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Development Cooperation

University of Ouagadougou
(Burkina Faso)

University of Natural Resources, and
Life Sciences Vienna (Austria)

Macroinvertebrates and freshwater quality in sahelo-soudanian area (West Africa, Burkina Faso)

SUSFISH



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23 07 2013

OUTLINE

- ✓ Introduction
- ✓ Materials and Methods
- ✓ Data Analysis
- ✓ Some results
- ✓ Next step

INTRODUCTION

✓The freshwaters cover less than 1% of the earth's surface¹ and contain the most of aquatic organisms in the world².

✓The Freshwater ecosystems provide goods and services for the livelihood of many people in the world specially in Africa.

1. Gleick, 2000. The changing water paradigm a look at twenty-century resource development Water International, volume 25, number1, 127-138
2. Dudgeon D. Freshwater biodiversity: importance, threats, status and conservation challenges. *Biol. Rev.* (2006), 81, pp. 163-182

INTRODUCTION ...

✓ This precious resource that human being use as well as the plants and animals is an ending resource and most threatened

✓ Water and biological resources management is became a major challenge that humanity must face for its' survival.

INTRODUCTION...

✓ In Africa, specially in West Africa the rapid population growth, irrigation areas, industrialization and urbanization are putting ever-greater pressure on aquatic ecosystems³ .

✓ However, most of knowledge on biomonitoring has been obtained since 1974.



INTRODUCTION ...

In Burkina Faso, Rivers catchments drain an area of vast and varied land used for agricultural and urban-industrial activities.

This caused a release of a lot of wastes from both domestic and industrial activities into the rivers, lakes and ponds.

These activities may change the natural balance, and alter aquatic habitats and animals life condition.



INTRODUCTION...

In front of this situation

Water quality
needed to be
understand! How?



INTRODUCTION....

macroinvertebrates are considered as one of the best biological indicators of water quality.

However, there is lack of data on water quality assessment based on benthic fauna in Burkina Faso.

OBJECTIVES

This study aimed to :

- ❑ describe distribution and seasonal dynamic of benthic fauna in freshwater from Burkina Faso,
- ❑ assess factor affecting spatial and temporal distribution of benthic fauna in freshwater;
- ❑ And to analyse relationship between benthic fauna and water quality in order to identify Macroinvertebrates that could be used as bioindicators of freshwater quality in this location



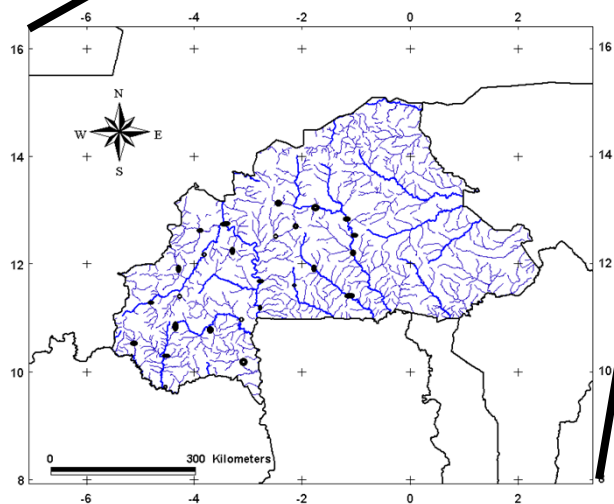
MATERIALS AND METHODS



KABORE IDRISSE _PhD _student_BOKU_2013

Study area

Burkina Faso is located in the heart of West Africa ($12^{\circ} 16'N$, $2^{\circ} 4'W$).



Sampling sites

1. Good reference sites

Karfiguéla (River)
Kokorowé (River)

2. Impaired sites

Bobo Dioulasso
Ouagadougou
(Rivers)

3. Unknown sites

Djaraba River
Bromo River
Powéry River...

SAMPLING TIME

Two seasons in Burkina Faso

✓ rainy season

dry season....



