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Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique

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Edito

Voici, avec un peu de retard, notre 59ème bulletin de veille, qui nous espérons toujours informatif !

Nous vous proposons deux tribune en fin de ce bulletin, téléchargeables sous forme de fiches thématiques sur notre site ECOTOX. la première concerne la contamination en cuivre des sols viticoles https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-40-aout-2022, la seconde rapporte une première approche de l'histoire de l'écotoxicologie à l'INRA et Irstea https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-41-octobre-2022.

Nous vous rappelons notre PCI pour la soumission de vos preprints : https://ecotoxenvchem.peercommunityin.org/ Notre PCI monte en puissance.

N'oubliez pas de nous transmettre les informations que vous souhaitez diffuser, notamment vos publications que nous pourrions avoir oubliées. Nous rencontrons actuellement des soucis d'alertes WoS, il se peut que la liste des productions du réseau soit donc incomplète.

L'équipe vous souhaite une bonne lecture de ce bulletin !

Contact : veille-ecotox@inrae.fr

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- High Prevalence and Varied Distribution of Antibiotic-Resistant Bacteria in the Rhizosphere and Rhizoplane of Citrus medica
- Facultative pathogenic bacteria and antibiotic resistance genes in swine livestock manure and clinical wastewater: A molecular biology comparison
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ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / BIOCONTROLE

- Impact of Litsea cubeba inter-row cover on the structure of bacterial community in the tea plantation

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- Using amendment derived from vermicompost combined with calcium and magnesium mineral to achieve safe production of eggplant and its microbial ecological effect in Cd-contaminated soil | SpringerLink
- Biochar rebuilds the network complexity of rare and abundant microbial taxa in reclaimed soil of mining areas to cooperatively avert cadmium stress
- Fungal bioproducts for petroleum hydrocarbons and toxic metals remediation: recent advances and emerging technologies

ERA / PUBLICATIONS SCIENTIFIQUES / PLASTIQUES

- Bioplastic (PHBV) addition to soil alters microbial community structure and negatively affects plant-microbial metabolic functioning in maize
- Year-Long Microbial Succession on Microplastics in Wastewater: Chaotic Dynamics Outweigh Preferential Growth
- Individual and combined toxicity of microplastics and diuron differs between freshwater and marine diatoms
- Occurrence of polycyclic aromatic hydrocarbons, microplastics and biofilms in Alqueva surface water at touristic spots
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- Finding a Benign Plasticizer to Enhance the Microbial Degradation of Polyhydroxybutyrate (PHB) Evaluated by PHB Degrader Microbulbifer sp. SOL66
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- Biodegradable microplastics enhance soil microbial network complexity and ecological stochasticity
- Organic matter production and recycling in marine biofilm developing on common and new plastics
- Microbial succession during the degradation of bioplastic in coastal marine sediment favors sulfate reducing microorganisms

PESTICIDES ET SANTE DES AGRICULTEURS

- Glyphosate exposure in early pregnancy and reduced fetal growth: a prospective observational study of high-risk pregnancies
- Pyrethroids and developmental neurotoxicity - A critical review of epidemiological studies and supporting mechanistic evidence
- Determinants of organophosphorus pesticide urinary metabolite levels in pregnant women from the CHAMACOS cohort
- Prenatal ambient pesticide exposure and childhood retinoblastoma
- Occupation and Semen Parameters in a Cohort of Fertile Men
- Urinary glyphosate kinetics after occupational exposure
- Suspect and non-targeted screening-based human biomonitoring identified 74 biomarkers of exposure in urine of Slovenian children
- Occupational exposure and risk assessment for agricultural workers of thiamethoxam in vineyards
- Modelling human health risks from pesticide use in innovative legume-cereal intercropping systems in Mediterranean conditions
- Occupational and residential exposures to organophosphate and pyrethroid pesticides in a rural setting
- Exploratory analysis of the association between pyrethroid exposure and rheumatoid arthritis among US adults: 2007-2014 data analysis from the National Health and Nutrition Examination Survey (NHANES)
- Disparities in chemical exposures among pregnant women and neonates by socioeconomic and demographic characteristics: A nontargeted approach
- Review of studies analysing glyphosate and aminomethylphosphonic acid (AMPA) occurrence in groundwater
- An updated systematic review on the maternal exposure to environmental pesticides and involved mechanisms of autism spectrum disorder (ASD) progression risk in children
- Urinary metabolites of diazinon and chlorpyrifos in sprayer operators and farm workers of a potato farm

PUBLICATIONS DU RESEAU ECOTOX

- The impact of temperature on insecticide sensitivity depends on transgenerational effects
- Radiation adverse outcome pathways (AOPs) are on the horizon: Advancing radiation protection through an international Horizon-Style exercise
- Web of Science
- Reclaimed wastewater reuse in irrigation: Role of biofilms in the fate of antibiotics and spread of antimicrobial resistance
- Essential Oils from Cameroonian Aromatic Plants as Effective Insecticides against Mosquitoes, Houseflies, and Moths
- How Silicon Alleviates the Effect of Abiotic Stresses During Seed Germination: A Review
- Wild privet (Ligustrum vulgare L.) - a reliable plant model for the air-pollution biomonitoring
- Multigenerational responses in the Lymnaea stagnalis freshwater gastropod exposed to diclofenac at environmental concentrations
- From molecules to phenotype: mechanisms involved in stress, sociability and hypolocomotion after chronic gamma radiation in adult zebrafish
- Integrated environmental risk assessment of rare earth elements mixture on aquatic ecosystems
- A PBPK model to evaluate zebrafish eleutheroembryos' actual exposure: bisphenol A and analogs' (AF, F, and S) case studies (Sep, 10.1007/s11356-022-22741-2, 2022)
- Graphene-based nanomaterials and microbial communities: a review of their interactions, from ecotoxicology to bioprocess engineering perspectives

- Higher facilitation for stress-intolerant ecotypes along a metal pollution gradient are due to a decrease in performance in absence of neighbours

- Male frequency in Caenorhabditis elegans increases in response to chronic irradiation
- Phytoremediation of Soil Contaminated by Organochlorine Pesticides and Toxic Trace Elements: Prospects and Limitations of Paulownia tomentosa
- Experimental Exposure to Tebuconazole Affects Metabolism and Body Condition in a Passerine Bird, the House Sparrow (Passer domesticus)
- At Which Spatial Scale Does Crop Diversity Enhance Natural Enemy Populations and Pest Control? An Experiment in a Mosaic Cropping System
- A PBPK model to evaluate zebrafish eleutheroembryos' actual exposure: bisphenol A and analogs' (AF, F, and S) case studiesWeb of Science
- rbioacc: An R-package to analyze toxicokinetic data
- Effects of particle size and amendment rates of Sargassum biochar on chlordecone sequestration in West Indian soilscience
- Adverse outcome pathways (AOPs) for radiation-induced reproductive effects in environmental species: state of science and identification of a consensus AOP networkb of Scienc
- Collembola are Among the Most Pesticide-Sensitive Soil Fauna Groups: A Meta-Analy
- Development of an adverse outcome pathway for radiation-induced microcephaly via expert consultation and machine learning Science
- Conformation and structural features of diuron and irgarol: Insights from quantum chemistry calculations

OUVRAGES / RAPPORTS / ACTES DE CONGRES

- 30 years of data: Lead and other environmental toxins linked to CVD deaths in U.S., United Kingdom

REGLEMENTATION

- Motion for a resolution : extension of the approval periods of the active substances 2-phenylphenol, 8-hydroxyquinoline, amidosulfuron, bensulfuron, bifenox, chlormequat, chlorotoluron, clofentezine, clomazone, daminozide, deltamethrin, dicamba, difenoconazole, diflufenican, dimethachlor, esfenvalerate, etofenprox, fenoxaprop-P, fenpropidin, fenpyrazamine, fludioxonil, flufenacet, flumetralin, fosthiazate, lenacil, MCPA, MCPB, nicosulfuron, paraffin oils, paraffin oil, penconazole, picloram, prohexadione, propaquizafop, prosulfocarb, quizalofop-P-ethyl, quizalofop-P-tefuryl, sodium 5-nitroguaiacolate, sodium o-nitrophenolate, sodium p-nitrophenolate, sulphur, tebufenpyrad, tetraconazole, tri-allate, triflusulfuron and tritosulfuron - B9-0460/2022

DROIT ET POLITIQUE DE L'ENVIRONNEMENT

- Réunion du Groupe Santé Environnement : présentation du 4e plan national santé environnement
- Premier appel à projets conjoint entre hubs de données
- Procédure de mise sur le marché de produits phytopharmaceutiques : de l'évaluation à l'autorisation

REVUE DE PRESSE

- Qualité de l’air : de nouvelles normes européennes trop timides
- Breast Cancer Month: Neonicotinoid Insecticides and Breast Cancer Risk (Triple Negative Breast Cancer)
- European Commission makes steps to tackle water pollution but falls short on chemical mixtures
- Common Herbicide Contributes to Development of Inflammatory Bowel Disease
- Environmental health groups urge national governments to play their part to ensure reforms of key chemical legislations make speedy progress
- Pesticides : quel est le rôle de l’Union européenne ?
- REACH : la France doit se positionner en faveur de la révision en avril 2023.
- Commission moves forward on new hazard classes for endocrine disruptors and persistent and mobile chemicals

- AgBiome receives U.S. EPA approval for new Esendo™ fungicide
- First biopesticide with Cordyceps javanica fungus registered against Bemisia tabaci fly in Brazil
- Députés : 10 mesures phares sur les polluants chimiques dangereux et pesticides
- Jérôme Salomon sur France 2 : une reconnaissance de la faille du système d'homologation
- Actualité - Pesticides et abeilles - Vers la fin de l'opacité des procédures d'évaluation
- EDC-Free Europe campaigners welcome the publication of the draft proposal for new EU hazard classes for endocrine disruptors
- Pollution des eaux par des métabolites de pesticides
- Chartes pesticides dites « de bon voisinage » : Générations Futures dresse un état des lieux
- Dérogations de pesticides : l'avocat général de la Cour de justice de l'UE plaide pour un encadrement plus strict
- Produits phytosanitaires : Bruxelles adopte le dispositif simplifié pour les pesticides biologiques

TRIBUNE LIBRE

12/10/2022

Algal responses to metal(loid) pollution, urbanization, and climatic changes in subarctic lakes around Yellowknife, Canada

Authors: Sivarajah B, Korosi JB, Thienpont JR et al.

Source: ARCTIC SCIENCE Early Access, DOI 10.1139/AS-2021-0052

Abstract: The lakes around Yellowknife (Northwest Territories, ...

06/10/2022

Microbial Diversity of a Disused Copper Mine Site (Parys Mountain, UK), Dominated by Intensive Eukaryotic Filamentous Growth

By: Distaso MA, Bargiela R, Johnson B et al.

Source: MICROORGANISMS 10:1694, 2022, DOI 10.3390/microorganisms10091694

Abstract: The Parys Mountain copper mine (Wales, UK) contains ...

22/09/2022

Aquatic toxicity prediction of diverse pesticides on two algal species using QSTR modeling approach

Authors: Banjare P, Singh J, Papa E, Roy PP

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, DOI 10.1007/s11356-022-22635-3

Abstract: With the aim of identification ...

22/09/2022

Algal bioaccumulation and toxicity of platinum are increased in the presence of humic acids

Authors: Hourtane O, Rioux G, Campbell PGC, Fortin C

Source: ENVIRONMENTAL CHEMISTRY Early Access, DOI 10.1071/EN22037

Abstract: There is a growing interest for platinum in e...

22/09/2022

Single and Combined Toxicity Effects of Zinc Oxide Nanoparticles: Uptake and Accumulation in Marine Microalgae, Toxicity Mechanisms, and Their Fate in the Marine Environment

Author: Hazeem L

Source: WATER 14:2669, 2022, DOI 10.3390/w14172669

Abstract: Recently, there has been rapid growth in the production of zinc oxide nanoparticles (ZnO-NPs) due ...

16/09/2022

Graphene-based nanomaterials and microbial communities: a review of their interactions, from ecotoxicology to bioprocess engineering perspectives

Authors: Brayle P, Pinelli E, Gauthier L et al.

Source: ENVIRONMENTAL SCIENCE-NANO Early Access, DOI 10.1039/d2en00547f

Abstract: Graphene-based materials (GBMs) are gaining more ...

08/09/2022

Effects of Enrofloxacin on the Epiphytic Algal Communities Growing on the Leaf Surface of Vallisneria natans

Authors: Chen Q, Jin LQ, Zhong Y, Ji GH

Source: ANTIBIOTICS-BASEL 11:1020, 2022, DOI 10.3390/antibiotics11081020

Abstract: Enrofloxacin (ENR) is a member of quinolones, which ...

07/09/2022

Effects of ofloxacin on the structure and function of freshwater microbial communities

Authors: Deng Y, Debognies A, Zhang Q et al.

Source: AQUATIC TOXICOLOGY 244:106084, 2022, DOI 10.1016/j.aquatox.2022.106084

Abstract: Ofloxacin (OFL) is a broad-spectrum fluor...

02/09/2022

Metabolic plasticity of mixotrophic algae is key for their persistence in browning environments

Authors: Calderini ML, Salmi P, Rigaud C et al.

Source: MOLECULAR ECOLOGY Early Access, DOI 10.1111/mec.16619

Abstract: Light availability is the main regulator of primary production, ...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS

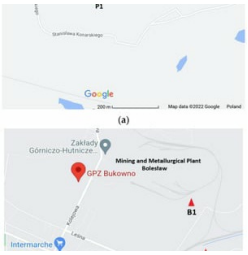
25/10/2022

A field study of nano-FeS loaded lignin hydrogel application for Cd reduction, nutrient enhancement, and microbiological shift in a polluted paddy soil

Authors Wei, XJ, Chen, HY, Lin, D et al.

Source CHEMICAL ENGINEERING JOURNAL 451, 3, 2022

Abstract Cadmium (Cd) pollution in paddy soil has caused serious harm to human health. Nano-ferrous sulfide@lignin hydrogel (FeS@LH) composites could be an ideal material for paddy soil Cd removal due to the excellent adsorption performance and mechanical strength. But the FeS@LH's performance in a paddy field remains unclear...



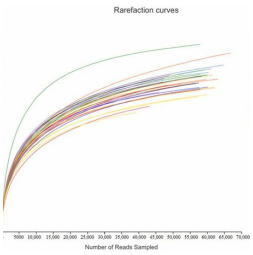
25/10/2022

The Effect of Heavy Metals on Microbial Communities in Industrial Soil in the Area of Piekary... and .. and ...

