https://doi.org/10.15454/x8by-ae98

Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique

ECOTOX N°54, Décembre 2021

Réalisé par l'équipe de veille sur la période du 1er novembre au 31 décembre 2021.
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Edito

Voici notre 54ème bulletin de veille, qui nous espérons toujours informatif !

Nous vous proposons dans ce bulletin une tribune concernant les conséquences à long-terme des accidents nucléaires de Tchernobyl et de Fukushima sur les organismes sauvages. La tribune est téléchargeable sous forme de fiche thématique sur notre site ECOTOX : https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-36-decembre-2021
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L'équipe vous souhaite une bonne lecture de ce bulletin !

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https://doi.org/10.15454/x8by-ae98

SOMMAIRE

https://doi.org/10.15454/x8by-ae98

https://doi.org/10.15454/x8by-ae98

https://doi.org/10.15454/x8by-ae98

https://doi.org/10.15454/x8by-ae98

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Tribune libre

Quelles conséquences à long-terme des accidents nucléaires de Tchernobyl et de Fukushima sur les organismes sauvages ? Vers une approche éco-évolutive

Introduction

Les accidents nucléaires majeurs de Tchernobyl (26 avril 1986, Ukraine) et Fukushima-Daiichi (11 mars 2011, Japon) ont entrainé d'importants rejets radioactifs dans l'environnement (IAEA, 2006 ; Giraudeau, Bonzom *et al*., 2018). Les radionucléides émis lors de ces accidents nucléaires se sont dispersés et redistribués dans l'environnement au fil des années. Dans les premiers temps la faune et la flore ont subi une exposition aigüe aux rayonnements ionisants (Encadré 1), en particulier dans les régions touchées par les retombées des centrales accidentées (Figure 1). Cette exposition a produit des effets délétères sur plusieurs espèces dans certains territoires contaminés (e.g. Geras'Kin *et al*., 2008). Aujourd'hui, les organismes sauvages présents sur ces territoires restent exposés chroniquement aux rayonnements ionisants. Quels sont les effets de ces rayonnements sur les individus, les populations, le fonctionnement des écosystèmes ?

Encadré 1. Les radionucléides : des spécificités à prendre en compte

La particularité des radionucléides vient de leur propriété à émettre des rayonnements dits ionisants susceptibles de produire des effets sur les organismes. Les effets des rayonnements ionisants sont exprimés non pas vis-à-vis de la concentration des radionucléides dans les milieux, comme c'est souvent le cas pour les substances chimiques conventionnelles mais au regard de la quantité d'énergie reçue par les organismes exposés. Il s'agit donc de déterminer, pour un organisme donné et des conditions d'exposition définies, la quantité d'énergie déposée dans cet organisme du fait de son exposition aux rayonnements émis par le(s) radionucléide(s) considéré(s). La faune et la flore présentes sur ces territoires radio-contaminés sont donc exposées aux rayonnements ionisants selon 2 voies : une exposition externe induite par les rayonnements émis par les radionucléides présents dans l'environnement (sol, eau, etc.), une exposition interne induite par les radionucléides ingérés, inhalés ou absorbés (passage percutané) par la flore et la faune sauvages. Il est donc nécessaire de prendre en compte l'ensemble des voies d'exposition possibles d'un organisme pour déterminer la quantité d'énergie qu'il reçoit (Beaugelin-Seiller, 2011 ; CEAEQ 2015 ; IRSN 2021).

Figure 1. Exemple de paysages dans la région de Tchernobyl et de Fukushima. Une forêt dans la zone d'exclusion de Tchernobyl (Ukraine, novembre 2010) où ont été réalisées des études sur les effets de la radio-contamination sur la décomposition des litières de feuilles (Bonzom *et al*., 2016) (photo de gauche). Une rizière entourée de forêts dans la préfecture de Fukushima (Japon, juin 2013), le lieu de reproduction de plusieurs espèces de grenouilles, dont la rainette (*Dryophytes japonicus*) étudiée dans Giraudeau, Bonzom *et al*., 2018 (photo de droite). Photos : Jean-Marc Bonzom/IRSN.

I - Une première indication : l'abondance des organismes

Une première méthode employée pour estimer l'état de ces populations est l'étude de l'abondance des populations de différents groupes d'organismes. Les résultats sont contrastés en fonction de la région (Tchernobyl, Fukushima) et du groupe biologique considéré (oiseaux, insectes, mammifères, ...). La levée d'une grande partie des pressions humaines dans ces régions par la mise en place de « zones d'exclusion » (c.-à-d., la population civile a été évacuée de ces zones) a favorisé la présence par exemple de grands mammifères (élans, chevreuils, sangliers, loups dans la zone d'exclusion de Tchernobyl (Deryabina *et al.*, 2015)). Néanmoins, d'autres études montrent dans la zone d'exclusion de Tchernobyl une diminution de l'abondance de certains mammifères en fonction de la contamination du milieu (Møller et Mousseau, 2013, Beaugelin *et al.*, 2020). Dans la préfecture de Fukushima, l'abondance des mammifères n'apparait au contraire pas dépendre de la contamination du milieu ; les résultats montrent que de nombreuses espèces de mammifères sont plus abondantes dans les zones où l'activité humaine est limitée (Lyons *et al.*, 2020). Cette dernière étude souligne **l'importance de prendre en compte l'effet des activités humaines sur les populations sauvages lorsque l'on veut discerner les effets potentiels induits par l'exposition aux rayonnements ionisants de ceux relevant d'autres facteurs.**

Ces mesures d'abondance permettent d'avoir un premier aperçu de l'état des populations, mais elles ne permettent pas à elles seules d'apprécier l'état de santé des individus. De plus, si la reproduction des individus présents dans les zones les plus contaminées est impactée, un système qualifié de « source-puit » (Dias, 1996), peut se mettre en place : la faible compétition pour les ressources induite du fait de la reproduction limitée dans les zones les plus contaminées peut favoriser la migration d'individus en direction de ces zones. Cette hypothèse a notamment été vérifiée pour des hirondelles rustiques (*Hirundo rustica*) dans la région de Tchernobyl (Møller *et al.*, 2006). Les populations dont on estime l'abondance peuvent ainsi être constituées par des individus dont l'exposition passée aux rayonnements ionisants diffère. **Il est donc fondamental d'étudier plus précisément si les individus des zones les plus contaminées présentent des capacités (survie, reproduction, ...) identiques aux individus présents dans les zones les moins contaminées.**

II – Quels effets individuels plusieurs années après les accidents ?

Des études à l'échelle individuelle ont mis en évidence des effets liés à la radio-contamination de l'environnement comme du stress oxydant, des dommages génétiques, une dépression du système immunitaire, des malformations de spermatozoïdes, un ralentissement de la capacité des cellules à se multiplier, de l'albinisme partiel, des cataractes, une perturbation de l'expression de gènes impliqués dans les grandes fonctions, ... (p.ex. Møller et Mousseau, 2006 ; Geras'kin *et al.*, 2008 ; Aliyu *et al.*, 2015 ; IRSN 2016 ; Cannon et Kiang, 2020 ; et plus spécifiquement, p. ex. : singe : Ochiai *et al.*, 2014, Hayama *et al.*, 2017, Urushihara *et al.,* 2018 ; campagnol : Kesäniemi *et al.*, 2019 ; papillon : Taira *et al.*, 2014 ; poisson : Lerebours *et al.*, 2020).

Cependant, dans de nombreux cas les débits de doses décrits par les auteurs sont souvent sous-estimés. En effet, dans de nombreuses études seule une partie de l'exposition des organismes aux radiations est prise en compte. Elle se limite à l'irradiation gamma externe, sans tenir compte de la contamination interne, voie d'exposition prépondérante pour de nombreuses combinaisons d'organismes et de radionucléides (Giraudeau, Bonzom *et al*., 2018) (Fig.1). Certaines études n'ont au contraire pas mis en évidence d'impacts négatifs des rayonnements ionisants à l'échelle individuelle (p. ex. crustacé : Fuller *et al.*, 2017, 2018 ; grenouille : Giraudeau, Bonzom *et al.*, 2018 ; mouche du vinaigre : Itoh *et al.*, 2018).

Malgré l'existence de certains effets, à partir de ce type d'études à l'échelle individuelle, il reste difficile d'estimer leurs conséquences sur l'état des populations et leur capacité à persister dans les régions radio-contaminées.

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III – Des effets sur l'évolution des populations ?

Hyla orientalis
(J-M Bonzom/IRSN)

Au sein d'une population tous les individus ne présentent pas les mêmes caractéristiques (morphologiques, comportementales, physiologiques, …). Certaines caractéristiques peuvent être favorisées par un effet de sélection si elles permettent aux individus d'être plus aptes à survivre et à se reproduire dans des environnements contaminés. Au fil des générations, la fréquence de ces individus sélectionnés et leurs descendants peut alors s'accroître au sein de la population. De telles caractéristiques sont qualifiées d'adaptations. Depuis les accidents de Tchernobyl et Fukushima, plusieurs générations d'organismes se sont succédé et il est probable que de telles adaptations se soient mises en place. Toutefois, bien que le processus d'adaptation soit souvent mentionné (Møller *et al*., 2016) pour interpréter certains résultats obtenus sur le terrain, il reste très difficile à démontrer. Pour identifier une adaptation, il est nécessaire notamment de démontrer qu'elle persiste même après plusieurs générations placées dans un environnement non contaminé et qu'elle confère un avantage pour la survie et/ou la reproduction de l'organisme. Dans le cas de l'accident de Tchernobyl, très peu d'études en ont fait réellement la démonstration. Parmi elles, Ruiz-Gonzalez *et al.* (2016) ont isolé des bactéries associées aux plumes d'hirondelles rustiques capturées dans 3 sites différemment contaminés dans la région de Tchernobyl et dans un site contrôle au Danemark. Les auteurs de cette étude ont mis en évidence de meilleures capacités de survie et de multiplication des bactéries provenant des zones plus contaminées (en comparaison de celles provenant des zones moins contaminées, les débits de dose ambiants étant compris entre 0,03 et 2,9 µGy/h). Plus récemment, une étude cherchant à tester l'hypothèse de l'adaptation a été réalisée dans la région de Tchernobyl. Arnaise *et al.* (2020) se sont intéressés à une potentielle adaptation de champignons (*Microbotryum lychnidis-dioicae*) infectant les parties reproductrices d'une plante à fleur. Ils montrent que les champignons provenant des zones les plus contaminées supportent moins les effets d'une irradiation expérimentale aigüe et forte. Ces résultats vont à l'encontre de ce qui aurait été attendu si les champignons provenant des zones les plus contaminées étaient adaptés aux rayonnements depuis l'accident.

Si de potentielles adaptations sont souvent perçues comme bénéfiques pour la viabilité des organismes sauvages dans les zones contaminées, cette spécialisation peut cependant représenter un handicap face à d'autres stresseurs. Dans le cas où d'autres modifications environnementales (climatiques, autres pollutions, …) apparaitraient dans les zones contaminées, il est possible que des organismes adaptés aux rayonnements ionisants soient moins susceptibles de supporter de nouveaux changements environnementaux (Bergelson et Purrington, 1996 ; Coustau, *et al.,* 2000). Une importante direction de recherche aujourd'hui est donc de caractériser le potentiel des populations à supporter des modifications futures de l'environnement. Ce potentiel peut être notamment évalué par la mesure de la diversité génétique.

Dans le cas de l'accident de Tchernobyl, plusieurs études se sont intéressées à cette diversité génétique. Une première, réalisée sur des campagnols roussâtres (*Myodes glareolus*) (Baker *et al.*, 2017), révèle l'existence d'une plus grande diversité génétique dans les zones les plus contaminées. Les auteurs concluent à l'existence d'un plus grand nombre de mutations dans les zones les plus contaminées, mais l'effet de la migration d'individus en direction de ces zones permettrait également d'obtenir une telle diversité (Kesäniemi *et al.*, 2018). Une deuxième étude de la diversité génétique réalisée sur des populations de rainettes vertes (*Hyla orientalis*) montre également une augmentation de la diversité génétique dans la zone d'exclusion de Tchernobyl en comparaison à d'autres populations situées dans des zones moins contaminées (Car *et al.,* 2021). Cette étude conclue également à une augmentation du taux de mutation dans cette zone, et indique que la diversité obtenue n'a pu s'établir que sur des populations comprenant un faible nombre d'individus. Il résulte de cette étude que parmi la population initiale, seul ce faible nombre d'individus, qui présente la diversité génétique observable aujourd'hui, a persisté dans la zone. Les autres ont probablement disparus du fait des effets des rayonnements ionisants, comme l'apparition de mutations délétères. Au contraire, d'autres études sur un crustacé aquatique (*Asellus aquaticus*) ou des vers de terre (*Octolasion lacteum*) ne montrent pas de différence de diversité en fonction du niveau de contamination radioactive (Fuller *et al.,* 2019 et Newbold *et al.,* 2019). Ce qui pourrait s'expliquer par une absence de

modification des processus évolutifs, ou bien une compensation de processus ayant des effets antagonistes sur la diversité génétique (par exemple la dérive génétique et les mutations).

Une méta-analyse regroupant des études utilisant diverses méthodes et sur de nombreux groupes d'organismes a été réalisée par Møller et Mousseau (2015) et montre un large effet des rayonnements ionisants sur l'accroissement des mutations à la suite de l'accident de Tchernobyl. Ils ne montrent cependant pas d'évolution à la baisse des mutations au cours du temps, ce qui aurait pu être attendu du fait de la diminution de l'exposition des organismes. Si cet effet des rayonnements ionisants semble ainsi généralisable à de nombreux groupes d'organismes, **l'étude détaillée de l'impact évolutif de cet effet concerne pour l'instant peu de ces groupes et cela ne permet pas aujourd'hui d'avoir une vision précise des effets des accidents nucléaires majeurs de Tchernobyl et de Fukushima sur l'évolution à long-terme des populations impactés par la radio-contamination.** L'étude des processus évolutifs ayant court dans les zones contaminées et mobilisant diverses méthodologies (généralisation de la diversité génétique à de nombreuses espèces, utilisation de marqueurs génétiques donnant une image plus complète du génome (omiques), comparaison génotypes/phénotypes, etc.) seraient nécessaires à mettre en place de manière à mieux caractériser notamment la viabilité de ces populations.

IV - Prendre en compte les interactions entre les organismes, quelles conséquences sur le fonctionnement de l'écosystème ?

Les effets des accidents nucléaires sont généralement étudiés à l'échelle des individus ou de populations d'une même espèce, mais un écosystème ne se résume pas à une simple juxtaposition d'organismes. Une direction de recherche particulièrement intéressante aujourd'hui vise à intégrer ces interactions dans l'étude des effets des rayonnements ionisants. Par exemple, après avoir constaté une diminution de l'abondance d'oiseaux et d'insectes pollinisateurs dans les zones les plus contaminées de la zone d'exclusion de Tchernobyl, Møller *et al.,* (2012) se sont intéressés à l'abondance des jeunes arbres fruitiers. Puisque ces arbres sont dépendants à la fois des insectes pour la pollinisation et des oiseaux pour la dispersion des graines, les auteurs ont alors fait l'hypothèse que ces diminutions d'abondances animales pouvaient induire une diminution de l'apparition de jeunes arbres fruitiers. Les résultats de cette étude montrent effectivement une diminution de l'abondance en fonction de la contamination radioactive de l'environnement et soulignent leur dépendance aux insectes pollinisateurs et aux oiseaux frugivores. Ainsi, en plus de potentiels effets délétères des rayonnements ionisants sur ces arbres, les interactions inter-espèces peuvent induire des **« effets indirects ».** Dans le cas de petits papillons bleus (*Zizeeria maha*) de la préfecture de Fukushima, de nombreuses études ont été menées depuis l'accident, montrant par exemple une augmentation des anomalies au niveau des ailes, des yeux, des antennes, des pattes ou encore des parties buccales des papillons échantillonnés dans les zones les plus contaminées (Hiyama *et al.*, 2012). Pour comprendre les mécanismes à l'origine de ces effets, Gurung *et al.* (2018) ont élevé des chenilles en laboratoire en les alimentant avec leur plante hôte *Oxalis corniculata*. En alimentant des chenilles avec des oxalis provenant de milieux contaminés par l'accident, les auteurs ont observé des effets (par exemple des anomalies morphologiques) identiques à ceux observés sur le terrain. A l'inverse, lorsque les chenilles sont contaminées directement avec des radionucléides et alimentées avec des oxalis non contaminées, ces anomalies ne sont pas observées. Sakauchi *et al.,* (2021) ont alors suspecté un effet indirect des rayonnements ionisants lié aux oxalis et à la modification de leur composition en nutriments après contamination, et ont pu notamment montrer une diminution de leur concentration en sodium. **Des effets très spécifiques de la contamination par les radionucléides sur certains organismes peuvent potentiellement induire en cascade un ensemble de modifications sur d'autres organismes, et donc à l'ensemble de l'écosystème associé.**

Dans certains cas, la modification des interactions peut ne pas induire d'effet indirect strict, mais peut moduler la réponse des organismes aux rayonnements ionisants. Mappes *et al.* (2019) se sont par exemple demandé si les effets des rayonnements ionisants sur des campagnols (*Myodes glareolus*) présents dans la zone contaminée de Tchernobyl pouvaient être modulés par un apport supplémentaire de nourriture. Sans apport de nourriture, les résultats ont montré une diminution de l'abondance avec l'augmentation des rayonnements ionisants, alors

qu'avec un apport en nourriture au contraire on observait une augmentation de l'abondance dans les zones les moins contaminées et aucun effet dans les zones les plus contaminées. Ainsi, les auteurs concluent qu'un apport alimentaire supplémentaire peut jusqu'à un certain point atténuer les effets néfastes d'un environnement contaminé par des radionucléides. De nouveau, cette étude met en évidence **l'importance de la prise en compte des interactions entre les organismes sur le terrain qui peuvent profondément influencer les relations entre l'exposition aux rayonnements ionisants et leurs effets.**

Puisque les interactions entre organismes peuvent être impactées par l'exposition aux rayonnements ionisants, cela peut *in fine* affecter le fonctionnement de l'écosystème contaminé. Pour étudier ces effets, les grandes fonctions telles que la décomposition de la matière végétale ont été étudiées dans la région de Tchernobyl. Mousseau *et al.* (2014) ont mis en évidence une diminution du taux de décomposition des litières de feuilles, et une augmentation de l'épaisseur de la litière au sol, en lien avec une augmentation de la radioactivité ambiante. Ces résultats suggèrent un recyclage de la matière organique plus lent en réponse à un niveau de radioactivité ambiant plus élevé, possiblement à cause d'un impact négatif sur les communautés d'organismes décomposeurs (bactéries, champignons, faune du sol). A l'opposé, après avoir réalisé le même type d'expérimentation, Bonzom *et al.* (2016) ont montré que le taux de décomposition des litières de feuilles augmentait avec l'accroissement du niveau de radiation absorbé par les organismes décomposeurs (Fig.1). Les auteurs proposent deux hypothèses pour expliquer ce résultat : (i) sous l'effet des rayonnements ionisants les organismes décomposeurs ont pu répondre en augmentant leur survie et leur succès reproducteur, et *de facto*, leur abondance dans les zones contaminées. (ii) Les décomposeurs ont consommé préférentiellement la litière déposée expérimentalement (issue de zones non contaminées) plutôt que la litière locale contaminée. Certains paramètres comme le gradient de contamination, l'estimation de la dose ou encore la nature des feuilles utilisées pourraient expliquer la contradiction entre les résultats de ces deux études.

La prise en compte de l'effet de la contamination radioactive de l'environnement à la suite des accidents nucléaires majeurs sur les interactions et le fonctionnement des écosystèmes reste, à ce jour, très marginale. Pour autant, il s'agit d'un axe de recherche central pour une évaluation holistique des conséquences écologiques d'une radio-contamination de l'environnement.

Comprendre et mesurer les conséquences d'une radio-contamination de l'environnement sur l'évolution des populations ainsi que sur le fonctionnement des écosystèmes apparait donc essentiel pour mieux défendre le vivant et déterminer de manière éclairée des critères de protection assurant le bon état écologique des écosystèmes, cible de la protection. Ce type d'approche bénéficierait à l'étude des effets de l'ensemble des modifications environnementales d'origine anthropique (pollution diverses, dérèglement climatique, …).

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https://doi.org/10.15454/x8by-ae98

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https://doi.org/10.15454/x8by-ae98

ERA / PUBLICATIONS SCIENTIFIQUES / COMMUNAUTES MICROBIENNES AQUATIQUES

First evaluation of the periphyton recovery after glyphosate exposure

Authors: Vera MS, Trinelli MA

Source: ENVIRONMENTAL POLLUTION 290: 117998, 2021, DOI 10.1016/j.envpol.2021.117998

Abstract: The potential environmental risk of glyphosate has promoted the need for decontamination of glyphosate-polluted water bodies. These treatments should be accompanied by studies of the recovery potential of aquatic communities and ecosystems. We evaluated the potential of freshwater periphyton to recover from glyphosate exposure using microcosms under laboratory conditions. Periphyton developed on artificial substrates was exposed to 0.4 or 4 mg l-1 monoisopropylamine salt of glyphosate (IPA) for 7 days, followed by translocation to herbicide-free water. We sampled the community 1, 2 and 3 weeks after the transfer. Dry weight, ash-free dry weight, chlorophyll a, and periphyton abundances were analysed...

Study of Heavy Metals and Microbial Communities in Contaminated Sediments Along an Urban Estuary

Authors: Yi J, Lo LSH, Liu HB et al.

Source: FRONTIERS IN MARINE SCIENCE 8: 741912, 2021, DOI 10.3389/fmars.2021.741912

Abstract: Estuarine sediments are increasingly contaminated by heavy metals as a result of urbanization and human activities. Continuous multi-heavy metal accumulation in the ecosystem can provoke new effects on top of the complex environmental interactions already present in estuarine ecosystems. It is important to study their integrated influence on imperative microbial communities to reflect on the environmental and ecological risks they may impose...

Anthracene and Pyrene Biodegradation Performance of Marine Sponge Symbiont Bacteria Consortium

Authors: Marzuki I, Asaf R, Paena M et al.

Source: MOLECULES 26: 6851, 2021, DOI 10.3390/molecules26226851

Abstract: Every petroleum-processing plant produces sewage sludge containing several types of polycyclic aromatic hydrocarbons (PAHs). The degradation of PAHs via physical, biological, and chemical methods is not yet efficient. Among biological methods, the use of marine sponge symbiont bacteria is considered an alternative and promising approach in the degradation of and reduction in PAHs. This study aimed to explore the potential performance of a consortium of sponge symbiont bacteria in degrading anthracene and pyrene. Three bacterial species (Bacillus pumilus strain GLB197, Pseudomonas stutzeri strain SLG510A3-8, and Acinetobacter calcoaceticus strain SLCDA 976) were mixed to form the consortium. The interaction between the bacterial consortium suspension and PAH components was measured at 5 day intervals for 25 days...

https://doi.org/10.15454/x8by-ae98

How do visible and UV light affect the structure and function of leaf-associated aquatic fungal communities polluted by TiO_2 nanoparticles?

Authors: Du JJ, Qv WR, Pu GZ et al.