Field work

Hand net (square opening 25 x 25cm, mesh 500 μ m)



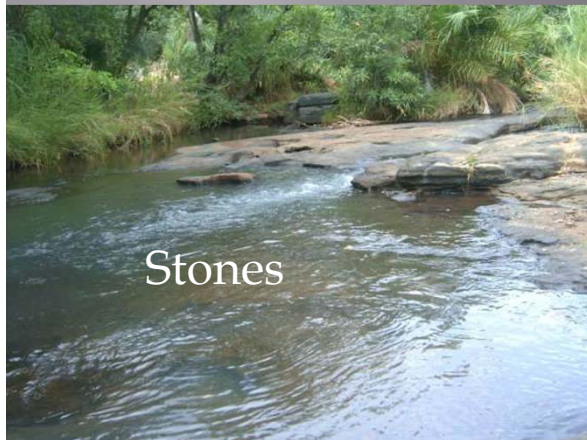
gloves

aquatic benthic fauna sampling

Waders

Multi-habitats-Sampling procedure

The sampling catchments were made of microhabitats: a area of 625 Cm² are moved; forshaked;brushed or lifted.



➤ One sample is constituted of 20 pooled units

Field treatment:

The large debris and stones were removed
Forceps



The remaining samples
in the container (s) and
preserved with ethanol
(90%)



The containers
closed, stored and
labelled outside.

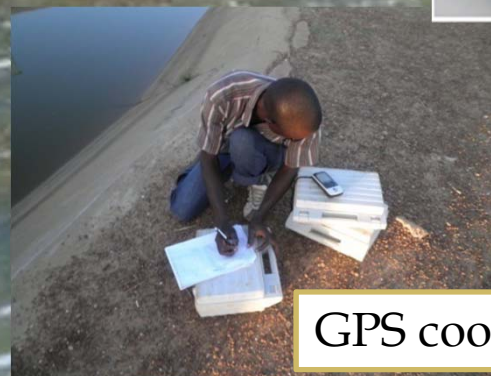


METHODS

Environment variables



➤ Water samples are collected for further chemical analyses in the Lab



Laboratory work



Laboratory Work

Sieving



using sieves running water

Sorting



all specimens were removed

Identification



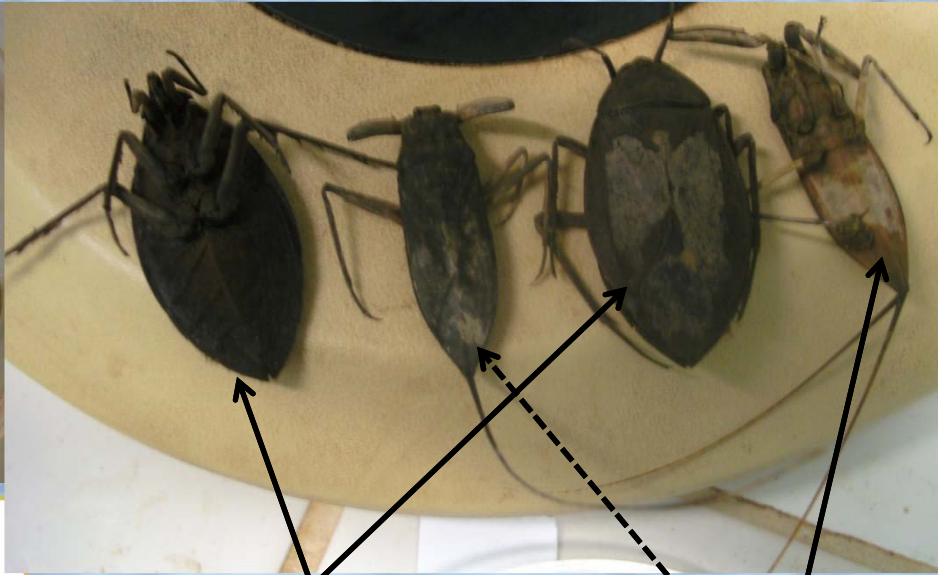
Determination to highest potential level