Authors Jaroslawiecka, AK, Piotrowska-Seget, Z

Source MICROBIOLOGY RESEARCH 13, 3: 626-642, 2022

Abstract The aim of this study was to determine the activity and structure of microbial communities in soils contaminated with heavy metals (HMs). To achieve this goal, soil samples were taken from two contaminated sites (i.e., Piekary Slaskie and Bukowno) in Poland. A wide range of methods were applied, including: total and metal-toler...



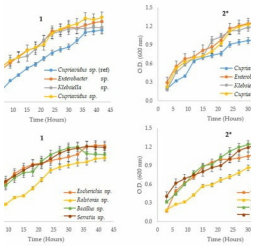
25/10/2022

Effects of Oxathiapiprolin on the Structure, Diversity and Function of Soil Fungal Community

Authors Chen, YX, Zhang, FW, Huang, Bet al.

Source TOXICS 10, 9, 2022

Abstract Pesticides can affect non-target microorganisms in the soil and are directly related to soil microecological health and environmental safety. Oxathiapiprolin is a piperidinyl thiazole isoxazoline fungicide that shows excellent control effect against oomycete fungal diseases, including late blight, downy mildew, root rot, stem rot, and blight. Though it c...



25/10/2022

Tolerance and Cadmium (Cd) Immobilization by Native Bacteria Isolated in Cocoa S... ... with Increased Metal ...

Authors Feria-Caceres, PF, Penagos-Velez, L, Moreno-Herrera, CX

Source MICROBIOLOGY RESEARCH 13, 3, 2022

Abstract Twelve cadmium native bacteria previously isolated in soils of cocoa farms located in the western Colombian Andes (Santander), and tolerant to 2500 mu M CdCl2 (120 mg Cd/L), were chosen in order to test their tolerance and Cd immobilization using liquid culture medium (Nutritive broth) at different concentrations of hea...

25/10/2022

Responsive change of crop-specific soil bacterial community to cadmium in farmlands surrounding mine area of Southeast China br

Authors Wang, C, Jia, YX, Wang, QQ et al.

Source Environemental Research 214, 1, 2022

Abstract In arable soils co-influenced by mining and farming, soil bacteria significantly affect metal (Cadmium, Cd) bioavailability and accumulation. To reveal the soil microecology response under this co-influence, three intersection areas (cornfield, vegetable field,

and paddy field) were investigated. With a similar nutrient con-dition, the so...

25/10/2022

An Insight into the Endophytic Bacterial Community of Tomato after Spray Application of Propiconazole and ...

Authors Yadav, U, Bano, N, Bag, S et al.

Source MICROBIOLOGY SPECTRUM 2022

Abstract Propiconazole (PCZ) is a commonly sprayed fungicide against fungal pathogens. Being systemic in action, it reaches subcellular layers and impacts the endophytes. Although PCZ is a fungicide, it is hypothesized to exert an inhibitory effect on the bacterial endophytes. Therefore, this study aims to get an insight into the perturbations caused by the ...

25/10/2022

Changes in Microbial Diversity, Soil Function, and Plant Biomass of Cotton Rhizosphere Soil Under the Influence ...

Authors Wang, XB, Wang, J, Wang, YP, et al.

Source CURRENT MICROBIOLOGY 79, 11, 2022

Abstract Chlorpyrifos (CPF), a common organophosphorus pesticide, is extensively used in agricultural practices. However, we lack sound evidence for the linkage between soil microbial diversity, soil function, and plant biomass under the influence of CPF, which prevents us from assessing the actual impact of CPF on agricultural production...

25/10/2022

Deciphering the diversity, composition, function, and network complexity of the soil microbial community after repeated exposure to a fungicide boscalid*

Authors Han, LX, Xu, M, Kong, XB et al.

Source ENVIRONMENTAL POLLUTION 312, 2022

Abstract Boscalid is a novel, highly effective carboximide fungicide that has been substantially and irrationally applied in greenhouses. However, little is known about the residual characteristics of boscalid and its ecological effects in long-term polluted greenhouse soils. Therefore, actual boscalid pollution status in greenhouse soils was simulate...

25/10/2022

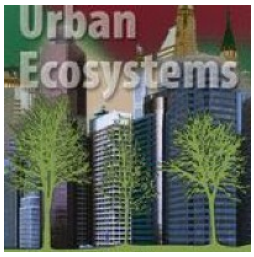
Enduring legacy of coal mining on the fungal community in a High Arctic soil after five decades

Authors Kerfahi, D, Newsham, KK, Dong, K et al.

Source PEDOSPHERE 32, 5, 2022

Abstract Mineral extraction is known to affect soil fungi in polar environments, but it is unknown how long these effects persist. Here, by amplifying the internal transcribed spacer regions of rRNA genes in soil fungi, we compared soil fungal community in intact

natural tundra with that in a nearby former coal mining area, abandoned 52 years previously, ...



28/09/2022

Soil microbial community changes in response to the environmental gradi... Guangzhou City urbanization in Guangzhou City

Authors Wang, M, Yu, SQ, Chen, XH et al.

Source Urban Ecosystems, 2022

Abstract Soil microbes play important roles in many terrestrial ecological processes. Rapid urbanization causes drastic changes in land use and land cover, thus forming a heterogeneous environmental gradient and directly or indirectly affecting the composition and function of soil microbial communities. To investigate the effects of rapid urbanization on soil mi...

28/09/2022

Applications of Cr-rich composted tannery sludge in the soil decrease microbial biomass an... specific .. specific ...

Authors Araujo, ASF, Pereira, APD, Mendes, LW

Source Environmental Science and Pollution Research, 2022

Abstract The tannery industries generate a solid waste known as tannery sludge, which is composed of organic and inorganic compounds, mainly chromium (Cr). When Cr is not removed from the tannery sludge, this solid waste is metal-rich and its application could affect the soil microorganisms...

28/09/2022

Microbial metabolic limitation and carbon use feedback in lead contaminated agricultural soils

Authors Wang, XX, Cui, YX, Chen, L et al.

Source Chemosphere308, 1, 2022

Abstract Potentially toxic elements (PTEs) pollution causes a great threat to microbial metabolism, which plays a vital role in studying soil nutrient cycling and predicting carbon (C) storage in agroecosystems. However, the responses of microbial metabolism characteristic to heavy metal contamination and the mechanisms through which microbial metabolism media...

28/09/2022

A direct contact bioassay using immobilized microalgal balls to evaluate the toxicity of contaminated field soils

Authors Hussain, F, Ashun, E, Jung, SP et al.

Source Journal of Environmental Management 321, 2022

Abstract The present study used a bioassay of immobilized microalgae (Chlorella vulgaris) via direct contact to assess the toxicity of eleven uncontaminated (reference) and five field contaminated soils with various physicochemical properties and contamination. Photosynthetic oxygen concentration in the

headspace of the test kit by Ch...

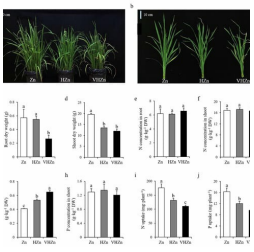
28/09/2022

Response of microbial community to different land-use types, nutrients and heavy metals in urban river sediment

Authors Pan, YW, Xie, JW, Yan, WX et al.

Source Journal of Environmental Mnagement 321, 2022

Abstract Nutrients and heavy metals (HM) in the sediment have an impact on microbial diversity and community structure. In this study, the distribution characteristics of nutrients, HM, and microbial community in the sed-iments along the Longsha River, a tributary of the Pearl River (or Zhu Jiang), China were investigated by analyzing sampl...



28/09/2022

High Levels of Zinc Affect Nitrogen and Phosphorus Transformation in Rice Rhizosphere Soil by Modifying Microbial ...

Authors Lv, HH, Ji, CC, Ding, JL et al.

Source Plants-Basel 11,17, 2022

Abstract Due to global industrialization in recent decades, large areas have been threatened by heavy metal contamination. Research about the impact of excessive Zn on N and P transformation in farmland has received little attention, and its mechanism is still not completely known. In this study, we planted rice in soils with toxic levels of Zn, and analyzed th...

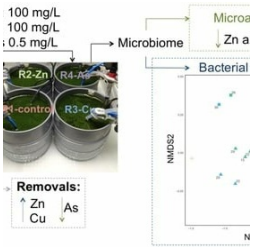
28/09/2022

Development of a machine-learning model to identify the impacts of pesticides characteristics on soil microbial communities from high-throughput sequencing data

Authors Ke, MJ, Xu, NH, Zhang, ZY et al.

Source Environmental Microbiology 2022 DOI 10.1111/1462-2920.16175

Abstract High-throughput sequencing (HTS) of soil environmental DNA provides an advanced insight into the effects of pesticides on soil microbial systems. However, the association between the properties of the pesticide and its ecological impact remains methodically challenging. Risks associated with pesticide use can be mini...



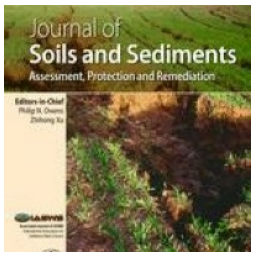
28/09/2022

Current Concentrations of Zn, Cu, and As in Piggery Wastewater Compromise Nutrient Removals in Microalgae–Bacteria ...

Authors Collao, J, Garcia-Encina, PA, Blanco, S et al.

Source Biology-Basel 11, 8, 2022

Abstract Photobioreactor systems based on consortia of microalgae and bacteria are a promising, efficient and sustainable alternative for treatment of wastewaters with high nitrogen content, such as piggery wastewater. In these biological systems, microorganisms play a key role in wastewater treatment by degradation of organic matter and accumu...



28/09/2022

Effect of reclaimed water recharge on bacterial community composition and fun... sediment of the ... sediment of the ...

Authors Gao, H, Yang, LH, Song, XF

Source Journal of Soils and Sediments 2022

Abstract Reclaimed water has been widely used in river landscape restoration. Bacterial communities living in river sediments are the main bearers of metabolic activity in most river ecosystems. When reclaimed water is used to restore river landscapes, its effect on bacterial communities in river sediments remains unclear...

28/09/2022

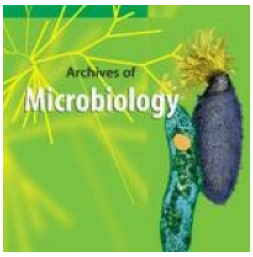
Pollution and edaphic factors shape bacterial community structure and functionality in historically contaminated soils

Authors Mapelli, F, Vergani, L, Terzaghi, E et al.

Source Microbiological Research 263, 2022

Abstract Studies about biodegradation potential in soils often refer to artificially contaminated and simplified systems, overlooking the complexity associated with contaminated sites in a real context. This work

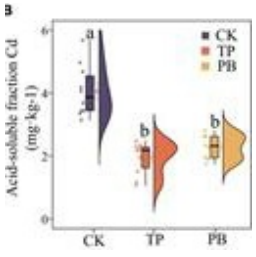
aims to provide a holistic view on microbiome assembly and functional diversity in the model site SIN Brescia-Caffaro (Italy), ch...



28/09/2022

Bacterial inoculants as effective agents in minimizing the non-target impact of azadirachtin p... and ... and ...

Authors Singh, U, Roy, P, Sharma, SSource Archives of Microbiology 204, 9, 2022Abstract Microbes regulate soil health by negating ecological disturbances, and improve plant productivity in a sustainable manner. Indiscriminate application of pesticides creates a detrimental impact on the rhizospheric microbiota, thereby affecting soil health. Azadirachtin, earlier believed to be an environment-friendly alternative to chemical pesticides, exhibits a non-target impact on microbial communities. This ...



28/09/2022

Biochar rebuilds the network complexity of rare and abundant microbial taxa in reclai... mining areas ... mining areas ...

Authors Zhu, YF, Ge, XP, Wang, LP et al.Source Frontiers in Microbiology 13, 2022Abstract Understanding the interactions between the soil microbial communities and species is critical in the remediation of heavy metal-contaminated soil. Biochar has been widely applied as a stabilizer in the in situ remediation of cadmium (Cd)-contaminated soils in mining areas. However, the rebuilding of the microbial taxa of rare and abundant species by biochar and their cooperative resistance to Cd stress remai...

28/09/2022

Response of microbial communities and metabolic profiles to the rhizosphere of Tamarix ramosissima in soils contaminated by multiple heavy metals

Authors Qian, FH, Huang, XJ, Su, XM, Bao, YYSource Journal of Hazardous Materials 438, 2022Abstract Heavy metals (HMs) contamination around smelters poses serious stress to soil microbiome. However, the coeffect of multiple HMs and native vegetation rhizosphere on the soil ecosystem remains unclear. Herein, effects of high HMs level and the rhizosphere (Tamarix ramosissima) on soil bacterial community structure and metabolic profiles in sierozem were analyzed by coupling high-throughput sequencin...

28/09/2022

The evaluation of Hudson River sediment as a growth substrate - Microbial activity, PCB-degradation potential and risk assessment

Authors Urbaniak, M, Baran, A, Mierzejewska, E, Kannan, K

Source Science of the Total Environment 836, 2022

Abstract The potential use of growth substrates prepared with an admixture of 10% to 75%

Hudson River sediments was evaluated by analysis of changes in microbial activity (measured using Biolog Ecoplates) and molecular markers (presence of degradative tceA1 and bphA genes) as well as potential risks toward humans and the envi...

15/09/2022

Disentangling biogeographic and underlying assembly patterns of fungal communities in metalliferous mining and smelting soils

Authors Liu, B, Yao, J, Ma, B

Source Science of the Total Environment 845

Abstract Elucidating community assembly and their relevance to environmental variables are fundamental for understanding microbial diversity and functioning in terrestrial ecosystems, yet the geographical diversity and

assembly patterns of the fungal community in metalliferous ecospheres associated with mining and smelting activities have received penu-rious...

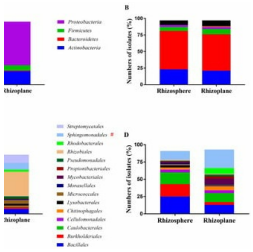
25/10/2022

Differential response of N2O emissions, N2O-producing and N2O-reducing bacteria to varying tetracycline doses in fertilized soil

Authors Omirou, M, Stephanou, C, Anastopoulos, I et al.

Source ENVIORNMENTAL RESEARCH 214, 3, 2022

Abstract Tetracyclines are the most widely used antibiotics worldwide. Their presence in soils could affect nutrient cycling, but our knowledge regarding how they affect soil microbial communities involved in greenhouse gas emissions is limited. The objective of the current study was to evaluate how tetracycline is affecting N2O emiss...



