, présentée par le collectif des maires anti-pesticides et d'ONG qui les jugeaient insuffisants pour protéger les populations.

Dans un arrêté et [un décret publiés le 27 décembre](#) après plusieurs mois de polémique, le gouvernement a tranché et confirmé les distances mises en consultation publique à l'automne : cinq mètres pour les cultures dites basses comme les légumes et céréales et dix mètres pour les cultures hautes, fruitiers ou vignes. Une distance portée à 20 mètres pour les produits « les plus dangereux », qui représentent environ 0,3 % des substances actives utilisées. [...]

[Accès au document](#)

## Face au « flou artistique », 62 % des agris ne comptent pas appliquer les ZNT

Agri-Mutuel 17/02/20

C'est ce que révèle un sondage publié sur Terre-net et Web-agri entre le 4 et le 11 février 2020 (2 279 votants) : 61,8 % des agriculteurs indiquent qu'ils ne comptent pas mettre en place de zones de non-traitement à proximité des habitations pour les semis de printemps. Ils affichent leur désaccord face à cette mesure et dénoncent un manque de précisions quant à son application. [...]

[Accès au document](#)

## Perturbateurs endocriniens : vers une définition européenne transversale ?

Actu-environnement 27/01/20

Lors d'une table ronde au Sénat, différentes parties prenantes sont revenues sur le cadre de gestion des perturbateurs endocriniens et notamment sur leur définition. En ligne de mire, les échéances européennes sur le sujet.

« Il est important d'avoir une définition transversale [des perturbateurs endocriniens] dans l'ensemble des réglementations, y compris sectorielle : aujourd'hui elle existe pour les produits phytosanitaires et les biocides. Reste désormais les produits cosmétiques, les jouets et les contenants alimentaires », a indiqué Pierre Bodenez, chef du service des risques liés à l'environnement, des déchets et des pollutions diffuses à la Direction générale de la prévention des risques au ministère de la Transition écologique, lors d'une table ronde sur l'exposition du quotidien aux perturbateurs endocriniens (PE) au Sé\_nat. [...]

[Accès au document](#)

## Phytos : le collectif des maires anti-pesticides attaque les textes sur les distances d'épandage

Actu-environnement 24/01/20

Les textes sur les zones de non-traitement autour des habitations sont critiqués de toutes parts. L'association des maires anti-pesticides et des ONG les attaquent en justice. Les organisations agricoles s'y opposent mais pour des raisons opposées.

Le collectif des maires anti-pesticides a annoncé, le 21 janvier, le dépôt d'un recours devant le Conseil d'État contre les textes réglementant les distances d'épandage des produits phytosanitaires, publiés le 29 décembre dernier. Il demande également leur suspension au juge des référés compte tenu de l'urgence de la situation. [...]

[Accès au document](#)

## Restriction de l'usage du plomb : le parlement s'oppose à une dérogation pour le PVC valorisé

Actu-environnement 22/01/20

La restriction de l'usage du plomb dans le PVC pour toutes ses formes et composés, ne doit pas comporter de dérogation pour les produits recyclés : c'est la résolution qu'a adopté la commission de l'environnement du Parlement européen mardi 21 janvier. Dans une proposition de modification du règlement Reach, la Commission européenne propose, en effet, que pour des articles à base de PVC, la concentration en plomb ne puisse pas dépasser 0,1 % pour pouvoir être mis sur le marché. [...]

[Accès au document](#)

## Pesticides : un nouvel outil pour connaître les ventes par département

Actu-environnement 21/01/20

Faciliter l'accès des citoyens aux données et assurer davantage de transparence sur l'évolution de l'utilisation des produits phytosanitaires en France. Tel est l'objectif affiché par le ministère de la Transition écologique et l'Office français de la biodiversité (OFB) à travers la mise en ligne de [l'outil Dataviz](#).