AQUATIC ASSESSMENT APPROACH

Biological material



Chironomidae



Belostomatidae

Nepidae



Sphaeriidae

AQUATIC ASSESSMENT APPROACH

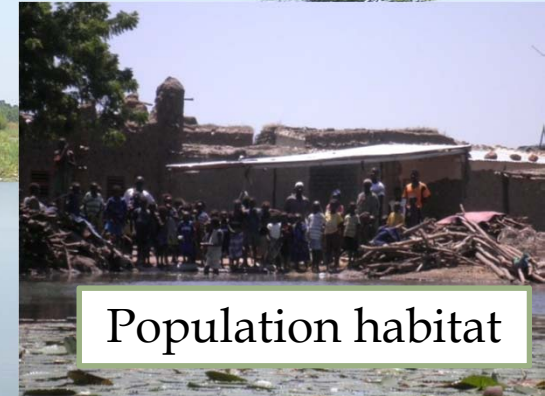
Field parameters collected:



Water abstraction



Foam



Population habitat



Land use



Live stock



Washing

Statistic analysis

specific richness, Abundance, Density, diversity Indices are used to assess benthic fauna distribution.

The role of environmental variables on benthic fauna spatial distribution will be assessed by multivariate redundancy analysis (RDA).

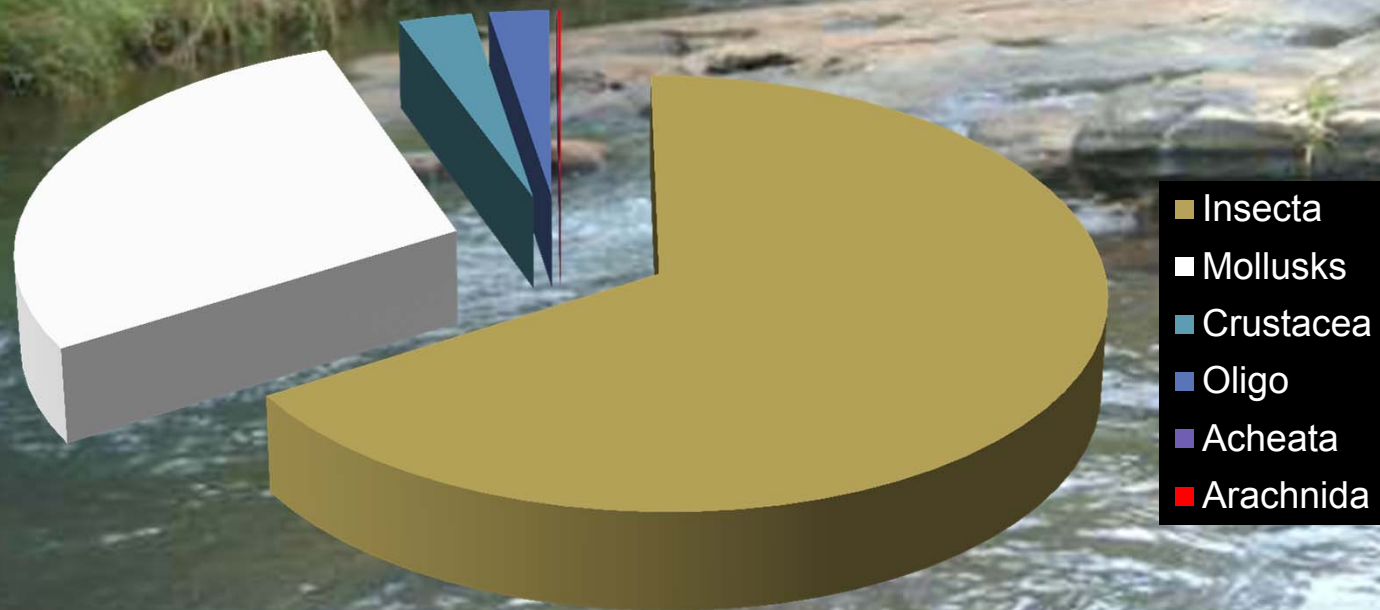
✓Water quality will be assessed by multimetric techniques.

The image shows six petri dishes arranged in two rows of three. Each dish contains a white, semi-transparent agar-like medium. Various insects and larvae are visible on the surface of the medium. The top-left dish contains several small, dark, segmented larvae and a larger, more complex insect. The top-middle dish shows several ants and a larger insect. The top-right dish contains a large, dark, segmented insect, possibly a beetle, and several smaller insects. The bottom-left dish shows several small, dark, segmented larvae. The bottom-middle dish contains several small, dark, circular spots and a few small larvae. The bottom-right dish shows several small, dark, segmented larvae and a few small insects. A central text box with a yellow border and black text reads "SOME RESULTS".