25/10/2022

High Prevalence and Varied Distribution of Antibiotic-Resistant Bacteria in the Rhizosp... Rhizoplane .. Rhizoplane ...

Authors Yang, F, Wang, Y, Liu, QW et al.

Source MICROORGANISMS 10,9, 2022

Abstract The plant-associated bacteria, including that in the rhizosphere and rhizoplane, play important roles in human exposure to antibiotic-resistant bacteria (ARB). The rhizosphere and rhizoplane represent two distinct environments with different selective pressures for bacterial colonization. However, whether the difference in characteristics between the...

25/10/2022

Facultative pathogenic bacteria and antibiotic resistance genes in swine livestock manure and clinical wastewater: A molecular biology comparison

Authors Hembach, N, Bierbaum, G, Schreiber, C, Schwartz, T

Source ENVIRONMENTAL POLLUTION 313, 2022

Abstract Manure contains vast amounts of biological contaminants of veterinary origin. Only few studies analyse clinically critical resistance genes against reserve antibiotics in manure. In general, resistances against these high priority antibiotics involve a high potential health risk. Therefore, their spread in the soil as well a...

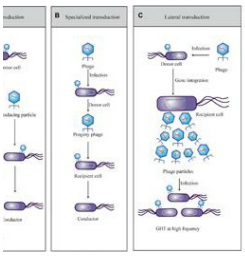
28/09/2022

Antibiotic resistance genes and bacterial diversity: A comparative molecular study of treated sewage from different origins and their impact on irrigated soils

Authors Shekhawat, SS, Kulshreshtha, NM, Saini, P et al.

Source Chemosphere 307, 4, 2022

Abstract Present study aims to investigate how is soil affected following irrigation with treated effluents of different origins by analysing the bacterial diversity, metabolic diversity and antibiotic resistance genes (ARGs). Comparative analysis with previously reported ARGs in effluents was performed to understand the mobility of ARGs from t...



28/09/2022

Bacteriophages: Underestimated vehicles of antibiotic resistance genes in the soil

Authors Zhang, Y, Guo, YJ, Qiu, TL et al.

Source Frontiers in Microbiology 13, 2022

Abstract Bacteriophages (phages), the most abundant biological entities on Earth, have a significant effect on the composition and dynamics of microbial communities, biogeochemical cycles of global ecosystems, and bacterial evolution. A variety of antibiotic resistance genes (ARGs) have been identified in

phage genomes in different soil samples. Pha...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / BIOCONTROLE

25/10/2022

Impact of Litsea cubeba inter-row cover on the structure of bacterial community in the tea plantation

Authors Hao, HP, Xia, F, Bai, HT et al.

Source ANNALS OF MICROBIOLOGY 72, 1, 2022

Abstract Purpose: The application of bio-control plants in the agricultural processes is one of the effective ways to solve the traditional agricultural synthetic pesticide residues. This study will investigate the effect of bio-control plant Litsea cubeba branch inter-row cover on soil bacterial community, soil-enriched metabolites, and soil mineral ...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / BIOREMEDIATION

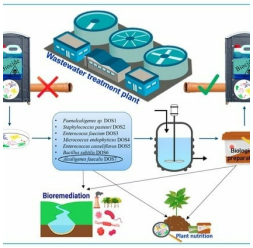
25/10/2022

Activity of nitrogen-fixing cyanobacteria under salinity and heavy metals stress

Authors Usmonkulova, A, Shonakhunov, T, Kadirova, G

Source JOURNAL OF PHARMACEUTICAL NEGATIVE RESULTS 13, 3/ 355_363, 2022

Abstract In this article, the effects of different concentrations of heavy metals Cu (II), Co(II) and Cd(II) cations and NaCl salt stress on the morphological characteristics, biomass, chlorophyll a, exopolysaccharides and phytohonnones production capacity of native salt-tolerant nitrogen-fixing cyanobacteria N...



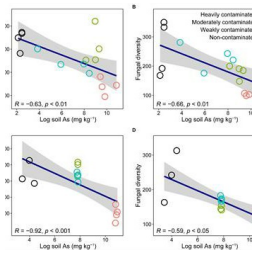
25/10/2022

Didecyldimethylammonium Chloride- and Polyhexamethylene Guanidine-Resistant Bacter... Fecal Sludge .. Fecal Sludge ...

Authors Loiko, N, Kanunnikov, O, Serdyukov, D et al.

Source BIOLOGY BASEL 11, 9, 2022

Abstract Simple Summary Every year, more than a million tons of fecal sludge (FS) containing biocides based on quaternary ammonium compounds and guanidine derivatives, which are widely used for FS deodorization and control of microbial activity, are generated in the environmentally safe toilet complexes of Russian Railways trains. Higher disposal ...



25/10/2022

Microbial community composition in the rhizosphere of Pteris vittata and its effects o... phytoremediation . phytoremediation ...

Authors Jia, P, Li, FL, Zhang, SC et al.

Source FRONTIERS IN MICROBIOLOGY 13, 2022

Abstract Arsenic contamination causes numerous health problems for humans and wildlife via bioaccumulation in the food chain. Phytoremediation of arsenic-contaminated soils with the model arsenic hyperaccumulator Pteris vittata provides a promising way to reduce the risk, in which the growth and arsenic absorption ability of plants and the biotransfo...

25/10/2022

N-acetylation of toxic aromatic amines by fungi: Strain screening, cytotoxicity and genotoxicity evaluation, and application in bioremediation of 3,4-dichloroaniline

Authors Rodrigues, AD, Montanholi, AD, Shimabukuro, AA et al.

Source JOURNAL OF HAZARDOUS MATERIALS 441, 2022

Abstract Aromatic amines (AA) are one of the most commonly used classes of compounds in industry and the most common pollutants found in both soil and water. 3,4-Dichloaniline (3,4-DCA) is a persistent residue of the phenylurea herbicide in the environment. In this study, we used a colorimetric method as a new approach to s...

25/10/2022

Influence of Rhizosphere Bacteria on the State of Heavy Metal Compounds in the Soil–Plant System

Authors Plekhanova, I. O., Kulikov, V. O., Shabaev, V. P.

Source EURASIAN SOIL SCIENCE 55, 9, 2022

Abstract The results of a greenhouse experiment with the humus horizon of a sandy loamy soddy-podzolic soil are presented. It was contaminated with heavy metals added with sewage sludge before 1990, then fodder grasses were grown for 20 years, after that the soil was left for 10 years under fallow. In the experiment, the influence of ...

25/10/2022

Time effects of rice straw and engineered bacteria on reduction of exogenous Cu mobility in three typical Chinese soils

Authors Shi, HZ, Wen, D, Huang, YD et al.

Source PEDOSPHERE 32, 5, 2022

Abstract Globally, copper (Cu) accumulation in soils is a major environmental concern. Agricultural organic waste and some bacterial species can readily absorb metals in an eco-friendly manner, and thus are commonly used in metal-contaminated soil remediation. This study investigates the change in Cu fractions during the aging process and the time effects of ri...

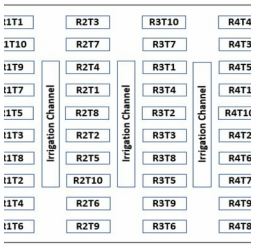
25/10/2022

Degradation of isoproturon in vitro by a mix of bacterial strains isolated from arable soil

Authors Duc, HD

Source CANADIAN JOURNAL OF MICROBIOLOGY 2022

Abstract Isoproturon (IPU) is widely used to control annual grasses and broad leaf weeds in cereal crops. In this study, four IPUdegrading bacterial strains, i.e., Sphingomonas sp. ISP1, Arthrobacter sp. ISP2, Acinetobacter baumannii 4IA, and Pseudomonas sp. ISP3, were isolated from agricultural soil. The mixed culture of four isolates completely degraded the herbicide at...



25/10/2022

New Approach for Mining Site Reclamation Using Alternative Substrate Based on Phosphate Industry By-Product ...

Authors Gueable, YKD, Bezrhoud, Y, Ake, HJA et al.

Source SUSTAINABILITY 14, 18, 2022

Abstract The objective of this study was to evaluate the effect of mixtures of the phosphate industry's by-products and sewage sludge on some heavy metals (Pb, Zn and Cd) in the soil-plant system and the microbial load (bacteria, fungi and actinobacteria) in the soil...

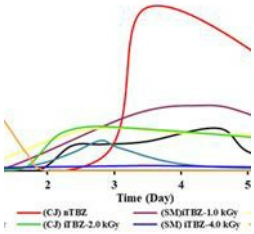
25/10/2022

A mechanism of microbial sensitivity regulation on interventional remediation by nanozyme manganese oxide in soil heavy metal pollution

Authors Su, HF, Zhang, YZ, Lu, ZC, Wang, QY

Source JOURNAL OF CLEANER PRODUCTION 373, 2022

Abstract Studies have found that nanozyme materials can be an potential solution for microorganisms with insufficient enzyme activities to meet habitat requirements, bringing new application prospects for the remediation of soil pollution via inoculation with exogenous microorganisms. However, few studies have investigated the mechanism of mi...



25/10/2022

Tunisian hypersaline sediments to set up suitable halotolerant microbial bioanodes for electrostimula... b.. b...

Authors Saidi, N, Erable, B, Saadaoui, S et al.

Source FRONTIERS IN ENERGY RESEARCH10, 2022

Abstract This study investigated for the first time the performance of microbial halotolerant bioanodes designed from two Tunisian Hypersaline Sediments (THS) for simultaneous electrostimulated biodegradation of synthetic fruit packaging wastewater containing thiabendazole (TBZ), and recovery of an anodic current signal....

28/09/2022

Bacterial remediation of pesticide polluted soils: Exploring the feasibility of site restoration

Authors Bokade, P, Gaur, VK, Tripathi, V et al.

Source Journal of Hazardous Materials 441, 2022

Abstract Review: For decades, reclamation of pesticide contaminated sites has been a challenging avenue. Due to increasing agricultural demand, the application of synthetic pesticides could not be controlled in its usage, and it has now adversely impacted the soil, water, and associated ecosystems posing adverse effects on human health. ...

28/09/2022

Latest eco-friendly approaches for pesticides decontamination using microorganisms and consortia microalgae: A comprehensive insights, challenges, and perspectives

Authors Sheng, YQ, Benmati, M, Guendouzi, S et al.

Source Chemosphere 308, 1,2022

Abstract Review: Pesticides are chemical compounds that are considered toxic to many organisms, including humans. Their elimination from polluted sites attracted the attention of Scientifics in the last decade; Among the various methods used to decontaminate pesticides from the environment, the microbial-algae consortium is a promising bioremediation ...

28/09/2022

Transcriptomic analysis reveals the molecular mechanisms of arbuscular mycorrhizal fungi and nitrilotriacetic acid on Suaeda salsa tolerance to combined stress of cadmium and salt

Authors Cui, X, Jia, BB, Diao, FW et al.

Source Process Safety and Environmental Protection 160: 210-220, 2020

Abstract Halophytes are dominant plants in the phytoremediation of heavy metal contaminated saline soils. Arbuscular mycorrhizal (AM) fungi can improve plant abiotic stress tolerance and chelating agents nitrilotriacetic acid (NTA) can alleviate heavy metal stress. However, the combined effects and mechanisms of two amendm...

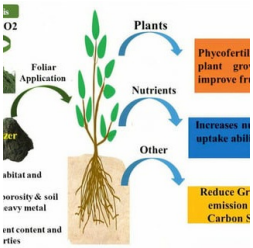
28/09/2022

Assessing the effects of β-triketone herbicides on HPPD from environmental bac... combination of ... combination of ...

Authors Thiour-Mauprivez, C, Dayan, FE, Terol, H et al.

Source Environmental Science and Pollution Research, 2022

Abstract 4-hydroxyphenylpyruvate dioxygenase (HPPD) is the molecular target of beta-triketone herbicides in plants. This enzyme, involved in the tyrosine pathway, is also present in a wide range of living organisms, including microorganisms. Previous studies, focusing on a few strains and using high herbicide concentrat...



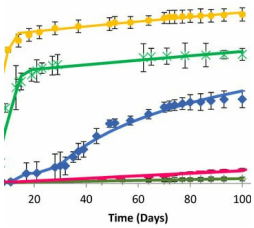
28/09/2022

Algal-Mediated Nanoparticles, Phycochar, and Biofertilizers for Mitigating Abiotic... R.. Stresses in Plants: A R...

Authors Abideen, Z, Waqif, H, Munir, N et al.

Source Agronomy-Basel 12, 8, 2022

Abstract Review: The excessive use of agrochemicals to ensure food security under the conditions of a growing population, global climate change, weather extremes, droughts, wasteful use of freshwater resources, and land degradation has created severe challenges for sustainable crop production. Since the frequent and abrupt environmental changes are outc...



28/09/2022

Chlorpyrifos Removal in an Artificially Contaminated Soil Using Novel Bacterial Strain... Cyclodextrin. .. Cyclodextrin. ...

Authors Lara-Moreno, A, Morillo, E, Merchan, F et al.

Source Agronomy Basel 12, 8, 2022

Abstract The removal of chlorpyrifos (CLP) from the environment is a matter of general interest, because it is one of the most widely used insecticides in the world but presents a high toxicity and persistence in the environment. Biological strategies are considered as a good option to remediate different environmental compartments. Assisted nat...

28/09/2022

Indigenous functional microbial degradation of the chiral fungicide mandipropamid in repeatedly treated soils: Preferential changes in the R-enantiomer

Authors Han, LX, Liu, YL, Nie, JY et al.

Source Journal of Hazardous Materials 435, 2022

Abstract This study investigated the indigenous functional microbial communities associated with the degradation of chiral fungicide

mandipropamid enantiomers in soils repeatedly treated with a single enantiomer. The R-enantiomer degraded faster than the S-enantiomer, with degradation half-lives ranging from 10.2 d to 79.2 d for the R-enantiome...

28/09/2022

Numerical Simulation Method for Microbial Remediation Effect of Nano Heavy Metal Contaminated Soil

Authors Liang, L

Source Journal of Nanomaterials 2022

Abstract Heavy metal soil remediation is an important component in mitigating environmental problems, and microbial remediation has good treatment effect, good environmental affinity, and high treatment cost treatment efficiency. Numerical simulations of soil remediation effects enable the selection of suitable remediation methods and the determination of the optimal remediation...

28/09/2022

Characterization of soil microbial community activity and structure for reducing available Cd by rice straw biochar and Bacillus cereus RC-1

Authors Mei, C, Wang, H, Cai, KZ et al.