Source: ENVIRONMENTAL SCIENCE-NANO Early Access, DOI 10.1039/d1en00275a

Abstract: Most intensively studied nanoparticles (NPs) possess photocatalytic activity. However, knowledge of the ecotoxicity of TiO2 NPs in response to the natural photoperiod remains scarce. To increase our understanding of the phototoxicity of TiO2 NPs toward aquatic fungal communities, regarding their structure and functioning, a microcosm experiment was conducted involving narrow-leaf cattail (*Typha angustifolia*) leaf decomposition with TiO2 NPs (50 mg L-1) under different light conditions (visible light, UV light, and the natural photoperiod) for 214 days...

Periphytic Algae and Cyanobacteria from the Rio Doce Basin Respond Differently to Metals and Salinity, Showing Different Potential for Bioremediation

Authors: Gomes MP, Kochi LY, Freitas PL et al.

Source: PLANTS-BASEL 10: 2349, 2021, DOI 10.3390/plants10112349

Abstract: We have studied the isolated and combined effects of metals (Fe and Mn) and NaCl the on growth, physiology, and metal-uptake capacity of two photosynthetic periphytic species-*Synechococcus elongatus* (Cyanobacteria) and *Chlorococcum infusionum* (Chlorophyta)-isolated from an impacted area of the Rio Doce River (Brazil) after the Fundao dam collapse...

Herbicide-Induced Shifts in the Periphyton Community Composition Indirectly Affect Feeding Activity and Physiology of the Gastropod Grazer *Physella acuta*

Authors: Konschak M, Zubrod JP, Acosta TSD et al.

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY 55: 14699-14709, 2021, DOI 10.1021/acs.est.1c01819

Abstract: Herbicides are well known for unintended effects on freshwater periphyton communities. Large knowledge gaps, however, exist regarding indirect herbicide impacts on primary consumers through changes in the quality of periphyton as a food source (i.e., diet-related effects). To address this gap, the grazer *Physella acuta* (Gastropoda) was fed for 21 days with periphyton that grew for 15 days in the presence or absence of the herbicide diuron (8 µg/L) to quantify changes in the feeding rate, growth rate, and energy storage (neutral lipid fatty acids; NLFAs) of *P. acuta*. Periphyton biomass, cell viability, community structure, and FAs served as proxies for food quality that support a mechanistic interpretation of the grazers' responses...

An approach to evaluating the acute toxicity of nitrofurazone on community functioning using protozoan periphytons

Authors: Uroosa, Kazmi SSU, Zhong XX, Xu HL

Source: MARINE POLLUTION BULLETIN 173: 113066, 2021, DOI 10.1016/j.marpolbul.2021.113066

Abstract: The acute toxicity of nitrofurazone on community functioning was studied using an acute toxicity test. Consequently, 14-day protozoan periphyton assemblages were used as test organism communities, under a range of nitrofurazone concentrations including 0 (control), 0.5, 3, 6, and 12 mg/ml within 0, 2, 4, 6, 8, 10, and 12 h time duration. Fuzzy coding

https://doi.org/10.15454/x8by-ae98

system of functional traits classified the test protozoan periphyton community into six major traits and 15 categories...

Contrasting Effects of Environmental Concentrations of Sulfonamides on Microbial Heterotrophic Activities in Freshwater Sediments

Authors: Pesce S, Kergoat L, Paris L et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 753647, 2021, DOI 10.3389/fmicb.2021.753647

Abstract: The sulfonamide antibiotics sulfamethoxazole (SMX) and sulfamethazine (SMZ) are regularly detected in surface sediments of contaminated hydrosystems, with maximum concentrations that can reach tens of µg/kg in stream and river sediments. Little is known about the resulting effects on the exposed benthic organisms. Here we investigated the functional response of stream sediment microbial communities exposed for 4 weeks to two levels of environmentally relevant concentrations of SMX and SMZ, tested individually. To this end, we developed a laboratory channel experiment where natural stream sediments were immersed in water contaminated with nominal environmental concentrations of 500 and 5,000 ng/L of SMX or SMZ, causing their accumulation in surface sediments...

As above, so below? Effects of fungicides on microbial organic matter decomposition are stronger in the hyporheic than in the benthic zone

Authors: Bollinger E, Zubrod JP, Konschak M et al.

Source: LIMNOLOGY AND OCEANOGRAPHY Early Access, DOI 10.1002/lno.11973

Abstract: Microbial organic matter decomposition is a critical ecosystem function, which can be negatively affected by chemicals. Although the majority of organic matter is stored in sediments, the impact of chemicals has exclusively been studied in benthic systems. To address this knowledge gap, we assessed the impact of a fungicide mixture at three concentrations on the decomposition of black alder leaves in the benthic and hyporheic zone. We targeted two sediment treatments characterized by fine and coarse grain sizes (1-2 vs. 2-4 mm). Besides microbial communities' functioning (i.e., decomposition), we determined their structure through microbial biomass estimates and community composition...

Metabolomics insight into the influence of environmental factors in responses of freshwater biofilms to the model herbicide diuron

Authors: Creusot N, Chaumet B, Eon M et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, DOI 10.1007/s11356-021-17072-7

Abstract: Freshwater biofilms have been increasingly used during the last decade in ecotoxicology due to their ecological relevance to assess the effect(s) of environmental stress at the community level. Despite growing knowledge about the effect of various stressors on the structure and the function of these microbial communities, a strong research effort is still required to better understand their response to chemical stress and the influence of environmental stressors in this response. To tackle this challenge, untargeted metabolomics is an approach of choice because of its capacity to give an integrative picture of the exposure to multiple stress and associated effect as well as identifying the molecular pathways involved in these responses. In this context, the present study aimed to explore the use of an untargeted metabolomics approach to unravel at the molecular/biochemical level the response of the whole biofilm to chemical stress and the influence of various environmental factors in this response...

Nanoscale zero-valent iron alters physiological, biochemical, and transcriptomic response of nonylphenol-exposed algae (*Dictyosphaerium* sp.)

Authors: Jiang Y, Du LN, Cheng QL et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, DOI 10.1007/s11356-021-17199-7

Abstract: Nanoparticles and organic pollutants are two major contaminants found in aquatic environments. Algae are regarded as the model organism for the risk assessment of pollutants in water. In our previous study, we investigated the toxic effects of nonylphenol (NP), a typical organic water pollutant, on algae; however, it remains unclear how algae respond to the coexistence of NP and nanoparticles. In this study, a concentration gradient of nanoscale zero-valent iron (nZVI; 10, 50, 100, and 200 mg/L) was added to NP-exposed Dictyosphaerium sp. to investigate both the toxic effects of this combination and the potential for NP removal...

Fluorescence responsiveness of unicellular marine algae Dunaliella to stressors under laboratory conditions

Authors: Pavlinska Z, Chorvat D, Mateasik A et al.

Source: JOURNAL OF BIOTECHNOLOGY 324:100018, 2020, DOI 10.1016/j.btecx.2020.100018

Abstract: We examined the responsiveness of unicellular green alga *Dunalliela tertiolecta* to selected stressors employing confocal- and time-resolved imaging of endogenous fluorescence. Our aim was to monitor cell endogenous fluorescence changes under exposure to heavy metal Cd, acidification, as well as light by laser-induced photobleaching...

Indirect Effects of the Herbicide Glyphosate on Plant, Animal and Human Health Through its Effects on Microbial Communities

Authors: van Bruggen AHC, Finckh MR, He M et al.

Source: FRONTIERS IN ENVIRONMENTAL SCIENCE 9: 763917, 2021, DOI 10.3389/fenvs.2021.763917

Abstract: The herbicide glyphosate interferes with the shikimate pathway in plants and in major groups of microorganisms impeding the production of aromatic amino acids. Glyphosate application on plants results in a slow death, accelerated by reduced resistance to root pathogens. Extensive glyphosate use has resulted in increasing residues in soil and waterways. Although direct glyphosate effects on animals are limited, major concerns have arisen about indirect harmful side effects. In this paper, we focus on indirect effects of sublethal concentrations of glyphosate on plant, animal and human health due to shifts in microbial community compositions in successive habitats...

Rethinking the term "glyphosate effect" through the evaluation of different glyphosate-based herbicide effects over aquatic microbial communities star

Authors: Garcia CASY, Vera MS, Vinocur A et al.

Source: ENVIRONMENTAL POLLUTION 292: 118382, 2022, DOI 10.1016/j.envpol.2021.118382

Abstract: Glyphosate-based herbicides (GBH) -the most widely used herbicides in agriculture worldwide-are frequently generalized by the name of "glyphosate". However, GBH encompass a variety of glyphosate salts as active ingredient and different adjuvants, which differ between products. These herbicides reach water bodies and produce diverse impacts over aquatic communities. Yet, the risk assessment assays required for the approval focus mostly on active ingredients. Herein, we compared the effect of five different GBH as well as of monoisopropylamine salt of glyphosate (GIPA) on

aquatic microbial communities from natural shallow lakes that were mixed and allowed to evolve in an outdoor pond. We performed an 8-day long assay under indoor control conditions to evaluate the effects of exposure on the structure of nano-plus microphytoplankton (net phytoplankton, with sizes between 2 and 20 µm and >20 µm, respectively) and picoplankton (size ranging between 0.2 and 2 µm) communities through microscopy and flow cytometry, respectively...

Diversity, functions and antibiotic resistance of sediment microbial communities from lake geneva are driven by the spatial distribution of anthropogenic contamination

Authors: Lyautey E, Bonnineau C, Billard P et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 738629, 2021, DOI 10.3389/fmicb.2021.738629

Abstract: Lake sediments are natural receptors for a wide range of anthropogenic contaminants including organic matter and toxicants such as trace metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls that accumulate over time. This contamination can impact benthic communities, including microorganisms which play a crucial role in biogeochemical cycling and food-webs. The present survey aimed at exploring whether anthropogenic contamination, at a large lake scale, can influence the diversity, structure and functions of microbial communities associated to surface sediment, as well as their genetic potential for resistance to metals and antibiotics...

Effect of different types of anthropogenic pollution on the bacterial community of urban rivers

Authors: Zhang L, Cheng Y, Zhou Y et al.

Source: WATER ENVIRONMENT RESEARCH 93: 1322-1332, 2021, DOI 10.1002/wer.1517

Abstract: The health of urban rivers is threatened by multiple anthropogenic stressors. Bacterial communities in rivers can quickly respond to different types of polluted environments, making them useful for water quality assessments and predictive insights. However, research on river bacterial communities has largely ignored interactions between these communities. Here, 16S rRNA amplicon sequencing analysis is used to comprehensively analyze the bacterial communities in the water and sediments in different types of anthropogenically impacted urban river...

Imidacloprid treatments induces cyanobacteria blooms in freshwater communities under sub-tropical conditions

Authors: Dimitri V, Yao KS, Li D et al.

Source: AQUATIC TOXICOLOGY 240: 105992, 2021, DOI 10.1016/j.aquatox.2021.105992

Abstract: Imidacloprid is one of the most used neonicotinoid insecticides all over the world and is considered as a contaminant of concern due to its high toxicity potential to aquatic organisms. However, the majority of the studies that have evaluated the effects of imidacloprid on aquatic organisms were conducted under temperate conditions. In the present study, a mesocosm experiment was conducted under sub-tropical conditions to assess the effects of imidacloprid on the structure (macroinvertebrates, zooplankton and phytoplankton) and functional endpoints of an aquatic ecosystem and to compare the results with similar temperate and (sub-)tropical mesocosm studies. Imidacloprid (0, 0.03, 0.3 and 3 µg/L) was applied to 13 mesocosms weekly over a period of 4 weeks, followed by a one month recovery period...

https://doi.org/10.15454/x8by-ae98

Toxicity of alpha-Ag2WO4 microcrystals to freshwater microalga *Raphidocelis subcapitata* at cellular and population levels

Authors: de Abreu CB, Gebara RC, dos Reis LL et al.

Source: CHEMOSPHERE 288: 132536, 2022, DOI 10.1016/j.chemosphere.2021.132536

Abstract: Silver-based materials have microbicidal action, photocatalytic activity and electronic properties. The increase in manufacturing and consumption of these compounds, given their wide functionality and application, is a source of contamination to freshwater ecosystems and causes toxicity to aquatic biota. Therefore, for the first time, we evaluated the toxicity of the silver tungstate (alpha-Ag2WO4), in different morphologies (cube and rod), for the microalga *Raphidocelis subcapitata*. To investigate the toxicity, we evaluated the growth rate, cell complexity and size, reactive oxygen species production and chlorophyll a fluorescence...

A unified dataset of colocated sewage pollution, periphyton, and benthic macroinvertebrate community and food web structure from Lake Baikal (Siberia)

Authors: Meyer MF, Ozersky T, Woo KH et al.

Source: LIMNOLOGY AND OCEANOGRAPHY LETTERS Early Access, DOI 10.1002/lol2.10219

Abstract: Sewage released from lakeside development can introduce nutrients and micropollutants that can restructure aquatic ecosystems. Lake Baikal, the world's most ancient, biodiverse, and voluminous freshwater lake, has been experiencing localized sewage pollution from lakeside settlements. Nearby increasing filamentous algal abundance suggests benthic communities are responding to localized pollution. We surveyed 40-km of Lake Baikal's southwestern shoreline from 19 to 23 August 2015 for sewage indicators, including pharmaceuticals, personal care products, and microplastics, with colocated periphyton, macroinvertebrate, stable isotope, and fatty acid samplings...

Comparative study of the effects of biocides and metal oxide nanoparticles on microbial community structure in a stream impacted by hydraulic fracturing

Authors: Alhajjar RK, Ghannam RB, See JRC et al.

Source: CHEMOSPHERE 284: 131255, 2021, DOI 10.1016/j.chemosphere.2021.131255

Abstract: Our study goal was to investigate the impact of biocides and nanoparticles (NPs) on the microbial diversity in a hydraulic fracturing impacted stream. Biocides and NPs are known for their antimicrobial properties and controlling microbial growth. [...] However, previous work has often focused on the response to a single compound. Here we provide a more thorough analysis of the microbial community response to three different biocides and three different nanoparticles. A microcosm-based study was undertaken that exposed stream microbial communities to either biocides or NPs...

Double-dose responses of Scenedesmus capricornus microalgae exposed to humic acid

Authors: Zheng XY, Xu ZX, Zhao DM et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 806P: 150547, 2022, DOI 10.1016/j.scitotenv.2021.150547

Abstract: Dissolved organic matter (DOM) has been found to attenuate the ecotoxicity of various environmental pollutants, but research on its own toxic effects in aquatic ecosystems has been very limited. Herein, the toxic effects of humic acid (HA), a represent DOM typically found in natural

https://doi.org/10.15454/x8by-ae98

waters, on the freshwater alga *Scenedesmus capricornus* were investigated...

Plastic leachates lead to long-term toxicity in fungi and promote biodegradation of heterocyclic dye

Authors: Li Z, Xie YW, Zeng Y et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 806: 150538, 2022, DOI 10.1016/j.scitotenv.2021.150538

Abstract: The hazardous effects of plastic and plastic leachates on organisms, even bacteria, have attracted widespread attention, but only a limited effort has been devoted to explore the response of fungi to plastic leachate induced by light irradiation. Here, we performed plastic leaching experiments to obtain leachates from polyethylene, polyethylene terephthalate and polypropylene, and optical properties of plastic leachates were analysed to determine the influence of light conditions and plastic materials on that. The effects of plastic leachates on the production of fungal enzyme and the biodegradation of heterocyclic dye by fungi were evaluated...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS

Insight into the Characteristics of Soil Microbial Diversity during the Ecological Restoration of Mines: A Case Study in Dabaoshan Mining Area, China

Authors: Fan L, Zhao WP, Feng WD and more...

Source: Sustainability 13(21): 11684, 2021, DOI 10.3390/su132111684

Abstract: Soil microorganisms play an important role in regulating a variety of ecological functions. In recent years, the research on ecological restoration after mining has made people more aware of the importance of microbial diversity to ecosystem restoration. The present study investigated the effect of ecological restoration on microbial community structure and its relationship with soil physicochemical properties in the Dabaoshan mining area, China...

Microbial response to copper oxide nanoparticles in soils is controlled by land use rather than copper fate

Authors: Rippner DA, Margenot AJ, Fakra SC and more...

Source: Environmental Science-Nano 8(12): 3560-3576, 2021, DOI 10.1039/d1en00656h

Abstract: Copper (Cu) products, including copper oxide nanoparticles (nCuO), are critically important agricultural fungicides and algaecides. Foliar application onto crops and subsequent aerosol drift of these Cu products, especially nCuO, on to soil may alter nutrient cycling and microbial communities in both managed and unmanaged environments. We measured the influence of land use on soil microbial biomass and respiration in response to the addition of nCuO to an alluvial soil...

Microbial activity and community level physiological profiles (CLPP) of soil under the cultivation of spring rape with the Roundup 360 SL herbicide

Authors: Jezierska-Tys S, Joniec J, Mocek-Plociniak A and more ...

Source: Journal of Environmental Health Science and Engineering 19(2): 2013-2026, 2021, DOI 10.1007/s40201-021-00753-3

Abstract: The use of glyphosate in agriculture raises a lot of controversy because research concerning its impact on the soil provides

https://doi.org/10.15454/x8by-ae98

contradictory information. However, despite these negative opinions, glyphosate is still used in agricultural practice. Therefore, for a more complete assessment, the authors carried out research using traditional microbiological methods and a modern method of metabolic profile analysis in glyphosate-treated soil...

Can moderate heavy metal soil contaminations due to cement production influence the surrounding soil bacterial communities?

Authors: da Costa Silva TA, de Paula M, Silva WS, Lacorte GA

Source: Ecotoxicology 2022, DOI 10.1007/s10646-021-02494-3

Abstract: Events of soil contamination by heavy metals are mostly related to human activities that release these metals into the environment as emissions or effluents. Among the industrial activities related to heavy metal pollution, cement production plants are considered one of the most common sources. In this work we applied the High-throughput sequencing approach called 16 S rDNA metabarcoding to perform the taxonomic characterization of the prokaryotic communities of the soil surrounding three cement plants as well as two areas outside the influence of the cement plants that represented agricultural production environments free of heavy metal contamination (control areas)...

Indirect Effects of the Herbicide Glyphosate on Plant, Animal and Human Health Through its Effects on Microbial Communities

Authors: van Bruggen AHC, Finckh MR, He M and more...

Source: Frontiers in Environmental Sciences 9, 2021, DOI 10.3389/fenvs.2021.763917

Abstract: The herbicide glyphosate interferes with the shikimate pathway in plants and in major groups of microorganisms impeding the production of aromatic amino acids. Glyphosate application on plants results in a slow death, accelerated by reduced resistance to root pathogens. Extensive glyphosate use has resulted in increasing residues in soil and waterways. Although direct glyphosate effects on animals are limited, major concerns have arisen about indirect harmful side effects. In this paper, we focus on indirect effects of sublethal concentrations of glyphosate on plant, animal and human health due to shifts in microbial community compositions in successive habitats....

Impact of Metal-Based Nanoparticles on Cambisol Microbial Functionality, Enzyme Activity, and Plant Growth

Authors: Kolesnikov S, Timoshenko A, Minnikova T and more...

Source: Plants Basel 10(10), 2021, DOI 10.3390/plants10102080

Abstract: An increase in the penetration of metal-based nanoparticles (NPs) into the environment requires an assessment of their ecotoxicity as they impair the critical activity of plants, animals, bacteria, and enzymes. Therefore, the study aimed to observe the effects of metal-based NPs, including copper (Cu), nickel (Ni), and zinc (Zn), on the Cambisols, which cover a significant part of the earth's soil and play an important role in the biosphere...

Glyphosate-based herbicides alter soil carbon and phosphorus dynamics and microbial activity

Authors: Chavez-Ortiz P, Tapia-Torres Y, Larsen J, Garcia-Oliva F

Source: Applied Soil Ecology 169, 2022, DOI 10.1016/j.apsoil.2021.104256

Abstract: Glyphosate is among the most used herbicides worldwide. However, both the active ingredient and additives of the commercial formulations may adversely affect chemical and biological processes in soil. Therefore, the aim of

this work was to evaluate the effect of glyphosate and the commercial formulation (CH) on soil C, N and P dynamics, and microbial enzyme activity in two soil management conditions: a nopal plot (NP) with an history of 5 years of glyphosate application, and in an abandoned plot (AP) with a history of previous agricultural management without glyphosate applications...

Dynamics of Soil Microbial N-Cycling Strategies in Response to Cadmium Stress

Authors: Zhao HC, Lin JH, Wang XH and more...

Source: Environmental Science & Technology 55(20): 14305-14315, 2021, DOI 10.1021/acs.est.1c04409

Abstract: Globally increasing trace metal contamination of soils requires a better mechanistic understanding of metal-stress impacts on microbially mediated nutrient cycling. Herein, a 5-month laboratory experiment was employed to assess the effects of cadmium (Cd) on soil microbial N-cycling processes and associated functional gene abundance, with and without urea amendment...

Bacterial diversity rather than available Cd is the main driver of exoenzyme activity and stoichiometry after soil amendments in mildly contaminated soil

Authors: Wang XQ, Wu XW, Zhang BB and more...

Source: Journal of Soils and Sediments 2021, DOI 10.1007/s11368-021-03085-9

Abstract: Purpose Microbial exoenzyme activity (EEA) and stoichiometry (EES) are of great significance to soil health through their influence on carbon (C), nitrogen (N), and phosphorus (P) cycling. However, when agricultural soil is contaminated by cadmium (Cd), the underlying mechanisms and effects on EEA and EES are still poorly understood...

The use of soil enzymes activity, microbial biomass, and basal respiration to assess the effects of cobalt oxide nanomaterial in soil microbiota

Authors: Bouguerra S, Gavina A, Natal-da-Luz T and more...

Source: Applied Soil Ecology 169, 2022, DOI 10.1016/j.apsoil.2021.104246

Abstract: Despite the high array of potential applications of cobalt oxide nanomaterial (nano-Co3O4), data regarding its toxicity to soil biota is limited, compromising the capability of predicting the risks of this metal oxide nanomaterial (MO-NM). In a previous study the predicted no effect concentration of nano-Co3O4 to soil (PNECsoil) was estimated to be 5.3 mg kg(-1) soil(dw). Given limitations in available data, this threshold was obtained through the application of assessment factors, which are known to overestimate the risks, by being a deterministic and highly protective approach. Thus, this PNECsoil value could be refined if there were more ecotoxicological data...

The toxicity of hexavalent chromium to soil microbial processes concerning soil properties and aging time

Authors: Zhang XM, Zhang X, Li LF and more...

Source: Environmental Research 204, A, 2022, DOI 10.1016/j.envres.2021.111941

Abstract: Chromium (Cr) pollution has attracted much attention due to its biological toxicity. However, little is known regarding Cr toxicity to soil microorganisms. The present study assesses the toxicity of Cr(VI) on two microbial processes, potential nitrification rate (PNR) and substrate-induced respiration (SIR), in a wide range of agricultural soils and detected the abundance of soil bacteria, fungi, ammonia-oxidizing bacteria and archaea...

https://doi.org/10.15454/x8by-ae98

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Antibiotiques et antibiorésistances

The risk of transmitting antibiotic resistance through endophytic bacteria

Authors: Scaccia N, Vaz-Moreira I, Manaia CM

Source: Trends in Plant Sciences 26(12): 1213-1226, 2021, DOI 10.1016/j.tplants.2021.09.001

Abstract: Antibiotic resistance is a global human health threat distributed across humans, animals, plants, and the environment. Under the One-Health concept (humans, animals, and environment), the contamination of water bodies and soil by antibiotic-resistant bacteria cannot be dissociated from its potential transmission to humans. Edible plants can be colonized by a vast diversity of bacteria, representing an important link between the environment and humans in the One-Health triad. Based on multiple examples of bacterial groups that comprise endophytes reported in edible plants, and that have close phylogenetic proximity with human opportunistic pathogens, we argue that plants exposed to human derived biological contamination may represent a path of transmission of antibiotic resistance to humans...