SOME RESULTS

Results

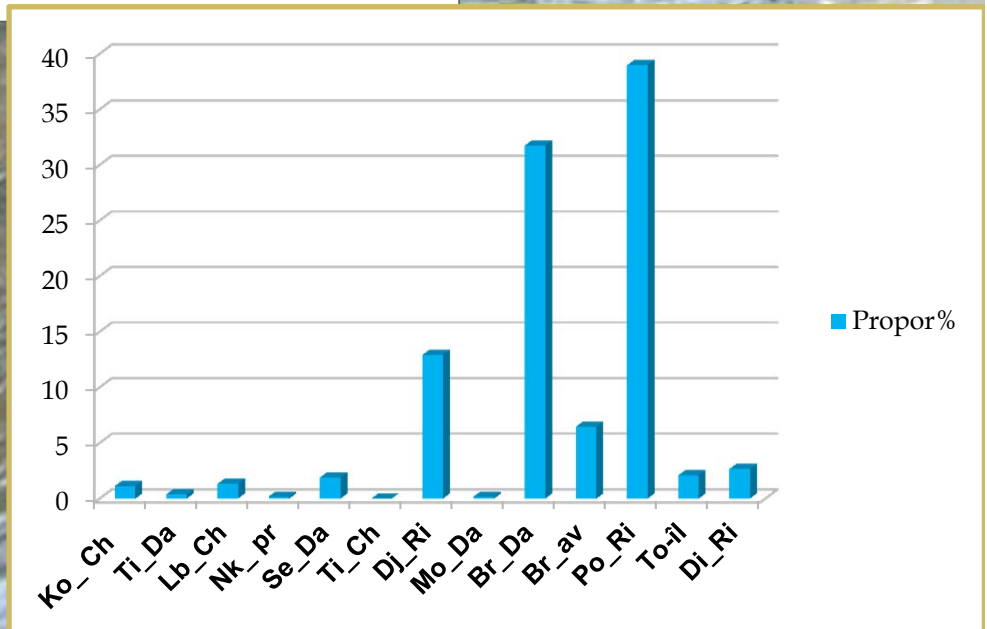
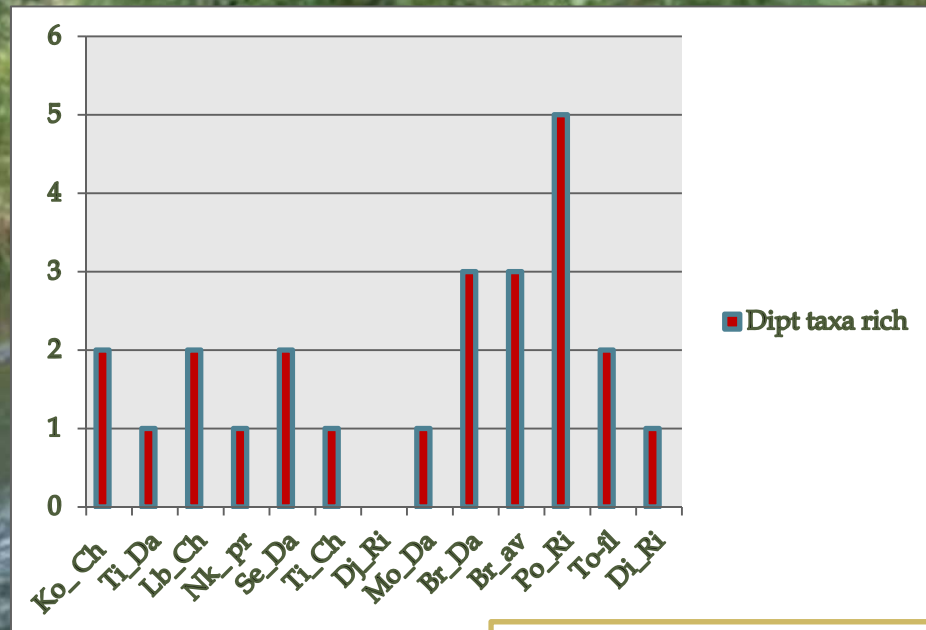
Benthic fauna composition in Burkina Faso



49 Insecta family in all

Results...