Source Science of the Total Environment 239, 2022

Abstract The combination of biochar and specific bacteria has been widely applied to remediate Cadmium-contaminated soil. But little is known about how such composites affect the dynamic distribution of metal fractions. This process is accompanied by the alternations of soil properties and microbial community structures...

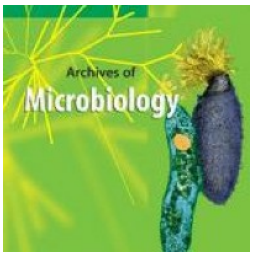
28/09/2022

The combined enhancement of RL, nZVI and AQDS on the microbial anaerobic-aerobic degradation of PAHs in soil

Authors Lv, LH, Sun, LA, Yuan, CL et al.

Source Chemosphere 307, 1, 2022

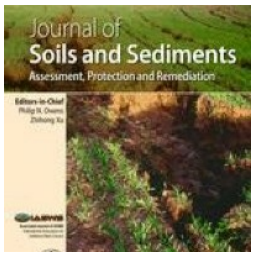
Abstract Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous persistent organic pollutants in soil, which have carcinogenic, teratogenic and mutagenic hazards. The effects of rhamnolipid (RL), nano zero-valent iron (nZVI), and anthraquinone-2,6-disulfonic acid (AQDS) on the degradation of PAHs in soil were studied. It was found that the treatment of 5 mg &a...



28/09/2022

Bacterial inoculants as effective agents in minimizing the non-target impact of azadirachtin p... and ... and ...

Authors Singh, U, Roy, P, Sharma, SSource Archives of Microbiology 204, 9, 2022Abstract Microbes regulate soil health by negating ecological disturbances, and improve plant productivity in a sustainable manner. Indiscriminate application of pesticides creates a detrimental impact on the rhizospheric microbiota, thereby affecting soil health. Azadirachtin, earlier believed to be an environment-friendly alternative to chemical pesticides, exhibits a non-target impact on microbial communities. This ...



28/09/2022

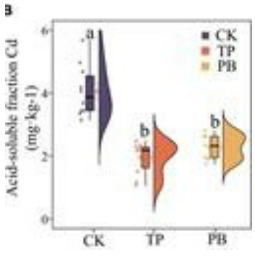
Using amendment derived from vermicompost combined with calcium... production .. magnesium mineral to achieve safe production ...

Authors Wang, F, Wang, YF, Wu, YK et al.

Source Journal of Soils and Sediments 2022

Abstract Purpose Widespread heavy metal pollution in farmland soil has brought serious harm to the environment, and the use of in situ stabilization technology is a sustainable solution for safe agricultural production in Cd-contaminated soil. In this experiment, the effect of the amendment on the Cd bioavailability and its

ecological effects in Cd-...



28/09/2022

Biochar rebuilds the network complexity of rare and abundant microbial taxa in reclai... mining areas ... mining areas ...

Authors Zhu, YF, Ge, XP, Wang, LP et al.Source Frontiers in Microbiology 13, 2022Abstract Understanding the interactions between the soil microbial communities and species is critical in the remediation of heavy metal-contaminated soil. Biochar has been widely applied as a stabilizer in the in situ remediation of cadmium (Cd)-contaminated soils in mining areas. However, the rebuilding of the microbial taxa of rare and abundant species by biochar and their cooperative resistance to Cd stress remai...

28/09/2022

Fungal bioproducts for petroleum hydrocarbons and toxic metals remedia... emerging t.. advances and emerging t...

Authors da Silva, AF, Banat, IM, Robl, D, Giachini, AJ

Source Bioprocess and Biosystems Engineering 2022

Abstract Petroleum hydrocarbons and toxic metals are sources of environmental contamination and are harmful to all ecosystems. Fungi have metabolic and morphological plasticity that turn them into potential prototypes for technological development in biological remediation of these contaminants due to their ability to interact w...

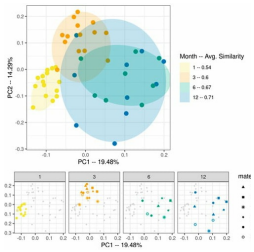
25/10/2022

Bioplastic (PHBV) addition to soil alters microbial community structure and negatively affects plant-microbial metabolic functioning in maize

Authors Brown, RW, Chadwick, DR, Zang, HD et al.

Source JOURNAL OF HAZARDOUS MATERIALS 441, 2022

Abstract Microplastic contamination poses a significant threat to agroecosystem functioning, provoking a move away from the use of conventional oil-based plastics in agriculture, to biodegradable alternatives that may be degraded over a shorter timescale. The impact of these bioplastics on plant and soil health, however, has received re...



25/10/2022

Year-Long Microbial Succession on Microplastics in Wastewater: Chaotic D... Preferential Growth Preferential Growth

Authors Tagg, AS, Sperlea, T, Labrenz, M et al.

Source MICROORGANISMS 10, 9, 2022

Abstract Microplastics are a globally-ubiquitous aquatic pollutant and have been heavily studied over the last decade. Of particular interest are the interactions between microplastics and microorganisms, especially the pursuit to discover a plastic-specific biome, the so-called plastisphere. To follow this up, a year-long microcosm experimental setup...

20/10/2022

Individual and combined toxicity of microplastics and diuron differs between freshwater and marine diatoms

Authors: Hao BB, Wu HP, Zhang SY, He B

Source: SCIENCE OF THE TOTAL ENVIRONMENT 853:158334, 2022, DOI 10.1016/j.scitotenv.2022.158334

Abstract: Microplastics are considered as the emerging pollutants, which not only directly affect aquatic organisms, but also causes combined pollution by adsorbing other pollutants. Diuron, as one of the most widely used herbicides, is frequently monitored in the aquatic environment for its adverse ...

18/10/2022

Occurrence of polycyclic aromatic hydrocarbons, microplastics and biofilms in Alqueva surface water at touristic spots

Authors: Raposo A, Mansilha C, Veber A et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 850:157983, 2022, DOI 10.1016/j.scitotenv.2022.157983

Abstract: Freshwater pollution is a huge concern. A study aiming to evaluate physico-chemical characteristics, microbiota, occurrence of two groups of persistent environmental pollutants with similar chemical properties (polycyclic aromatic hydrocarbons-PAHs and microplastics -MPs) in Alqueva'...

18/10/2022

Selective adsorption of antibiotics on aged microplastics originating from mariculture benefits the colonization of opportunistic pathogenic bacteria

Authors: Yu XX, Du HH, Huang YH et al.

Source: ENVIRONMENTAL POLLUTION 313: 120157, 2022, DOI 10.1016/j.envpol.2022.120157

Abstract: Microplastics and antibiotics widely coexist in the aquatic environment, especially in mariculture regions. However, antibiotics adsorbed on microplastics and their role in the colonization of microorganisms on microplastics are poorly understood. Therefore, in-situ aging experiments were conducted to...

06/10/2022

Products released from surgical face masks can provoke cytotoxicity in the marine diatom Phaeodactylum tricornutum

Authors: Sendra M, Rodriguez-Romero A, Yeste MP et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 841:156611, 2022, DOI 10.1016/j.scitotenv.2022.156611

Abstract: Surgical face masks are more present than ever as personal protective equipment due to the COVID-19 pandemic. In this work, we show that the contents of regular surgical masks: i) polypropylene microfibres and ii) some added metals such as: Al, Fe, Cu, Mn, Zn and Ba, may be ...

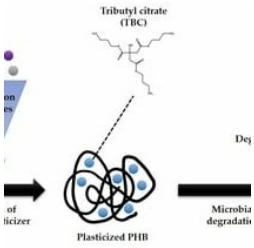
28/09/2022

Effects of microplastics on common bean rhizosphere bacterial communities

Authors Meng, F, Harkes, P, van Steenbrugge, JJM, Geissen, V

Source Applied Soil Ecology 181,2022

Abstract Microplastic pollution in terrestrial ecosystems is a growing concern due to its potential influences on soil properties and crop growth. Little is known about the effects of microplastics on the microbiome in the rhizo-sphere. Here, we studied the effects of two types of microplastics (MPs), low density polyethylene (LDPE-MPs...



28/09/2022

Finding a Benign Plasticizer to Enhance the Microbial Degradation of Polyhydroxybutyrate (PHB) Evaluated by ...

Authors Cho, J, Kim, SH, Jung, HJ et al.

Source Polymers 14, 17, 2022

Abstract As a biodegradable plastic, polyhydroxybutyrate (PHB) has relatively poor mechanical properties, preventing its wider use. Various plasticizers have been studied to improve the mechanical properties of PHB; however, due to the slow degradation speed in the soil environment and lack of evaluation methods, studies on the degradation

of PHB with plasticizer...

28/09/2022

Phthalates-A family of plasticizers, their health risks, phytotoxic effects, and microbial bioaugmentation approaches

Authors Mondal, T, Mondal, S, Ghosh, SK et al.

Source Environmental Research 214, 3, 2022

Abstract Review: Phthalates are a family of reprotoxicant compounds, predominantly used as a plasticizer to improve the flexibility and longevity of consumable plastic goods. After their use these plastic products find their way to the waste disposal sites where they leach out the hazardous phthalates present within them, into the surrounding ...

28/09/2022

Biodegradable microplastics enhance soil microbial network complexity and ecological stochasticity

Authors Sun, YZ, Li, XF, Cao, N et al.

Source Journal of Hazardous Materials 439, 2022

Abstract Biodegradable plastics have emerged as an ecological alternative to conventional petroleum-based plastics. Despite the recent advances in the effects of conventional microplastic on soil ecosystems, the ecological impact of biodegradable microplastics in soil environments remains poorly understood. Here, we performed soil mi-crocosms wit...

16/09/2022

Organic matter production and recycling in marine biofilm developing on common and new plastics

Authors: Misic C, Rafael A, Harriague AC

Source: MARINE ENVIRONMENTAL RESEARCH 180:105729, 2022, DOI 10.1016/j.marenvres.2022.105729

Abstract: To face the recent pandemic and comply with international legislation, new plastic objects (surgical masks, nitrile gloves, compostable plastics) have been produced, with a significant increase of their input into the marine environment, together with other common plastics. Given that floati...

16/09/2022

Microbial succession during the degradation of bioplastic in coastal marine sediment favors sulfate reducing microorganisms

Authors: Pinnell LJ, Conkle JL, Turner JW

Source: FRONTIERS IN MARINE SCIENCE 9:945822, 2022, DOI 10.3389/fmars.2022.945822

Abstract: Marine environments are sinks for many contaminants, including petroleum-based plastic waste. Bioplastics, or biodegradable plastics derived from renewable resources, are considered promising alternatives as numerous studies have demonstrated their degradation in marine environments. However, their r...

27/10/2022

Glyphosate exposure in early pregnancy and reduced fetal growth: a prospective observational study of high-risk pregnancies

Authors: Gerona RR, Reiter JL, Zakharevich I, Proctor C et al.

Source: Environmental Health 21(95), 2022, DOI 10.1186/s12940-022-00906-3

Abstract: This study aims to establish baseline urine GLY levels in a high-risk and racially diverse pregnancy cohort and to assess the relationship between prenatal GLY exposure and fetal development and birth outcomes. Random first trimester urine specimens were collected from h...

27/10/2022

Pyrethroids and developmental neurotoxicity - A critical review of epidemiological studies and supporting mechanistic evidence

Authors: Raun Andersen H, David A , Freire C, Fernández MF et al.

Source: Environ Res, 214(2): 113935, 2022, DOI 10.1016/j.envres.2022.113935

Abstract: To evaluate the epidemiological evidence for neurodevelopmental effects related to prenatal and childhood pyrethroid exposure in a systematic review and to assess biological plausibility by evaluating mechanistic evidence. We searched PubMed and Web of Science up to September 1, 20...

23/10/2022

Determinants of organophosphorus pesticide urinary metabolite levels in pregnant women from the CHAMACOS cohort

Authors: Kalantzi OI, Castorina R, Gunier RB, Kogut K et al.

Source: Sci Total Environ, 854: 158551, 2022, DOI 10.1016/j.scitotenv.2022.158551

Abstract: Human exposure to OPs has been linked to adverse effects including poorer child neurodevelopment, reduced birth weight, altered serum hormone levels, and reduced semen quality. We measured six OP dialkyl phosphate (DAP) metabolites [three dimethyl alkylphosphates (DMs) and three di...

23/10/2022

Prenatal ambient pesticide exposure and childhood retinoblastoma

Authors : Thompson S, Ritz B, Cockburn M, Heck JE

Source: International Journal of Hygiene and Environmental Health, 245: 114025, 2022, DOI 10.1016/j.ijheh.2022.114025

Abstract: To examine the relationship between childhood retinoblastoma and prenatal exposure to pesticides through residential proximity to agricultural pesticide applications. We conducted a population-based case-control study using cases aged 5 and younger identifi...

23/10/2022

Occupation and Semen Parameters in a Cohort of Fertile Men

Authors: Meyer JD, Brazil C, Redmon JB, Wang C et al.

Source: J Occup Environ Med, 64(10): 831-838, 2022, DOI 10.1097/JOM.0000000000002607.

Abstract: Associations of occupation and workplace exposures with semen volume, sperm concentration, motility, and morphology were assessed using generalized linear modeling. Lower sperm concentration and motility were seen in installation, maintenance, and repair occupations. Higher exposure ...

22/10/2022

Urinary glyphosate kinetics after occupational exposure

Authors: Kohsuwan K, Intayoung U, Khacha-Ananda S, Sapbamrer R et al.

Source: Int J Hyg Environ Health, 245: 114021, 2022, DOI 10.1016/j.ijheh.2022.114021.

Abstract: Glyphosate-surfactant herbicides are the most used and imported herbicide in Thailand. Urinary biomonitoring is a very important tool for evaluating glyphosate exposures and its adverse health effects. However, the data for glyphosate toxicokinetics, especially in Asi...

13/10/2022

Suspect and non-targeted screening-based human biomonitoring identified 74 biomarkers of exposure in urine of Slovenian children

Authors: Tkalec Z, Codling G, Tratnik JS, Mazej D et al.

Source: Environ Pollution, 313: 120091, 2022, DOI 10.1016/j.envpol.2022.120091.

Abstract: Human exposure to organic contaminants is widespread. Many of these contaminants show adverse health effects on human population. Human biomonitoring (HBM) follows the levels and the distribution of biomarkers of exposure (BoE), but it is usually done in a targeted manner. Suspect and n...

13/10/2022

Occupational exposure and risk assessment for agricultural workers of thiamethoxam in vineyards

Authors: Jiho L, JiWoo K, Yongho S, Eunyoung P et al.