Responses of bacterial communities and antibiotic resistance genes to nano-cellulose addition during pig manure composting

Authors: Dai XX, Wang XJ, Gu J and more...

Source: Journal of Environmental Management 300, 2021, DOI 10.1016/j.jenvman.2021.113734

Abstract: Treatment with exogenous additives during composting can help to alleviate the accumulation of antibiotic resistance genes (ARGs) caused by the direct application of pig manure to farmland. In addition, nano-cellulose has an excellent capacity for adsorbing pollutants. Thus, the effects of adding 300, 600, and 900 mg/kg nanocellulose to compost on the bacterial communities, mobile genetic elements (MGEs), and ARGs were determined in this study...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Biocontrôle

Untargeted metabolomics as a tool to monitor biocontrol product residues' fate on field-treated Prunus persica

Authors: Ramos M, Ghosson H, Raviglione D, Bertrand C et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 807 Part1: 150717, 2022, DOI 10.1016/j.scitotenv.2021.150717

Abstract: Evidence of chemical plant protection products' (PPPs) long-term impact has been found in all environmental compartments. Therefore, other types of PPPs are developed to complement chemical PPPs like PPPs from natural sources, namely biocontrol products (BPs). Little is known about those new BPs, and it is important to assess their potential long-term environmental impact. Recently, the Environmental Metabolic Footprinting (EMF) approach was developed. It permits studying sample's entire meta-metabolome (endometabolome and xenometabolome) through a kinetics tracking of metabolomes of treated and untreated samples...

https://doi.org/10.15454/x8by-ae98

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Bioremédiation

Cadmium-tolerant bacteria: current trends and applications in agriculture

Authors: Bravo D, Braissant O

Source: Letters in Applied Microbiology 2021, DOI 10.1111/lam.13594

Abstract: Cadmium (Cd) is considered a toxic heavy metal ; nevertheless, its toxicity fluctuates for different organisms. Cadmium-tolerant bacteria (CdtB) are diverse and non-phylogenetically related. Because of their ecological importance these bacteria become particularly relevant when pollution occurs and where human health is impacted. The aim of this review is to show the significance, culturable diversity, metabolic detoxification mechanisms of CdtB and their current uses in several bioremediation processes applied to agricultural soils. Further discussion addressed the technological devices and the possible advantages of genetically modified CdtB for diagnostic purposes in the future…

Indigenous functional microbial communities for the preferential degradation of chloroacetamide herbicide S-enantiomers in soil

Authors: Han LX, Liu T, Fang K and more...

Source: Journal of Hazardous Materials 423, B, 2022, DOI 10.1016/j.jhazmat.2021.127135

Abstract: This study investigated indigenous functional microbial communities associated with the degradation of chloroacetamide herbicides acetochlor (ACE), S-metolachlor (S-MET) and their enantiomers in repeatedly treated soils...

Remediation of soil cadmium pollution by biomineralization using microbial-induced precipitation: a review

Authors: Zheng, YT, Xiao, CQ, Chi, R

Source: World Journal of Microbiology and Biotechnology 37(12), 2021, DOI 10.1007/s11274-021-03176-2

Abstract: In recent years, with industrial pollution and the application of agricultural fertilizers with high cadmium (Cd) content, soil Cd pollution has become increasingly serious. A large amount of Cd is discharged into the environment, greatly endangering the stability of the ecological environment and human health. The use of microorganisms to induce Cd precipitation and mineralization is an important bioremediation method...

Arbuscular mycorrhizal fungal association boosted the arsenic resistance in crops with special responsiveness to rice plant

Authors: Mitra D, Saritha B, Janeeshma E and more...

Source: Environmental and Experimental Botany 193, 2022, DOI 10.1016/j.envexpbot.2021.104681

Abstract: Arsenic (As) is a potentially toxic metalloid classified as a group 1 carcinogen, released in the soil environment because of natural as well as different anthropogenic activities. The presence of excess As content in soil and irrigation water enhances the As accumulation in rice grains...

Remediation of copper-contaminated soils using *Tagetes patula* L., earthworms and arbuscular mycorrhizal fungi

Authors: Fu L, Zhang L, Dong PC and more...

Source: International Journal of Phytoremediation 13: 1-13, 2021, DOI 10.1080/15226514.2021.2002809

Abstract: ... Arbuscular mycorrhizal fungi (AMF) and earthworms have potential uses in the bioremediation of contaminated soils. In recent years, heavy metal-contaminated sites have been remediated by adding plants and AMF or earthworms to the soil. However, there are few studies on remediation using combinations of plants, animals, and microbes, especially for the remediation of Cu-contaminated soil...

Combining Culture-Dependent and Independent Approaches for the Optimization of Epoxiconazole and Fludioxonil-Degrading Bacterial Consortia

Authors: Alexandrino DAM, Mucha AP, Tomasino MP and more...

Source: Microorganisms 9(10), 2021, DOI 10.3390/microorganisms9102109

Abstract: Epoxiconazole (EPO) and fludioxonil (FLU) are two widely used fluorinated pesticides known to be highly persistent and with high ecotoxicological potential, turning them into pollutants of concern. This work aimed to optimize two degrading bacterial consortia, previously obtained from an agricultural soil through enrichment with EPO and FLU, by characterizing the contribution of their corresponding bacterial isolates to the biodegradation of these pesticides using both culture-dependent and independent methodologies...

Application of different alkaline materials as polluted soil amendments: A comparative assessment of their impact on trace element mobility and microbial functions

Authors: Alvarez-Ayuso E, Abad-Valle P

Source: Ecotoxicology and Environmental Safety 227, 2021, DOI 10.1016/j.ecoenv.2021.112927

Abstract: Treatment with chemical amendments is among the best techniques to remediate soils highly polluted with trace elements. The use of waste-derived products has several advantages in this regard, mainly in terms of reducing process costs and conserving natural resources. In this study, the performance of the synthetic zeolite NaP1 derived from coal combustion fly ash (SZ) and the by-product generated from the processing of aluminum salt slags (BP) was evaluated with this aim in comparison to calcite (CC)...

In-situ immobilization remediation, soil aggregate distribution, and microbial community composition in weakly alkaline Cd-contaminated soils: A field study

Authors: Ma Wy, Sun T, Xu YM and more...

Source: Environmental Pollution 292 A, 2022, DOI 10.1016/j.envpol.2021.118327

Abstract: Biochar has advantages of a large specific surface area and micropore structure, which is beneficial for immobilization remediation of heavy metal-contaminated soils. A field experiment was conducted to investigate the effects of rice husk biochar (BC) (7.5, 15, and 15 t hm (-2)) on Cd availability in soils and accumulation in maize (*Zea mays* L), soil aggregate structure, and microbial community abundance...

https://doi.org/10.15454/x8by-ae98

A Systematic Study on the Microbial Degradation of Glyphosate: A Review

Authors: Mohanty SS, Das AP

Source: Geomicrobiology Journal 2022, DOI 10.1080/01490451.2021.1998255

Abstract: One of the most widely used herbicides for the control of annual and perennial weeds and grass worldwide is Glyphosate. Extensive use of this herbicide resulted in its ubiquitous presence in the environment and has an adverse effect on both human health and the ecosystem. The rapid binding of this herbicide to the soil particles makes it hazardous even for the soil organisms. There are several treatment technologies such as photocatalytic degradation, microbial approach or adsorption that removes glyphosate from the environment. Among both biotic and abiotic approaches, microbial degradation is the most effective and eco-friendly alternative for glyphosate removal...

Identification of Antimonate Reducing Bacteria and Their Potential Metabolic Traits by the Combination of Stable Isotope Probing and Metagenomic-Pangenomic Analysis

Authors: Sun WM, Sun XX, Haggblom MM and more...

Source: Environmental Science & Technology 55(20): 13902-13912, 2021, DOI 10.1021/acs.est.1c03967

Abstract: Microorganisms play an important role in altering antimony (Sb) speciation, mobility, and bioavailability, but the understanding of the microorganisms responsible for Sb(V) reduction has been limited. In this study, DNA-stable isotope probing (DNA-SIP) and metagenomics analysis were combined to identify potential Sb(V)-reducing bacteria (SbRB) and predict their metabolic pathways for Sb(V) reduction...

Distinct Responses of Rare and Abundant Microbial Taxa to In Situ Chemical Stabilization of Cadmium-Contaminated Soil

Authors: Xu M, Huang QY, Xiong ZQ and more...

Source: MSYSTEMS 6(5), 2021, DOI 10.1128/mSystems.01040-21

Abstract: Soil microorganisms, which intricately link to ecosystem functions, are pivotal for the ecological restoration of heavy metal-contaminated soil. Despite the importance of rare and abundant microbial taxa in maintaining soil ecological function, the taxonomic and functional changes in rare and abundant communities during in situ chemical stabilization of cadmium (Cd)-contaminated soil and their contributions to the restoration of ecosystem functions remain elusive...

Heavy Metals Induced Modulations in Growth, Physiology, Cellular Viability, and Biofilm Formation of an Identified Bacterial Isolate

Authors: Syed A, Zeyad MT, Shahid M and more...

Source: ACS OMEGA 6(38): 25076-25088, 2021, DOI 10.1021/acsomega.1c04396

Abstract: The release of untreated tannery effluents comprising biotoxic heavy metal (HM) compounds into the ecosystem is one of our society's most serious environmental and health issues. After discharge, HM-containing industrial effluents reach agricultural soils and thus negatively affect the soil microbial diversity. Considering these, we assessed the effect of HMs on identified soil beneficial bacteria...

https://doi.org/10.15454/x8by-ae98

Evaluation of Heavy Metal Tolerance Level of the Antarctic Bacterial Community in Biodegradation of Waste Canola Oil

Authors: Zahri KNM, Gomez-Fuentes C, Sabri S, and more...

Source: Sustainability 13(19), 2021, DOI 10.3390/su131910749

Abstract: Heavy metal contamination is accidentally becoming prevalent in Antarctica, one of the world's most pristine regions. Anthropogenic as well as natural causes can result in heavy metal contamination. Each heavy metal has a different toxic effect on various microorganisms and species, which can interfere with other pollutant bioremediation processes. This study focused on the effect of co-contaminant heavy metals on waste canola oil (WCO) biodegradation by the BS14 bacterial community collected from Antarctic soil...

Characterizations of novel pesticide- degrading bacterial strains from industrial wastes found in the industrial cities of Pakistan and their biodegradation potential

Authors: Asim N, Hassan M, Shafique F and more...

Source: PEERJ 9, 2021, DOI 10.7717/peerj.12211

Abstract: Lack of infrastructure for disposal of effluents in industries leads to severe pollution of natural resources in developing countries. These pollutants accompanied by solid waste are equally hazardous to biological growth. Natural attenuation of these pollutants was evidenced that involved degradation by native microbial communities. The current study encompasses the isolation of pesticide-degrading bacteria from the vicinity of pesticide manufacturing industries...

Chlorpyrifos degradation, biocontrol potential and antioxidant defence activation under pesticide stress by rhizosphere bacteria isolated from rhizosphere of peach (*Prunus persica*) plants

Authors: Gani G, Asif M, Wani PA and more...

Source: Chemistry and Ecology 2021, DOI 10.1080/02757540.2021.1985475

Abstract: Current experiments were done to isolate plant growth-promoting rhizobacteria (PGPR) from peach (*Prunus persica*) rhizosphere having biocontrol, biodegradation and defence mechanism activation against pesticide toxicity. PGPR strains (Pseudomonas and Bacillus) showed biocontrol activity against phytopathogens. Bacillus flexus PS-26 tolerated a maximum amount of chlorpyrifos and was also able to degrade different concentrations of chlorpyrifos within 30 h. Bacillus flexus PS-26 formed more biofilm, released a high amount of antioxidants and exopolysaccharides under chlorpyrifos stress, which suggested its detoxification role. The present study proved Bacillus flexus PS-26 to be a super-bioinoculant, which could protect plants against pesticide...

Effect of culturing ryegrass (*Lolium perenne* L.) on Cd and pyrene removal and bacteria variations in co-contaminated soil

Authors: Li GR, Wang ZS, Lv YJ and more...

Source: Environmentam Technology & Innovation 24, 2021, DOI 10.1016/j.eti.2021.101963

Abstract: Heavy metals and polycyclic aromatic hydrocarbons (PAHs) in soil pose great threat to humans and the environment, and should be strictly removed. In the present study, a plant which was suitable for growth in co-contaminated soil was investigated, then co-contaminants removal with increasing contaminants concentrations and bacteria variations in co-contaminated soil were studied...

https://doi.org/10.15454/x8by-ae98

Rhizosphere interactions between PAH-degrading bacteria and *Pteris vittata* L. on arsenic and phenanthrene dynamics and transformation

Authors: Sun L, Zhu GH, Liao XY

Source: Chemosphere 285, 2021, DOI 10.1016/j.chemosphere.2021.131415

Abstract: The pot experiment was conducted to monitor the dynamics in soil solution chemistry in order to determine the main rhizosphere processes determining As and PAH bioavailability when utilizing P. vittata and PAH-degrading bacteria to remediate co-contaminated soils. The result showed that P. vittata was capable of depleting soil solution As and increasing phenanthrene solubilization, and thus facilitating plant As uptake and phenanthrene dissipation...

Bacterial strains found in the soils of a municipal solid waste dumping site facilitated phosphate solubilization along with cadmium remediation

Authors: Sahu S, Rajbonshi MP, Gujre N and more...

Source: Chemosphere 287(3), 2022, DOI 10.1016/j.chemosphere.2021.132320

Abstract Phosphate solubilizing bacteria (PSB) that can withstand high cadmium (Cd) stress is a desired combination for bioremediation. This study evaluated the Cd bioremediation potential of four PSB strains isolated from the contaminated soils of a municipal solid waste (MSW) discarding site (Guwahati, India)...

Improving cadmium accumulation by *Solanum nigrum* L. via regulating rhizobacterial community and metabolic function with phosphate-solubilizing bacteria colonization

Authors He, T, Xu, ZJ, Wang, JF, and more ....

Source Chemosphere 287,2, 2022, DOI10.1016/j.chemosphere.2021.132209

Abstract Soil cadmium (Cd) mobilized with phosphate-solubilizing bacteria (PSB), especially for strains effectively colonized in rhizosphere, is an important pathway for promoting its accumulation by Cd-hyperaccumulators. In this study, screened PSB strains, *Acinetobacter pittii* (AP) and *Escherichia coli* (EC), were used to evaluate their effects on Cd mobilization in rhizosphere, Cd accumulation by Solanum nigrum L., and rhizobacterial community and metabolic function under different colonization condition...

Stabilization and passivation of multiple heavy metals in soil facilitating by pinecone-based biochar: Mechanisms and microbial community evolution

Authors: Lan JR, Zhang SS, Dong YQ and more...

Source: Journal of Hazardous Materials 420, 2021, DOI 10.1016/j.jhazmat.2021.126588

Abstract: Soil contamination by multiple heavy metals and As is one of the major environmental hazards recognized worldwide. In this study, pinecone-biochar was used for stabilization and passivation of Pb, Cu, Zn, Cr, and As in contaminated soil around a smelter in Hubei province, China...

Biochar alleviates metal toxicity and improves microbial community functions in a soil co-contaminated with cadmium and lead

Authors: Azadi N, Raiesi F

Source: BIOCHAR 2021, DOI 10.1007/s42773-021-00123-0

Abstract: Soil amendment with biochar alleviates the toxic effects of heavy metals on microbial functions in single-metal contaminated soils. Yet, it is unclear how biochar application would improve microbial activity and enzymatic activity in soils co-polluted with toxic metals. The present research aimed at determining the response of microbial and biochemical attributes to addition of sugarcane bagasse biochar (SCB) in cadmium (Cd)-lead (Pb) co-contaminated soils...

Growth, physiological, and biochemical responses of thyme (*Thymus vulgaris* L.) to the application of arbuscular mycorrhizal fungi under cadmium stress conditions

Authors: Rostami R, Hosseini SA, Esmaielpour B, and more...

Source: Notulae Botanicae Horti Agrobotanici Cluj Napoca 49(3), 2021, DOI 10.15835/nbha49311924

Abstract: Thyme (*Thymus vulgaris* L.) is one of the most important medicinal plants used in various pharmaceutical, osmotic, health, and food industries. Arbuscular mycorrhizal fungi (AMF) symbiosis is viewed as one of the several methods to improve growth under heavy metals stress. To investigate the effects of cadmium (Cd) and AMF bio-fertilizers on the growth and morpho-physiological characteristics of thyme, a greenhouse experiment was performed...

Microbial growth in biobeds for treatment of residual pesticide in banana plantations

Authors: Dominguez-Rodriguez VI, Baltierra-Trejo E, Gomez-Cruz R, Adams RH

Source: PEERJ 9, 2021, DOI 10.7717/peerj.12200

Abstract: High doses of ethylenebisdithiocarbamate (EBDC) are used in banana production, and unused pesticide mixture (solution) is often disposed of improperly. This can result in soil and water contamination and present an undue risk to rural communities and the environment. An alternative to reduce the environmental impacts caused by pesticide residues is the biobeds treatment. It is necessary to establish if the composition of the proposed biomixtures supports microbial activity to degrade pesticides in biobeds...

Isolation of 2 simazine-degrading bacteria and development of a microbial agent for bioremediation of simazine pollution

Authors: Zhu JW, Zhao Y, Li XL and more...

Source: Anais da Acdemia Brazileira de ciencas 3(3), 2021, DOI 10.1590/0001-3765202120210373

Abstract: Simazine was one of the most commonly used herbicides and was widely used to control broadleaf weeds in agriculture and forestry. Its widespread use had caused wide public concern for its high ecological toxicity. In order to remove simazine residues, 2 strains capable of effectively degrading simazine were isolated from the soil and named SIMA-N5 and SIMA-N9. SIMA-N5 was identified as Bacillus licheniformis by 16SrRNA sequence analysis, and SIMA-N9 was *Bacillus altitudinis*...

Effects of earthworms and arbuscular mycorrhizal fungi on improvement of fertility and microbial communities of soils heavily polluted by cadmium

Authors: Wang G, Wang L, Ma F

Source: Chemosphere 286(2), 2022, DOI 10.1016/j.chemosphere.2021.131567

Abstract: Soil bacterial community (SBC) and fertility are pivotal for the evaluation of phytoremediation performance. Although affected by earthworms (E) and arbuscular mycorrhizal fungi (AMF), little is known about the impacts of the E-AMF interaction on the variation of SBC and fertility in cadmium (Cd)-spiked soil.

https://doi.org/10.15454/x8by-ae98

We elucidated these impacts in rhizosphere soil of Solanum nigrum L. Loss of nutrient availability, and SBC diversity was observed in Cd-polluted soil...

ERA / PUBLICATIONS SCIENTIFIQUES / Plastiques

Microplastic-associated biofilm in an intensive mariculture pond: Temporal dynamics of microbial communities, extracellular polymeric substances and impacts on microplastics properties

Authors: Deng H, Fu QQ, Li DZ et al.

Source: JOURNAL OF CLEANER PRODUCTION 319A: 128774, 2021, DOI 10.1016/j.jclepro.2021.128774

Abstract: Microplastics (MPs, plastic particles <5 mm) have been recognised as a novel ecological niche in the aquatic environments. Biofilm as a reservoir for opportunistic bacterial pathogens and MPs prevalence in the intensive mariculture could pose potential threats to the safety of cultured species. However, possible ecological consequences of biofilm colonising mariculture-associated MPs, such as effects on MPs fate, potential pathogens, and implications of extracellular polymeric substances (EPS) in biogeochemical cycles, are still unclear. The main objective of the present study was to investigate biota-MPs-EPS interactions in a mariculture pond. Polyethylene and polystyrene, and biodegradable polylactic acid, with a mean size of similar to 1 mm, were exposed in situ to the pond after shrimp postlarvae were stocked. Several methods, including microscopy, spectroscopy, and high-throughput sequencing, were employed to investigate biota-MPs-EPS interactions with the shrimp growth...

Cu(II) adsorption on Poly(Lactic Acid) Microplastics: Significance of microbial colonization and degradation

Authors: Sun Y, Wang XJ, Xia SQ, Zhao JF

Source: CHEMICAL ENGINEERING JOURNAL 429: 132306, 2022, DOI 10.1016/j.cej.2021.132306

Abstract: The current trend towards the use of biodegradable polymers is considered as a sustainable solution to plastic pollution. However, microplastics (MPs) generation due to harsh degradation conditions may impose higher environmental risks on organisms in the aquatic environment, especially when coexisted with various complicated pollutants. This study aimed at investigating the significance of microbial colonization and degradation in the Cu(II) adsorption by poly(lactic acid) MPs...

Presence of microplastics and antimicrobial-resistant bacteria in sea cucumbers under different anthropogenic influences in Gran Canaria (Canary Islands, Spain)

Authors: Tejedor-Junco MT, Diaz VC, Gonzalez-Martin M, Tuya F

Source: MARINE BIOLOGY RESEARCH Early Access, 2021, DOI 10.1080/17451000.2021.1990960

Abstract: Microplastics and antimicrobial-resistant bacteria are a matter of concern, especially in aquatic environments. In this study, we compared the presence of microplastics and antibiotic-resistant bacteria in the intestine of the sea cucumber Holothuria sanctori at sites under different levels of pollution in Gran Canaria Island (Canary Islands, Spain, eastern Atlantic). We sampled animals at two offshore sites (controls) under low organic pollution and at a site under high organic pollution, i.e. directly affected by sewage water...

Microalgae colonization of different microplastic polymers in experimental mesocosms across an environmental gradient

Authors: Nava V, Matias MG, Castillo-Escriva A et al.

Source: GLOBAL CHANGE BIOLOGY Early Access, 2021, DOI 10.1111/gcb.15989

Abstract: A variety of organisms can colonize microplastic surfaces through biofouling processes. Heterotrophic bacteria tend to be the focus of plastisphere research; however, the presence of epiplastic microalgae within the biofilm has been repeatedly documented. Despite the relevance of biofouling in determining the fate and effects of microplastics in aquatic systems, data about this process are still scarce, especially for freshwater ecosystems. Here, our goal was to evaluate the biomass development and species composition of biofilms on different plastic polymers and to investigate whether plastic substrates exert a strong enough selection to drive species sorting, overcoming other niche-defining factors. We added microplastic pellets of high-density polyethylene, polyethylene terephthalate, and a mix of the two polymers in 15 lentic mesocosms in five different locations of the Iberian Peninsula, and after one month, we evaluated species composition and biomass of microalgae developed on plastic surfaces...

Alterations of the rhizosphere soil microbial community composition and metabolite profiles of *Zea mays* by polyethylene-particles of different molecular weights

Authors: Fu Q, Lai JL, Ji XH and more...

Source: Journal of Hazardous Materials 423, 2022, DOI 10.1016/j.jhazmat.2021.127062

Abstract: Polyethylene film is the most widely used plastic film in agricultural production activities, and its depolymerization products are mainly polyethylene-particles (PE-particles) of different molecular weights. However, the impact of the molecular weights of the PE-particles on soil-crop microenvironment has not been elucidated. In this study, a potted microcosmic simulation system was used to evaluate the impact of low, medium and high molecular weight PE-particles on soil metabolism, microbial community structure, and crop growth...

