Nereis Park Newsletter

Number 5
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An eclectic issue

Dear all, I'm very happy about this issue that is composed of soil, freshwater, and marine bioturbation related articles. I am convinced that the three communities have to learn from each other.
Included, one article about a study in Patagonia to prove, if necessary that, if we are strongly interested in bioturbation, we are also open to many other research fields.
Finally, two calls for PhD candidates in France.

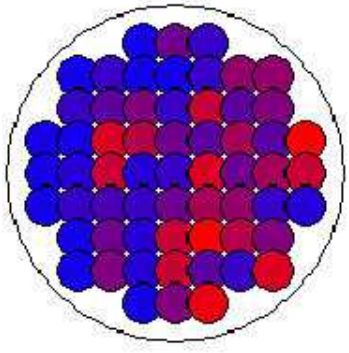
FG

Application of earthworm cast production assessment

There is currently a lack of ecotoxicity tests adapted to earthworm species of higher ecological relevance and whose endpoints could be directly related to their ecological role in the soil. We propose a new and relatively simple ecotoxicity test based on the estimation of cast production (CP) by *Lumbricus terrestris* under laboratory conditions. CP was found to be linearly correlated to earthworm biomass and to be greatly influenced by soil water content. Azinphos-methyl had no effect on CP at all the concentrations tested. Significant decreases were observed at the normal application rate for other pesticides with (imidacloprid, carbaryl, methomyl) or without (ethyl-parathion and chlorpyrifos-ethyl) a clear concentration– effect response. For the highest concentration tested, reduction in CP varied between 35 and 67%. CP is straightforward and rapidly measured and ecologically meaningful. We thus believe it to be of great use as an endpoint in ecotoxicity testing.

Yvan Capowiez *et al*. 2010 Earthworm cast production as a new behavioural biomarker for toxicity testing. Environmental Pollution 158 (2010) 388–393.

Yvan Capowiez



Quizz: Do you know what produced this nice collection of spots?

Interested in bioturbation, but not only !

Pollutants evaluation in sediments and marine organisms in the northern San Jorge Gulf, Patagonia, Argentina.

A new project was started concerning the north zone of San Jorge gulf, in Patagonia, Argentina. The am of this project is to known the actual condition of this idyllic zone of Patagonia. When we speech about actual condition, we referred to the oceanographic parameters, type of sediments, benthic macrofauna, pollution by hydrocarbons, heavy metals and other POP pollutants. Can we detect a climate change in this zone? It is another question. Recently the Argentine Ms. Sc. Agustina Ferrando, coming from Mazatlan, Mexico, will work with us trying to know the benthic infauna. She works in Mexico with Dra. Nuria Mendez, a specialist in polychaetes and other beasts coming from sediments. This zone has been declared a National and Provincial Park because the beauty and the quantity of marine mammals and birds that breeds and nest on its coast. But the potential pollution by hydrocarbons is just around the corner. Indeed, very recently has begun oil exploration in the Gulf and is now expected an important development of this activity very close to the National and Provincial Park.

We just start the work. But two different things affected the natural conditions. In December 2007, a few cubic meters of crude oil were spilled by a tanker. Some hundred of Magellanic penguins' were killed along the coast of the Gulf. But "Out of sight, out of mind", we don't known was happened with another animals and algae that we can't see.

In September 12, 2009, more than 40 pilot whale (*Globicephala melas*) appeared stranded on the Caleta Malaspina (45º 08' S; 066º 36' W), not more than 2 kilometres from Bahia Bustamante. They were separated by few meters from each other.

In 1991, at 20 miles from Bahia Bustamante (Punta Tafor), another stranding of the same species was detected. In this case, more than 440 pilot whales were killed. People ask the cause of these stranding but no answers so far.

As a conclusion, a lot of work can be done along the next three years. As always, money will be the limiting factor but we hope work deeply in these topics.

José Luis Esteves

Call for PhD candidates

Subject: The effects of bioturbation on the diversity of the prokaryotic communities in the sediment, and study of bioirrigation in ecologically contrasted habitats.