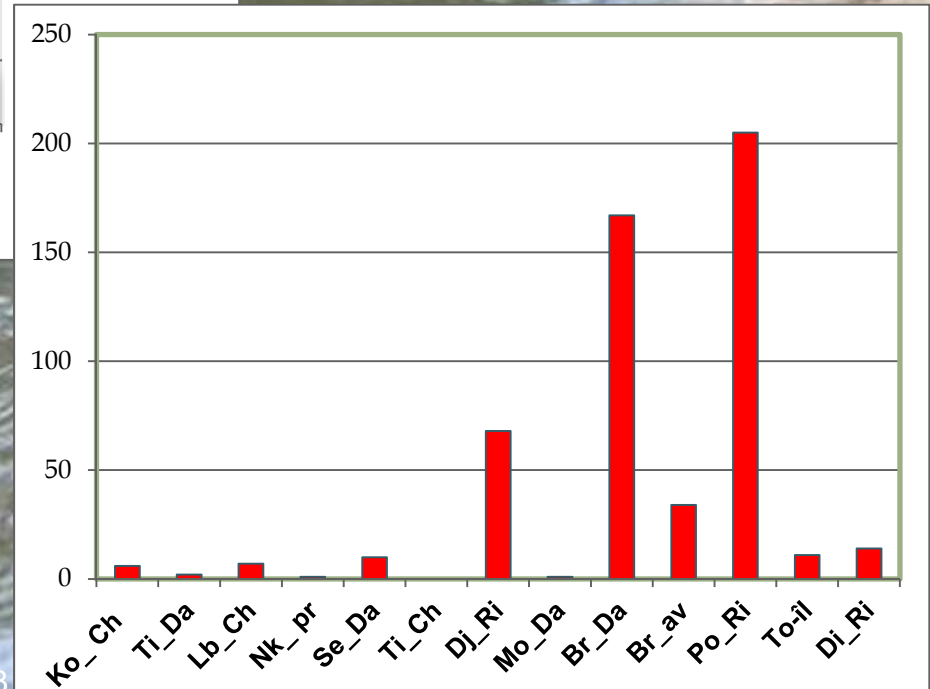
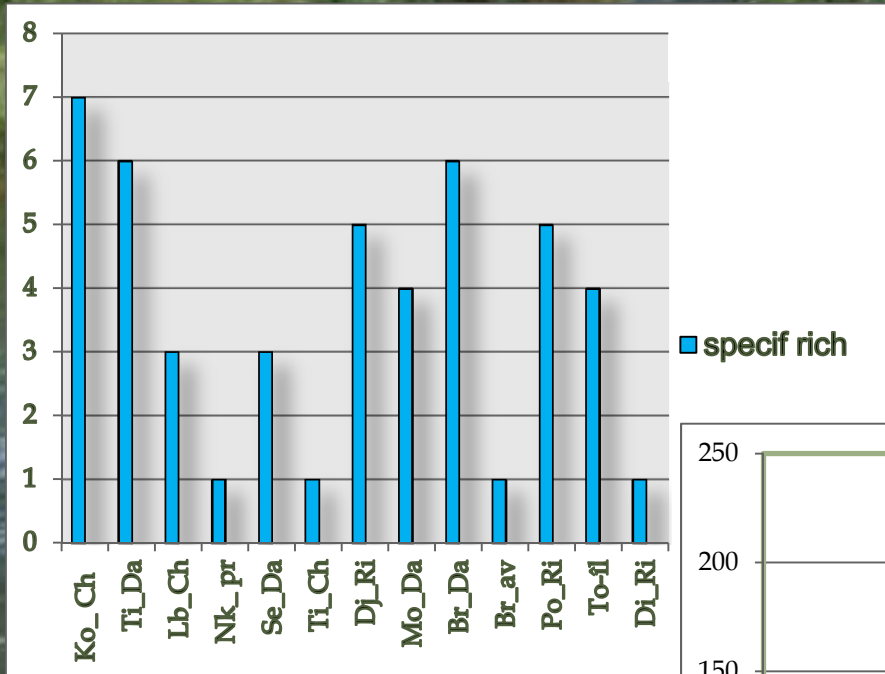
- Tabanidae Tabanus
- Syrphidae Eristalis
- Rhagionidae Atherix
- Simuliidae Simulium
- Culcidae
- Tipulidae
- Ceratopogonidae
- Stratomyiidae
- Chaoboridae Chaoborus
- Chironomidae



RESULTS...