Effect of Plastic Mulching on Soil Carbon and Nitrogen Cycling-Related Bacterial Community Structure and Function in a Dryland Spring Maize Field

Authors: Wang S, Ding LY, Liu WY, Wang J et al.

Source: AGRICULTURE-BASEL 11(11): 1040, 2021, DOI 10.3390/agriculture11111040

Abstract: Plastic mulching, given its positive effects on temperature and water retention, has been widely used to solve water shortages and nutrient scarcity in rainfed agricultural soils. This practice affects the physical and chemical processes of soil, including carbon and nitrogen cycling. However, research into microbe-mediated carbon and nitrogen cycling in soil with plastic mulching is still limited. In this study, the structures and functions of the soil bacterial community in non-mulched spring maize, plastic-mulched spring maize, and bareland fallow in a dryland field on the Loess Plateau in China were analyzed to explore the responses of microbe-mediated carbon and nitrogen cycling to plastic mulching…

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Abstract: Plastic mulching, given its positive effects on temperature and water retention, has been widely used to solve water shortages and nutrient scarcity in rainfed agricultural soils. This practice affects the physical and chemical processes of soil, including carbon and nitrogen cycling. However, research into microbe-mediated carbon and nitrogen cycling in soil with plastic mulching is still limited. In this study, the structures and functions of the soil bacterial community in non-mulched spring maize, plastic-mulched spring maize, and bareland fallow in a dryland field on the Loess Plateau in China were analyzed to explore the responses of microbe-mediated carbon and nitrogen cycling to plastic mulching…

In Situ Investigation of Plastic-Associated Bacterial Communities in a Freshwater Lake of Hungary

Authors: Szabo I, Al-Omari J, Szerdahelyi GS et al.

Source: WATER AIR AND SOIL POLLUTION 232:493, 2021, DOI 10.1007/s11270-021-05445-0

Abstract: Despite the great benefits of plastics in different aspects of life and due to the increase in plastic production and use, plastic wastes are becoming a major environmental concern. It is well known that inappropriate use and disposal lead to the accumulation of plastic litter in different aquatic environments. Microbial biofilm is able to develop on the surface of plastics (plastisphere) in aquatic environments over time. The aim of this study was to describe the bacterial communities associated with plastics in freshwater. Thus, in our first test, a total of six self-designed plastic colonizers were submerged under the surface of the water in Vacszentlaszlo lake, located in central Hungary, for a period of 3 months. Two plastic colonizers were cultivated monthly. Associated microbial communities were then analyzed as follows: (a) bacterial communities were studied by amplicon sequencing and (b) culturable bacteria were isolated from plastic surfaces and identified by 16S rRNA gene sequencing…

Microplastics increase susceptibility of amphibian larvae to the chytrid fungus *Batrachochytrium dendrobatidis*

Authors: Bosch J, Thumsova B, Lopez-Rojo N et al.

Source: SCIENTIFIC REPORTS 11: 22438, 2021, DOI 10.1038/s41598-021-01973-1

Abstract: Microplastics (MPs), a new class of pollutants that pose a threat to aquatic biodiversity, are of increasing global concern. In tandem, the amphibian chytrid fungus *Batrachochytrium dendrobatidis* (Bd) causing the disease chytridiomycosis is emerging worldwide as a major stressor to amphibians. We here assess whether synergies exist between this infectious disease and MP pollution by mimicking natural contact of a highly susceptible species (midwife toads, Alytes obstetricans) with a Bd-infected reservoir species (fire salamanders, Salamandra salamandra) in the presence and absence of MPs...

Nanoplastic Transport in Soil via Bioturbation by *Lumbricus terrestris*

Authors: Heinze WM, Mitrano DM, Lahive E, Koestel J and Cornelis G

Source: Environmental Science & Technology Early Access, 2021, DOI: 10.1021/acs.est.1c05614

Abstract: Plastic pollution is increasingly perceived as an emerging threat to terrestrial environments, but the spatial and temporal dimension of plastic exposure in soils is poorly understood. Bioturbation displaces microplastics (>1 μm) in soils and likely also nanoplastics (<1 μm), but empirical evidence is lacking. We used a combination of methods that allowed us to not only quantify but to also understand the mechanisms of biologically driven transport of nanoplastics in microcosms with the deep-burrowing earthworm *Lumbricus terrestris*. We hypothesized that ingestion and subsurface excretion drives deep vertical transport of nanoplastics that subsequently accumulate in the drilosphere, i.e., burrow walls…

https://doi.org/10.15454/x8by-ae98

Role of biofilms in the degradation of microplastics in aquatic environments

Authors: Debroy A, George N, Mukherjee G
Source: JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY Early Access, 2021, DOI 10.1002/jctb.6978

Abstract: Microplastics are pollutants of emerging concern that have already gained significance in recent years because of their recalcitrant nature and their detrimental effects on living beings and the ecosystem. Due to their small size, microplastics are easily integrated into biogeochemical cycles and food webs, drastically affecting the environment. Our current knowledge on the interactions of microplastics with various components of ecosystems is limited; however, considering their potential long-term impact, massive research efforts are underway to understand the environmental fate of microplastics and any possible strategies for remediation. In marine ecosystems, plastic surfaces are mostly colonized by microorganisms that form biofilms. Plastic-biofilm interactions potentially influence the physical and chemical properties of the polymer, thereby leading to its degradation...

A review on microplastic pollution in the mangrove wetlands and microbial strategies for its remediation

Authors: Meera SP, Bhattacharyya M, Nizam A, Kumar A

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI10.1007/s11356-021-17451-0

Abstract: Mangroves are one of the most productive ecosystems in the world harboring huge biological diversity. The prime ecological roles of mangroves are prevention of coastal erosion and shoreline protection. Mangroves face varying degrees of threats due to overexploitation, conversion of mangrove habitats for agriculture, settlement and industrial purposes, illegal encroachment, global warming, sea-level rise, El Nino, and pollution. Among them, microplastic (MP) pollution is a major concern threatening not only the mangroves per se but also the rich biodiversity that it shelters. [...] This review article attempts to consolidate MP pollution of mangrove wetlands, its impact on mangroves and associated microbiota, and the microbial solution for its remediation as a sustainable strategy...

Effects of nanoplastics on microalgae and their trophic transfer along the food chain: recent advances and perspectives

Authors: Zhu HL, Fu SF, Zou H et al.

Source: ENVIRONMENTAL SCIENCE-PROCESSES & IMPACTS Early Access, 2021, DOI 10.1039/d1em00438g

Abstract: Nanoplastics (NPs) have drawn increasing attention in recent years due to their potential threats to aquatic ecosystems. Microalgae are primary producers, which play important roles in the normal functioning of ecosystems. According to the source of production and laboratory experiments, both NPs and microalgae are likely to be widely found in various water environments, so they have a great chance of interacting with each other. Although tremendous efforts have been made to explore these potential interactions, a timely and critical review is still missing. In this paper, the effects of NPs on microalgae and their trophic transfer along the food chain are summarized...

Cultivation of filamentous fungi for attack on synthetic polymers via biological Fenton chemistry

Authors: Schlosser D

Source: ENZYMATIC PLASTIC DEGRADATION Methods in Enzymology 648:71-94, 2021, DOI 10.1016/bs.mie.2020.12.006

Abstract: Environmental pollution with synthetic polymers (commonly named plastics) nowadays poses serious threats to the environment and human health. Unfortunately, most conventional plastics are highly recalcitrant even under conditions known to be favorable for microbial

degradation. Expanding the knowledge regarding opportunities and limitations of the microbial degradability of plastics would largely contribute to the development of adequate decontamination and management strategies for plastic pollution. This chapter provides cultivation approaches to be applied for the characterization of eco-physiologically diverse asco- and basidiomycete fungi with respect to their ability to attack solid and water-soluble synthetic polymers...

Exploring microbial consortia from various environments for plastic degradation

Authors: Cifuentes IEM, Ozturk B **Source:** ENZYMATIC PLASTIC DEGRADATION Methods in Enzymology 648:47-69, 2021, DOI 10.1016/bs.mie.2020.12.005

Abstract: Many complex natural and synthetic compounds are degraded by microbial assemblages rather than single strains, due to usually limited metabolic capacities of single organisms. It can therefore be assumed that plastics can be more efficiently degraded by microbial consortia, although this field has not been as widely explored as plastic degradation by individual strains. In this chapter, we present some of the current studies on this topic and methods to enrich and cultivate plastic-degrading microbial consortia from aquatic and terrestrial ecosystems, including substrate preparation and biodegradation assessment. We focus on both conventional and biodegradable plastics as potential growth substrates. Cultivation methods for both aerobic and anaerobic microorganisms are presented...

Uniqueness and Dependence of Bacterial Communities on Microplastics: Comparison with Water, Sediment, and Soil

Authors: Zhang WH, Yuan WK, Chen L et al.

Source: MICROBIAL ECOLOGY Early Access, 2021, DOI 10.1007/s00248-021-01919-0

Abstract: Revealing the dependence and uniqueness of microbial communities on microplastics could help us better understand the assembly of the microplastic microbial community in river ecosystems. In this study, we investigated the composition and ecological functions of the bacterial community on microplastics from the Three Gorges Reservoir area compared with those in water, sediment, and soil at species-level via full-length 16S rRNA gene sequencing...

Urban Stormwater Runoff: A Major Pathway for Anthropogenic Particles, Black Rubbery Fragments, and Other Types of Microplastics to Urban Receiving Waters

Authors: Werbowski LM, Gilbreath AN, Munno K, Zhu X, Grbic J, Wu T, Sutton R, Sedlak MD, Deshpande AD and Rochman CM

Source: Environmental Science & Technology Water 1(6): 1420-1428, 2021, DOI 10.1021/acsestwater.1c00017

Abstract: Stormwater runoff has been suggested to be a significant pathway of microplastics to aquatic habitats; yet, few studies have quantified microplastics in stormwater. Here, we quantify and characterize urban stormwater runoff from 12 watersheds surrounding San Francisco Bay for anthropogenic debris, including microplastics. Depth-integrated samples were collected during wet weather events. All stormwater runoff contained anthropogenic microparticles, including microplastics, with concentrations ranging from 1.1 to 24.6 particles/L. These concentrations are much higher than those in wastewater treatment plant effluent, suggesting urban stormwater runoff is a major source of anthropogenic debris, including microplastics, to aquatic habitats...

https://doi.org/10.15454/x8by-ae98

Effects of Nanoplastics on the Dinoflagellate *Amphidinium carterae* Hulburt from the Perspectives of Algal Growth, Oxidative Stress and Hemolysin Production

Authors: Wang SC, Liu FF, Huang TY et al.

Source: NANOMATERIALS 11:2471, 2021, DOI 10.3390/nano11102471

Abstract: Recently, the effects of nanoplastics (NPs) on aquatic organisms have attracted much attention; however, research on the toxicity of NPs to microalgae has been insufficient. In the present study, the effects of polystyrene nanoplastics (nano-PS, 50 nm) on growth inhibition, chlorophyll content, oxidative stress, and algal toxin production of the marine toxigenic dinoflagellate *Amphidinium carterae* Hulburt were investigated...

Eelgrass (*Zostera marina*) and its epiphytic bacteria facilitate the sinking of microplastics in the seawater

Authors: Zhao LC, Ru SG, He JL et al.

Source: ENVIRONMENTAL POLLUTION 292: 118337, 2022, DOI 10.1016/j.envpol.2021.118337

Abstract: Marine microplastics have received considerable attention as a global environmental issue. However, despite the constant accumulation of microplastics in the ocean, their transport processes and mechanisms remain poorly understood. This study investigated microplastics in the sediments of seagrass meadows and nearby regions without seagrass along the Shandong coast and found that the sediment in the seagrass meadows was a sink for microplastics. Subsequently, we evaluated the influence of eelgrass (Zostera marina), a common coastal seagrass, on the sedimentation of suspended polystyrene microplastics...

Biofilm on microplastics in aqueous environment: Physicochemical properties and environmental implications

Authors: He SY, Jia MY, Xiang YP et al.

Source: JOURNAL OF HAZARDOUS MATERIALS 424: 127286, 2022, DOI 10.1016/j.jhazmat.2021.127286

Abstract: The excellent properties of plastics make them widely used all over the world. However, when plastics enter the environmental medium, microplastics will inevitably be produced due to physical, chemical and biological factors. Studies have shown that microplastics have been detected in terrestrial, aquatic and atmospheric environments. In addition, the presence of microplastics will provide a new artificial adhesion substrate for biofilms. It has been proved that the formation of biofilms could significantly change some properties of microplastics. Some studies have found that microplastics attached with biofilms have higher environmental risks and eco-toxicity. [...] In this paper, we comprehensively reviewed representative studies in this area...

Nanoplastic pollution inhibits stream leaf decomposition through modulating microbial metabolic activity and fungal community structure

Authors: Du JJ, Qv WR, Niu YL et al.

Source: JOURNAL OF HAZARDOUS MATERIALS 424: 127392, 2022, DOI 10.1016/j.jhazmat.2021.127392

Abstract: Many studies have proved the impacts of nanoplastic pollution in freshwaters on aquatic organisms and ecosystems. To explore toxic mechanisms of nanoplastics on stream functioning, we conducted a microcosm experiment to investigate the effects of polystyrene nanoparticles (PS NPs, 1-100 μg/L) on the process of leaf litter decomposition mediated by the microbial community...

https://doi.org/10.15454/x8by-ae98

Effects of microplastics on soil carbon dioxide emissions and the microbial functional genes involved in organic carbon decomposition in agricultural soil

Authors: Zhang YX, Li X, Xiao M, Feng ZY et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 806: 150714, 2022, DOI 10.1016/j.scitotenv.2021.150714

Abstract: The accumulation of microplastics (MPs) in agricultural fields can not only disguise soil organic carbon (SOC) storage but also affect the production of carbon dioxide (CO2) by microbial decomposition. However, little is known about the impact of this emerging pollutant on soil CO_2 emissions and the functional genes related to SOC degradation. In the present study, a short-term (30-day) microcosm experiment was performed to investigate the effects of virgin and aged low-density polyethylene (LDPE) MPs on soil CO2 emissions. We also measured functional gene abundances related to starch (sga), hemicellulose (abfA, manB and xylA), cellulose (cex) and lignin (lig and mnp) degradation through a high-throughput quantitative-PCR-based chip...

Extracellular polymeric substances in green alga facilitate microplastic deposition

Authors: Gopalakrishnan K, Kashian DR

Source: CHEMOSPHERE 286: 131814, 2022, DOI 10.1016/j.chemosphere.2021.131814

Abstract: Microplastics (MPs) are globally ubiquitous in sediments and surface waters. Interactions between biota and MPs are complex and influence their fate and effects in the environment. Once MPs enter aquatic systems, they are colonized by biofilms that may form from the excretion of extracellular polymeric substances (EPS) from microalgae. Biofilm accumulation may change the density of the MPs, contributing to their transport to the sediments. Furthermore, benthic plantivores may consume biofilm laden MPs allowing them to enter the food web. Thus, it is crucial to understand the role algae plays in the vertical transport of MPs in the aquatic environment. In this study, Chlamydomonas was cultured with MPs at different concentrations (0-0.4 mg/mL), and temperatures ranging from 2.5 to 32.5 degrees C to understand the deposition dynamics and impacts of MPs on EPS production and algal density...

Biodegradability of Novel Polylactide and Polycaprolactone Materials with Bacteriostatic Properties Due to Embedded Birch Tar in Different Environments

Authors: Richert, A, Kalwasinska, A, Brzezinska, MS, Dabrowska, GB

Source: International journal of Molecular Sciences 22(9), 2021, DOI 10.3390/ijms221910228

Abstract: The microbial biodegradation of new PLA and PCL materials containing birch tar (1-10% v/v) was investigated. Product of dry distillation of birch bark (*Betula pendula* Roth) was added to polymeric materials to obtain films with antimicrobial properties. The subject of the study was the course of enzymatic degradation of a biodegradable polymer with antibacterial properties...

DROIT ET POLITIQUE DE L'ENVIRONNEMENT

Combiner les leviers pour optimiser l'efficacité des produits

Agri-mutuel 22/12/21

[...] Du nouveau en biocontrôle

Les solutions de biocontrôle se comptaient jusque-là sur les doigts d'une seule main. Désormais, une nouvelle alternative à la chimie émerge, le phosphonate de potassium, pour lutter

https://doi.org/10.15454/x8by-ae98

contre la septoriose. Il vient d'obtenir son AMM et sera tout prochainement commercialisé sous le nom de « Pygmalion » par la société De Sangosse. [...]

Accès au document

Distances d'épandage des produits phytos : le gouvernement s'en remet à l'Anses

Agri-mutuel 21/12/21

Le gouvernement a annoncé mardi s'en remettre à l'Agence nationale de sécurité sanitaire (Anses) pour déterminer les distances d'épandage des produits phytosanitaires, ouvrant une « phase transitoire » où les distances actuelles sont maintenues. [...]

Pour tenir compte « des délais incompressibles d'évaluation, une phase transitoire est prévue » et, « à compter du 1er octobre 2022, les produits n'ayant pas fait l'objet d'une demande recevable auprès de l'Anses ont vocation à se voir appliquer par voie réglementaire une distance de 10 mètres ». [...]

Accès au document

Consultation publique : projet d'autorisation provisoire d'emploi de semences de betteraves sucrières traitées

Ministère Agriculture 27/12/21

L'État met en consultation du public un projet d'arrêté autorisant provisoirement l'emploi de semences de betteraves sucrières traitées avec des produits phytopharmaceutiques contenant les substances actives imidaclopride ou thiamethoxam. [...]

Ce projet a été soumis au Conseil de surveillance prévu par la loi du 14 décembre 2020, qui s'est réuni le 21 décembre et a rendu un avis favorable.

Il est à présent mis à consultation du public jusqu'au 16 janvier 2022.

Accès au document

Perturbateurs endocriniens : l'identification du Bisphénol A comme substance extrêmement préoccupante confirmée

Ministère Ecologie 24/12/21

Le 21 décembre 2021, la Cour de justice de l'Union européenne a confirmé en appel l'identification du Bisphénol A comme substance extrêmement préoccupante (SVHC) pour ses propriétés de perturbation endocrinienne pour la santé humaine. Une nouvelle avancée pour la protection de la santé des Français et des Européens. [...]

Accès au document

Mise à jour de la liste des produits phytosanitaires de biocontrôle potentiellement utilisables dans les JEVI pro

Ecophyto 22/12/21

Thématiques : Réglementation, Méthodes de lutte et biocontrôle

Région : Échelle nationale

Le 14 décembre est parue la note de service DGAL/SDSPV/2021-953 qui constitue une mise à jour de la liste des produits phytopharmaceutiques de biocontrôle, produits non soumis à un certain nombre d'exigences législatives et réglementaires. Les nouveautés apparaissent en surbrillance grisée.

Ces produits correspondent aux produits phytopharmaceutiques de biocontrôle évoqués par la Loi Labbé, dès lors que leur(s) usage(s) permet une utilisation dans les JEVI. Sur l'ensemble des produits que compte cette liste, plus de 250 (dont plus de 70 fongicides rosier à base de soufre, une trentaine de molluscicides à base de phosphate ferrique, une trentaine d'herbicides à base d'acide pélargonique) environ sont utilisables sur les espaces soumis à la Loi Labbé. De plus, l'utilisation de ces produits n'est pas soumise aux mesures de protection des riverains. [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

L'État met en consultation du public les textes révisant le dispositif des Zones de Non Traitement (ZNT)

Ministère Agriculture 21/12/21

Le dispositif de mise en place des zones de non traitement (ZNT) adopté en 2019, prévoit, à proximité de zones habitées, des distances minimales sans application de produits phytopharmaceutiques qui doivent être respectées par les agriculteurs en fonction du type de culture et du matériel qu'ils utilisent.

Il prévoit également l'adoption au niveau local de chartes dont l'objectif est de créer un dialogue, entre riverains et agriculteurs, permettant aux acteurs d'échanger sur les enjeux liés à l'utilisation des pesticides.

Suite aux décisions du Conseil Constitutionnel du 19 mars 2021 et du Conseil d'État du 26 juillet 2021 il a été demandé au Gouvernement d'agir pour :

- Revoir les modalités de consultation du public des chartes ;

- Renforcer l'information des riverains et des personnes qui peuvent se trouver à proximité des champs qui sont traités ;

- Prévoir des mesures de protection des personnes travaillant à proximité des zones d'utilisation des produits phytopharmaceutiques;

- Fixer des distances de non traitement plus importantes pour les produits suspectés d'être les plus dangereux.

Dans ce cadre, le gouvernement met en consultation publique ce jour un projet de décret et un projet d'arrêté adaptant le dispositif des zones de non-traitement par des produits phytopharmaceutiques (ZNT). [...]

Accès au document

Création du tableau de maladie professionnelle relatif au cancer de la prostate en lien avec l'exposition professionnelle aux pesticides

Ministère Agriculture 22/12/21

Par décret en date du 22 décembre 2021, un tableau de maladie professionnelle relatif au cancer de la prostate en lien avec l'exposition aux pesticides a été créé au régime agricole. Il va permettre de compléter et de faciliter les possibilités d'accompagnement au bénéfice des travailleurs agricoles qui ont été exposés aux pesticides.

C'était une décision attendue, particulièrement aux Antilles. Ce tableau permettra l'indemnisation des anciens travailleurs agricoles exposés à la chlordécone pendant leur activité professionnelle, dès lors qu'ils rempliront les conditions du tableau. [...]

Ce nouveau tableau est le fruit des travaux engagés depuis plusieurs mois par les membres de la commission supérieure des maladies professionnelles en agriculture (COSMAP) qui s'est unanimement prononcée, le 12 octobre dernier, en sa faveur sur la base des derniers avis scientifiques (avis de l'ANSES et expertise collective de l'INSERM).

Accès au document

Consultation publique : projets de décret et d'arrêté relatifs aux mesures de protection des personnes lors de l'utilisation de produits phytopharmaceutiques

Ministère Agriculture 21/12/21

[...] Objectifs des textes

[…] Le projet de décret établit une nouvelle procédure d'élaboration et d'approbation des chartes d'engagement des utilisateurs, afin que la consultation du public sur le projet de charte s'effectue conformément aux dispositions de l'article L. 123-19-1 du code de l'environnement. De plus, il prévoit que les chartes devront nécessairement préciser les modalités d'information des résidents et des personnes présentes préalablement à l'utilisation des produits phytopharmaceutiques.

https://doi.org/10.15454/x8by-ae98

Le projet d'arrêté étend aux personnes travaillant à proximité des zones traitées les dispositions en place pour la protection des personnes résidant à proximité de ces zones.

La consultation est ouverte du 21 décembre 2021 au 11 janvier 2022 inclus, en cliquant sur le lien suivant :

https://formulaires.agriculture.gouv.fr/index.php/726654?lang=fr

Accès au document

Fairway : gestion et gouvernance de systèmes agricoles pour la bonne qualité de l'eau potable

BRGM 22/12/21

Enjeux et besoins

L'eau potable est vitale pour la santé humaine. La pollution diffuse de l'azote et des pesticides provenant de l'agriculture est le principal obstacle à l'atteinte des objectifs de qualité de l'eau potable.

