

GRAINES d'EXPLORATEURS



Contact : sabine.lavorel@inrp.fr



Translation: Jean-Marie Pincemin, INRP International Office

Birth of the project :

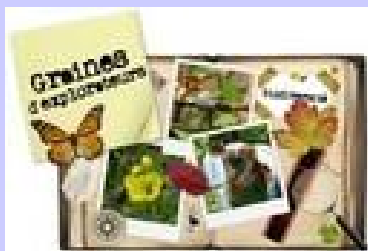
from Esperitu Santo to *Graines d'Explorateurs*



Year 2006-07 : Participation to the *Santo* scientific mission
160 scientists of 25 countries (Vanuatu)
<http://acces.inrp.fr/santo/>



Year 2007-08 : Setting up of local scientific expeditions
(with participating schools)
Development of a website to publish pedagogical resources



Year 2008-09 : Development of the project

- Supervision of the classes that responded to the call in May 2008
- Building a continuous partnership between researchers and teachers
- Collective production (*hyperpaysages*)
- Possibility for teachers to use new tools
(*Graines d'Explorateurs* forum, pedagogical sets...)

France-Vanuatu

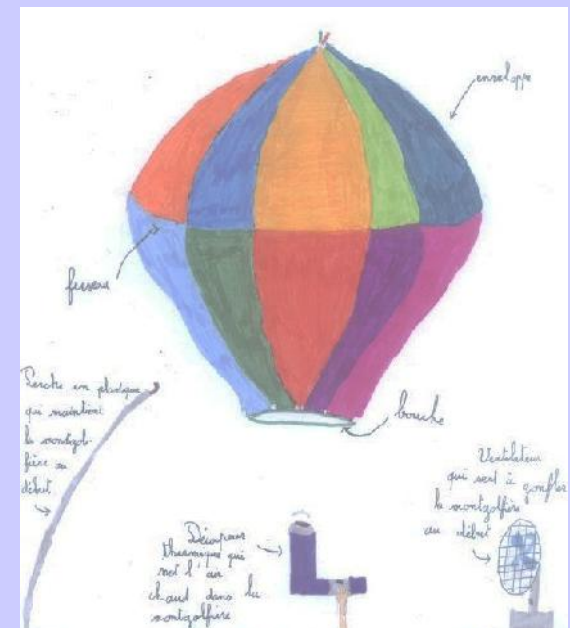


Vanuatu - France

Vanuatu



France



<http://acces.inrp.fr/santo/dispositifs-pilotes/vanuatu/groupspace.2006-10-20.4392026249/classe-de-6eme-cm2/dessins>

http://acces.inrp.fr/santo/echanges_scolaires/Classes/robert_schuman/index_html/view

Graines d'Explorateurs

Objectives

- Build on the experience gained during the *SANTO* scientific expedition and demonstrate the importance of the process of investigation to teach sciences,
- Raise the pupils' awareness of how important it is to know their direct environment and to participate in civic education *via* the study of biodiversity issues,
- Develop the pupils' scientific culture and their taste for sciences,
- Give value and meaning to scientific processes thanks to a better knowledge of the world of research among the pupils.

Tools offered by INRP

- Creation of an Internet forum allowing teachers to get quick answers to their scientific & educational questions,
- Constitution of pedagogical sets with all the necessary equipment for local scientific expeditions : digital camera, GPS, ...
- Online publication of scientific, educational and didactical resources,
- Teacher training on the use of new tools in their teaching practices.