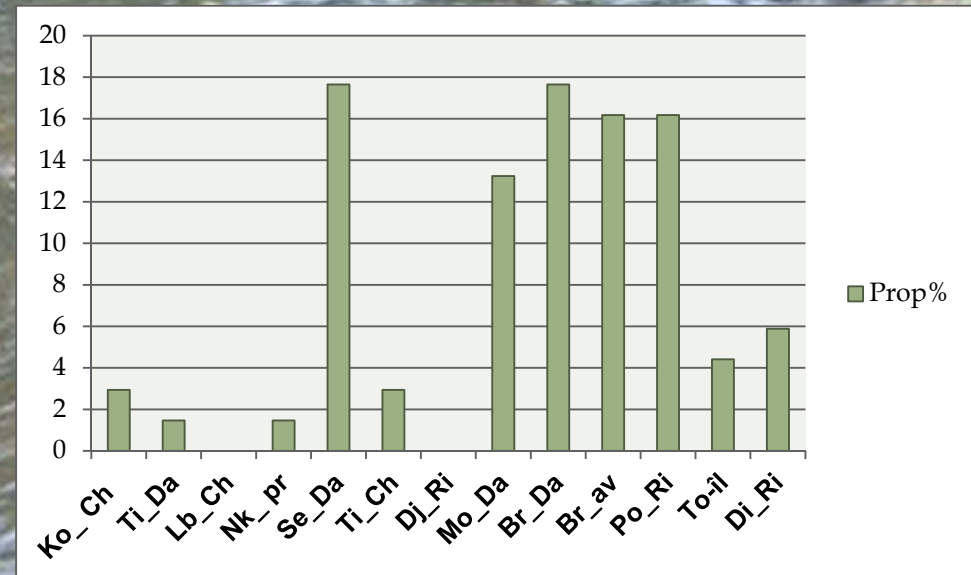
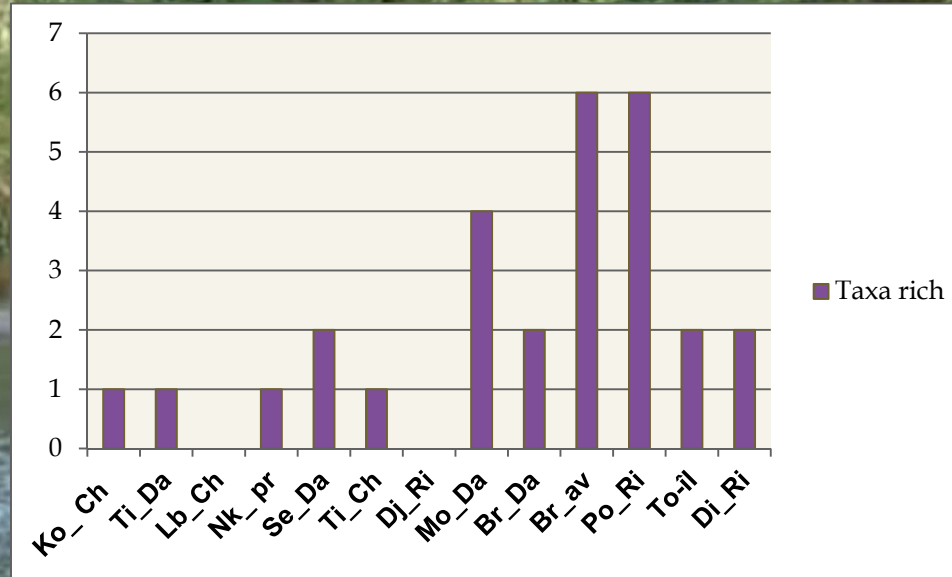
Molluscs: 712 specimens : 9 genera belonged to 17 species are identified.