Le projet Fairway, financé par le programme européen de recherche et d'innovation Horizon 2020 de 2017 à 2021, avait pour objectifs principaux :

- d'examiner des approches existantes pour la protection des ressources en eau potable contre la pollution par les pesticides et les nitrates ;

- d'identifier et de développer des mesures novatrices et des approches de gouvernance pour une protection plus efficace de l'eau potable. [...]

Accès au document

AMI "Démonstrateurs territoriaux des transitions agricoles et alimentaires"

Banque des Territoires 19/12/21

Les réponses sont attendues au plus tard le 1er juin 2022 pour la première vague, le 2 décembre 2022 pour la deuxième vague.

Cet Appel à manifestation d'intérêt "Démonstrateurs territoriaux des transitions agricoles et alimentaires" vise à accompagner les territoires dans la transformation de leurs systèmes de production agricole et alimentaire, pour répondre aux enjeux de la transition écologique et énergétique (limitation des intrants, amélioration de la souveraineté, de la durabilité et de la résilience des secteurs concernés, réduction de leurs émissions de GES). [...]

Retrouvez ici le dossier de candidature dès la fin janvier 2022

Accès au document

Pré-Annonce du 1er appel à projets transnationaux 2022 du nouveau partenariat européen Water4All

ANR 23/12/21

Trente-et-une agences de financement Européennes et internationales lanceront un appel à projets transnationaux pour financer des projets de recherche et d'innovation sur la « Gestion des ressources en eau pour en accroitre la résilience, l'adaptation et l'atténuation des événements hydroclimatiques extrêmes ». [...]

Les thématiques de recherche de cet appel sont :

- Résilience, adaptation et atténuation des événements hydroclimatiques extrêmes

- Outils de gestion de l'eau dans le cadre d'événements hydroclimatiques extrêmes

- Amélioration de la gouvernance de l'eau dans le contexte des événements hydroclimatiques extrêmes et dans les contextes internationaux

Le lancement de cet appel à projets est prévu courant janvier 2022. [...]

Accès au document

Plans de surveillance et de contrôle

Agriculture.gouv 07/12/21

Les plans de surveillance et les plans de contrôle (PSPC) relèvent de deux stratégies différentes et

https://doi.org/10.15454/x8by-ae98

complémentaires. Sur la base de prélèvements aléatoires représentatifs de la production ou de la consommation, les plans de surveillance permettent d'évaluer l'exposition globale du consommateur à un risque particulier et ainsi d'identifier les mesures de gestion pour le maîtriser.

Les plans de contrôle […] portent sur des denrées ciblées qui représentent un risque accru de contamination et vont permettre ainsi d'évaluer l'efficacité des mesures de gestion mises en œuvre. [...]Bilan des plans de surveillance et plans de contrôle en 2020 (PDF, 4.22 Mo)

Synthèse du bilan 2020 (PDF, 619.22 Ko)

Accès au document

Lancement des appels à projets 2022 du Programme national de recherche Environnement-Santé-Travail

ANSES 15/11/21

L'Anses lance ce jour de nouveaux appels à projets dans le cadre du Programme national de recherche Environnement-Santé-Travail (PNR EST). Ils visent à soutenir des travaux de recherche pour développer les connaissances scientifiques indispensables à l'évaluation des risques et à l'expertise sanitaire. L'édition 2022 comporte deux appels à projets : l'un général, sur les thèmes santé-environnement et santé-travail, et le second spécifiquement sur le thème « radiofréquences et santé ».

La date limite des soumissions est fixée au 6 janvier 2022. [...]

Accès au document

Consultation publique : projet de liste des cultures qui ne sont pas considérées comme attractives pour les abeilles ou d'autres insectes pollinisateurs

Ministère de l'Agriculture 21/11/21

Le plan national en faveur des insectes pollinisateurs et de la pollinisation prévoit la révision de l'arrêté du 28 novembre 2003 « relatif aux conditions d'utilisation des insecticides et acaricides à usage agricole en vue de protéger les abeilles et autres insectes pollinisateurs».

L'objectif est d'améliorer le dispositif actuel de protection de ces espèces. [...]

Accès au document

LIFE Programme: More than €290 million in EU funding for nature, environment and climate action projects

EC 25/11/21

The Commission has today approved an investment package of more than **€290 million** for **132 new projects** under the LIFE programme for the environment and climate action. This EU funding will mobilise a total investment of **€562 million**, with projects in almost all Member States. The new LIFE projects will help Europe become a climate-neutral continent by 2050, put Europe's biodiversity on a path to recovery by 2030, and contribute to the EU green recovery post-Covid-19. This is the first batch of projects selected under the new programming period 2021-2027 which sees an increase of the funding by almost 60%. [...]

Accès au document

EU Soil Strategy for 2030: towards healthy soils for people and the planet

European Commission 18/11/21

Factsheet on Soil Strategy

Accès au document

https://doi.org/10.15454/x8by-ae98

Plan national en faveur des insectes pollinisateurs et de la pollinisation 2021-2026

Ministère de l'agriculture 21/11/21

Un plan ambitieux pour mieux prendre en compte la situation des pollinisateurs

[...] Le déclin des pollinisateurs, observé sur le territoire national et, plus largement, à l'échelle mondiale par la communauté scientifique, est désormais connu par un large public. Aujourd'hui, une espèce d'abeille et de papillon sur dix est au bord de l'extinction selon l'UICN. La préservation des insectes pollinisateurs, sauvages et domestiques, constitue un enjeu majeur pour garantir les capacités de production alimentaire d'un grand nombre de cultures ainsi que pour préserver la diversité des espèces animales et végétales essentielles aux équilibres des écosystèmes. [...]

Accès au document

Campagne 2021 - « Les antibios, comme il faut, quand il faut »

Ministère Agriculture 15/11/21

Le ministère de l'Agriculture et de l'Alimentation diffuse, tout au long des mois de novembre et décembre 2021, la campagne de communication du plan Écoantibio 2 dans la presse spécialisée, déclinée autour du message « Les antibios, comme il faut, quand il faut ». Elle s'adresse aux éleveurs des différentes filières de productions animales, aux vétérinaires ainsi qu'aux propriétaires d'animaux de compagnie. [...]

Accès au document

Écophyto II+ : les appels à projets pour 2021 et 2022 sont lancés

Actu-environnement 5/11/21

L'appel à projets national 2021-2022 du plan Écophyto II+ est désormais lancé. Grâce aux initiatives retenues, il vise la mise en œuvre de cinq axes du plan : tout d'abord, une évolution des pratiques avec la diminution de l'utilisation de produits phytopharmaceutiques. Il s'intéresse également à la recherche et à l'innovation pour améliorer les connaissances et les outils à la disposition des agriculteurs. [...]

Article réservé aux abonnés

Accès au document

REGLEMENTATION / DROIT

Listes d'organismes nuisibles et interdictions et exigences relatives à l'introduction et à la circulation dans l'Union de végétaux, produits végétaux

RÈGLEMENT D'EXÉCUTION (UE) 2021/2285 DE LA COMMISSION du 14 décembre 2021 modifiant le règlement d'exécution (UE) 2019/2072 en ce qui concerne les listes d'organismes nuisibles ainsi que les interdictions et les exigences relatives à l'introduction et à la circulation dans l'Union de végétaux, produits végétaux et autres objets, et abrogeant les décisions 98/109/CE et 2002/757/CE et les règlements d'exécution (UE) 2020/885 et (UE) 2020/1292

Numéro officiel : UE/2021/2285
Date de signature : 14/12/2021
Liens juridiques : Modification le 11/04/2022 Règlement d'exécution UE/2019/2072

Abrogation le 11/04/2022 Décision 98/109/CE 02/02/1998

Abrogation le 11/04/2022 Décision 2002/757/CE 19/09/2002

Abrogation le 11/04/2022 Règlement d'exécution UE/2020/885 26/06/2020

Abrogation le 11/04/2022 Règlement d'exécution UE/2020/1292 15/09/2020

Accès au document

https://doi.org/10.15454/x8by-ae98

Date d'expiration reportée de l'approbation du N,N diéthyl-méta-toluamide en vue de son utilisation dans les produits biocides (type de produits 19)

DÉCISION D'EXÉCUTION (UE) 2021/2146 DE LA COMMISSION du 3 décembre 2021 reportant la date d'expiration de l'approbation du N,N diéthyl-méta-toluamide en vue de son utilisation dans les produits biocides relevant du type de produits 19

Numéro officiel : UE/2021/2146
Date de signature : 03/12/2021

Accès au document

Protection des abeilles et autres insectes pollinisateurs et préservation des services de pollinisation lors de l'utilisation des produits phytopharmaceutiques

Arrêté du 20 novembre 2021 relatif à la protection des abeilles et des autres insectes pollinisateurs et à la préservation des services de pollinisation lors de l'utilisation des produits phytopharmaceutiques

Numéro officiel : AGRG2134356A
Date de signature : 28/11/2003
Liens juridiques : Abrogation le 01/01/2022 Arrêté 28/11/2003 NOR AGRG0400190A

Accès au document

Enregistrement, évaluation et autorisation du N,N-diméthylformamide : annexe XVII du règlement modifié

RÈGLEMENT (UE) 2021/2030 DE LA COMMISSION du 19 novembre 2021 modifiant l'annexe XVII du règlement (CE) n° 1907/2006 du Parlement européen et du Conseil concernant l'enregistrement, l'évaluation et l'autorisation des substances chimiques, ainsi que les restrictions applicables à ces substances (REACH), en ce qui concerne le N,N-diméthylformamide

Numéro officiel : UE/2021/2030
Date de signature : 19/11/2021
Liens juridiques : Modification Règlement CE/1907/2006 18/12/2006

Accès au document

Enregistrement, évaluation et autorisation des substances chimiques : annexe XIV du réglement modifié

RÈGLEMENT (UE) 2021/2045 DE LA COMMISSION du 23 novembre 2021 modifiant l'annexe XIV du règlement (CE) n° 1907/2006 du Parlement européen et du Conseil concernant l'enregistrement, l'évaluation et l'autorisation des substances chimiques, ainsi que les restrictions applicables à ces substances (REACH)

Numéro officiel : UE/2021/2045
Date de signature : 23/11/2021
Liens juridiques : Modification Règlement CE/1907/2006 18/12/2006

Accès au document

Approbation renouvelée de la substance active «cyperméthrine» comme substance dont la substitution est envisagée

RÈGLEMENT D'EXÉCUTION (UE) 2021/2049 DE LA COMMISSION du 24 novembre 2021 renouvelant l'approbation de la substance active «cyperméthrine» comme substance dont la substitution est envisagée, conformément au règlement (CE) n° 1107/2009 du Parlement européen et du Conseil concernant la mise sur le marché des produits phytopharmaceutiques, et modifiant l'annexe du règlement d'exécution (UE) n° 540/2011 de la Commission

Numéro officiel : UE/2021/2049
Date de signature : 24/11/2021
Liens juridiques : Modification le 01/02/2022 Règlement d'exécution UE/540/2011 25/05/2011

https://doi.org/10.15454/x8by-ae98

Accès au document

Période d'approbation prolongée des substances actives «benfluraline», «dimoxystrobine», «fluazinam», «flutolanil», «mécoprop-P», «mépiquat», «métirame», «oxamyl» et «pyraclostrobine»

RÈGLEMENT D'EXÉCUTION (UE) 2021/2068 DE LA COMMISSION du 25 novembre 2021 modifiant le règlement d'exécution (UE) no 540/2011 en ce qui concerne la prolongation de la période d'approbation des substances actives «benfluraline», «dimoxystrobine», «fluazinam», «flutolanil», «mécoprop-P», «mépiquat», «métirame», «oxamyl» et «pyraclostrobine»

Numéro officiel : UE/2021/2068
Date de signature : 25/11/2021
Liens juridiques : Modification Règlement d'exécution UE/540/2011 25/05/2011

Accès au document

Statistiques sur les pesticides en ce qui concerne la liste des substances actives

RÈGLEMENT (UE) 2021/2010 DE LA COMMISSION du 17 novembre 2021 modifiant le règlement (CE) n° 1185/2009 du Parlement européen et du Conseil relatif aux statistiques sur les pesticides en ce qui concerne la liste des substances actives

Numéro officiel : UE/2021/2010
Date de signature : 17/11/2021
Liens juridiques : Modification Règlement CE/1185/2009 25/11/2009

Accès au document

AVIS / EXPERTISES / NORMES

Bisphenol A: EFSA draft opinion proposes lowering the tolerable daily intake

EFSA 15/12/2021

The European Food Safety Authority (EFSA) has re-evaluated the risks of bisphenol A (BPA) in food and proposes to considerably lower the tolerable daily intake (TDI) compared to its previous assessment in 2015. EFSA's conclusions on BPA are explained in a draft scientific opinion that is open for public consultation until 8 February 2022. All interested parties are encouraged to contribute to the consultation. [...]

Accès au document

Néonicotinoïdes : l'EFSA évalue les utilisations d'urgence sur la betterave sucrière en 2020/21

EFSA 18/11/21

L'EFSA a finalisé l'évaluation des autorisations d'urgence accordées par 11 États membres de l'UE pour l'utilisation d'insecticides à base de néonicotinoïdes sur la betterave sucrière en 2020 et 2021.

Les évaluations portent sur 17 autorisations d'urgence pour des produits phytopharmaceutiques contenant de la clothianidine, de l'imidaclopride, du thiaméthoxame et du thiaclopride, accordées par l'Allemagne, la Belgique, la Croatie, le Danemark, l'Espagne, la Finlande, la France, la Lituanie, la Pologne, la Roumanie et la Slovaquie. [...]

Dans les 17 cas, l'EFSA a conclu que les autorisations d'urgence étaient justifiées, soit parce qu'aucune méthode ou produit alternatif - chimique ou non chimique - n'était disponible, soit parce qu'il existait un risque que l'organisme nuisible développe une résistance aux produits alternatifs disponibles. [...]

Accès au document

Modification of the existing maximum residue level for ametoctradin in honey

EFSA 22/11/21

In accordance with Article 6 of Regulation (EC) No 396/2005, the applicant BASF SE submitted a request to the competent national authority in the Netherlands to modify the existing maximum residue level (MRL) for the active substance ametoctradin in honey. The data submitted in support of the request were found to be sufficient to derive an MRL proposal for honey. Adequate analytical methods for enforcement are available to control the residues of ametoctradin in the commodity under consideration at the validated screening detection limit (SDL) of 0.0025 mg/kg. Based on the risk assessment results, EFSA concluded that the dietary intake of residues in food of plant and animal origin (including honey) resulting from the use of ametoctradin according to the existing agricultural practices is unlikely to present a risk to consumer health.

https://doi.org/10.2903/j.efsa.2021.6943

Résapath : Réseau d'épidémiosurveillance de l'antibiorésistance des bactéries pathogènes animales - Bilan 2020

ANSES 18/11/21

Anses 2021. Résapath - Réseau d'épidémiosurveillance de l'antibiorésistance des bactéries pathogènes animales, bilan 2020, Lyon et Ploufragan-Plouzané-Niort, France, novembre 2021, rapport, 39 pp.

Accès au document

Antibiorésistance des bactéries zoonotiques et commensales isolées chez les animaux producteurs d'aliments et leurs denrées

ANSES 18/11/21

Bilan de surveillance 2014-2020

Anses. 2021. LNR Résistance antimicrobienne - Surveillance de l'antibiorésistance des bactéries zoonotiques et commensales isolées chez les animaux producteurs d'aliments et leurs denrées, bilan 2014-2020. Fougères et Ploufragan-Plouzané-Niort, Anses. 54 p.

Accès au document

PUBLICATIONS DU RESEAU ECOTOX

Introducing ground cover management in pesticide emission modeling

Authors: Gentil-Sergent C, Basset-Mens C, Renaud-Gentie C, Mottes C et al.

Source: INTEGRATED ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 18(1): 274-288, 2022, DOI 10.1002/ieam.4482

Abstract: Ground cover management (GCM) is an important agricultural practice used to reduce weed growth, erosion and runoff, and improve soil fertility. In the present study, an approach to account for GCM is proposed in the modeling of pesticide emissions to evaluate the environmental sustainability of agricultural practices. As a starting point, we include a cover crop compartment in the mass balance of calculating initial (within minutes after application) and secondary (including additional processes) pesticide emission fractions…

New perspectives on the calculation of bioaccumulation metrics for active substances in living organisms

Authors: Ratier A, Lopes C, Multari G, Mazerolles V et al.

Source: INTEGRATED ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 18(1): 10-18, 2022, DOI 10.1002/ieam.4439

https://doi.org/10.15454/x8by-ae98

Abstract: Today, only few ready-to-use and convenient decision-making tools are available in ecotoxicology concerning accumulation and effects of chemical substances on organisms, accounting for exposure situations that are known to be complex (routes of exposure, metabolism, mixtures, etc.). This paper presents new perspectives on the generic calculation of bioaccumulation metrics via the innovative web tool MOSAIC(bioacc) (http://mosaic.univ-lyon1.fr/bioacc). MOSAIC(bioacc) provides all kinds of bioaccumulation metrics associated with their uncertainty whatever the species-compound combination…

Role of Biofilms in Contaminant Bioaccumulation and Trophic Transfer in Aquatic Ecosystems: Current State of Knowledge and Future Challenges

Authors: Bonnineau C, Artigas J, Chaumet B, Dabrin A et al.

Source: REVIEWS OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, VOL 253:115-153, 2021, DOI 10.1007/398_2019_39

Abstract: In freshwater environments, microbial assemblages attached to submerged substrates play an essential role in ecosystem processes such as primary production, supported by periphyton, or organic matter decomposition, supported by microbial communities attached to leaf litter or sediments. These microbial assemblages, also called biofilms, are not only involved in nutrients fluxes but also in contaminants dynamics. Biofilms can accumulate metals and organic contaminants transported by the water flow and/or adsorbed onto substrates. Furthermore, due to their high metabolic activity and their role in aquatic food webs, microbial biofilms are also likely to influence contaminant fate in aquatic ecosystems. In this review, we provide (1) a critical overview of the analytical methods currently in use for detecting and quantifying metals and organic micropollutants in microbial biofilms attached to benthic substrata (rocks, sediments, leaf litter); (2) a review of the distribution of those contaminants within aquatic biofilms and the role of these benthic microbial communities in contaminant fate; (3) a set of future challenges concerning the role of biofilms in contaminant accumulation and trophic transfers in the aquatic food web…

Alternating bio-based pyridinic copolymers modified with hydrophilic and hydrophobic spacers as sorbents of aromatic pollutants

Authors: Jlalia I, Chabbah T, Chatti S, Schiets F et al.

Source: POLYMERS FOR ADVANCED TECHNOLOGIES Early Access, 2021, DOI 10.1002/pat.5578

Abstract: The main objective of this work was to design new advanced sorbent phases, alternating copolymers, derived from isosorbide and 2,6-difluorpyridine, to be used for the removal of aromatic organic pollutants present in water at low concentrations. Six different monomers, dianhydrohexitols isomers and bisphenol derivatives, were synthesized in order to make it possible to study their hydrophilic and hydrophobic effect on the sorption efficiency of the resulting polymeric phases…

Inter-laboratory validation of an ISO test method for measuring enzyme activities in soil samples using colorimetric substrates

Authors: Cheviron N, Grondin V, Marrauld C, Poiroux F et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI 10.1007/s11356-021-17173-3

Abstract: The evaluation of soil quality requires the use of robust methods to assess biologically based indicators. Among them, enzyme activities are used for several decades, but there is a clear need to update their measurement methods for routine use, in combining feasibility, accuracy, and reliability. To this end, the platform Biochem-

Env optimized a miniaturized method to measure enzyme activities in soils using colorimetric substrates in micro-well plates. The standardization of the method was carried out within the framework of ISO/TC 190/SC 4/WG 4 "Soil quality - Biological methods" workgroup, recommending an inter-laboratory evaluation for the publication of a full ISO standard…

Chronic toxicity of uranium to three benthic organisms in laboratory sediment

Authors: Simon O, Coppin F, Micozzi N, Beaugelin-Seiller K et al.

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 241: 106776, 2022, DOI 10.1016/j.jenvrad.2021.106776

Abstract: Due to mining activities, concentration of uranium (U) in the environment nearby former and operating sites can be higher than in other areas. The derivation of quality criteria for U in freshwater ecosystems, rivers and lakes includes the consideration of contaminated sediments and the associated risk to the benthic life. Therefore, the derivation of a quality criteria for sediment has been viewed as a logical and necessary extension of the work already done to establish water quality criteria. In order to contribute to the determination of a Quality Standard for sediment (QS(sediment)) according to the European recommendations, this study focuses on the acquisition of a new toxicity dataset, to enrich the few rare existing data, most often unsuitable…

Impact of sublethal and low lethal concentrations of flonicamid on key biological traits and population growth associated genes in melon aphid, *Aphis gossypii* Glover

Authors: Shi DD, Luo C, Lv HX, Zhang L et al.

Source: CROP PROTECTION 152: 105863, 2022, DOI 10.1016/j.cropro.2021.105863

Abstract: Flonicamid (N-cyanomethyl-4-trifluoromethylnicotinamide) is a novel systemic insecticide that shows high insecticidal toxicity against sap-sucking pests. However, little is known about the sublethal effects of flonicamid on melon aphid, *Aphis gossypii* Glover, a serious insect pest of many vegetables. Herein, the toxicity of flonicamid to A. gossypii was determined using the leaf-dipping method, and the sublethal effects of this insecticide on biological traits of *A. gossypii* were evaluated using age-stage, two-sex life table method…

Water and soil contaminated by arsenic: the use of microorganisms and plants in bioremediation

Authors: Bertin PN, Crognale S, Plewniak F, Battaglia-Brunet F et al.

Soruce: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI 10.1007/s11356-021-17817-4

Owing to their roles in the arsenic (As) biogeochemical cycle, microorganisms and plants offer significant potential for developing innovative biotechnological applications able to remediate As pollutions. This possible use in bioremediation processes and phytomanagement is based on their ability to catalyse various biotransformation reactions leading to, e.g. the precipitation, dissolution, and sequestration of As, stabilisation in the root zone and shoot As removal. On the one hand, genomic studies of microorganisms and their communities are useful in understanding their metabolic activities and their interaction with As…

Determination of diffusion coefficients in agarose and polyacrylamide gels for 112 organic chemicals for passive sampling by organic Diffusive Gradients in Thin films (o-DGT)

Authors: Bonnaud B, Miege C, Daval A, Fauvelle V et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH, Early Access, 2021, DOI 10.1007/s11356-021-17563-7

Abstract: The diffusive gradient in thin film technique was recently adapted to organic compounds. The diffusional coefficient (D) is a key parameter needed to calculate the time-weighted average concentration. In this study, two methods are used for D measurement in two gels (agarose and polyacrylamide): the diffusion cell method (D-cell) and the slice stacking method (D-stack). Thus, D were discussed and compared for 112 organic compounds, including pesticides, hormones, and pharmaceuticals. D-stack tends to be higher than D-cell. It could be explained by the presence of a non-negligible diffusive boundary layer thickness in diffusion cell…

Effects of silver nanoparticles on performance of anaerobic digestion of sewage sludge and associated microbial communities

Authors: Grosser A, Grobelak A, Rorat A, Courtois P et al.