Abstract
The Arcachon bay shelters a *Zostera noltii* meadow (marine phanerogam) which covers the majority of the shore (about 70 km² in the 80's), but which undergoes a drastic regression since 2005 (about 30 % of area less in 2007 compared with 1989). Recent studies have demonstrated the ecological and biogeochemical importance of these meadows. Bioturbation activity of benthic invertebrates generates both a particulate reworking and a transport of porewater (bioirrigation). Bioturbation modifies the physical, chemical and biological properties of the sediment-water interface and thus exert a control on sediment biogeochemistry, mainly via a modification of the specific and/or functional diversity of the benthic prokaryotic communities. In this context, this PhD has two main objectives:
1) A measurement of the bioirrigation activity of the benthic fauna in the Arcachon Bay, in several habitats: naked sediments, sediments covered with a low density meadow (i.e. in the regression area) and sediments covered with a high density meadow. These ex-situ studies will be completed by an experimental study on the bioirrigation generated by several species from the Arcachon Bay, and belonging to the five functional groups of bioturbation.
2) A study of the influence of bioturbation on the taxonomic and functional diversity of the benthic prokaryotic communities (bacteria and archea) of the Arcachon Bay. The effect of the various functional groups of bioturbation on the total number of prokaryotes (flow cytometry), on the taxonomic diversity of prokaryotic communities (ARISA), as well as on the functional prokaryotic diversity will be studied, both in-situ and experimentally.

Laboratory
The location of the position is Arcachon, laboratory UMR 5805 EPOC, CNRS-Université Bordeaux 1, Environnements et Paléoenvironnements Océaniques : http://www.epoc.u-bordeaux.fr/index.php?lang=fr&page=accueil, France.

Funding

A funding of this PhD by the Aquitaine region has been requested but is still under evaluation. Otherwise, the PhD will be funded by a grant from the French Ministery for Education. This ministerial grant is dependent on the result of the competitive examination of the Doctoral School "Sciences and Environnements" from Bordeaux 1 University.

Requested skills
The candidate will have to be either a microbiologist with a strong interest for benthic ecology, or a benthic ecologist, with a strong interest for microbiology.
As the ministerial grant will be awarded according to the merit of the candidate (except in case of an Aquitaine region grant), the candidate will have to have good university results.

Application
To apply for this position, please visit the web site of the Doctoral School "Sciences and Environnements" from Bordeaux 1 University: http://www.u-bordeaux1.fr/edse/index.html
Deadline for application: 17/05/2010.
The position will start in October-November 2010.

Contact
-Frédéric Garabétian: f.garabetian@epoc.u-bordeaux1.fr (supervisor of the PhD)
-Aurélie Ciutat: a.ciutat@epoc.u-bordeaux1.fr (co- supervisor of the PhD)

Call for PhD candidates

Subject: Effects of biotic interactions on litter decomposition and bioturbation processes.

Supervisors:
Dr. Franck GILBERT & Dr. Antoine LECERF

Laboratory:EcoLab – Laboratoire d'Ecologie Fonctionnelle UMR 5245 (CNRS-UPS-INPT)29 rue Jeanne Marvig - BP 24349F- 31055 Toulouse cedex 4 (France)

Abstract:
The ecosystem consequences of biodiversity loss are still not fully appreciated for animals because of theoretical gaps and the paucity of empirical testing in multitrophic systems. Streams and wetlands will be used to investigate effects of macroinvertebrates on particular organic matter dynamics.

Two ecosystem functions will be examined concomitantly: (i) decomposition of submerged plant litter as the main energy source to aquatic food webs, (ii) bioturbation that controls sediment distribution and the structure and functions of benthic communities. These will be studied in a 3-trophic level system with plant litter, primary consumers, and predators.

The working hypothesis will be that the rates of litter decomposition and bioturbation are determined indirectly by biotic interactions within and between trophic guilds. Efforts will be devoted to assessing the relative importance of trophic (density-mediated) and non-trophic (trait-mediated) interactions in controlling both ecosystem functions.

The successful candidate will undertake experimental studies using *ex-situ* and *in-situ* mesocosms. He/she will manipulate model organisms such as Gammarids (omnivores), Ephemeroptera larvae (burrower), and Odonate larvae (predators). He/she will use predictions from models for bioturbation, litter decomposition and predator-prey interactions to generate originate hypotheses.

Requested skills:
We seek for a highly motivated candidate with a Master degree in the field of ecology and environmental sciences. He/she will be invited to present the project in front of a PhD project selection committee. A 3-year MESR grant (French Ministry of Higher Education and Research) PhD fellowship will be awarded to selected candidates.

Application procedure:
Interested candidates should contact Franck Gilbert (franck.gilbert@cict.fr ; phone +33 (0)5 62 29 99 87) or Antoine Lecerf (lecerf@cict.fr ; phone +33 (0)5 62 29 99 85) ASAP or by the middle of May 2010 at the latest.

The answer: Luminophore quantification using microplate reader (scanning mode)