Examples of local scientific expeditions

1. Study of biodiversity in a brook : the RIZE

Level: 1st year of lower secondary school. (FR: 6ème – collège)

Class: 24 pupils

Duration: 36 yearly hours (1 hour a week)

2. Underground biospeleological expeditions: the DORVAN *massif* (mounts)

Level: 2nd year of higher secondary school (FR: 1ère S – lycée)

Class: 28 pupils

Duration: 36 yearly hours (2 hours a week)

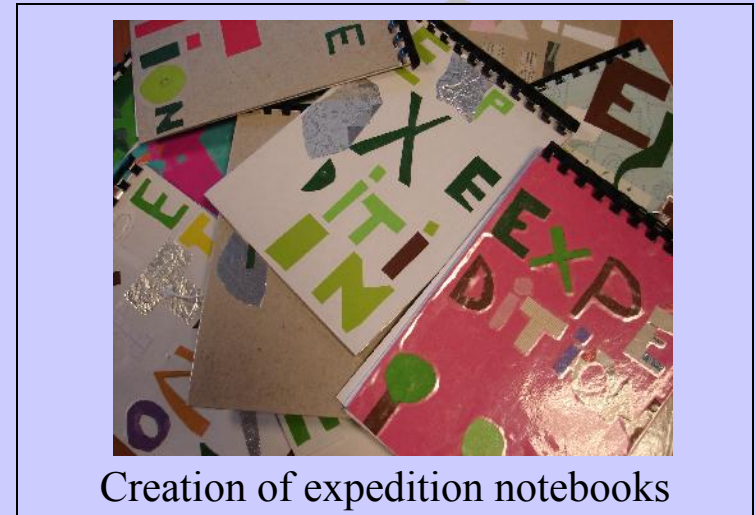
Study of biodiversity in a brook : the RIZE

Gathering biodiversity information in our direct environment

Checking out the expedition area.



Back to class : preparation of the expedition



The expedition :

Division of the tasks by groups



Study of the brook's physical characteristics



Study of the mud's fauna

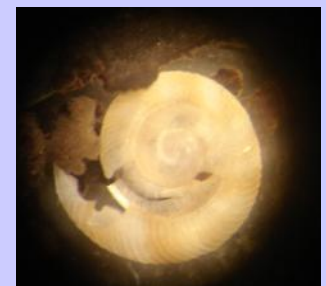
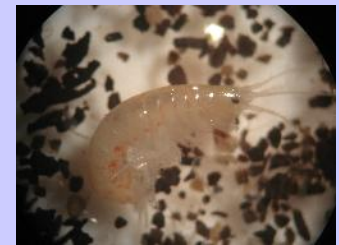


Study of the flora and fauna
by the brook

Data exploitation :

Determination of the species

(University LYON 1)



Underground bio speleological expeditions:

the **DORVAN** *massif* (Torcieu, Ain)



Problem & hypothesis

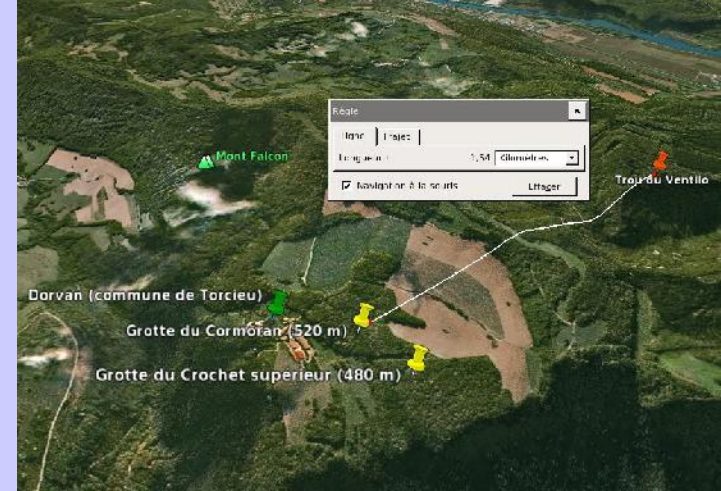
How can we explain that many underground species lack pigmentation ?



Depigmented diplura (length 3 m m)

Hypothesis : the loss of pigmentation is a usual evolution process, which happens recurrently, in many independent species.