Source: RENEWABLE ENERGY 171: 1014-1025, 2021, DOI 10.1016/j.renene.2021.02.127

Abstract: The effects of nanoparticles on performance and stability of anaerobic digestion of sewage sludge were investigated in four reactors. One reactor was fed with only sewage sludge(control reactor) while the remaining ones were fed with sewage sludge with the addition of the following additives:1) silver nanoparticles(NPs reactor); 2) ionic silver(AgNO3 reactor); 3) diluent used for nanoparticles(DIS reactor)…

Pesticide and agro-ecological transition: assessing the environmental and human impacts of pesticides and limiting their use

Authors: Voltz M, Guibaud G, Dages C, Douzals JP et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Article Number204001, 2021, DOI 10.1007/s11356-021-17416-3

Abstract: no abstract available

Ardieres-Morcille in the Beaujolais, France: A research catchment dedicated to study of the transport and impacts of diffuse agricultural pollution in rivers

Authors: Gouy V, Liger L, Bonnineau C, Carluer N et al.

Source: HYDROLOGICAL PROCESSES 35(10): 14384, 2021, DOI 10.1002/hyp.14384

Abstract: The 8-km(2) Morcille catchment, which is a sub-catchment of the 150-km(2) Ardieres catchment in the Beaujolais region of France, is one of the first sites in Europe where research has been conducted on surface water contamination by pesticides. A consolidated hydrological and chemical dataset has been set up with data collected since 2002 on the Morcille River and since 2011 on the Ardieres River. Additional data on the ecotoxicological and ecological impacts of pesticides on aquatic microbial communities and macroinvertebrates has also been recorded in both rivers since 2005…

Contrasting Effects of Environmental Concentrations of Sulfonamides on Microbial Heterotrophic Activities in Freshwater Sediments

Authors: Pesce S, Kergoat L, Paris L, Billet L et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 753647, 2021, DOI 10.3389/fmicb.2021.753647

Abstract: The sulfonamide antibiotics sulfamethoxazole (SMX) and sulfamethazine (SMZ) are regularly detected in surface sediments of contaminated hydrosystems, with maximum

concentrations that can reach tens of mu g kg(-1) in stream and river sediments. Little is known about the resulting effects on the exposed benthic organisms. Here we investigated the functional response of stream sediment microbial communities exposed for 4 weeks to two levels of environmentally relevant concentrations of SMX and SMZ, tested individually…

Fluorescence excitation/emission matrices as a tool to monitor the removal of organic micropollutants from wastewater effluents by adsorption onto activated carbon

Authors: Guillossou R, Le Roux J, Goffin A, Mailler R et al.

Source: WATER RESEARCH 190: 116749, 2021, DOI 10.1016/j.watres.2020.116749

Abstract: Monitoring the removal of organic micropollutants (OMPs) in advanced wastewater treatment facilities requires expensive and time-consuming analytical methods that cannot be installed online. Spectroscopic techniques such as fluorescence excitation/emission spectroscopy were demonstrated to offer the potential for monitoring OMPs removal in conventional wastewater treatment plants or ozonation pilots but their application to activated carbon (AC) adsorption processes was only investigated at lab scale and not in real treatment facilities. In this study, indexes from fluorescence emission/excitation matrices (EEMs) were used to find correlations with the removal of 28 OMPs from a large-scale AC pilot in fluidized bed employed for wastewater advanced treatment, as well as from batch experiments...

Molecular Characterization of Fungal Biodiversity in Long-Term Polychlorinated Biphenyl-Contaminated Soils

Authors: Marchal C, Germain J, Raveton M, Lyonnard B et al.

Source: MICROORGANISMS 9(10): 2051, 2021, DOI 10.3390/microorganisms9102051

Abstract: Polychlorinated biphenyls (PCBs) belong to the organic pollutants that are toxic to humans and harmful to environments. Numerous studies dealing with the impact of PCBs on soil microorganisms have focused on bacterial communities. The effects of PCBs on fungal communities in three different PCB-polluted soils from former industrial sites were investigated using high-throughput sequencing of the internal transcribed spacer 1 region. Significant differences in fungal alpha diversity were observed mainly due to soil physico-chemical properties…

Nanopharmaceuticals (Au-NPs) after use: Experiences with a complex higher tier test design simulating environmental fate and effect

Authors: Hund-Rinke K, Diaz C, Jurack A, Klein J et al.

Source: ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY 227: 112949, 2021, DOI 10.1016/j.ecoenv.2021.112949

Abstract: The current environmental hazard assessment is based on the testing of the pristine substance. However, it cannot be excluded that (nano)pharmaceuticals are excreted into sewage during the use phase followed by entry into wastewater treatment plants (WWTPs). Sorption to sewage sludge or release via effluent can result in modified ecotoxicological effects which possibly can only be detected with a modified test approach. The objective of our study was to investigate a realistic exposure scenario for metallic nanoparticles (NPs) in phar-maceutical products, excreted into effluent, and released into the environment after treatment in WWTPs…

Metabolomics insight into the influence of environmental factors in responses of freshwater biofilms to the model herbicide diuron

Authors: Creusot N, Chaumet B, Eon M, Mazzella N et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI 10.1007/s11356-021-17072-7

Abstract: Freshwater biofilms have been increasingly used during the last decade in ecotoxicology due to their ecological relevance to assess the effect(s) of environmental stress at the community level. Despite growing knowledge about the effect of various stressors on the structure and the function of these microbial communities, a strong research effort is still required to better understand their response to chemical stress and the influence of environmental stressors in this response. To tackle this challenge, untargeted metabolomics is an approach of choice because of its capacity to give an integrative picture of the exposure to multiple stress and associated effect as well as identifying the molecular pathways involved in these responses…

Improvement of the QuEChERS extraction step by matrix-dispersion effect and application on beta-lactams analysis in wastewater sludge by LC-MS/MS

Authors: Guironnet A, Wiest L, Vulliet E

Source: TALANTA 237: 122923, 2022, DOI 10.1016/j.talanta.2021.122923

Abstract: In the last decade, beta-lactams use in veterinary and human medicine increased to represent today about 15% of the overall consumption. Beta-lactams tend to degrade and metabolize in the environment. Therefore, analytical methods must be sensitive enough to quantify low concentrations of the parent molecules and also allow detection of metabolites. This study presents the development of a modified QuEChERS method for the extraction of seven beta-lactams and one degradation product (Amoxicillin, Ampicillin, Cefapirin, Cefoperazone, Cefquinome, Ceftiofur, Cloxacillin, and Amoxicillin-Diketopiperazine) from sewage treatment plant sludge and their analysis by liquid chromatography coupled with tandem mass spectrometry…

Pesticide exposure of workers in apple growing in France

Authors: Bureau M, Beziat B, Duporte G, Bouchart V et al.

Source: INTERNATIONAL ARCHIVES OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH Early Access, 2021, DOI 10.1007/s00420-021-01810-y

Abstract: Objective Although apple trees are heavily sprayed, few studies have assessed the pesticide exposure of operators and workers in apple orchards. However, these data are crucial for assessing the health impact of such exposures. The aim of this study was to measure pesticide exposure in apple growing according to tasks and body parts. Methods A non-controlled field study was conducted in apple orchards in 4 regions of France during the 2016 and 2017 treatment seasons. Workers' external contamination and their determinants were assessed over 156 working days corresponding to 30 treatment days, 68 re-entry days and 58 harvesting days…

Differences in chemical contaminants bioaccumulation and ecotoxicology biomarkers in Mytilus edulis and Mytilus galloprovincialis and their hybrids

Authors: Sussarellu R, Chouvelon T, Aminot Y, Couteau J et al.

Source: ENVIRONMENTAL POLLUTION 292 Part A: 118328, 2022, DOI 10.1016/j.envpol.2021.118328

https://doi.org/10.15454/x8by-ae98

Abstract: The Mytilus mussels are spread all over the world and many related species coexist in several areas and can produce hybrid offspring. Mussels have been used for decades in national and international programs to monitor chemical contamination in the environment. Differences in bioaccumulation and biotransformation abilities between species and their hybrids should be evaluated to assess the comparability of the results obtained within the international biomonitoring programs. The objective of this study was to characterize bioaccumulation abilities and biomarker responses in Mytilus edulis, Mytilus galloprovincialis and their hybrids via an in situ transplantation experimentation on their progenies…

Leaching and degradation of S-Metolachlor in undisturbed soil cores amended with organic wastes

Authors: Dollinger J, Bourdat-Deschamps M, Pot V, Serre V et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI 10.1007/s11356-021-17204-z

Abstract: Organic waste (OW) reuse in agriculture is a common practice fostered by benefits in terms of waste recycling and crop production. However, OW amendments potentially affect the fate of pesticide spread on fields to protect the crops from pests and weeds. The influence of OW on the sorption, degradation, and leaching of pesticides is generally studied for each mechanism separately under artificial laboratory conditions. Our study aims at evaluating the balance of these mechanisms under more realistic conditions to clarify the influence of three common OW amendments on the fate, in soil, of the widely used herbicide S-Metolachlor…

Diversity, functions and antibiotic resistance of sediment microbial communities from lake geneva are driven by the spatial distribution of anthropogenic contamination

Authors: Lyautey E, Bonnineau C, Billard P, Loizeau JL et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 738629, 2021, DOI 10.3389/fmicb.2021.738629

Abstract: Lake sediments are natural receptors for a wide range of anthropogenic contaminants including organic matter and toxicants such as trace metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls that accumulate over time. This contamination can impact benthic communities, including microorganisms which play a crucial role in biogeochemical cycling and food-webs. The present survey aimed at exploring whether anthropogenic contamination, at a large lake scale, can influence the diversity, structure and functions of microbial communities associated to surface sediment, as well as their genetic potential for resistance to metals and antibiotics…

2D distribution of *Pseudomonas fluorescens* activities at the soil-root interface of sunflower grown on vineyard soils: Effects on copper uptake

Authors: Randriamamonjy S, Mouret A, Metzger E, Gaudin et al.

Source: SOIL BIOLOGY & BIOCHEMISTRY 163: 108462, 2021, DOI 10.1016/j.soilbio.2021.108462

Abstract: *Pseudomonas fluorescens* is a siderophore producing bacteria that is expected to alter the mobility and bioavailability of Cu in vineyard soils due to its ability to produce pyoverdine under iron deficiency. In this study, we monitored the effect of this bacterial species, particularly the production of sidemphore, on the mobility and bioavailability of copper (Cu) and other elements using a spatialized approach. Two vineyard soils cultivated with sunflower, one non-carbonated (N-Carb) and one carbonated (Carb), were bioaugmented with *P. fluorescens* or not. 2D mapping using diffusive equilibration in thin films (DET) and diffusive gradient in thin films (DGT) was performed on day 15 after germination…

Simulating the impact of volatilization on atmospheric concentrations of pesticides with the 3D chemistry-transport model CHIMERE: Method development and application to S-metolachlor and folpet

Authors: Couvidat F, Bedos C, Gagnaire N, Carra M et al.

Journal: JOURNAL OF HAZARDOUS MATERIALS 424 Part B: 127497, 2022, DOI 10.1016/j.jhazmat.2021.127497

Abstract: A module to simulate the volatilization of pesticides from soils and plants was implemented in the air quality model CHIMERE in order to simulate spatiotemporal distribution of pesticide atmospheric concentrations. Pesticide applications are spatially distributed according to the quantities of pesticides sold per municipality in France (recorded in the French BNVD-S database) and are temporally distributed according to the application periods determined with enquiries. The model was applied to S-metolachlor and folpet...

Direct and indirect photodegradation of atrazine and S-metolachlor in agriculturally impacted surface water and associated C and N isotope fractionation

Authors: Drouin G, Droz B, Leresche F, Payraudeau S et al.

Source: ENVIRONMENTAL SCIENCE-PROCESSES & IMPACTS Eatly Access, 2021, DOI 10.1039/d1em00246e

Abstract: Knowledge of direct and indirect photodegradation of pesticides and associated isotope fractionation can help to assess pesticide degradation in surface waters. Here, we investigated carbon (C) and nitrogen (N) isotope fractionation during direct and indirect photodegradation of the herbicides atrazine and S-metolachlor in synthetic agriculturally impacted surface waters containing nitrates (20 mg L-1) and dissolved organic matter (DOM, 5.4 mg(C) L-1). Atrazine and S-metolachlor were quickly photodegraded by both direct and indirect processes (half-lives <5 and <7 days, respectively). DOM slowed down photodegradation while nitrates increased degradation rates...

Enhanced and sustainable control of *Myzus persicae* by repellent plants in organic pepper and eggplant greenhouses

Authors: Wang J, Li S, Fang Y, Zhang F et al.

Source: PEST MANAGEMENT SCIENCE Early Access, 2021, DOI 10.1002/ps.6681

Abstract: BACKGROUND Repellent plants (RPs), generally used to keep pests away from crops in integrated pest management, have been shown to reduce the need for synthetic insecticide sprays in various agroecosystems. However, few studies have evaluated the pest control efficiency of RPs over the entire growth period of crops. To evaluate the effect of RPs against *Myzus persicae* and explore the application and management modes of RPs in the field, we planted mint (*Mentha haplocalyx*), mung bean (*Vigna radiata*), celery (*Apium graveolens*) and coriander (*Coriandrum sativum*) near the ventilation openings of commercial greenhouses...

Comparative toxicity of conventional and unconventional oils during rainbow trout (*Oncorhynchus mykiss*) embryonic development: From molecular to health consequences

Authors: Berube R, Lefebvre-Raine M, Gauthier C, Bourdin T et al.

Source: CHEMOSPHERE 288 Part2: 132521, 2022, DOI 10.1016/j.chemosphere.2021.132521

Abstract: Canadian freshwater ecosystems are vulnerable to oil spills from pipelines, which contain mostly diluted bitumen. This study aimed to compare the toxicity of a dilbit and a conventional oil on developing rainbow trout. A total of five exposure scenarios were performed, from 10 to 43 days, using water-accommodated fraction (WAF) with an initial loading of 1:9 oil to water ratio (w/v) in a range of dilutions from 0.32 to 32% WAF, respectively, with TPAH and VOC concentrations from 2.41 to 17.5 mu g/L and 7.94-660.99 mu g/L, and with or without a recovery period…

First assessment of Atlantic open ocean Sargassum spp. metal and metalloid concentrations

Authors: Dassie EP, Gourves PY, Cipolloni O, Pascal PY et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2021, DOI 10.1007/s11356-021-17047-8

Abstract: Over the last decade, increasing proliferations of Atlantic Sargassum populations have led to massive beaching with disastrous environmental consequences. This study is a preliminary assessment of open ocean Sargassum spp. element concentration to assess their potential contribution on coastal ecosystems. Sargassum spp. samples from seven sites, collected along a transect from the center of the Atlantic Ocean to near the coast of Martinique (French West Indies), were analyzed to determine their potential metal and metalloid enrichment…

Plant-cyanobacteria interactions: Beneficial and harmful effects of cyanobacterial bioactive compounds on soil-plant systems and subsequent risk to animal and human health

Authors: Nowruzi B, Bouaicha N, Metcalf JS, Porzani SJ et al.

Source: PHYTOCHEMISTRY 192: 112959, 2021, DOI 10.1016/j.phytochem.2021.112959

Abstract: Plant-cyanobacteria interactions occur in different ways and at many different levels, both beneficial and harmful. Plant-cyanobacteria interactions, as a beneficial symbiosis, have long been demonstrated in ricegrowing areas (Poaceae) where the most efficient nitrogen-fixing cyanobacteria are present in paddies. Moreover, cyanobacteria may in turn produce and/or secrete numerous bioactive compounds that have plant growthpromoting abilities or that may make the plant more resistant to abiotic or biotic stress. In recent years, there has been a growing worldwide interest in the use of cyanobacterial biomass as biofertilizers to replace chemical fertilizers, in part to overcome increasing organic-farming demands…

Response of Three *Miscanthus x giganteus* Cultivars to Toxic Elements Stress: Part 1, Plant Defence Mechanisms

Authors: Al Souki KS, Line C, Douay F, Pourrut B

Source: PLANTS-BASEL 10(10): 2035, 2021, DOI 10.3390/plants10102035

Abstract: *Miscanthus x giganteus* demonstrated good phytostabilization potentials in toxic element (TE) contaminated soils. However, information about its tolerance to elevated concentrations is still scarce. Therefore, an ex-situ pot experiment was launched using three cultivars (termed B, U, and A) grown in soils with a gradient Cd, Pb and Zn concentrations. Control plants were also cultivated in non-contaminated soil….

Potential ability of tobacco (*Nicotiana tabacum* L.) to phytomanage an urban brownfield soil

Authors: Di Lodovico E, Marchand L, Oustriere N, Burges A et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH 105299, 2021, DOI 10.1007/s11356-021-16411-y

Abstract: The ability of tobacco (*Nicotiana tabacum L.* cv. Badischer Geudertheimer) for phytomanaging and remediating soil ecological functions at a contaminated site was assessed with a potted soil series made by fading an uncontaminated sandy soil with a contaminated sandy soil from the Borifer brownfield site, Bordeaux, SW France, at the 0%, 25%, 50%, 75%, and 100% addition rates. Activities of sandblasting and painting with metal-based paints occurred for decades at this urban brownfield, polluting the soil with metal(loid)s and organic contaminants, e.g., polycyclic aromatic hydrocarbons, in addition to past backfilling…

In vitro and in vivo assessment of a CLD sequestration strategy in Nitisol using contrasted carbonaceous materials

Authors: Feidt C, El Wanny N, Ranguin R, Gaspard S et al.

Source: ENVIRONMENTAL GEOCHEMISTRY AND HEALTH 126003, 2021, DOI 10.1007/s10653-021-01108-5

Abstract: Chlordecone (Kepone) (CLD) is a highly persistent pesticide formerly used in the French West Indies. High levels of this pesticide may be found in soils and constitute a subsequent source of contamination for outdoor-reared animals due to involuntary ingestion of consistent amounts of soil. In that context, carbonaceous materials may be used to amend soil to efficiently decrease the bioavailability of such organic pollutants. The present study aims to assess the efficiency of diverse amendments of a contaminated Guadeloupe nitisol using two physiologically based approaches…

Comparison of uptake and elimination kinetics of metallic oxide nanomaterials on the freshwater microcrustacean *Daphnia magna*

Authors: Arze AR, Mouneyrac C, Chatel A, Manier N

Source: NANOTOXICOLOGY ERaly Access, 2021, DOI 10.1080/17435390.2021.1994668

Abstract: The widespread use and release of nanomaterials (NMs) in aquatic ecosystems is a concerning issue as well as the fate and behavior of the NMs in relation to the aquatic organisms. In this work, the freshwater microcrustacean Daphnia magna was exposed to 12 different and well-known NMs under the same conditions for 24 h and then placed in clean media for 120 h, in order to determine their different uptake and elimination behaviors. The results showed that most of the tested NMs displayed a fast uptake during the first hours arriving to a plateau by the end of the uptake phase...

Key factors influencing metal concentrations in sediments along Western European Rivers: A long-term monitoring study (1945-2020)

Authors: Dendievel AM, Grosbois C, Ayrault S, Evrard O et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 805: 149778, 2022, DOI 10.1016/j.scitotenv.2021.149778

Abstract: Since 1945, a large amount of heterogeneous data has been acquired to survey river sediment quality, especially concerning regulatory metals such as Cd, Cr, Cu, Hg, Ni, Pb, and Zn. Large-scale syntheses are critical to assess the effectiveness of public regulations and the resiliency of the river systems. Accordingly, this data synthesis proposes a first attempt to decipher spatio-temporal trends of metal contamination along seven major continental rivers in Western Europe (France, Belgium, Germany, and the Netherlands). A large dataset (>12,000 samples) from various sediment matrices (bed and flood deposits - BFD, suspended particulate matter - SPM, dated sediment cores - DSC) was set up based on monitoring and scientific research from the 1950s to the 2010s. This work investigates the impact of analytical protocols

https://doi.org/10.15454/x8by-ae98

(matrix sampling, fractionation, extraction), location and time factors (related to geology and anthropogenic activities) on metal concentration trends...

OUVRAGES / RAPPORTS / ACTES DE CONGRES

A chemicals perspective on designing with sustainable plastics: goals, considerations and trade-offs

OECD Ilibrary 7/12/21

The development of plastic products does not systematically take sustainability, particularly from a chemicals perspective, into account. This report seeks to enable the creation of inherently sustainable plastic products by integrating sustainable chemistry thinking in the design process. By applying a chemicals lens during the plastic material selection process, designers and engineers can make informed decisions to incorporate sustainable plastic during the conceptualisation phase of their products.

https://doi.org/10.1787/f2ba8ff3-en

Overcoming environmental risks to achieve sustainable development goals

SpringerLink 18/11/21

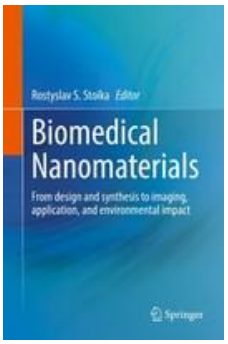
This thought-provoking book examines how the accumulated knowledge on past and present environmental issues and risks within Japan can be applied in order to help deliver the transformation to a sustainable and well-being society.

This thought-provoking book examines how the accumulated knowledge on past and present environmental issues and risks within Japan can be applied in order to help deliver the transformation to a sustainable and well-being society. The book opens with a series of case analyses on environmental pollution events and pollution-related diseases within the country over the past half century or more. Lessons learned regarding the harm to society are highlighted. Diverse current environmental issues are then explored in detail, ranging from the management of hazardous chemical and asbestos exposure to marine plastic pollution and nuclear disasters. This discussion forms the basis for the final part of the book, which focuses on how progress can be made towards the Sustainable Development Goals set out in the United Nations' 2030 Agenda for Sustainable Development. Important insights are also provided into future directions in human ecology and ecotoxicology. The book will be a valuable resource for both new and established researchers as well as for those seeking comprehensive information on environmental/occupational health and health promotion.

Accès au document

Biomedical Nanomaterials

Springerlink 18/11/21



This book characterizes how to design and synthesize nanomaterials of an organic and mineral nature. The book also discusses the visualization of developed nanomaterials and their bio-applications, as well as describes the biomedical effects and environmental impact of nanomaterials.

[...] More specifically, this book addresses the important nanomaterials and nanobiotechnologies that are used in those fields in biomedicine and life sciences. [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

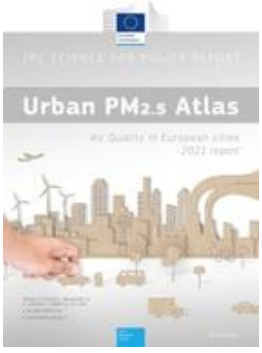
Pour une alimentation saine et durable Analyse des politiques de l'alimentation en France

France stratégie 22/09/21

France Stratégie publie un rapport sur les politiques de l'alimentation dans leurs composantes économiques, sociales environnementales et de santé publique, réalisé à la demande de Richard Ferrand, président de l'Assemblée nationale. La France est confrontée à des défis multiples : économique, avec un enjeu d'autonomie alimentaire ; économique et social avec un vieillissement de la population agricole, un manque d'attractivité et la faiblesse des revenus des métiers de l'agriculture ; environnemental, car l'agriculture et l'alimentation constituent une source non négligeable de gaz à effet de serre et de pollutions diffuses ; de santé publique, avec un taux d'obésité à un niveau historiquement élevé même s'il reste plus faible que chez la plupart de nos voisins européens, et avec des modes de production agricole qui ont contribué à l'émergence de nouvelles préoccupations liées aux **contaminants chimiques**.