- Sphaerium sp.
- Coelatura aegyptiaca
- Coelatura sp.
- Mutela rostrata
- Mutela sp.
- Lymnae natalensis
- Biomphalaria pfeifferi
- Biomphalaria sp.
- Bulinus senegalensis
- Bulinus camerunensis
- Bulinus forskali
- Bulinus globosus
- Bulinus jousseaumei
- Lanistes ovum
- Lanistes varicus
- Bellamyia unicolor
- Cleopatra bulimoïdes
- Cleopatra sp.
- Potamoda sp.

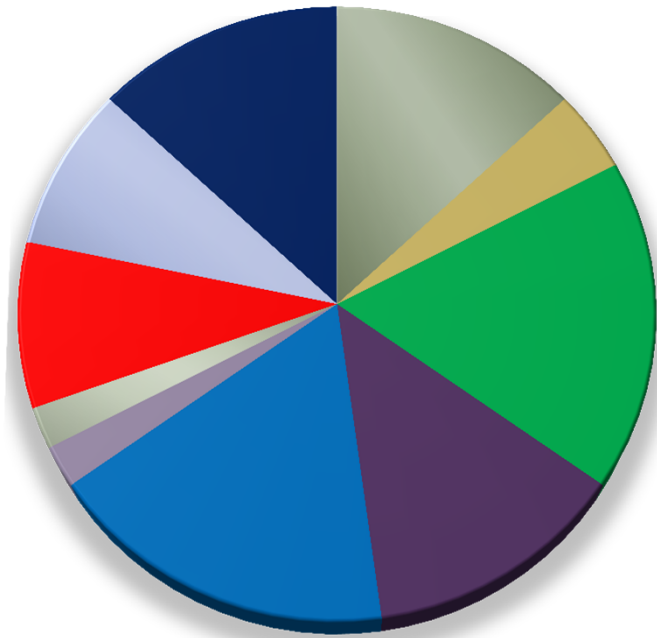


RESULTS...

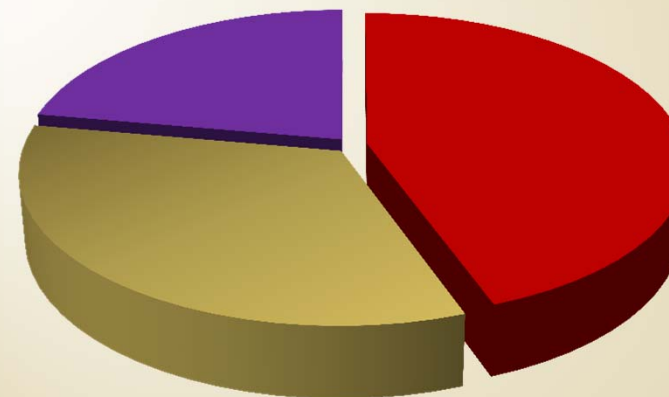
- Naucoridae Macrocoris
- Naucoridae Naucoris
- Corixidae Micronecta
- Notonectidae Anisops
- Pleidae Plea
- Belostomidae Limnogeton
- Belostomidae Belostoma
- Belostomidae Diplonycus
- Veliidae Microvelia
- Nepidae Laccotraphes
- Ranatridae Ranatra
- Hydrometridae Hydrometra
- Gerridae Limnogonus



Activities and sources pollution



- Fishing
- washing
- water abstraction
- cattles breeding
- Crops
- Sand abstracton
- Mining exploitation
- Bridges bult
- Dam bult
- Navigation



- Fertilizer
- Pesticides
- Wastes

Next step

- ❖ Identification is going on to high level with specialists
- ❖ **Working paper 1 : Distribution patterns of benthic fauna in Semi-arid country.**
- ❖ Courses
- ❖ Sampling 2014 and 2015
- ❖ **Article 2 : Water quality assessment pattern in sub-tropical freshwater (Burkina Faso).**

Parteners





THANKS FOR YOUR ATTENTION!