Source: Ecotoxicology and Environmental Safety 243: 113988, 2022, DOI 10.1016/j.ecoenv.2022.113988

Abstract: Dermal & inhalation exposure was examined and according to these results, risk assessment of agricultural workers to thiamethoxam was performed during pesticide mixing/loading and hand-held sprayer application (11 replicates, each of about 1000 L of spray suspension) ...

13/10/2022

Modelling human health risks from pesticide use in innovative legume-cereal intercropping systems in Mediterranean conditions

Authors: Zemmouri B, Lammoglia SK, Bourasa FZ, Seghouani M et al.

Source: Ecotoxicology and Environmental Safety, 238: 113590, 2022, DOI 10.1016/j.ecoenv.2022.113590

Abstract: Evaluating the pesticide risk to human health is a growing concern in the assessment of the sustainability of cropping practices. The assessment of human health risks linked to pesticide use in either conventional or innovative cropping systems is poorly docu...

13/10/2022

Occupational and residential exposures to organophosphate and pyrethroid pesticides in a rural setting

Authors: Bravo N, Garí M, Grimalt JO

Source: Environ Res, 214(4): 114186, 2022, DOI 10.1016/j.envres.2022.114186.

Abstract: Organophosphate (OP) and pyrethroid pesticides (PYR) are extensively used in agriculture, resulting in higher exposures among farmworkers. The present study reports the occurrence of 8 urinary OP and PYR metabolites in a sample of farmworkers and residents from Sucs (n = 87), a rural township in North West Ca...

06/10/2022

Exploratory analysis of the association between pyrethroid exposure and rheumatoid arthritis among US adults: 2007-2014 data analysis from the National Health... Examination Survey .. Examination Survey ...

Authors: Guo X, Li N, Wang H, Su W et al.

Source: Environ Sci Pollut Res Int, 2022, DOI 10.1007/s11356-022-23145-y

Abstract: The objective of this study was to evaluate whether pyrethroid exposure was linked to RA in adults. Data were originated from the 2007-2014 National Health and Nutrition Examination Survey (NHANES). The levels of pyrethroid exposure were assessed by 3-phenoxybenzoic acid (3-PBA) concentrations in urine sample...

06/10/2022

Disparities in chemical exposures among pregnant women and neonates by socioeconomic and demographic characteristics: A nontargeted approach

Authors: Goin DE, Abrahamsson D, Wang M, Jiang T et al.

Source: Environ Res, 215(1): 114158, 2022, DOI 10.1016/j.envres.2022.114158.

Abstract: We recruited 294 demographically diverse pregnant participants in San Francisco from the Mission Bay/Moffit Long (MB/ML) hospitals, which serve a primarily higher income population, and Zuckerberg San Francisco General Hospital (ZSFGH), which serves a lower income population. We collected m...

29/09/2022

Review of studies analysing glyphosate and aminomethylphosphonic acid (AMPA) occurrence in groundwater

Authors: Carretta L, Masin R, Zanin G

Source: Environmental Reviews,12: 8789, 2022, DOI 10.3390/app1217878

Abstract: To meet the demands of farmers and combat weed problems, woodlands and farmlands are sprayed with agrochemicals, primarily glyphosate-based herbicides. Farmers increasingly embrace these herbicides containing glyphosate. Glyphosate and aminomethylphosphonic acid (AMPA), a key metabolite of glyphosate, have been repo...

29/09/2022

An updated systematic review on the maternal exposure to environmental pesticides and involved mechanisms of autism spectrum disorder (ASD) progression risk in children

Authors: Maleki M, Noorimotlagh Z, Mirzaee SA, Jaafarzadeh N et al.

Source: Rev Environ Health, 2022, DOI 10.1515/reveh-2022-0092.

Abstract: Autism spectrum disorder (ASD) increased dramatically over the past 25 years because of genetic and environmental factors. This systematic review (SR) aimed to determine the association between maternal exposure during pregnancy to environmental pesticides and other associations with the ris...

22/09/2022

Urinary metabolites of diazinon and chlorpyrifos in sprayer operators and farm workers of a potato farm

Authors: Saraji M, Talebi K, Balali-Mood M, Imani S

Source: J Environ Sci Health B, 57(9): 745-755, 2022, DOI 10.1080/03601234.2022.2111152

Abstract: In order to investigate the effect of diazinon and chlorpyrifos on agricultural workers exposed to pesticides, urinary metabolites 2-Isopropyl-6-methyl-4-pyrimidinol (IMPy) and 3,5,6-Trichloro-2-pyridinol (TPCy) in farm workers, sprayer operators, and non-exposed people as a control...

19/10/2022

The impact of temperature on insecticide sensitivity depends on transgenerational effects

Authors: Bagni T, Siaussat D, Maria A, Couzi P et al.

Source: Science of the Total Environment 851(1): 158140, 2022, DOI 10.1016/j.scitotenv.2022.158140

Abstract: The combined effects of insecticides and temperature are increasingly being studied because species are expected to change their responses to insecticides with climate warming. As recently highlighted, the impact of temperature on insecticide sensitivity might be influenc...

19/10/2022

Radiation adverse outcome pathways (AOPs) are on the horizon: Advancing radiation protection through an international Horizon-Style exercise

Authors: Burtt JJ, Leblanc J, Randhawa K, Ivanova A et al.

Source: International Journal of Radiation Biology Early Access, 2022, DOI 10.1080/09553002.2022.2121439

Abstract: Purpose The Adverse Outcome Pathway (AOP) framework, a systematic tool that can link available mechanistic data with phenotypic outcomes of relevance to regulatory decision-making, is being explored in areas related to radiation risk assessment. To examine the ...

19/10/2022

Web of Science

Authors: Moreau J, Rabdeau J, Badenhausser I, Giraudeau M et al

Source: Environmental Monitoring and Assessment 194(10): 790, 2022, DOI 10.1007/s10661-022-10394-0

Abstract: For decades, we have observed a major biodiversity crisis impacting all taxa. Avian species have been particularly well monitored over the long term, documenting their declines. In particular, farmland birds are decreasing worldwide, but the contribution of pest...

19/10/2022

Reclaimed wastewater reuse in irrigation: Role of biofilms in the fate of antibiotics and spread of antimicrobial resistance

Authors: Brienza M, Sauvetre A, Ait-Mouheb N, Bru-Adan V et al.

Source: Water research 221: 118830, 2022, DOI 10.1016/j.watres.2022.118830

Abstract: Reclaimed wastewater associated biofilms are made up from diverse class of microbial communities that are continuously exposed to antibiotic residues. The presence of antibiotic resistance bacteria (ARB) and their associated antibiotic resistance genes (ARGs) ensures also a continuous ...

19/10/2022

Essential Oils from Cameroonian Aromatic Plants as Effective Insecticides against Mosquitoes, Houseflies, and Moths

Authors: Wandjou JGN, Baldassarri C, Ferrati M, Maggi F et al.

Source: Plants-Basel 11(18): 2353, 2022, DOI 10.3390/plants11182353

Abstract: Recently, spices have attracted the attention of scientists and agrochemical companies for their potential as insecticidal and acaricidal agents, and even as repellents to replace synthetic compounds that are labeled with detrimental impacts on environment and human and animal health. In this ...

19/10/2022

How Silicon Alleviates the Effect of Abiotic Stresses During Seed Germination: A Review

Authors: El Moukhtari A, Ksiaa M, Zorrig W, Cabassa C et al.

Source: Journal of Plant Growth regulation Early Access, 2022, DOI 10.1007/s00344-022-10794-z

Abstract: Rapid synchronized seed germination is desirable to ensure seedling establishment and improve crop yield. However, abiotic stresses from drought, salinity, and heavy metals have a negative impact on seed germination. The application of silicon (Si) has emerged as a prom...

19/10/2022

Wild privet (Ligustrum vulgare L.) - a reliable plant model for the air-pollution biomonitoring

Authors: Haveric A, Cetkovic T, Hasanovic M, Pourrut B et al.

Source: Toxicology Letters 368: S132-S132, Supplement S, Meeting Abstract P07-34, 2022, DOI 10.1016/j.toxlet.2022.07.377

19/10/2022

Multigenerational responses in the Lymnaea stagnalis freshwater gastropod exposed to diclofenac at environmental concentrations

Authors: Bouly L, Vignet C, Carayon JL, Malgouyres JM et al.

Source: Aqautic Toxicology 251: 106266, 2022, DOI 10.1016/j.aquatox.2022.106266

Abstract: Over the last decade, there has been increased concern about the occurrence of diclofenac (DCF) in aquatic ecosystems. Living organisms could be exposed to this "pseudo-persistent" pharmaceutical for more than one generation. In this multigenerational study, we assessed the DCF impac...

19/10/2022

From molecules to phenotype: mechanisms involved in stress, sociability and hypolocomotion after chronic gamma radiation in adult zebrafish

Authors: Cantabella E, Charlier T, Adam-Guillermin C, Armant O

Source: Toxicology Letters Volume 368: S52-S53, Supplement S, Meeting Abstract SOC-IV-05, 2022, DOI 10.1016/j.toxlet.2022.07.162

19/10/2022

Integrated environmental risk assessment of rare earth elements mixture on aquatic ecosystems

Authors: Lachaux N, Cossu-Leguille C, Poirier L, Gross EM et al.

Source: Frontiers in Environmental Science 10: 974191, 2022, DOI 10.3389/fenvs.2022.974191

Abstract: Rare Earth elements (REE) have become essential in strategical sectors such as high- and green-technologies. Their increasing use in human activities worldwide leads to anthropogenic REE releases detectable in all compartments of the environment, transforming REE into ...

22/09/2022

A PBPK model to evaluate zebrafish eleutheroembryos' actual exposure: bisphenol A and analogs' (AF, F, and S) case studies (Sep, 10.1007/s11356-022-22741-2, 2022)

Authors: Billat P, Brochot C, Brion F, Beaudouin R

Source: Environmental Science and Pollution Research Early Access, correction, 2022, DOI 10.1007/s11356-022-22994-x

22/09/2022

Graphene-based nanomaterials and microbial communities: a review of their interactions, from ecotoxicology to bioprocess engineering perspectives

Authors: Brayle P, Pinelli E, Gauthier L, Mouchet F et al.

Source: Environmental Science-Nano Early Access, 2022, DOI 10.1039/d2en00547f

Abstract: Graphene-based materials (GBMs) are gaining more and more attention from the scientific community due to their unique properties. One of the major concerns is to deliver the safest material possible on the market. To address this challenge, assessing the GBM ecotoxicity is required. Micr...

22/09/2022

Higher facilitation for stress-intolerant ecotypes along a metal pollution gradient are due to a decrease in performance in absence of neighbours

Authors: Nemer D, Michalet R, Rande H, Sappin-Didier V et al.

Source: Oikos Early Access: 09499, 2022, DOI 10.1111/oik.09499

Abstract: The study of variation in plant-plant interactions along metal-pollution gradient is in its infancy, although this is worth to be assessed for both restoration and theoretical perspectives. Additionally, the mechanisms of facilitation at stake in these particular stressed conditions are poorly known...

22/09/2022

Male frequency in Caenorhabditis elegans increases in response to chronic irradiation

Authors: Quevarec L, Reale D, Dufourcq-Sekatcheff E, Car C et al.

Source: Evolutionary Applications Early Access, 2022, DOI 10.1111/eva.13420

Abstract: Outcrossing can be advantageous in a changing environment because it promotes the purge of deleterious mutations and increases the genetic diversity within a population, which may improve population persistence and evolutionary potential. Some species may, therefore, switch their re...

08/09/2022

Phytoremediation of Soil Contaminated by Organochlorine Pesticides and Toxic Trace Elements: Prospects and Limitations of Paulownia tomentosa

Authors: Mamirova A, Baubekova A, Pidlisnyuk V, Shadenova E et al.

Source: Toxics 10(8): 465, 2022, DOI 10.3390/toxics10080465

Abstract: *Paulownia tomentosa* (Thunb.) Steud is a drought-resistant, low-maintenance and fast-growing energy crop that can withstand a wide range of climatic conditions, provides a high biomass yield (approximately 50 t DM ha(-1) yr(-1)), and develops successfully in contaminated sites. In Kazakhstan...

08/09/2022

Experimental Exposure to Tebuconazole Affects Metabolism and Body Condition in a Passerine Bird, the House Sparrow (Passer domesticus)

Authors: Bellot P, Dupont SM, Brischoux F, Budzinski H et al.

Source: Environmental Toxicology and Chemistry Early Access, 2022, DOI 10.1002/etc.5446

Abstract: Triazole compounds are among the most widely used fungicides in agroecosystems to protect crops from potential fungal diseases. Triazoles are suspected to have an impact on nontarget species due to their interactions with nonfungal sterol synthesis, and wild birds are likely...

08/09/2022

At Which Spatial Scale Does Crop Diversity Enhance Natural Enemy Populations and Pest Control? An Experiment in a Mosaic Cropping System

Authors: Jaworski CC, Thomine E, Rusch A, Lavoir AV et al.

Source: Agronomy Basel 12(8): 1973, 2022, DOI 10.3390/agronomy12081973

Abstract: The importance of plant richness to enhance the presence, biodiversity and efficiency of natural enemies in agricultural systems has largely been studied and demonstrated these last decades. Planting and preserving non-crop plants or manipulating crop richness in fields are practices that have ...

08/09/2022

A PBPK model to evaluate zebrafish eleutheroembryos' actual exposure: bisphenol A and analogs' (AF, F, and S) case studiesWeb of Science

Authors: Billat PA, Brochot C, Brion F, Beaudouin R

Source: Environmental Science and Pollution Research Early Access, 2022, DOI 10.1007/s11356-022-22741-2

Abstract: The zebrafish eleutheroembryo model is increasingly used to assess the toxicity and developmental adverse effects of xenobiotics. However, the actual exposure is seldom measured (poorly accessible), while a predictive model could estimate these concentrations. The pred...

08/09/2022

rbioacc: An R-package to analyze toxicokinetic data

Authors: Ratier A, Baudrot V, Kaag M, Siberchicot A et al.

Source: Ecotoxicology and Environmental Safety 242: 113875, 2022, DOI 10.1016/j.ecoenv.2022.113875

Abstract: The R-package rbioacc allows to analyse experimental data from bioaccumulation tests where organisms are exposed to a chemical (exposure) then put into clean media (depuration). Internal concentrations are measured over time during the experiment. rbioacc provides tu...

02/09/2022

Effects of particle size and amendment rates of Sargassum biochar on chlordecone sequestration in West Indian soilscience

Authors: Stephan P, Le Roux Y, Gaspard S et al.