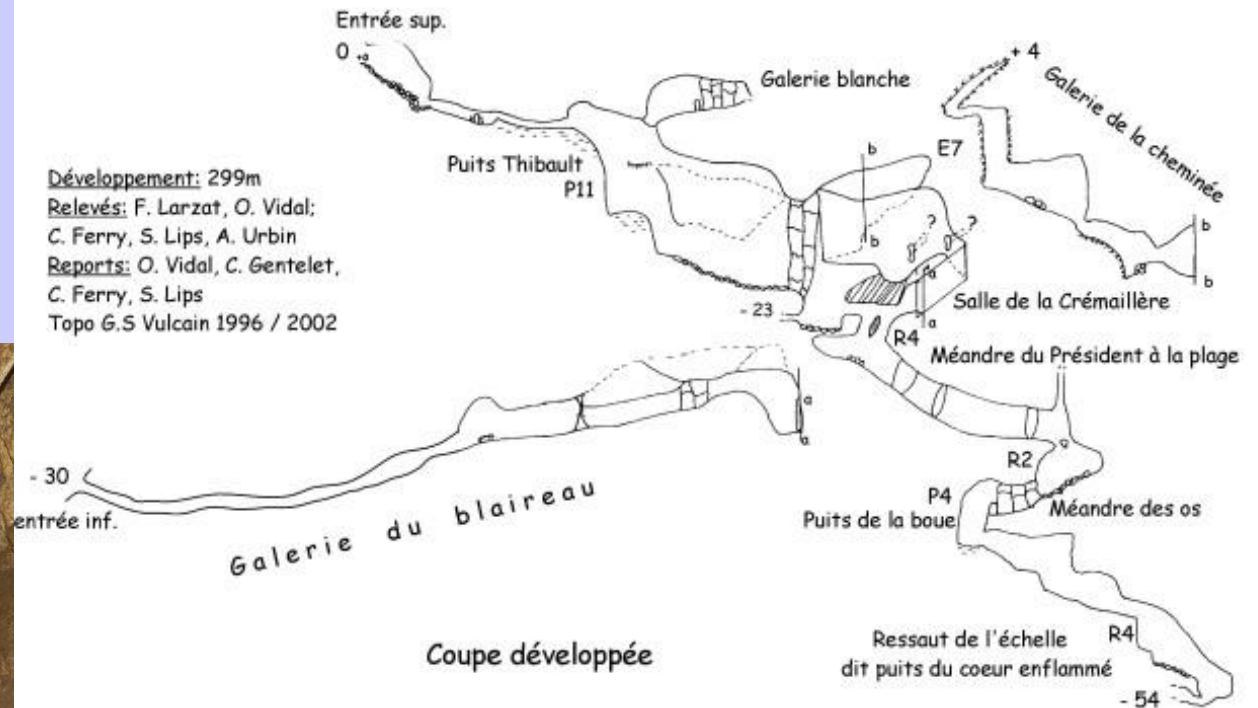
The expedition



Trou du ventilo

(Vaux- en Bugey - Ain)

Développement: 299m
Relevés: F. Larzat, O. Vidal;
 C. Ferry, S. Lips, A. Urbin
Reports: O. Vidal, C. Gentelet,
 C. Ferry, S. Lips
 Topo G.S Vulcain 1996 / 2002