Accès au document

Urban PM2.5 Atlas: Air quality in European cities: 2021 report



EC-JRC 17/11/21

Many European cities still suffer from poor air quality and exceed the EU air quality standards This is the case in particular for PM2.5 (focus of this Atlas) which is responsible for adverse health effects and premature deaths. While air pollution legislation has undoubtedly resulted in an overall improvement of the air quality over the years, there are still problems, which are increasingly localised in specific regions and cities. A key issue is thus to determine at which scale to act in order to abate these remaining air pollution problems most effectively. In this Atlas, both the spatial (e.g. urban, country) and sectoral (transport, residential, agriculture…) contributions are quantified for 150 urban areas in Europe. […]

Accès au document

REVUE DE PRESSE / ASSOCIATIONS

PFUE : la santé environnementale sera-t-elle le parent pauvre de la présidence française ?

Générations futures 27/12/21

C'est en tout cas ce que pourrait laisser croire la note publiée en amont de la PFUE par Elisabeth Toutut-Picard, députée LREM et présidente du Groupe Santé Environnement. Cette dernière insiste sur l'importance d'actionner divers leviers afin de porter la santé environnementale au niveau Européen.

Générations Futures salue cette initiative mais regrette que cette note arrive un peu tard et que ces propositions manquent à la fois d'ambition et de projets concrets réalisables dans les 6 mois de la PFUE. [...]

Accès au document

On analyse les mensonges et autres approximations lors des présidentielles !

Générations futures 28/12/21

Générations Futures mène une campagne de fact-checking (vérification des faits) sur l'agriculture et les pesticides ; polluants chimiques; santé environnementale durant les campagnes présidentielles.

https://doi.org/10.15454/x8by-ae98

En avril 2022 auront lieu les élections présidentielles. […]. Générations Futures a décidé de vérifier les interventions des candidats et de leurs porte-paroles (ainsi que du Président de la République et des actuels ministres de l'agriculture, la santé et l'environnement) sur 3 principaux thèmes :

- Agriculture et pesticides

- Polluants chimiques

- Santé environnementale

[...]

Accès au document

Alerte néonicotinoïdes !

Générations futures 29/12/21

Le gouvernement s'apprête à autoriser pour une nouvelle année l'utilisation de semences de betteraves traitées par des néonicotinoïdes.

Participez à la consultation publique et aidez Générations Futures dans son combat !

Le gouvernement vient de publier un projet d'arrêté prévoyant de prolonger d'un an la dérogation pour l'usage d'insecticides néonicotinoïdes sur les cultures de betteraves. Il est soumis à consultation publique jusqu'au 16 janvier 2022. [...]

Accès au document

FNSEA : Nouvelle manifestation honteuse

UFC-Que-Choisir 20/12/21

Décidément, en matière de manifestation, la FNSEA ne s'embarrasse pas avec la hiérarchie des valeurs et justifie l'injustifiable. Après les violences de la manifestation du printemps à Dijon contre la politique agricole commune, c'est maintenant à « la République des juges » que le syndicat s'en prend !

En effet, quelle ne fut ma stupeur de découvrir, mardi, que la FNSEA du grand Bassin parisien s'était mobilisée, à l'aube, devant le Conseil d'État pour protester contre la décision de la haute juridiction administrative annulant, à notre initiative avec d'autres ONG, certaines dispositions réglementaires sur les distances d'épandage près des habitations car insuffisamment protectrices. Le Conseil d'État a ordonné en juillet au gouvernement de revoir sa copie. Dénonçant une injustice, une République des juges, une centaine d'agriculteurs, via une opération coup de poing, a ainsi semé l'agitation et brûlé des palettes avant que la police n'intervienne… [...]

Accès au document

Chlordécone: maladie professionnelle et cancer de la prostate

Générations futures 22/12/21

Les cancers de la prostate liés à l'exposition au chlordécone, un insecticide persistant largement utilisé pendant des décennies aux Antilles, sont désormais reconnus comme maladie professionnelle, selon un décret publié ce mercredi au Journal officiel

Accès au document

Reflections, Part One: Pesticide industry's playbook

PAN 21/12/21

This blog is the first in a three-part series highlighting some of what I've seen and learned during 25 years of advocacy at PAN. These storytelling pieces are a bit longer than PAN's usual blogs; parts two and three will be posted before my departure early next year. [...]

Kristin Schafer is PAN's Executive Director. With training in international policy and social change strategies, Kristin has been at PAN for over 20 years. Before taking on the Executive Director role, she was PAN's program and policy director. She has been lead author on several PAN reports, with a particular emphasis on children's health. She serves on the Policy Committee of the Children's Environmental Health Network.

Accès au document

Protection des populations aux épandages de pesticides

Générations futures 21/12/21

https://doi.org/10.15454/x8by-ae98

Le gouvernement cède à face la pression des agriculteurs et ignore des décisions du Conseil d'Etat visant à mieux protéger les riverains.

Contexte. Depuis des années nos ONG alertent sur les carences de l'Etat en matière de protection des riverains et travailleurs soumis aux épandages de pesticides. Cette pression a abouti, lors des Etats Généraux de l'Alimentation de 2017, à l'adoption de l'article 83 qui introduit l'obligation de prendre des mesures de sécurité des riverains et l'adoption de chartes d'engagements. Les textes règlementaires promulgué en 2019 étant trop faibles et les chartes en découlant totalement inacceptables, nos ONG ont déposé des recours victorieux à la fois devant le Conseil Constitutionnel et le Conseil d'Etat. Ces deux instances nous ont donné en partie raison, obligeant de nouveau l'Etat à revoir sa copie. Ce sont ces textes qui sont aujourd'hui soumis à la consultation du public jusqu'au 10 janvier 2022. [...]

Accès au document

Review Shows that Monsanto/Bayer Claims of Glyphosate Safety Not Supported by Credible Science

Beyond Pesticides, December 21, 2021

A research team undertaking a review of industry-conducted glyphosate safety studies submitted to EU (European Union) regulators shows that most of the research fails to meet current international standards for scientific validity. The researchers find that of the 11 reviewed studies, which were submitted to regulators by Bayer AG (now owner of the Monsanto "Roundup" brand of glyphosate herbicide) and several other chemical companies, only two are scientifically "reliable"; six others are deemed "partly reliable," and the remaining three, "not reliable." [...]

Accès au document

Le livre blanc « One Health » porté par l'agro-industrie fera-t-il partie de la feuille de route de la PFUE ? Dans l'affirmative, nous nourrissions de grosses inquiétudes !

Générations futures 06/12/21

Contexte : Le 7 décembre 2021, Générations Futures a participé à la deuxième réunion de suivi « Une seule santé » du 4e Plan national santé environnement (PNSE4), co-présidé par M. Jean-Luc Angot et Mme la députée Sandrine Le Feur.

A l'occasion de cette réunion nous avons découvert l'existence du livre blanc « One Health » présentant 36 actions à mettre en place pour une politique française ambitieuse « une seule santé ». Les recommandations de ce livre blanc sont destinées aux décideurs publics et au monde professionnel, en prévision de la Présidence française du Conseil de l'Union européenne (PFUE). [...]

Accès au document

Pesticide Use on Island Resorts Tied to Biodiversity Collapse

Beyond Pesticides, December 8, 2021

The diversity, abundance, and richness of invertebrate species on oceanic islands declines as a result of pesticide use, urban development, and other human activities, finds research published recently in Royal Society Open Science. Oceanic islands, despite their small size, harbor 20% of all species, and 50% of endangered species, making conservation critically important in the context of a sixth mass extinction and insect apocalypse. As the study indicates, "Although agriculture is currently considered the predominant driver of the worldwide species decline, it is crucial to investigate and consider all human land uses for obtaining a global impact assessment, especially in regions where land use types other than agriculture are predominant." [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

Consultations publiques EFSA/ECHA sur le glyphosate

Générations futures 06/12/21

Des centaines de commentaires hors sujets du monde agricole…pendant que les ONG dont Générations Futures et l'INSERM pointent les mêmes manques dans le dossier !

La consultation publique sur le dossier de renouvellement du glyphosate (RAR) s'est achevée le 22 novembre dernier. Les commentaires reçus lors de cette consultation sont disponibles et visibles sur les sites de l'ECHA et de l'EFSA depuis le 02 décembre.

Forte mobilisation de l'agrobusiness argentin et français, souvent hors sujet ! [...]

Accès au document

Après les mots, les actes ! 60 eurodéputés demandent à la Commission de cesser l'exportation de pesticides interdits dans l'Europe

Michele Rivasi 06/12/21

60 députés appellent à nouveau la Commission européenne à arrêter immédiatement cette pratique dangereuse pour la santé et l'environnement.

A l'initiative de Michele Rivasi et d'Eric Andrieu, une lettre ouverte signée par 60 députés européens, été adressée ce lundi 6 décembre 2021 à la présidente de la Commission européenne, Ursula von der Leyen. Dans ce courrier, ils demandent unanimement à la Commission de mettre fin rapidement à l'exportation de ces produits toxiques dangereux et interdits dans l'Union européenne. [...]

Accès au document

Chlordécone : le cancer de la prostate reconnu comme maladie professionnelle

Europe1 29/11/21

Un décret reconnaissant le cancer de la prostate comme maladie professionnelle à la suite de l'usage du pesticide chlordécone sera pris "avant la fin de l'année", a indiqué dimanche le ministre de l'Agriculture et de l'Alimentation Julien Denormandie. [...]

Accès au document

Pesticides : des traces détectées sur les habitations même à 100 mètres des cultures, selon Générations Futures

FranceTVInfo 25/11/21

Quel est l'impact des pesticides utilisés dans l'agriculture sur les populations environnantes ? Dans une "enquête citoyenne", publiée jeudi 25 novembre, Générations Futures s'est intéressée à des habitations situées à moins de 100 mètres des cultures traitées. Résultat : 90 % d'entre elles présentent des traces de substances chimiques. [...]

Accès au document

Abeilles : le traitement des cultures autorisé deux heures avant le coucher du soleil

Europe1 21/11/21

Les produits phytopharmaceutiques pourront être utilisés deux heures avant le coucher du soleil, quelle que soit la température extérieure, selon un décret paru dimanche au Journal officiel et salué par les agriculteurs, mais dénoncé par les apiculteurs. Le décret doit entrer en vigueur au 1er janvier 2022. [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

Pesticides : un rapport sur le coût pour les citoyens

Pollinis 30/11/21

Le secteur des pesticides ne profite qu'à une poignée de multinationales agrochimiques, mais l'ensemble des citoyens en assume le coût.

Accès au document

La Présidence française de l'UE (PFUE) doit faire de la santé environnementale le cœur de sa présidence

Générations futures 29/11/21

Pour ce faire, elle doit agir concrètement sur le sujet des pesticides et autres polluants chimiques, et c'est ce que lui propose ce jour nos ONG.

PAN Europe et Générations Futures, soutenues par 16 ONG*, publient ce jour deux documents de positionnement (voir ici et ici) proposant des actions réalisables et en mesure d'être entreprises lors de la PFUE concernant les pesticides et les polluants chimiques. [...]. Les thèmes qu'ils abordent font écho aux déclarations du Président Emmanuel Macron lors du Congrès de l'UICN de septembre 2021 lorsqu'il affirmait que l'échelle européenne est la scène adéquate pour motiver une sortie accélérée des pesticides. [...]

Accès au document

Delay in proposed microplastics restriction leading to irreversible pollution

EEB 25/11/21

One additional year without a restriction on microplastics could see levels of pollution equivalent to 1.6 billion plastic bottles released into the environment.

An EU proposal to restrict intentionally added microplastics used in products has been delayed yet again – and the wait could lead to increasingly uncontrollable rates of plastic pollution, data from ClientEarth and the EEB (European Environmental Bureau) has shown. The NGOs insist that the proposal must no longer be delayed. [...]

Accès au document

Des riverains exposés aux pesticides jusqu'à 100 mètres et plus de la zone d'épandage la plus proche !

Générations futures 25/11/21

[...] Cette année nous avons lancé une campagne étudiant la présence de pesticides dans l'air présents au niveau de leurs habitations. Nous l'avons voulue participative, c'est-à-dire permettant aux citoyens de prendre part facilement à cette campagne. [...]

Ces résultats obtenus sur un nombre limités d'échantillons demanderaient à être confirmés sur un plus grand nombre de prélèvements. Toutefois une tendance se dessine qui montre que l'exposition moyenne aux pesticides (en terme d'occurrence de résidus, de nombre de résidus trouvés et de concentration médiane) semble assez comparable dans notre échantillonnage dans les zones 0 à 20 m des cultures et 21 à 100m des cultures. On ne trouve des chiffres significativement plus bas que pour les prélèvements réalisés au-delà des 100m des cultures. [...]

Accès au document

Glyphosate : de nouvelles données décrédibilisent l'évaluation du risque

Que Choisir 24/11/21

« Aucune classification de danger cancérogène n'est justifiée pour le glyphosate », juge un rapport préliminaire publié en septembre dernier par l'Autorité européenne de sécurité des aliments (Efsa). Que cet herbicide soit cancérogène n'est donc, d'après le groupe d'évaluation du glyphosate en charge de l'identification de ses effets sanitaires et écologiques, ni probable, ni même possible.

[...] Mais une analyse critique de ce rapport, réalisée par l'association Générations Futures, vient renforcer le doute – déjà soulevé par

https://doi.org/10.15454/x8by-ae98

plusieurs polémiques passées – concernant sa fiabilité. [...]

Accès au document

Glyphosate : Ras-le-bol du double discours des pouvoirs publics français !

Que Choisir 24/11/21

L'autorisation d'utiliser le glyphosate expirant fin 2022, les autorités européennes ont lancé la procédure de réévaluation de cette substance. Mais alors que vient de s'achever une consultation du public sur des aspects scientifiques particulièrement ardus, je ne peux que dénoncer cette parodie d'apparence démocratique qui masque bien mal la volonté délibérée des autorités européennes mais aussi françaises de réautoriser le glyphosate. Quoi qu'il en coûte. [...]

Accès au document

European Parliament resolution calls for a rapid reform of FCM laws

Chemtrust 23/11/21

In October 2021, the European Parliament adopted a resolution on the Farm to Fork Strategy, supporting targets and measures to reduce pollution along the value chain including EU Food Contact Materials (FCM).

Parliament called on the European Commission to bring forward the date of the publication of their proposal for a new regulatory framework.

The resolution reiterated the Parliament's call for specific provisions to substitute endocrine disrupting chemicals (EDCs) and other hazardous chemicals in food contact materials. [...]

Accès au document

Pesticides : le manque d'ambition et de portage politique se confirme !

Générations futures 22/11/21

Ce lundi 22 novembre se tenait un Conseil d'Orientation et de Suivi (COS) du Plan Ecophyto 2+, dont Générations Futures est partie prenante. [...]

A l'ordre du jour notamment :

- Les données d'utilisation des pesticides

- Le futur plan polinisateur et l'arrêté abeille

- Le sujet de l'exposition des riverains aux pesticides

- La PFUE dont la question du glyphosate [...]

Accès au document

Fungal Resistance to Antimicrobial Pesticides Leads to Deadly Infection

Beyond Pesticides, November 19, 2021

The U.S. Environmental Protection Agency (EPA) announced, in mid-October, a revision of its guidance on the evaluation of antimicrobial pesticides used against *Candida auris* (*C. auris*). This pathogen is a type of fungus (a yeast) that can cause serious infection, and can spread readily among patients and staff in hospitals and other congregate healthcare settings (such as nursing homes). *C. auris* shas developed resistance to what used to be the therapeutic impacts of major antifungal medications. (Resistance is a major and growing problem in healthcare and in agriculture, with the latter exacerbating the former.) [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

Pesticide Exposure Contributes to Preterm Births and Low Birth Weight

Beyond Pesticides, November 18, 2021

A study published by King George's Medical University, India, finds exposure to xenobiotic substances like pesticides during pregnancy increases risks associated with preterm birth, including a rise in cesarean section (C-section) deliveries and a decrease in fetal body weight. Preterm births occur when a fetus is born early or before 37 weeks of complete gestation. Premature births can result in chronic (long-term) illnesses among infants from lack of proper organ development and even death. [...]

Accès au document

Abeilles : l'arrêté sur les produits phytopharmaceutiques publié au JO

Terre-Net 21/11/21

L'arrêté qui impose des horaires pour l'utilisation des produits phytopharmaceutiques sur les cultures, afin de protéger les abeilles et autres insectes pollinisateurs, est paru dimanche au Journal officiel.

Si le produit est autorisé par l'Anses (l'Agence nationale de sécurité sanitaire alimentaire) pour un usage en période de floraison, « le traitement doit, sauf cas particulier, être réalisé dans les deux heures qui précèdent le coucher de soleil et dans les trois heures qui suivent le coucher de soleil », selon l'arrêté du ministère de l'Agriculture, dont l'entrée en vigueur est fixée au 1er janvier 2022. [...]

Article similaire du Monde

Accès au document

Leur réintroduction est « justifiée », estime l'Efsa

Agri-Mutuel 18/11/21

La décision de 11 pays de l'Union européenne, dont la France, d'autoriser la réintroduction temporaire en 2020 et 2021 d'insecticides néonicotinoïdes, qualifiés de « tueurs d'abeilles », était « justifiée », faute d'alternative, a estimé jeudi l'Autorité européenne de sécurité des aliments (Efsa). [...]

Liens : https://www.agri-mutuel.com/politique-economie/leur-reintroduction-est-justifiee-estime-lefsa/

Aquatic Wildlife Populations Take A Nosedive after Neonicotinoid Exposure

Beyond Pesticides, November 10, 2021

The diversity and abundance of freshwater aquatic insects plunges when commonly used neonicotinoid (neonic) insecticides leach into waterways, finds research published in the Proceedings of the National Academy of Sciences this month. While this is the latest study exploring the effects of neonicotinoids in the field at real-world exposure levels, it is far from the first to show unacceptable hazards to wildlife and ecological health. As research on neonics piles up, advocates are watching in dismay as regulators at the Environmental Protection Agency (EPA) fail to respond to the science and allow indiscriminate poisoning to continue. [...]

Accès au document

Pesticides and climate change

PAN 10/11/21

[...] The Intergovernmental Panel on Climate Change (IPCC) warns that we are on course for global warming of more than 2°C without "deep reductions in carbon dioxide and other greenhouse gas emissions" and that a "rapid and far-reaching transition is required".

Not only do pesticides affect our health and the environment, but they also play a part, both directly and indirectly, in climate change: For example, fossil fuels are used in the production and transportation of pesticides; their use supports highly unsustainable food and farming systems; and they affect the soil's ability to sequester carbon. [...]

https://doi.org/10.15454/x8by-ae98

Accès au document

Switching to 'Healthier' Mediterranean Diet Increases Pesticide Exposure Three-fold, Unless You Go Organic

Beyond Pesticides, November 9, 2021

Replacing a modern, 'western' diet of highly processed foods with a Mediterranean diet filled with conventional, chemically-grown fruits and vegetables triples exposure to toxic pesticides, according to research recently published in The American Journal of Clinical Nutrition. However, this disturbing change can be eliminated by eating a Mediterranean diet consisting entirely of organic food, which is not sprayed with synthetic pesticides. The advantages of the Mediterranean diet, often ranked as the 'best diet' and emphasized by medical practitioners for its health benefits, now appear to depend on the production practices involved in the meals an individual eats. [...]

Accès au document

Nous voulons des données fiables, publiques et précises sur l'utilisation des pesticides

Générations futures 8/11/21

Une réforme des règlements européens sur les statistiques agricoles est en cours.

Cette réforme législative est d'une importance capitale puisqu'elle définira quelles données seront disponibles pour mesurer notamment les progrès réalisés ou non vers une utilisation réduite et durable des pesticides. [...]

Notre objectif avec nos collègues européens de ClientEarth, PAN Europe et Beelife et bien d'autres ONG françaises et européennes ?

Faire en sorte que la règlementation prévoit de collecter et publier toutes les données d'utilisation des pesticides !

Accès au document

Glyphosate: Health and cancer groups ask France to publicly clarify contradictory position regarding the health effects of the world's top-selling herbicide

HEAL 4th November 2021

The Health and Environment Alliance (HEAL), the Association of European Cancer Leagues (ECL) and La Ligue contre le Cancer urge the French government to publicly clarify its position regarding the health risks posed by world's top-selling herbicide glyphosate, in the context of the ongoing EU renewal process of the substance. France and the three other rapporteur member states leading on the evaluation process of glyphosate recently released their preliminary conclusions, which find the herbicide meets the approval criteria for human health [1, 2]. [...]

Accès au document

45 different cancers associated with work-related pesticide exposure

Beyond Pesticide, November 4, 2021

A scientific literature analysis by the Federal University of Goias, Brazil, finds occupational (work-related) exposure to agricultural pesticides increases the risk for 45 different types of cancer. This analysis assesses studies from the last decade—2011 to 2020—to identify cancer risk associated with occupational exposure by country, pesticide type, and methods used to diagnose disease. Many pesticides are"known or probable" carcinogens (cancer-causing agents), and widespread uses only amplify chemical hazards, adversely affecting human health. However, research on cancer and pesticides lacks comprehensive information regarding human health effects associated with long-term chemical use. [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

Climate and chemicals: what are the connections?

ChemTrust 3/11/21

"Three interconnected planetary crises: climate change, biodiversity loss and pollution: are putting global economic and social well-being at risk". This is how the United Nation Environment Program (UNEP) framed societal challenges in its February 2021 strategy.

CHEM Trust has previously written about how chemical pollution is one of the key drivers of the biodiversity crisis, and published several reports on the impact of chemical pollution on wildlife. But what are the interconnections between chemicals and the climate crisis? [...]

Accès au document

REVUE DE PRESSE / RECHERCHE ET MEDIAS

Des valeurs limites d'exposition professionnelle pour de nouveaux agents chimiques

Actu-environnement 29/12/21

Deux textes réglementaires introduisent dans la réglementation des valeurs limites d'exposition professionnelle (VLEP) pour de nouveaux agents chimiques dangereux. [...]

Ces deux textes transposent la directive européenne du 5 juin 2019 relative à la protection des travailleurs contre les risques liés à l'exposition à des agents cancérigènes ou mutagènes au travail, et la directive du 24 octobre 2019 établissant une cinquième liste de VLEP indicatives.

Article réservé aux abonnés

Accès au document

Déclin des insectes : l'Opecst pointe le rôle déterminant des pesticides

Actu-environnement 29/12/21

L'office chargé d'éclairer scientifiquement le Parlement souligne le rôle primordial de l'agriculture intensive parmi les causes du déclin des insectes. Il pointe la mauvaise évaluation des risques des pesticides avant leur mise sur le marché. [...]

Article réservé aux abonnés

Accès au document

Monsanto agrees $12 million settlement for Hawaii pesticide violations

Chemistryworld 21/12/21

Bayer-owned firm admits charges relating to use and storage of pesticides on its research farms.

Agrochemical company Monsanto has agreed to plead guilty to environmental crimes related to the use and storage of pesticides in Hawaii, and will pay $12 million (£9 million) in fines, according to the US Department of Justice (DOJ). [...]

Accès au document

Microplastics in French mountain air may have crossed Atlantic Ocean

Newscientist 21/12/21

Microplastics found at a mountain top in the French Pyrenees may have crossed continents and oceans, travelling around 4500 kilometres in a fast-moving region of the troposphere, which is the lowest layer of the atmosphere. The finding suggests the particles can circulate the world and reach even the most remote regions. [...]