Source: Environmental Science and Pollution research Eraly Access, 2022, DOI 10.1007/s11356-022-21885-5

Abstract: The use of biochars (BCs) and activated carbons as a way of sequestering soil-bound pollutants such as chlordecone (CLD) is increasingly being studied. This study aims at assessing the impact of Sargassum BC/AC particle size and Sargassum BC amendment

rate on CLD adsorptio...

02/09/2022

Adverse outcome pathways (AOPs) for radiation-induced reproductive effects in environmental species: state of science and identification of a consensus AOP networkb of Scienc

Authors: Tollefsen KE, Alonzo F, Beresford NA, Brede DA et al.

Source: International Journal of Radiation Biology Early Acces, 2022, DOI 10.1080/09553002.2022.2110317

Abstract: Background Reproductive effects of ionizing radiation in organisms have been observed under laboratory and field conditions. Such assessments often rely on associations between exposure and effects, and thus lacking a detailed mechanistic understanding of ca...

02/09/2022

Collembola are Among the Most Pesticide-Sensitive Soil Fauna Groups: A Meta-Analy

Authors: Joimel S, Chassain J, Artru M, Fabure J

Source: Environmental Toxicology and Chemistry Early Access, 2022, DOI 10.1002/etc.5428

Abstract: Pesticides are a major concern because of their deleterious impacts on biodiversity and on the ecological functions provided by living organisms. Although earthworms are well studied, smaller-sized organisms, such as Collembola, also contribute to the agroecosystem functioning, and thei...

02/09/2022

Development of an adverse outcome pathway for radiation-induced microcephaly via expert consultation and machine learning Science

Authors: Jaylet T, Quintens R, Benotmane MA, Luukkonen J et al.

Source: International Journal of Radiation Biology Eraly Acess, 2022, DOI 10.1080/09553002.2022.2110312

Abstract: Background Brain development during embryogenesis and in early postnatal life is particularly complex and involves the interplay of many cellular processes and molecular mechanisms, making it extremely

vulnerable to exogenous insults, including ionizing rad...

02/09/2022

Conformation and structural features of diuron and irgarol: Insights from quantum chemistry calculations

Authors: Bouchouireb Z, Sussarellu R, Stachowski-Haberkorn S, Graton J et al.

Source: Computational and Theoretical Chemistry] 1216: 113844, 2022, DOI 10.1016/j.comptc.2022.113844

Abstract: The structure and the conformations of diuron and irgarol have been investigated from crystal structure analyses and Density Functional Theory (DFT) calculations. Significant

changes in terms of conformer distribution are found according to the ...

OUVRAGES / RAPPORTS / ACTES DE CONGRES

31/10/2022

30 years of data: Lead and other environmental toxins linked to CVD deaths in U.S., United Kingdom

A comparison of cardiovascular deaths associated with environmental toxins has shown a significantly higher risk associated with lead exposure and lower risk for particulate matter in the U.S. than in the United Kingdom. Despite these differences, the U.S. and the U.K. have shown decreasing trends in cardiovascular deaths concerning exposure to smoking, secondhand smoke, lead and particulate matter.

www.eurekalert.org

REGLEMENTATION

10/10/2022

Motion for a resolution : extension of the approval periods of the active substances 2-phenylphenol, 8-hydroxyquinoline, amidosulfuron, bensulfuron, bifenox, chlormequat, chlorotoluron, clofentezine, clomazone, daminozide, deltamethrin, dicamba, difenoc... etofenprox, fenoxaprop-P, fenpropidin, fenpyrazamine, .. etofenprox, fenoxaprop-P, fenpropidin, fenpyrazamine, ...

European Parliament resolution on Commission Implementing Regulation (EU) 2022/1480 of 7 September 2022 amending Implementing Regulation (EU) No 540/2011 as regards the extension of the approval periods of the active substances 2-phenylphenol (including its salts such as the sodium salt), 8-hydroxyquinoline, amidosulfuron, bensulfuron, bifenox, chlormequat, chlorotoluron, clofentezine, clomazone, daminozide, deltamethrin, dicamba, difenoconazole, diflufenican, dimethachlor, esfenvalerate, etofenp...

www.europarl.europa.eu

22/10/2022

Réunion du Groupe Santé Environnement : présentation du 4e plan national santé environnement

Les Français ont de plus en plus d'attentes sur les questions de santé environnement. Ils souhaitent notamment être mieux informés sur les risques qui les entourent. Au nom du principe de précaution, les citoyens souhaitent également que les risques émergents sur leur environnement et sur leur santé puissent être évalués et anticipés.

solidarites-sante.gouv.fr

18/10/2022

Premier appel à projets conjoint entre hubs de données

Le Plan National Santé-Environnement 4 vise à stimuler le développement de la recherche en santé-environnement. Dans ce contexte, le Green Data For Health (GD4H) et le Health Data Hub (HDH) se sont associés pour lancer un appel à projets commun afin d'améliorer la mobilisation des bases de données environnementales et de santé au service des projets de recherche et d'innovation. 18/10/2022 À la une Appel à projet Le GD4H et le HDH lancent un appel à projets commun. ...

www.health-data-hub.fr

22/09/2022

Procédure de mise sur le marché de produits phytopharmaceutiques : de l'évaluation à l'autorisation

Présentation de la procédure de mise sur le marché des produits phytopharmaceutiques dans le cadre de la mission de protection et de santé des végétaux du ministère.

agriculture.gouv.fr

27/10/2022

Qualité de l'air : de nouvelles normes européennes trop timides

Les normes européennes en matière de qualité de l'air sont anciennes et désormais loin d'être assez strictes pour protéger la santé des européens. Aujourd'hui 77% de la population de l'UE est exposée à des taux de particules fines (PM2,5) qui dépassent les recommandations sanitaires de l'OMS. Revoir la règlementation était donc une urgence, reconnue par la Commission Européenne elle-même dans le cadre du pacte vert pour l'Europe et de son plan d'action «zéro pollution». Sa nouvelle proposition, p…

fne.asso.fr

27/10/2022

Breast Cancer Month: Neonicotinoid Insecticides and Breast Cancer Risk (Triple Negative Breast Cancer)

A study published in Environment International adds to the growing body of research evaluating the association between neonicotinoid insecticides (neonics/NIs) and breast cancer. Past studies suggest neonics act as endocrine disruptors, affecting the development and regulation of estrogen hormones that promote breast cancer. However, this study is one of the few to evaluate the toxicological and molecular mechanisms involved in initiating breast cancer events. According to the Centers for Disease…

beyondpesticides.org

26/10/2022

European Commission makes steps to tackle water pollution but falls short on chemical mixtures

Released today, the revised EU rules for clean water target pollutants of emerging concern but lack teeth to address chemical cocktails effects, warns the EEB. The […]

eeb.org

26/10/2022

Common Herbicide Contributes to Development of Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) may be exacerbated by exposure to the herbicide propyzamide, used in both agriculture and on ornamental lawns and landscapes, according to research published in the journal Nature this month. As the rate of autoimmune diseases continues to increase rapidly in the U.S. and the world, it is critical for scientists to better understand the etiology behind these diseases and the environmental factors contributing to their development. Recent data show that the number …

beyondpesticides.org

25/10/2022

Environmental health groups urge national governments to play their part to ensure reforms o… chemical … chemical …

HEAL and 14 environmental health organisations call on European governments to keep pressing the European Commission to deliver the promised reforms of the REACH and CLP regulations, and to support the proposal for a new pesticide reduction law.

www.env-health.org

25/10/2022

Pesticides : quel est le rôle de l’Union européenne ?

Pour de nombreux agriculteurs, difficile de se passer de pesticides pour protéger leurs récoltes. Mais leur utilisation peut parfois s’avérer nocive pour les animaux ou l’environnement et des résidus peuvent se retrouver jusque dans nos assiettes. Ils peuvent alors devenir dangereux pour notre santé si le niveau de résidus dépasse un certain niveau. Quel cadre […] L’article Pesticides : quel est le rôle de l’Union européenne ? est apparu en premier sur Touteleurope.eu.

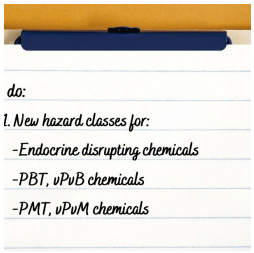
www.touteleurope.eu

25/10/2022

REACH : la France doit se positionner en faveur de la révision en avril 2023.

Ce jour, Générations Futures a envoyé une lettre appelant au positionnement clair de la France… L'article REACH : la France doit se positionner en faveur de la révision en avril 2023. est apparu en premier sur Générations Futures.

www.generations-futures.fr



25/10/2022

Commission moves forward on new hazard classes for endocrine disruptors and… mobile chemicals mobile chemicals

Last week CHEM Trust submitted their comments to the Europe Commissions' public consultation on the proposals to introduce new hazard classes for identifying harmful chemicals. These amendments to the EU's Regulation for the Classification, Labelling and Packaging of substances and mixtures (CLP) are an essential part of the European Green Deal and commitments made in the […]

chemtrust.org

24/10/2022

AgBiome receives U.S. EPA approval for new Esendo™ fungicide

Esendo™ fungicide is the latest in AgBiome's lineup of microbial-based solutions and the first of it

news.agropages.com

24/10/2022

First biopesticide with Cordyceps javanica fungus registered against Bemisia tabaci fly in Brazil

Canadian company Lallemand has attained registration for its bioinsecticide, LALGUARD JAVA WP, in Br

news.agropages.com

12/10/2022

Députés : 10 mesures phares sur les polluants chimiques dangereux et pesticides

Ce mercredi, nous avons envoyé aux députés des commissions Développement Durable et Affaires économiques ainsi… L'article Députés : 10 mesures phares sur les polluants chimiques dangereux et pesticides est apparu en premier sur Générations Futures.

www.generations-futures.fr

07/10/2022

Jérôme Salomon sur France 2 : une reconnaissance de la faille du système d'homologation

Jérôme Salomon répond au journaliste de Complément d'Enquête sur les métabolites de pesticides présents dans l'eau potable : une intervention qui souligne les défaillances de l'état sur le sujet.

www.generations-futures.fr

28/09/2022

Actualité - Pesticides et abeilles - Vers la fin de l'opacité des procédures …

L'association Pollinis vient de remporter une grande victoire contre l'opacité des décisions de la Commission européenne concernant l'évaluation de la toxicité des pesticides sur les abeilles dans le cadre des autorisations de mise sur le marché. Plus de 20 ans après les premières alertes de Que Choisir, il était temps !

www.quechoisir.org

22/09/2022

EDC-Free Europe campaigners welcome the publication of the draft proposal for new EU hazar… endocrine .. endocrine …

The EDC-Free Europe coalition, of which HEAL is a member, has welcomed the publication of the European Commission's draft proposal for new hazard classes for the identification of endocrine disrupting chemicals (EDCs) in the CLP regulation.

www.env-health.org

22/09/2022

Pollution des eaux par des métabolites de pesticides

Les autorités ont sciemment mis et laissé sur le marché des pesticides engendrant des pollutions… L'article Pollution des eaux par des métabolites de pesticides est apparu en premier sur Générations Futures.

www.generations-futures.fr

15/09/2022

Chartes pesticides dites « de bon voisinage » : Générations Futures dresse un état d… lieux lieux

Du contenu des chartes au processus d'élaboration et de « concertation » en passant par la consultation… L'article Chartes pesticides dites « de bon voisinage » : Générations Futures dresse un état des lieux est apparu en premier sur Générations Futures.

www.generations-futures.fr

13/09/2022

Dérogations de pesticides : l'avocat général de la Cour de justice de l'UE plaide pour un encad… plus … plus …

Dans un communiqué paru le 12 septembre 1, l'association de lobbying européen contre les pesticides PAN Europe se félicite de l'avis rendu par l'avocat général de la Cour de justice de l'Union européenne (CJUE), qui conseille à la Cour de définir, de manière restrictive, la possibilité pour les États membres de prévoir des dérogations pour les pesticides.

www.agriculture-environnement.fr

01/09/2022

Produits phytosanitaires : Bruxelles adopte le dispositif simplifié pour les p… biologique biologiques

Afin de soutenir la transition de l'UE vers des systèmes alimentaires durables et la réduction de l'utilisation des pesticides chimiques dans le cadre de la stratégie « De la ferme à la table », la Commission a décidé de mettre en place de nouvelles règles qui vont faciliter l'autorisation des micro-organismes destinés à être utilisés comme substances actives dans les produits phytopharmaceutiques.

www.reussir.fr

Réseau d'écotoxicologie terrestre et aquatique

Fiche thématique N°40 - Aout 2022

Contamination en cuivre des sols viticoles

En France, l'utilisation du cuivre en tant que fongicide contre le mildiou de la vigne (*Plasmopara viticola*) remonte à 1882 avec l'invention de la bouillie bordelaise ($Ca(OH)_2$+$CuSO_4$). Le cuivre est la seule substance efficace pour la lutte contre le mildiou autorisée en agriculture biologique. Une polémique s'est ainsi développée sur l'usage de cet élément, écotoxique à forte dose, en agriculture biologique. Depuis 2018, les doses de cuivre appliquées sont règlementées pour tous les viticulteurs avec une dose maximale autorisée de 4 kg de cuivre/ha/an (soit 28 kg/ha sur 7 ans avec une possibilité de lissage). Des interrogations subsistent sur l'écotoxicité de cet élément dans les écosystèmes viticoles actuels en fonction de l'évolution des pratiques agricoles (réduction des doses, variabilité des formes et des formulations, etc.). L'objectif de cette fiche thématique est de faire un rapide état des lieux des connaissances sur l'écodynamique et l'écotoxicité du cuivre et de souligner les questions de recherche encore ouvertes.

Un historique lourd de conséquences

Le cuivre dans les sols a une origine naturelle et anthropique. Les teneurs actuelles de cuivre dans des sols sont le résultat de l'accumulation de différentes sources (fond pédogéochimique, retombées anthropiques, effluents d'élevage, déchets, traitements phytosanitaires). Une analyse des sols européens (Ballabio et al., 2018) a montré que les sites les plus concentrés en cuivre sont des sols viticoles (49 mg/kg en moyenne). Dans le cas des sols viticoles, ce sont essentiellement les apports de produits phytosanitaires qui sont à l'origine de l'accumulation du cuivre, même si d'autres types d'apports sont parfois non négligeables, comme c'est le cas pour l'épandage de composts de déchets ménagers qui a été fréquent dans certaines régions dans les années 70-90. Les horizons de surface des sols viticoles français ont des teneurs variant de quelques dizaines à plusieurs centaines de mg/kg. Les teneurs mesurées aujourd'hui sont le résultat des applications passées.