Coupe développée



Selection of the collected species



Niphargus
Length: about 15 mm



Diplopoda 1



Coleoptera



Campodeidae
Length: about 2 mm



Collembola 1
Length: about 1 mm

Scoliopteryx libatrix

Length: about 2 cm



Pseudo scorpion

Length: about 2 mm



Spider *Meta*

Length: about 25 mm



Data exploitation : morphological observations

Example of the Niphargus

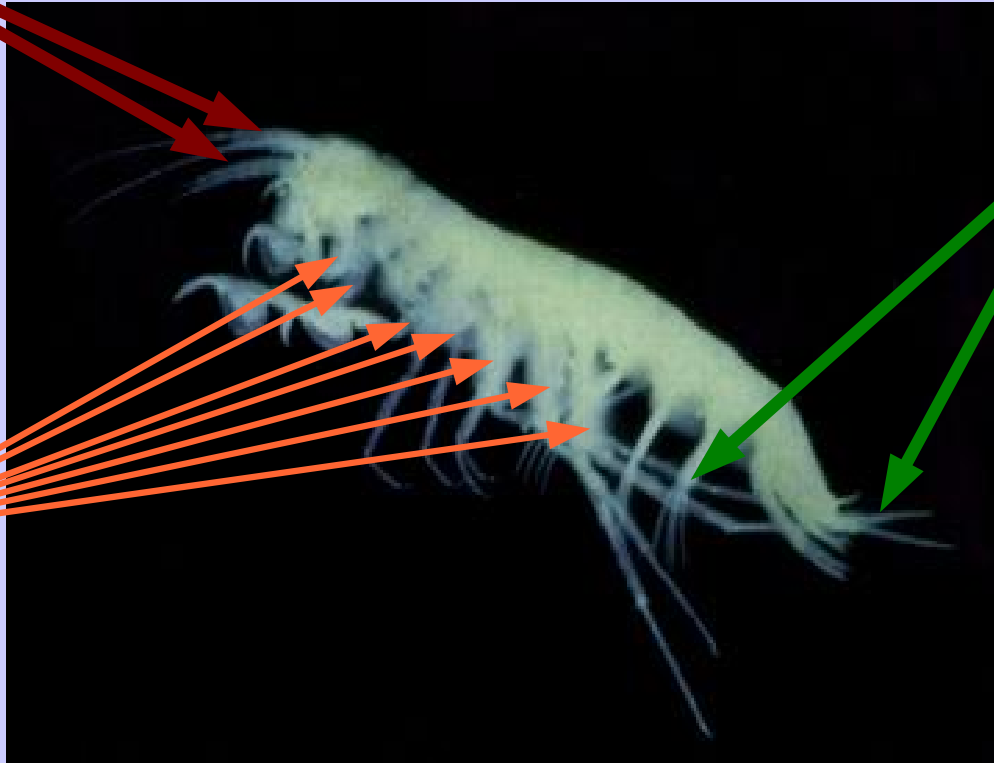
2 pairs of antennas



7 pairs of legs



« crossed »
Appendices



Construction of a table on morphological characteristics

<i>Organisme</i>	Antennes	Chélicères	Nombre de parties du corps	Paires de pattes	Furca	Ailes	Appendices
<i>Niphargus</i>	présentes	absentes	2 (CA)	7	-	-	croisés
<i>Gammarus</i>	présentes	absentes	2 (CA)	7	-	-	croisés
Cloporte	présentes	absentes	2 (CA)	7	-	-	non croisés
Collembole 1	présentes	absentes	3 (TTA)	6	présente	absentes	-
Collembole 2	présentes	absentes	3 (TTA)	6	présente	absentes	-
Campodé	présentes	absentes	3 (TTA)	6	absente	absentes	-
Coléoptère	présentes	absentes	3 (TTA)	6	-	2 paires	-
<i>Scoliopteryx</i>	présentes	absentes	3 (TTA)	6	-	2 paires	-
Diplopode 1	présentes	absentes	T	2 par segment	-	-	-
Diplopode 2	présentes	absentes	+ nombreux segments semblables	2 par segment	-	-	-
Chilopode	présentes	absentes		1 par segment	-	-	-
Amblypyge	absentes	présentes	2 nettes (PO)	8	-	-	-
Araignée	absentes	présentes	2 nettes (PO)	8	-	-	-
Pseudoscorpion	absentes	présentes	2 peu nettes (PO)	8	-	-	-