Cet outil permet de visualiser l'évolution des ventes de pesticides par département sur la période 2008-2018. Figurent dans le peloton de tête la Haute-Corse avec + 13,2 % par an, le Gard avec + 12,1 %, les Hautes-Alpes avec + 10,7 % et le Tarn-et-Garonne avec + 10 %. Le 7 janvier dernier, le Gouvernement avait révélé que les ventes de pesticides avaient augmenté de 21 % en 2018 par rapport à l'année précédente. [...]

[Accès au document](#)

## Certificats d'économie de produits phytos : une expérimentation en Outre-mer en 2022 ?

Actu-environnement 16/01/20

La loi Egalim de 2018 prévoit la pérennisation du dispositif des certificats d'économie de produits phytosanitaires (CEPP), expérimenté en métropole depuis 2016, et son extension aux territoires ultramarins. Une mission commune aux commissariats généraux de l'environnement et de l'agriculture (CGEDD et CGAER) a été chargée de préfigurer les contours du dispositif tel qu'il pourrait s'appliquer aux Outre-mer et qui sera arrêté par décret. [...]

[Accès au document](#)

## Six axes pour améliorer le règlement Reach

Actu-environnement 15/01/20

Treize ans après l'entrée en vigueur du règlement européen Reach, le conseil économique, social et environnemental (CESE) français publie une série de recommandations pour améliorer son efficacité. Faisant porter de manière inédite la charge de la preuve d'innocuité aux fabricants de substances chimiques, le règlement Reach a placé les



entreprises au cœur du système. Une bonne manière de les responsabiliser mais qui peut induire des défaillances si le contrôle n'est pas à la hauteur. [...]

[Accès au document](#)

## Phytosanitaires : face à la hausse des ventes, un nécessaire changement de paradigme ?

**Actu-environnement 09/01/20**

[...] Année après année et plans après plans, la réduction de l'usage des phytosanitaires ne s'amorce pas, au contraire.

[...] les ministres de la Transition écologique, de la Santé, de la Recherche et de l'Agriculture, ont réuni le comité d'orientation stratégique et de suivi (COS) du plan national de réduction des produits phytopharmaceutiques, Écophyto 2+. Et le bilan n'est pas fameux... « Après une légère baisse en 2017, le comité a constaté une augmentation globale forte des quantités de produits phytopharmaceutiques vendues en 2018 ». Les ventes ont augmenté de 21 % par rapport à 2017, et de 23 % pour les seuls usages agricoles. [...]

[Accès au document](#)

## Pesticides : une revue scientifique révèle l'illusoire protection des travailleurs agricoles

**Actu-environnement 09/01/20**

L'efficacité réelle des équipements de protection individuelle est souvent surestimée et de nombreux facteurs occultés rendent leur utilisation difficile. Or, de nombreux pesticides sont autorisés en se basant sur cette protection théorique.

Le rôle protecteur attribué aux équipements de protection individuelle (EPI) dans l'autorisation de mise sur le marché (AMM) des pesticides doit être remis en question. C'est la conclusion à laquelle les auteurs d'une revue critique de la

littérature scientifique parviennent dans un article à paraître dans le numéro de mars 2020 de la revue Safety Science. [...]

[Accès au document](#)

## Poussières de plomb dans les espaces publics : les enfants et les travailleurs à surveiller

**Actu-Environnement 10/02/20**

L'agence de sécurité sanitaire (Anses) estime qu'il faut surveiller les enfants et les professionnels qui sont au contact des poussières de plomb déposées dans les espaces extérieurs. Ce mode d'exposition est encore peu connu.

Saisie par les ministères en charge de la Santé et du Travail après la publication de mesures relevant des concentrations très importantes de plomb, à la suite de l'incendie de Notre-Dame de Paris, l'agence de sécurité sanitaire (Anses) fait le point sur l'exposition aux poussières de plomb déposées sur les surfaces d'espaces publics extérieurs (trottoirs, voiries, mobilier urbain, aires de jeux...). Elle conclut que c'est une source d'exposition peu connue mais à surveiller, le plomb étant toxique pour la santé et plus particulièrement pour celle des jeunes enfants. [...]