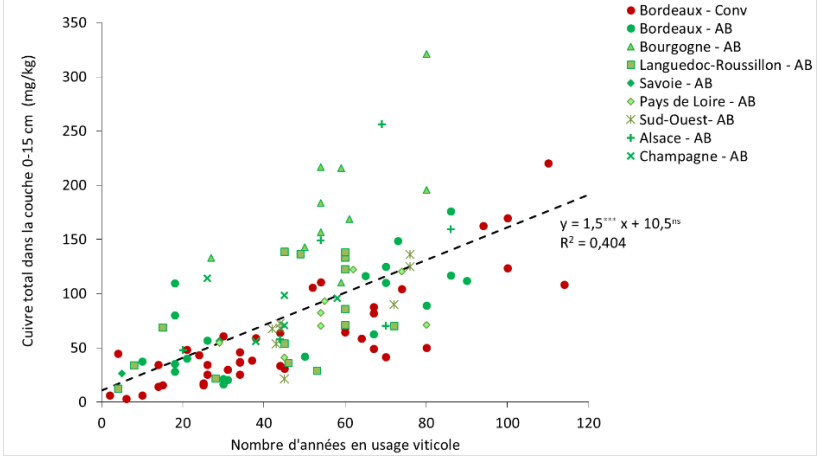


Figure 1. Relation significative ($p < 0,001$) entre l'âge viticole des sols et la teneur en cuivre de leur horizon de surface (0-15 cm) Le nombre d'années en usage viticole de chaque parcelle résulte de l'analyse de photographies aériennes (https://remonterletemps.ign.fr/). En vert sont les parcelles conduites en agriculture biologique et en rouge celles conduites en agriculture conventionnelle.

L'analyse d'une centaine de sols provenant de différentes régions viticoles (Anatole Monnier, 2014 ; Pierdet, 2020 ; Blondel, 2021 ; Ouedraogo, 2022) a permis de dégager une relation entre le nombre d'années pendant lesquelles le sol a été cultivé en vigne et la teneur en cuivre mesurée aujourd'hui dans l'horizon de surface (Figure 1). Dans ce panel, aucune différence significative n'est apparue entre les sols cultivés aujourd'hui en agriculture biologique et en agriculture conventionnelle. Ce résultat est logique car les teneurs mesurées aujourd'hui sont en fait le résultat de l'usage passé des sols. Les viticulteurs doivent donc gérer au mieux une situation dont ils ont hérité, sans continuer à la dégrader.

Réseau d'écotoxicologie terrestre et aquatique

Fiche thématique N°40 - Aout 2022

Mobile ou immobile : le cuivre migre-t-il dans les sols ?

De fait de sa très forte affinité pour la matière organique, le cuivre s'accumule préférentiellement dans l'horizon superficiel des sols. De manière générale, il est admis qu'il a une faible mobilité dans les sols. Dans les sols sableux et acides, un transfert du cuivre peut néanmoins être observé vers des horizons d'accumulation plus profonds – transfert vertical dont l'importance dépend aussi de la pluviométrie (Mirlean et al., 2007). Cependant, dans les sols viticoles chaulés, ce transfert vertical du cuivre semble limité. L'incorporation du cuivre dans le profil est par contre notable suite au labour avant replantation. Ce labour, qui va enfouir la couche de surface, modifie la distribution du cuivre dans le sol créant parfois des couches contaminées vers 30 à 40 cm de profondeur (Brun et al., 1998 ; Pierdet, 2020). Le labour profond peut aussi affecter l'agrégation et le lessivage particulaire, favoriser la minéralisation de la matière organique ou modifier l'adsorption du cuivre sur les constituants du sol, tous ces processus favorisant les transferts en profondeur.

Le cuivre étant fortement retenu en surface dans les sols, ses transferts superficiels se font essentiellement par érosion de surface et ruissellement, notamment dans les vignobles en pente non enherbés. Les concentrations en cuivre dans les eaux de ruissellement sont bien plus élevées, parfois de plus d'un facteur 20, que dans les eaux d'infiltration (Banas et al., 2010). Malgré cela, la quantité de cuivre exportée par ruissellement reste très faible comparée à la quantité totale de cuivre dans les sols. Le traçage isotopique du cuivre dans un bassin versant a permis d'estimer à environ 1 % la part de cuivre total transférée par ruissellement, dont seulement 16 % sous forme dissoute (Babcsányi et al., 2016). Il apparait donc que, dans les sols viticoles, l'homme est un vecteur important de la dissémination du cuivre de par les pratiques agronomiques de labour et de désherbage en inter-rang ou sous le rang.

Phytotoxicité du cuivre

Le cuivre est un oligo-élément pour les plantes car il est nécessaire à l'action d'enzymes impliquées dans des fonctions physiologiques diverses telles que la respiration, la photosynthèse ou le métabolisme de la paroi des cellules. Au-delà d'un certain seuil, il devient toxique, perturbant le fonctionnement physiologique de la plante jusqu'à sa létalité. Cette toxicité à relativement faible dose s'explique, notamment, par ses propriétés redox qui lui confèrent un fort pouvoir oxydant, et son aptitude à déplacer d'autres ions métalliques de leurs cibles physiologiques, tel que le fer.

La forme chimique absorbée par les racines des plantes est la forme ionique : l'ion Cu^{2+} est réduit en ion Cu^{+} à la surface des racines avant d'être internalisé par des transporteurs dédiés. Le cuivre prélevé s'accumule principalement dans les racines. Les racines sont l'organe « tampon » qui stocke et détoxifie le cuivre lorsque celui-ci est présent en excès dans le sol et ce, jusqu'à une concentration critique variable selon la tolérance des plantes au cuivre. Au-delà, le cuivre provoque une « rhizotoxicité » qui se traduit par un épaississement, un brunissement et un raccourcissement des racines ainsi que par une diminution de leur ramification. Au niveau des organes aériens, la phytotoxicité cuprique se traduit par un jaunissement intervernaire du limbe foliaire, que l'on attribue le plus souvent à une déficience induite en fer.

Il est compliqué de définir des seuils de phytotoxicité de contaminants dans les sols car ceux-ci dépendent fortement de la méthodologie suivie. Dans la plupart des travaux menés sur le cuivre, du cuivre frais est apporté au sol et des végétaux sont cultivés, soit immédiatement après l'apport soit après un temps d'équilibre permettant au cuivre de se redistribuer sur les différentes phases. Les paramètres suivis sont l'élongation racinaire ou la biomasse produite. Les seuils de phytotoxicité résultants sont très variables selon les sols (tableau 1) lorsque ceux-ci sont exprimés en teneur totale de cuivre dans le sol, i.e. sans tenir compte de sa disponibilité. Fort logiquement, ces valeurs seuils dépendent étroitement des caractéristiques du sol influant sur la disponibilité du cuivre que sont le

pH, la CEC, la teneur en matière organique ou en oxydes de fer (Rooney et al., 2008). Les seuils les plus bas sont d'ailleurs peu réalistes car ils correspondent à des teneurs du fond pédogéochimique.

Tableau 1 : Seuils écotoxiques (minimum et maximum) exprimés en mg Cu/kg sol pour différentes plantes cultivées sur des sols contaminés artificiellement en cuivre (NA = Non Analysé)

Plante	Organe	Critère	NOEC	CE50	Références
Orge	Racines	Elongation	30 - 80	40 - 2480	Rooney et al. 2006 ; Ruyters et al. 2013 ; Daoust et al., 2006
	Parties aériennes	Elongation	NA	141 - 5820	Daoust et al., 2006
Blé tendre	Parties aériennes	Production de biomasse	NA	240 - 1405	Warne et al., 2008
Tomate	Parties aériennes	Production de biomasse	19 - 198	22 – 851	Rooney et al. 2006 ; Ruyters et al. 2013
Laitue	Plante entière	Production de biomasse	NA	104-729	Sacristan et al., 2015

A notre connaissance, peu d'études visant à déterminer les seuils de phytotoxicité de cuivre dans les sols ont intégré des indicateurs de disponibilité du cuivre tels que les teneurs extractibles par un extractant chimique, les concentrations en cuivre (total ou ionique) dans l'eau porale du sol ou les quantités accumulées par un capteur passif de type DGT. Par contre, des seuils de phytotoxicité ont été obtenus à partir de cultures hydroponiques, avec l'objectif de comparer à ces seuils les concentrations en cuivre (total ou ionique) mesurées dans l'eau porale des sols. Cette idée repose sur la relation étroite observée dans certaines études entre la concentration en cuivre (total ou ionique) de l'eau porale des sols et ses effets phytotoxiques (Lock et Janssen, 2003 ; Kader et al., 2016). Le tableau 2 présente des valeurs seuil de toxicité cuprique, exprimées en concentration de cuivre (total ou ionique), en solution pour différentes plantes. En comparant avec les concentrations mesurées dans l'eau porale des sols viticoles ces valeurs sont dépassées dans certains sols acides fortement contaminés en cuivre (Ouedraogo et al., 2020).

Tableau 2 : Seuils écotoxiques pour différentes plantes cultivées en solution hydroponique ou en sol.

	Milieu	Plante	Seuils de toxicité	Valeurs (µg/L)	Références
Cuivre total	Solution hydroponique	Vigne	CE50	250	Juang et al. 2012
		Maïs	CE50	413	Ouzounidou et al. 1995
		Blé dur	CE50	489	Michaud et al. 2008
		Tournesol	CE50	607	Kolbas et al. 2014
Cuivre ionique (Cu^{2+})	Solution hydroponique	Blé dur	CE50	4	Bravin et al. 2010
		Vigne	CE50	32	Garcia, 2004
	Eau porale de sols	Concombre	CE50	140	Kader et al. 2016

Toxicité du cuivre pour la faune et les microorganismes du sol

L'accumulation de cuivre peut avoir des effets négatifs sur les organismes du sol constituant la méso ou microfaune et la microflore. A forte concentration, le cuivre peut impacter la survie des organismes. A plus faible concentration, il altère leur croissance et leur reproduction, comme observé que vers de terre, enchytrées et collemboles (Sørensen et Holmstrup, 2005 ; Ruyters et al., 2013). La reproduction s'avère être le paramètre le plus sensible à la contamination. Les effets génotoxiques et cytotoxiques semblent variables selon les espèces, le temps d'exposition et les formes chimiques du cuivre apporté

(Wang et al., 2018). Le comportement des organismes est aussi impacté par la contamination cuprique, les vers de terre et les enchytrées ayant des stratégies d'évitement des zones les plus contaminées (Bart et al. 2017). L'abondance et la diversité des organismes du sol sont aussi affectées par l'accumulation de cuivre. Certaines espèces sont plus tolérantes que d'autres comme cela a été montré pour les enchytrées *Enchytraeus albidus* et *Enchytraeus luxurious* (de Barros Amorim et al., 2005) ou les collemboles *Folsomia candida*, *Sinella communis* et *Proisotoma minuta* (Greenslade et Vaughan, 2002). En conséquence, la biodiversité varie avec le niveau de contamination.
Une récente synthèse de l'impact écotoxique du cuivre sur la biodiversité tellurique, et les échanges scientifiques qui en ont suivi, ont conclu « qu'une dose de 4 kg/ha/an ne présente pas de risque à court-terme pour la biodiversité des sols dans certains vignobles mais pourrait constituer une menace dès à présent dans les vignobles les plus vulnérables (forte accumulation historique, conditions spécifiques de pH et de matière organique des sols) » (Karimi et al., 2021a et b., Imfeld et al., 2021). En effet, autant voire plus que la dose de cuivre apporté, c'est sa disponibilité dans le sol – elle-même dépendante du pH, de la teneur en matières organiques (et autres phases sorbantes) et de la teneur en cuivre du sol récepteur, qu'il faut considérer. Cependant, les seuils de toxicité pour les espèces telluriques sont généralement exprimés en fonction de teneurs de cuivre total et non de valeurs de disponibilité. D'autre part, la plupart des évaluations des seuils écotoxicologiques sont réalisées en laboratoire, avec des espèces modèles comme le ver du fumier *Eisena fetida*, qui ne se retrouvent pas dans les sols viticoles. Nous manquons de références sur les espèces effectivement présentes dans les sols.

La courte durée des biotests, l'utilisation de sols artificiels ou de forme chimique simple peuvent mal estimer l'écotoxicité du métal par rapport à une application au champ d'une formulation phytopharmaceutique commerciale. La disponibilité diminue également en fonction du temps écoulé après l'apport de cuivre par le phénomène appelé « vieillissement » qui correspond au changement de spéciation du métal et à son adsorption progressive sur les phases solides (Daoust, 2006, Ruyters et al., 2013). Par conséquent, les seuils de toxicité Cu peuvent être très divers selon les sols testés (tableau 3). Cette variabilité s'explique par une variabilité importante de la disponibilité du cuivre entre les sols testés en lien avec un différentiel de pH, de teneur en matières organiques (ou en oxydes) et/ou de CEC.

Tableau 3 : Quelques seuils écotoxiques pour les organismes de la mésofaune du sol. Le tableau présente les valeurs minimales et maximales retrouvées pour les différents sols testés dans les publications, exprimées en mg Cu/kg de sol (NA = Non Analysé).

Organisme	**Critère**	**NOEC** mg Cu/kg sol	**CE50** mg Cu/kg sol	**Références**
Nématodes	Survie	NA	413 - 1061	Donkin et Dusenbery, 1993
Collemboles	Reproduction	< 23 - 922	45 - 2270	Criel et al., 2008
	Reproduction	< 10 - 320	102 - 662	De Barros Amorim et al., 2005[1]
	Mortalité	10 - >1000	75 - >1000	
Enchytrées	Reproduction	100 - > 320	122 - > 320	
	Mortalité	> 320	> 320	
Ver du fumier (*Eisenia fetida*)	Reproduction	54 - 328	72 - 778	Criel et al., 2008
	Mortalité	NA	335 - 6190	Daoust et al., 2006

[1] Ces auteurs ayant comparé des seuils obtenus immédiatement après la contamination (3 jours) et des seuils obtenus après une période de « vieillissement » de 70 jours, nous avons préféré présenter ces dernières valeurs, plus réalistes.