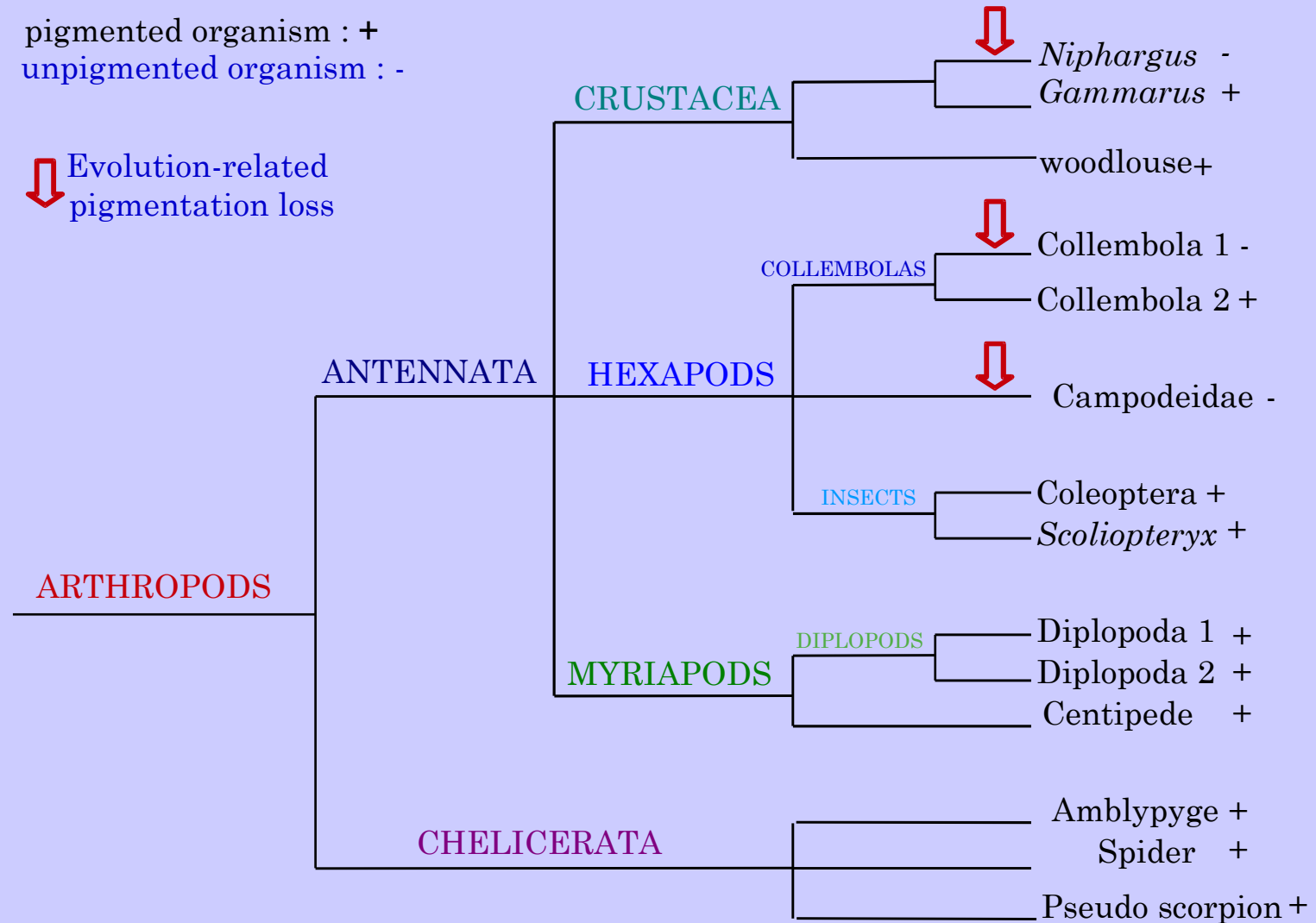
□ Circles = Share an evolution-related innovation

In order to test the hypothesis, the collected samples were coupled with a surface sample, to allow a comparison between underground and surface species from the same biological groups. As some groups do not have equivalent in temperate zones, some species from Santo were integrated in the samples as well.

Reconstitution of a species tree & Representation of the species pigmentation

pigmented organism : +
unpigmented organism : -

↓ Evolution-related
pigmentation loss



Conclusion: elaboration of an evolutionary scenario

The most recent common parent for the collected species was pigmented and the pigmentation loss happened independently for a niphargus, a collembola 1 and a campoda.

Scientific partners who took part in these projects:



Contact : sabine.lavorel@inrp.fr