[Accès au document](#)

## Résidus médicamenteux vétérinaires : quelle contamination en Bretagne ?

**Actu-environnement 07/02/20**

Quelle est la contamination des ressources en eaux et de l'eau potable par les résidus médicamenteux vétérinaires en Bretagne ? C'est la question à laquelle souhaite répondre l'étude Expo-veto portée notamment par l'École des hautes études en santé publique et le laboratoire d'étude et de recherche en environnement et santé. Le choix de la région n'est pas anodin : la Bretagne arrive en tête de la production laitière, porcine, de poulets et d'œufs de consommation. [...]

[Accès au document](#)

## Le Sénat crée une commission d'enquête sur la pollution des sols

Actu-environnement 06/02/20

Les sénateurs ont procédé, mercredi 5 février, à la désignation des 21 membres de la commission d'enquête sur les problèmes sanitaires et écologiques liés aux pollutions des sols qui ont accueilli des activités industrielles ou minières. [...]

L'objet de la commission d'enquête est de créer un [état des lieux national](#) des sites pollués, sachant que la base de données Basol recense d'ores et déjà 6 800 sites et sols pollués, auxquels s'ajoutent 300 000 anciens sites industriels potentiellement pollués, rappellent les sénateurs. Ces derniers souhaitent ensuite proposer des solutions de réhabilitation...

[Accès au document](#)

## Réduction des pesticides : la PAC n'est pas assez contraignante, estime la Cour des comptes européenne

Actu-environnement 06/02/20

La politique agricole commune 2021-2027 devrait être plus contraignante en matière de réduction d'usage des phytosanitaires, estime la Cour des comptes européennes. La Commission européenne renvoie la balle aux États membres.

Quelques jours après la publication de la Cour des comptes analysant l'échec français en matière de réduction de l'usage des produits phytopharmaceutiques, c'est au tour de la Cour des comptes européenne de livrer son avis sur les résultats européens en la matière. Et le diagnostic est sans appel : les avancées en matière de réduction des pesticides sont timides. La raison ? La réglementation est peu contraignante, les contrôles sont rares, les alternatives peu nombreuses et la surveillance des impacts sanitaires et environnementaux est faible. [...]

[Accès au document](#)

## Phytosanitaires : la Cour des comptes estime que l'État doit durcir son action

Actu-environnement 04/02/20

Face aux échecs successifs des plans Écophyto, la Cour des comptes estime que l'État pourrait davantage peser dans la transition agricole en fléchissant les financements, encadrant l'usage des produits et améliorant l'information du public.

La Cour des comptes a publié, le 4 février, un référé sur le bilan des plans Écophyto, qui visent une réduction de 50 % des produits phytopharmaceutiques. Elle estime « que les effets des plans Écophyto demeurent très en deçà des objectifs fixés ». Si elle dresse des recommandations pour rendre plus efficaces les politiques visant la transition du modèle agricole, la Cour des comptes « estime que l'État pourrait davantage influencer sur les modes de production et les filières par l'exercice de ses compétences normatives, de régulation et d'information ». La Cour des comptes publie également la [réponse du Premier ministre](#), auquel elle a adressé le référé le 27 novembre dernier. [...]

[Accès au document](#)

## Phytosanitaires Le Luxembourg va interdire le glyphosate fin 2020, une première en Europe

Terre-Net 16/01/20

Le Luxembourg va devenir le premier pays de l'Union européenne à bannir le glyphosate, un herbicide qui sera interdit fin 2020 avec une première étape le 1er février, a annoncé jeudi son ministère de l'agriculture.

D'ici au 31 décembre 2020, les produits phytopharmaceutiques à base de glyphosate seront bannis des sols du Grand-Duché, conformément à l'accord du gouvernement datant de 2018. [...]

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## ZNT : une réponse de communication éloignée de la réalité du risque

**Agriculteur-Normand 21/01/20**

Pour Gilles Lievens (président de la Chambre d'agriculture de l'Eure et président du pôle IRD de la CRAN), l'arrêté ZNT n'est qu'une réponse de communication éloignée de la réalité du risque. « On ne va pas supprimer les conflits de voisinage mais, au contraire, les mettre en relief », craint-il. [...]