Pour les micro-organismes du sol, la respiration, l'abondance et la diversité sont affectées par la contamination en cuivre (Scott-Fordsmand et al., 2000 ; de Barros Amorim et al., 2005 ; Fernández-Calviño et al., 2010). Les communautés fongiques semblent plus tolérantes que les communautés bactériennes, leur croissance étant affectée à des doses plus élevées (Vázquez-Blanco et al. 2020). Les activités enzymatiques des communautés microbiennes sont perturbées par l'excès de cuivre (Fernández-Calviño et al., 2010 ; Mackie et al., 2013), modifiant ainsi le fonctionnement des sols. Les activités enzymatiques semblent être les paramètres les plus sensibles pour rendre compte d'un effet sur les communautés microbiennes des sols. Pour tous ces paramètres, là encore, la teneur totale induisant un effet varie très fortement selon les sols. Le pH apparaît comme un facteur clef dans la composition de ces communautés et leur résistance au cuivre (Vázquez-Blanco et al., 2020) tout comme la teneur en matières organiques ou la texture du sol (Soler-Rovira et al., 2013). Il semble donc pertinent de ne pas raisonner par rapport à la teneur totale en cuivre mais bien par rapport à la teneur disponible. Ces références manquent actuellement.

Les questions de recherche à approfondir

Les processus contrôlant l'écodynamique du cuivre dans les sols en contexte viticoles sont aujourd'hui bien connus mais ils sont insuffisamment quantifiés dans ces milieux à forte variabilité spatiale. Les flux vers les aquifères superficiels ou profonds sont également rarement estimés. L'importance de la variabilité temporelle des échanges sol-solution et des transferts vers ces aquifères a été identifiée mais sa modélisation, en fonction de l'environnement pédoclimatique, reste à construire. La quantification de ces transferts entre le milieu terrestre et le milieu aquatique est cependant essentielle pour permettre de tester des scénarios d'évolution des pratiques ou d'impact des changements climatiques et aussi de prédire l'écotoxicité potentielle pour les organismes aquatiques.

La toxicité du cuivre est également connue, même si certains processus nécessitent encore des études approfondies. Cependant le lien entre la disponibilité du cuivre et son écotoxicité est insuffisamment étudié. Notamment, nous manquons de références et des méthodes d'évaluation fiables qui permettraient d'orienter les professionnels et de clairement identifier les sols où le cuivre pose un problème d'écotoxicité. Il est essentiel de construire rapidement ces références en reliant les connaissances sur la spéciation du cuivre dans les sols à celles sur son effet sur les organismes et les communautés.

Enfin, les études réalisées, sur lesquelles s'appuient les règlementations, testent de fortes doses, irréalistes par rapport aux pratiques actuelles d'application du cuivre en viticulture. Il semble important d'étudier les effets écotoxiques potentiels à des doses réalistes, et dans des conditions de terrain.

Contacts

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Réseau d'écotoxicologie terrestre et aquatique

Fiche thématique N°41 - Octobre 2021

Une première approche de l'histoire de l'écotoxicologie à l'INRA et Irstea

Introduction

L'utilisation de produits chimiques par l'Homme s'est fortement accrue depuis la seconde guerre mondiale. En opposition avec la notion de progrès qui a accompagné cette évolution, les produits chimiques n'ont pas tardé à contaminer les milieux naturels, puis à impacter les êtres vivants. Le livre « Le printemps silencieux » (Carson, 1962), dont nous célébrons cette année le 60ème anniversaire, a dénoncé cet état de fait, puis initié les préoccupations environnementales de la société, posant même les bases d'une nouvelle discipline scientifique, l'écotoxicologie.

Au niveau universitaire français, c'est à Jean-Michel Jouany (Professeur de la Faculté de Pharmacie de Nancy) que l'on doit le terme d'écotoxicologie, écrit pour la première fois en 1971 dans son article « Ecologie et nuisances », et introduit par cette simple phrase : « L'étude de l'influence des nuisances sur les relations individu-environnement pourrait être simplement qualifiée d'Ecotoxicologie » (Jouany, 1971). J.-M. Jouany et R. Truhaut (Professeur de la Faculté de Pharmacie de Paris) définiront ensuite l'écotoxicologie comme une science multidisciplinaire qui « étudie les effets délétères des agents chimiques, physiques et biologiques sur l'ensemble des êtres vivants, ainsi que leurs interrelations au sein des communautés et leur interaction avec l'environnement » (Truhaut et Jouany, 1977). Durant la même période, François Ramade (Professeur d'Ecologie de l'Université Paris-Sud) aura aussi un rôle actif dans le développement de l'écotoxicologie, en particulier par ses nombreux ouvrages, dont « Ecotoxicologie » (Ramade, 1977).

Comment des instituts de recherche tels que l'INRA et Irstea se sont-ils organisés pour répondre aux enjeux des recherches en écotoxicologie ?

Le réseau ECOTOX s'est associé avec le Comité INRAE/Cirad pour l'histoire de la recherche sur l'agriculture, l'alimentation et l'environnement, pour initier en 2020 un travail de recherche visant à présenter l'évolution de la réflexion scientifique et de l'organisation du dispositif de recherche et d'expertise en écotoxicologie au sein de l'INRA et d'Irstea. Cette première recherche, rendue possible par le recrutement de M1 puis en M2 d'Andréa Demonfaucon, étudiante en Master d'Histoire Moderne et Contemporaine, Parcours Construction des Sociétés Contemporaines (CSC) de l'Université Lumière-Lyon 2, a apporté un regard d'historienne sur ses aspects. Sa démarche s'est organisée autour de trois étapes :

-recherche et centralisation de sources écrites au sein des instituts

-entretien avec les acteurs

-rédaction de livrables.

Ce travail de recherche, encadré par P. Cornu et E. Valceschini, membres du Comité, avec l'appui de J. Garric (ex Irstea) et de C. Mougin (ex INRA), a permis de distinguer 3 grandes périodes dans cette histoire de l'écotoxicologie au sein de nos instituts.

Réseau d'écotoxicologie terrestre et aquatique

Fiche thématique N°41 - Octobre 2021

Le Temps de l'imperceptibilité des polluants : entre réglementation et tâtonnements scientifiques de l'écotoxicologie - 1980-1994

A partir des années 1970, notamment en raison des impacts des accidents industriels, la dégradation de la qualité de l'eau et des milieux aquatiques est devenue un enjeu de recherche et de législation. Dans ce contexte, le Centre technique du génie rural des eaux et des forêts (Ctgref, intégré au Cemagref en 1981) a été l'un des premiers laboratoires à se positionner en France sur la recherche environnementale, notamment en écotoxicologie. Il s'appuie sur des travaux menés en partenariat avec EDF (notamment sur l'impact des effluents chlorés issus des systèmes de refroidissement des centrales thermiques), ou les Agences de l'eau pour les effluents industriels et urbains. Ces premiers travaux positionnent la gestion des eaux et des milieux aquatiques face aux pollutions comme un enjeu vital. Des collaborations sont également nouées avec l'Ifremer et l'INRA.

Mais la prise de conscience de l'impact des pollutions sur les différents compartiments de l'environnement reste hétérogène. La prise en compte des impacts des pollutions sur les milieux terrestres et notamment les sols est plus tardive. Elle s'effectue au travers de deux grandes problématiques, la procédure d'autorisation de mise sur le marché des produits phytosanitaires (avec la directive européenne 91/414), et la valorisation par épandage des boues d'épuration. Comme la réglementation en matière de protection des sols est très limitée, c'est à travers la réglementation des substances toxiques qu'il faut trouver des évolutions. L'expertise liée à l'homologation des pesticides devient un des champs d'expertise privilégié pour l'INRA dès les années 1980 et tout au long des années 1990, pour aboutir à la création de la Structure Scientifique Mixte en 1997.

Le temps de la traque scientifique du devenir des polluants : les premiers pas de l'écotoxicologie institutionnelle - 1994-2006

Dans les années 1990, les forces en écotoxicologie sont peu nombreuses et dispersées sur l'ensemble du territoire national. Le Cemagref investit dans la création d'un Thème de Recherche (TR) permettant d'inclure l'ensemble des chercheurs concernés par le devenir et l'ilpact des pollutions chimiques, indépendamment de leur localisation, pour favoriser l'interdisciplinarité et coordonner les réponses aux appels à projets. Ainsi est créé en 1999 le TR EXPER « Effets des apports allochtones sur les milieux aquatiques. Facteurs d'exposition des organismes et perturbations des récepteurs biologiques » dédié aux questions d'écotoxicologie aquatique.

Le département de Phytopharmacie de l'INRA, longtemps en lien avec les instances en charge de l'homologation des produits phytosanitaires, a initié relativement tôt des recherches en écotoxicologie. Puis, dans les années 1990, une équipe pluridisciplinaire, Xénobiotiques et Environnement, voit à Versailles ses thématique de recherche évoluer de la dynamique des contaminants à la prise en compte de leurs impacts sur le vivant. Elle étudie également l'utilisation de champignons filamenteux comme agents de dépollution des sols. Elle propose comme perspectives le développement de bioindicateurs de la qualité biologique des sols. Les programmes nationaux portés par le PNETOX et l'ADEME sont des leviers importants.

Réseau d'écotoxicologie terrestre et aquatique

Fiche thématique N°41 - Octobre 2021

Le temps de la saisie scientifique des effets des polluants : l'âge d'or des réseaux en écotoxicologie - 2006 – Nos jours

La politique française de protection des ressources aquatiques se renforce de manière significative au cours de la décennie 2000. La Directive Cadre sur l'Eau (DCE) devient de plus en plus prégnante dans la gestion des eaux, renforçant la position des instituts de recherches sur la problématique des pollutions et de ses effets. Le Cemagref (devenu en 2012 l'Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture, Irstea) met en place le TR BELCA « Réponses Biologiques et Ecologiques aux contaminations du milieu Aquatique : Ecotoxicologie et Bioindication ». Sa finalité est de développer les connaissances sur l'impact des contaminations dans les milieux récepteurs, et de faire émerger des outils d'évaluation des dangers toxiques utilisables en support de la réglementation. Aux partenaires historiques de la gestion des milieux, s'ajoute également l'Office national de l'eau et des milieux aquatiques (ONEMA) . Cet acteur national de la gestion des milieux aquatiques soutient également le réseau AQUAREF qui mobilise les instituts de recherche nationaux (dont l'INRA et Irstea) pour répondre à des questions critiques pour la surveillance des milieux aquatiques tant en chimie qu'en hydrobiologie, et satisfaire aux besoins de surveillance générés par la DCE. Le TR BELCA se termine avec la réorganisation d'Irstea en 2018, prélude à la fusion avec l'INRA. Les travaux menés dans le TR BELCA, et par les partenaires scientifiques du domaine (CNRS, INRA, Ifremer, universités dont Metz et Bordeaux) ont permis de produire, entre 2016 et 2018 une série de livre sur l'écotoxicologie (https://www.istegroup.com/fr/series/ecotoxicologie/).

A la suite de la mission « écotoxicologie » confiée par l'INRA à J.-P. Cravedi en 2004, la création de l'unité « Physicochimie et écotoxicologie des sols d'agrosystèmes contaminés, PESSAC) est actée par l'INRA, avec la fusion de l'unité de Science du Sol et de l'équipe Xénobiotiques et Environnement de Versailles qui vise à structurer la communauté des écotoxicologues terrestres à l'INRA. Cette unité a pour mission forte d'assurer l'interdisciplinarité entre les chercheurs travaillant sur la dynamique des contaminants dans les sols et sur leurs impacts, en y associant des approches de modélisation. PESSAC jouera un rôle important en Ile de France en promouvant l'écotoxicologie au sein de la Fédération Ile de France de Recherche sur l'Environnement (FIRE) et du Labex Biodiversité, Agroécosystèmes, Sociétés, Climat (BASC). L'unité relancera également en 2010 les colloques de la Société d'Ecotoxicologie Fondamentale et Appliquée (SEFA). En 2015, l'UR PESSAC a fusionné avec l'UMR Environnement et Grande Cultures (EGC) pour former l'UMR Écologie fonctionnelle et écotoxicologie des agroécosystèmes (ECOSYS).

Les réseaux d'animation scientifique constituent d'autres leviers majeurs de la structuration du dispositif INRA, puis d'Irstea. Le réseau « Pesticides », actif entre 2001 et 2004 a mobilisé les acteurs de la recherche sur cette problématique, pour produire en 2004 l'ouvrage « Un point sur l'estimation des risques environnementaux des pesticides ».

Le réseau « Ecodynamique des micropolluants » (REM) créé dans la foulée s'adresse à une communauté scientifique qui s'intéresse à d'autres contaminants (métaux…). Sa finalité est d'instaurer un dialogue entre les chercheurs qui s'intéressent à la question de la dynamique des micropolluants, notamment dans le cadre de plusieurs écoles chercheurs (2005, 2006, 2009).

Le réseau des écotoxicologues de l'INRA, aujourd'hui réseau d'écotoxicologie terrestre et aquatique (ECOTOX) sera en 2009 une seconde conséquence de la mission Cravedi. Le réseau REM a intégré ECOTOX, qui mobilisera des chercheurs issus de plusieurs départements de l'INRA, puis d'Irstea, et est à ce jour un outil d'animation nationale reconnu., qui a permis la constitution du réseau EcotoxicoMic dédié à l'écotoxicologie microbienne. ECOTOX organise des séminaires trisannuels et offre un certain nombre de livrables (liste de diffusion, fiches thématiques, bulletins de veille, ouvrages, séminaires…). Enfin, le réseau se veut une interface entre les différentes structures traitant d'écotoxicologie u plan national, comme la Fondation Rovaltain ou encore la SEFA.

En conclusion

L'écotoxicologie est une discipline relativement récente, en quête d'implantation durable dans la sphère scientifique et institutionnelle depuis le milieu des années 1970. Ces premiers travaux ont fourni des éléments pour retracer l'histoire des écotoxicologues au sein de l'INRA et d'Irstea pour aboutir aujourd'hui à la communauté INRAE. Aujourd'hui, INRAE peut s'appuyer sur des forces "renforcées" grâce à la fusion des 2 instituts.

Cependant, seule une faible partie émergée d'un vaste iceberg n'a été considérée. Ce choix a été guidé par les sources documentaires collectées et les entretiens réalisés, qu'il reste nécessaire de compléter, en considérant par exemple l'écotoxicologie aquatique au sein de l'INRA ou encore l'implication des chercheurs dans les différentes instances d'expertise.

« *Conserver la nature, c'est aussi conserver l'homme ; il parait raisonnable de lutter contre la destruction des sols, d'augmenter les récoltes, de conserver les écosystèmes* » (Jouany, 1971).

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Pour en savoir plus

- Page « Histoire de l'écotoxicologie » https://www6.inrae.fr/ecotox/Productions/Histoire-de-l-ecotoxicologie
- Les fondements de l'écotoxicologie française https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-22-Aout-2019
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