Journal reference: Nature Communications, DOI: 10.1038/s41467-021-27454-7

Accès au contenu

An Overview of Research Focused on Assessing the Ecological Effects of PFAS at the USEPA, ORD Great Lakes Toxicology and Ecology Division

EPA 22/12/21

Citation: Ankley, G. An Overview of Research Focused on Assessing the Ecological Effects of PFAS at the USEPA, ORD Great Lakes Toxicology and Ecology Division. Strategic Environmental Research and Development Symposium (SERDP), Duluth, MN, November 29 - December 03, 2021. https://doi.org/10.23645/epacomptox.16984720

Impact/Purpose:

The GLTED is a lead in ORD for conducting ecological research with PFAS. This presentation will provide an overview of work being conducted at GLTED to an audience comprised mostly of scientists working for or associated with the US Department of Defense. [...]

Accès au document

Bisphénol A : l'Efsa propose de baisser la dose journalière tolérable d'un facteur 100 000

Actu-environnement 22/12/21

L'Autorité européenne de sécurité des aliments (Efsa) a réévalué les risques sanitaires du bisphénol A (BPA) présent dans les aliments. Elle propose de réduire considérablement la dose journalière tolérable (DJA), c'est-à-dire la quantité d'une substance qui peut être ingérée quotidiennement pendant toute une vie sans risque appréciable. Elle détaille l'ensemble de son analyse dans un projet d'avis scientifique ouvert à la consultation publique jusqu'au 8 février 2022. [...]

Accès au document

Plans de réduction des polluants atmosphériques : une échappatoire pour éviter leur renforcement

Actu-environnement 27/12/21

Un décret, publié le 26 décembre au *Journal officiel*, vient préciser les modalités de renforcement et de mise à jour du plan d'action de réduction des polluants atmosphériques du plan climat air énergie territorial (PCAET). Ce texte est pris en application de l'article 121 de la loi Climat et résilience du 22 août 2021. L'article L. 229-26 du Code de l'environnement impose à la métropole de Lyon, aux établissements publics de coopération intercommunale (EPCI) de plus de...

Accès au document

Substances CMR : accord sur une modification de la directive sur la protection des travailleurs

Actu-environnement 28/12/21

La présidence du Conseil et le Parlement européen sont parvenus, le 16 décembre, à un accord sur la quatrième mise à jour de la directive du 29 avril 2004 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents cancérigènes ou mutagènes au travail. Cette mise à jour avait été proposée, en septembre 2020, par la Commission. Le projet de texte prévoit d'instaurer une valeur limite pour l'acrylonitrile et les composés du nickel, et de réviser à la baisse la...

Accès au document

Redevance pour pollutions diffuses : la liste des substances concernées en 2022

Actu-environnement 28/12/21

L'arrêté interministériel établissant la liste des substances soumises à la redevance pour pollution diffuse à compter du 1er janvier 2022 est paru au

https://doi.org/10.15454/x8by-ae98

Journal officiel du 26 décembre. Les modifications sont conformes à celles contenues dans le projet de texte soumis à la consultation du public, en octobre dernier. Elles prennent en compte les dernières connaissances scientifiques sur la classification des substances, avait indiqué le ministère de la Transition...

Article réservé aux abonnés

Accès au document

Néonicotinoïdes : un projet de dérogation qui fait débat

Actu-environnement 28/12/21

En consultation jusqu'au 16 janvier 2022, un projet d'arrêté prévoit d'autoriser le traitement de semences de betteraves aux néonicotinoïdes face à l'absence de solutions alternatives. Un risque viral, jugé plus faible, rend cette dérogation controversée. [...]

Article réservé aux abonnés

Accès au document

Les cancers de la prostate liés aux pesticides reconnus comme maladie professionnelle

Actu-environnement 22/12/2021

Ce 22 décembre, un décret publié au *Journal officiel*, reconnaît les cancers de la prostate liés à l'exposition aux pesticides, dont le chlordécone, comme maladie professionnelle. Ce décret crée le tableau de maladie professionnelle n° 61, dans le régime agricole, relatif au cancer de la prostate en lien avec l'exposition aux pesticides. [...]

Article réservé aux abonnés

Accès au document

Egalement publié par Agi-Mutuel :

Accès au document

Certificats d'économie de phytos : un décret allège le taux d'obligation pour 2022 et 2023

Actu-environnement 14/12/21

Le dispositif CEPP se poursuit, avec la parution d'un nouveau décret. Le texte prévoit notamment une réduction du seuil d'obligation et l'intégration des entreprises d'Outre-mer. Le gouvernement fait également état d'un premier bilan timide du dispositif.

Les ministères de l'Agriculture et des Outre-mer ont signé, le vendredi 10 décembre, le décret relatif au dispositif des certificats d'économie de produits phytosanitaires (CEPP) pour l'année 2022 et les suivantes. Sa parution au *Journal officiel* succède à une période de consultation publique, débutée le 20 septembre et conclue le 10 octobre derniers. [...]

Liens : https://www.actu-environnement.com/ae/news/certificats-economie-phytos-allegement-obligation-38735.php4#xtor=ES-6

Polluants organiques persistants (POP) : vers de nouvelles exigences pour l'élimination des déchets et pour l'hexachlorobenzène

Red on line 13/12/21

En novembre 2021, la Commission européenne a présenté deux projets de règlement relatifs aux polluants organiques persistants (POP), des substances chimiques se décomposant si lentement qu'elles s'ajoutent à la chaîne alimentaire et empoisonnent l'environnement ainsi que la santé humaine. Les POP sont principalement encadrés au niveau international par la Convention de Stockholm que l'UE a mise en œuvre par le biais du règlement (UE) 2019/1021 sur les polluants organiques persistants. [...]

Accès au document

https://doi.org/10.15454/x8by-ae98

« Aucun gouvernement n'a suivi ou devancé avec une telle constance les desiderata du productivisme agricole »

Le Monde 11/12/21

Un canular orchestré par Extinction Rebellion annonçait, fin novembre, la fusion de la FNSEA et du ministère de l'agriculture. Une farce pas si absurde, relève Stéphane Foucart, journaliste au « Monde », dans sa chronique. [...]

Accès au document

Pourquoi le réchauffement climatique s'accélère dans les Pyrénées

The Conversation 12/12/21

[...] On peut ainsi prédire avec précision que les hausses de température en cours entraîneront de profonds changements écologiques, déstabilisant les écosystèmes de montagne.

[...] Dans les Pyrénées, les activités minières ont en grande partie cessé, mais elles se font toujours sentir, sous forme de pollution continue aux métaux lourds. On constate en effet une augmentation des inondations dues au dérèglement climatique, qui libèrent les métaux lourds stockés dans les tourbières.

Dans le même temps, les polluants organiques toxiques sont transportés des basses terres vers les écosystèmes montagneux par voie atmosphérique (évaporation, formation de nuages, vent et précipitations) mais aussi par des activités locales telles que l'utilisation de produits répulsifs par les agriculteurs et les touristes. [...]

Accès au document

La fertilité des abeilles atteinte par les pesticides néonicotinoïdes

Le Monde 06/12/21

Selon des travaux menés en plein champ, l'exposition à l'imidaclopride au stade larvaire ampute le taux de reproduction ultérieur.

Selon les conclusions des deux chercheurs américains [l'écologue Clara Stuligross et l'entomologiste Neal Williams] et publiés le 30 novembre dans la revue *Proceedings of the National Academy of Sciences* (*PNAS*), un insecticide agricole d'usage courant pourrait avoir des effets délétères différés, au point d'amputer d'environ 20 % le taux de reproduction d'abeilles n'ayant été exposées que par le biais de leurs géniteurs. [...]

Accès au document

La Métropole Nice Côte d'Azur s'engage pour protéger sa population de l'exposition aux perturbateurs endocriniens

Réseau Environnement Santé 11/12/21

André CICOLELLA, Président du Réseau Environnement Santé (RES), et Christian ESTROSI, Maire de Nice et Président de la Métropole Nice Côte d'Azur, ont signé le 11 décembre 2021 la Charte « Villes et Territoires Sans Perturbateurs Endocriniens », portée par le RES pour lutter contre l'épidémie de maladies chroniques. [...]

Par cet acte, la Métropole Nice Côte d'Azur (NCA) s'engage via cette Charte à restreindre et éliminer les phytosanitaires et biocides, à réduire l'exposition aux perturbateurs endocriniens dans l'alimentation, les éliminer dans les contrats publics, à sensibiliser et informer régulièrement les Niçois sur les avancées. [...]

Accès au document

S'il exempte la vigne, l'arrêté pollinisateur sera à appliquer sur l'enherbement

Vitisphere 26/11/21

Le ministère propose en consultation publique que les vignobles comptent parmi les cultures exemptées de contraintes pour leurs traitements phytos pendant la floraison. La présence de

plantes mellifères dans les parcelles viticoles sera à surveiller. [...]

Accès au document

Générations futures a lancé une enquête citoyenne

Agri-Mutuel 25/11/21

L'ONG Générations futures veut mieux mesurer l'exposition des riverains de zones cultivées aux pesticides et a demandé une nouvelle fois jeudi de renforcer les distances minimales à respecter entre zones d'épandage de produits phytosanitaires et habitations.

Générations futures, qui se bat contre l'usage de pesticides chimiques de synthèse, a lancé « une enquête citoyenne » sur l'exposition aux pesticides des riverains de zones cultivées, a indiqué François Veillerette, porte-parole de Générations Futures, à l'AFP. [...]

Accès au document

Le Gouvernement présente son plan pollinisateurs pour les cinq prochaines années

Le plan pollinisateurs pour la période 2022-2026 a été dévoilé par le Gouvernement le 21 novembre. Le dispositif bénéficiera d'un financement d'au moins 115 M€. Le programme semble complètement satisfaire peu de monde. [...]

Un plan en six axes :

- Amélioration des connaissances scientifiques ;

- Leviers économiques et d'accompagnements des agriculteurs/apiculteurs/forestiers ;

- Accompagnement des autres secteurs d'activités (aménagements urbains, infrastructures linéaires, sites industriels, sites à grande emprise foncière, aires protégées) ;

- Préservation du bon état de santé des abeilles et autres pollinisateurs ;

- Réglementation pour la protection des pollinisateurs lors de l'autorisation et l'utilisation des produits phytopharmaceutiques ;

- Partage des pratiques agricoles favorables aux pollinisateurs. [...]

Accès au document

Plan pollinisateurs : que prévoit la version finale pour les traitements phytosanitaires ?

Réussir 20/11/21

Le plan pollinisateurs, qui vise à enrayer le déclin des abeilles, va être publié « dans les tout prochains jours » selon le ministère de l'Agriculture, dans une version très proche de celle proposée à la consultation publique. En voici les points clés. [...]

Actuellement, seuls les insecticides sont concernés par la « mention abeilles », sésame nécessaire pour intervenir à floraison sur les cultures. **Avec le nouvel arrêté, fongicides et herbicides seront également concernés** : ces produits devront être évalués par l'Anses afin de déterminer s'ils peuvent être utilisés en période de floraison. Les firmes vont donc devoir déposer des dossiers à l'Anses pour obtenir la mention pour leurs produits. [...]

Accès au document

A new, lower threshold for lead poisoning in children means more kids will get tested – but the ultimate solution is eliminating lead sources

Conversation 5/11/21

The U.S. Centers for Disease Control and Prevention has updated its blood lead reference value – the level at which children ages 1-5 are considered to have high exposure to lead. Since 2012, this threshold had been set at 5 micrograms of lead per deciliter of blood; children at or above this level represented the top 2.5% with the highest blood lead levels in the nation. Now, in response to recent federal health surveys, the CDC has updated that number to 3.5 micrograms per deciliter. Environmental scientist Gabriel Filippelli, who has studied urban lead poisoning in

children, explains what this shift means for public health. [...]

Accès au document

Even organic pesticides spur change in the wildlife next door

Nature 17/11/21

A worker harvests kale on an organic farm. The limited selection of pesticides used on such farms can drive evolution of pesticide resistance in nearby species.

Organic farming is touted as a greener alternative to conventional farming. But new research suggests that even the handful of pesticides used on organic fields can affect nearby animals in much the same way that conventional pesticides do.

https://doi.org/10.1038/d41586-021-03445-y

High Temperature Thermal Treatment of PFAS

EPA 23/11/21

PFAS are a unique and stable class of compounds that are useful in a large number of applications. These traits have led to PFAS being present in numerous waste streams and products, like aqueous film forming foams (AFFF). It has been found that PFAS can bioaccumulate and can have harmful effects in humans and other animals. PFAS in the gas phase also can contribute to global warming. It is important to find methods to destroy PFAS without emitting harmful PFAS or products of incomplete destruction. Investigations into the incineration of PFAS and the development of a method to help determine incinerators' efficacies for PFAS destruction are outlined here, and some preliminary results are shown. Determining the temperatures and residence times needed to completely destroy PFAS is vital to ensure PFAS and PFAS by-products are not released into the environment. This information is important for the Department of Defense, local communites, and the general public. [...]

Accès au document

"Total" PFAS Methods

EPA 23/11/21

This presentation covers an overview of organic fluorine analysis method options that exist for perfluoroalkyl substances (PFAS) research. As PFAS compounds in circulation change and grow over time, it is important to find a way to measure all PFAS emissions. This presentation is intended to inform EPA, state, regional, and tribal employees of these methods and facilitate discussion in a workshop on PFAS analysis by nontargeted and total methods. [...]

Accès au document

A High-Resolution Reconstruction of PFAS Deposition in an Urban River using a Radiometrically Dated Sediment Core

EPA 18/11/21

Per- and polyfluoroalkyl substances (PFAS) are fluorinated, man-made chemicals that pose a risk to the environment. In this study, a radiometrically dated sediment core is analyzed for PFAS compounds to develop a picture of when they were used in manufacturing. This core was taken from an urban river in Rhode Island, USA that is home to former facilities that may have used PFAS compounds. PFAS analysis coupled with radiometric dating provides a history of PFAS discharge to the river. These data and methods are helpful to the environmental managers and the public to identify past and present sources of PFAS contamination.

Accès au document

https://doi.org/10.15454/x8by-ae98

Application of a Quality Scoring System for Assessing Per- and Polyfluoroalkyl Substances (PFAS) in Organic Solvents for In Vitro Toxicokinetic Testing

EPA 18/11/21

This poster will be presented at the 42nd Annual SETAC meeting being held virtually in November 2021 and is focused on the development of a quality scoring system to assess PFAS stock solutions. More than 450 unique PFAS-organic solvent stocks were assessed by mass spectrometry to guide further in vitro testing by providing a pass/fail score with informational flags. One application of this scoring system was to assess plasma protein binding, a toxicokinetic property that informs bioaccumulative potential, on more than 60 PFAS, where most chemicals displayed very high binding rates. [...] https://doi.org/10.23645/epacomptox.16879327

L'Europe exporte des milliers de tonnes de pesticides « tueurs d'abeilles » pourtant interdits sur son sol

Le Monde 18/11/21

L'UE a donné son feu vert aux demandes d'exportation d'au moins 4 000 tonnes de néonicotinoïdes interdits, notamment au Brésil. La France est le deuxième pays exportateur.

Depuis 2018, l'Union européenne (UE) interdit sur son sol l'usage de trois insecticides néonicotinoïdes (l'imidaclopride, le thiaméthoxame et la clothianidine), considérés comme des « tueurs d'abeilles » et une grave menace pour la biodiversité. [...]. Surtout, l'UE continue à produire et à exporter massivement ces pesticides ultratoxiques dont elle ne veut plus dans ses champs. [...]

Accès au document

Près de 300 communes s'engagent à lutter contre les perturbateurs endocriniens

Actu-environnement 17/11/21

Près de 300 communes ont adhéré à la charte « Villes et territoires sans perturbateurs endocriniens » portée depuis 2017 par le Réseau Environnement Santé (RES), a annoncé André Cicolella, son président, au Salon des maires, ce 17 novembre. Quatre Régions (dont Île-de-France, Occitanie ou Nouvelle-Aquitaine) et sept Départements (dont Paris, Seine-Saint-Denis, Bouches-du-Rhône, Saône-et-Loire) sont signataires de la charte [...]

Accès au document

Glyphosate : l'expertise européenne a exclu de son analyse l'essentiel de la littérature scientifique

Le monde 16/11/21

Selon l'analyse bibliométrique conduite par l'association Générations futures, 99 % des études sur la toxicité du pesticide sont jugées non pertinentes ou non fiables par le rapport préliminaire européen.

Une expertise peut-elle être scientifique si la science n'y a pas sa place ? C'est l'épineuse question posée par l'association Générations futures à propos de l'expertise préliminaire européenne sur le glyphosate, qui doit permettre la réautorisation en Europe de l'herbicide controversé, fin 2022. [...]

Accès au document

Health risks of air pollution in Europe, 2021

EEA 15/11/21

Air pollution is a major cause of premature death and disease and is the single largest environmental health risk in Europe. Heart disease and stroke are the most common reasons for premature deaths attributable to air pollution,

https://doi.org/10.15454/x8by-ae98

followed by lung diseases and lung cancer. This EEA briefing estimates the potential health benefits of attaining the EU air quality standards and the WHO guideline values for fine particulate matter in ambient air. It also assesses progress towards the health-related objective of the EU's Zero Pollution Action Plan. Finally, it presents the latest estimates of the health impacts of exposure to the following key air pollutants: fine particulate matter, nitrogen dioxide and ozone. [...]

Accès au document

Co-formulants used in commercial fungicide affects the health of bumblebees

PHYS.org 5/11/21

Researchers from Royal Holloway, University of London have found for the first time that a co-formulant found in commercial agricultural pesticides used across the UK significantly affects the health of bumblebees.

The new study shows that exposure to alcohol ethoxylates—a type of co-formulant used in fungicides—can cause severe gut damage, leading to a lack of appetite, weight loss and mortality in bumblebees. [...]

Accès au document

Mountaintop removal worse for endangered species than initially thought

PHYS.org 4/11/21

A new study published today by journal PLOS ONE has revealed that mountaintop removal mining poses a more serious and widespread threat to endangered species and people than was previously understood. The researchers from Defenders of Wildlife's Center for Conservation Innovation (CCI) and conservation technology nonprofit SkyTruth, combine water-quality data with satellite imagery of mountaintop removal mining activity to estimate the full extent of water-quality degradation attributable to the practice at the landscape level. [...]

Accès au document

Evaluation of the risks of chemical mixtures to human health

PEER 4/11/21

Panoramix (Providing risk assessments of complex real-life mixtures for the protection of European citizens and the environment) is a 4-year project supported by the European Commission with a € 4.4 M grant through the Horizon Europe program. The project focuses on innovative ways for quantifying the risk associated with exposure to chemical mixtures, without animal testing.

Children are exposed to man-made chemicals already before they are born. While progress has been made to reduce toxic substance levels, new chemicals constantly enter the market. [...]

Accès au document

Researchers must assume responsibility for halting the global bee decline

Phys.org 4/11/21

"Insect and pollinator decline constitutes a pressing societal challenge that requires attention and action now. What is at stake is nothing less than the world's ecosystems and food production," says professor Jeroen van der Sluijs at the Centre for the Study of the Sciences and the Humanities, University of Bergen (UiB).

Van der Sluijs points to the database Global Biodiversity Information Facility, which shows that biodiversity among wild bees has decreased with 25 percent since 1990. [...]

Accès au document

As-needed pesticide use brings wild bees, increases watermelon yield without reducing corn profits

PHYS.Og 4/11/21

Many farmers rent bee hives to pollinate crops, but they could tap into the free labor of wild bees

by adopting an as-needed approach to pesticides, a new proof-of-concept study shows.

A multiyear study of commercial-scale fields in the Midwest found this approach led to a 95% reduction in pesticide applications, while maintaining or increasing crop yield for corn and watermelon. The findings are detailed in a paper published in the Proceedings of the National Academy of Sciences. [...]

Accès au document

New methods for detecting single molecules

Phys.org 2/11/21

Resistance to antibiotics is on the rise worldwide. Researchers at the Fraunhofer Institute for Physical Measurement Techniques IPM alongside the Ludwig Maximilian University of Munich have developed a process for rapidly detecting multidrug-resistant pathogens. The unique feature: Even one single molecule of DNA is sufficient for pathogen detection. In future, the platform could be introduced as part of point-of-care diagnostics on hospital wards or in medical practices as an alternative to the established PCR analyses or in combination with other diagnostic methods. The system will be presented at MEDICA 2021. [...]

Liens : Accès au document

Nanoplastics found in the Alps were transported by air from Frankfurt, Paris and London

Phys.org 01/11/21

A team of researchers have found nanoplastics at the pristine high-altitude Sonnblick Observatory in the Alps. This is the first time that nanoplastics have been found in this area. The researchers were originally looking for certain organic particles, but found nanoplastics by chance, discovering a new analysis method for detecting nanoplastics in the process. The research is published today in Environmental Pollution. [...]

Accès au document

Upper ocean layer contains 24 trillion pieces of microplastics

Earth.com 1/11/21

[...] While studies to measure and monitor the presence of microplastics in regions of the world's oceans have been conducted for the past 50 years, they have made use of disparate methods of collection and analysis [...]. Large data sets to help follow the trends in microplastic pollution have thus not been available to researchers in general.

This is what prompted a global team of oceanographers, led by researchers from Kyushu University, to review the data from previous published and unpublished expeditions to sample microplastics in the oceans. They calibrated and processed these data in order to build a publicly available dataset [...]

The research is published in the journal Microplastics and Nanoplastics.

Accès au document

Foetuses can be affected by microplastics, scientists find

Euronews 27/10/21

Microplastics could be harming unborn babies, concerning new research has found.

Large polystyrene particles - around the size of a cloud or fog droplet at 10 micrometres - can make their way into the placenta, according to scientists at Utrecht University.

Presenting her research at the Plastic Health Summit in Amsterdam last week, lead scientist Hanna Dusza said more work is urgently needed to determine what effect the tiny pieces of plastic are having on foetal health. [...]

Accès au document

Plastic pollution found in Taiwan's high mountain Jiaming Lake

FocusTaiwan, Oct. 31

Microplastic contamination has been found in 100 percent of water samples collected from Jiaming Lake in Taitung, the second highest mountain lake in Taiwan and a main source of drinking water for the Formosan sambar deer, a protected species, according to a research report issued Sunday.

Meanwhile, the positive detection rate of microplastics in water samples collected from other sources […], at an elevation of 3,310-m above sea level, was up to 80 percent, the international environmental organization Greenpeace said in a statement [...]

Accès au document

US-EPA Comptox Chemicals Dashboard: Information hub for PFAS chemicals

Cfpub.epa 4/11/21

The US-EPA Center for Computational Toxicology and Exposure (CCTE) has been generating data and building software applications and web-based chemistry databases for over a decade. To support our efforts to develop new approaches to prioritize chemicals based on potential human health risks, we aggregate and curate data streams of various types to support prediction models. DSSTox currently stands as the most comprehensive registry of chemical substances available in ORD. [...]

https://doi.org/10.23645/epacomptox.16828621

Chemical Transformation Simulator (CTS): Predicting PFAS Metabolites and Environmental Transformation Products

Cfpub.Epa 2/11/21

The Chemical Transformation Simulator (CTS) is a publicly available web-based application that predicts how organic chemicals will transform in environmental and biological systems. Traditional exposure and risk assessments for human-made organic chemicals have only focused on chemicals in their manufactured form, but it is well known that many organic chemicals can be transformed in the environment. [...]

Accès au document