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## Emmanuel Macron veut reconquérir le cœur des agriculteurs

**Agri-mutuel 21/01/20**

Dissonances du côté de la ministre de l'écologie !

Si Emmanuel Macron s'est appliqué à défendre ce modèle français, c'est sans doute avant tout pour apaiser les tensions avec le monde agricole, irrité ces derniers mois par [...] le bouillant sujet de l'interdiction du glyphosate ou encore celui, tout aussi clivant, des zones de non traitement (ZNT) à proximité des habitations, illustration de l'objectif gouvernemental d'aller vers une réduction rapide de l'utilisation des pesticides de synthèse.

Cette belle déclaration d'amour du président a cependant été ternie par les propos tenus le matin-même par la ministre de la transition écologique, Elisabeth Borne. À l'occasion de ses vœux à la presse, cette dernière a estimé que « produire autrement c'est aussi changer de modèle agricole et ce n'est pas céder à un quelconque « bashing » que de le dire ». « Ce modèle a eu ses vertus mais il est arrivé à bout de souffle, il bouscule la nature et il enferme tellement d'agriculteurs dans une impasse », a poursuivi la ministre, ajoutant que cet état d'esprit devrait être porté dans la future Pac.

[...]

Quant au président de la République interrogé à l'issue de son discours, il a contredit les propos de sa ministre, estimant qu'en matière de transition agro-écologique, il fallait « avoir de

l'ambition, mais sans pessimisme ». « Il y a toute la transition écologique et environnementale qu'on est en train de faire filière par filière pour progressivement sortir de certains pesticides, et réduire les pesticides, conformément aux engagements que j'ai pris en campagne. On est en train de réinventer un nouveau modèle, la France a une exception agricole qui est forte et qu'il faut défendre ».

Questionné sur la capacité à préserver ce modèle français dans un contexte de concurrence internationale très fort, le président a également rappelé que sa stratégie restait de « faire bouger l'Europe dans le même sens ». « Derrière, ça veut dire aussi harmoniser les contrôles sanitaires européens », a-t-il ajouté, défendant l'idée d'une « agence sanitaire européenne ».

[Accès au document](#)

## Air pollution can worsen bone health

**EurekaAlert! 03/01/20**

Some of the effects of air pollution on health are well documented -lung cancer, stroke, respiratory diseases, and a long etcetera- but for others there is less scientific evidence. Such is the case of bone health: there are only a few studies and results are inconclusive. Now, a study in India led by the Barcelona Institute for Global Health (ISGlobal), an institution supported by "la Caixa", has found an association between exposure to air pollution and poor bone health.

Osteoporosis is a disease in which the density and quality of the bone is reduced. Globally, it is responsible for a substantial burden of disease and its prevalence is expected to increase due to aging of the population.

The new study performed by the CHAI Project, led by ISGlobal and published in Jama Network Open, analysed the association between air pollution and bone health in over 3,700 people from 28 villages outside the city of Hyderabad, in southern India. [...]

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## Le sulfoxaflor et la flupyradifurone, proches des néonicotinoïdes, interdits

**Agri Mutuel 31/12/19**

Le Gouvernement a confirmé par décret, le 30 décembre, l'interdiction de deux substances phytopharmaceutiques au mode d'action proche de celui des néonicotinoïdes, interdits en France depuis septembre 2018.

Après l'interdiction en 2018 des néonicotinoïdes, utilisés comme insecticides, dans le but de protéger les pollinisateurs, ce sont désormais le sulfoxaflor et la flupyradifurone, deux substances phytopharmaceutiques aux modes d'action identiques, qui sont interdits par un décret du 30 décembre.

Cette interdiction était prévue dans la loi Egalim, a rappelé le ministre de l'Agriculture dans un communiqué du 31 décembre. La France porte par ailleurs « au niveau européen des positions ambitieuses afin de renforcer les conditions d'autorisation des produits phytopharmaceutiques, en intégrant notamment la toxicité chronique et les effets sublétaux sur les pollinisateurs », ajoute-t-il.

[Accès au document](#)