



Are freshwater Stoneflies (Plecoptera) in dangered in West African Sahel region?

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Introduction

- ❖ Stoneflies are valuable indicators of ecological health and play a crucial role in maintaining the biodiversity of West Africa, but the research on Stoneflies species are still very insipid and sparse
- ❖ The debates on stonefly families and species number currently suffer from lack of knowledge
- ❖ With ongoing freshwaters habitats fragmentation, severe environmental pollution combined to climate change,
- ❖ it is crucial to lead a large-scale study to understand on stonefly community structure for implementing effective conservation strategies to protect these fascinating stoneflies and their vital role in the ecosystem
- ❖ This study aims to provide deeper insights on the occurrence of stonefly in large scale including dryland Sahel areas, particularly in Burkina Faso.

Material & Methods

Study Area

- ❖ Burkina Faso is a tropical Sahelian country located in Central West Africa, with area of 27, 4200 km², and bordered by 06 countries.

- ❖ Burkina Faso is marked by wet and dry seasons.

- ❖ More than 20 Millions of people and high growth rate

- ❖ Riverine ecosystems in West Africa, particularly in Burkina Faso are impacted by multiples human pressures.

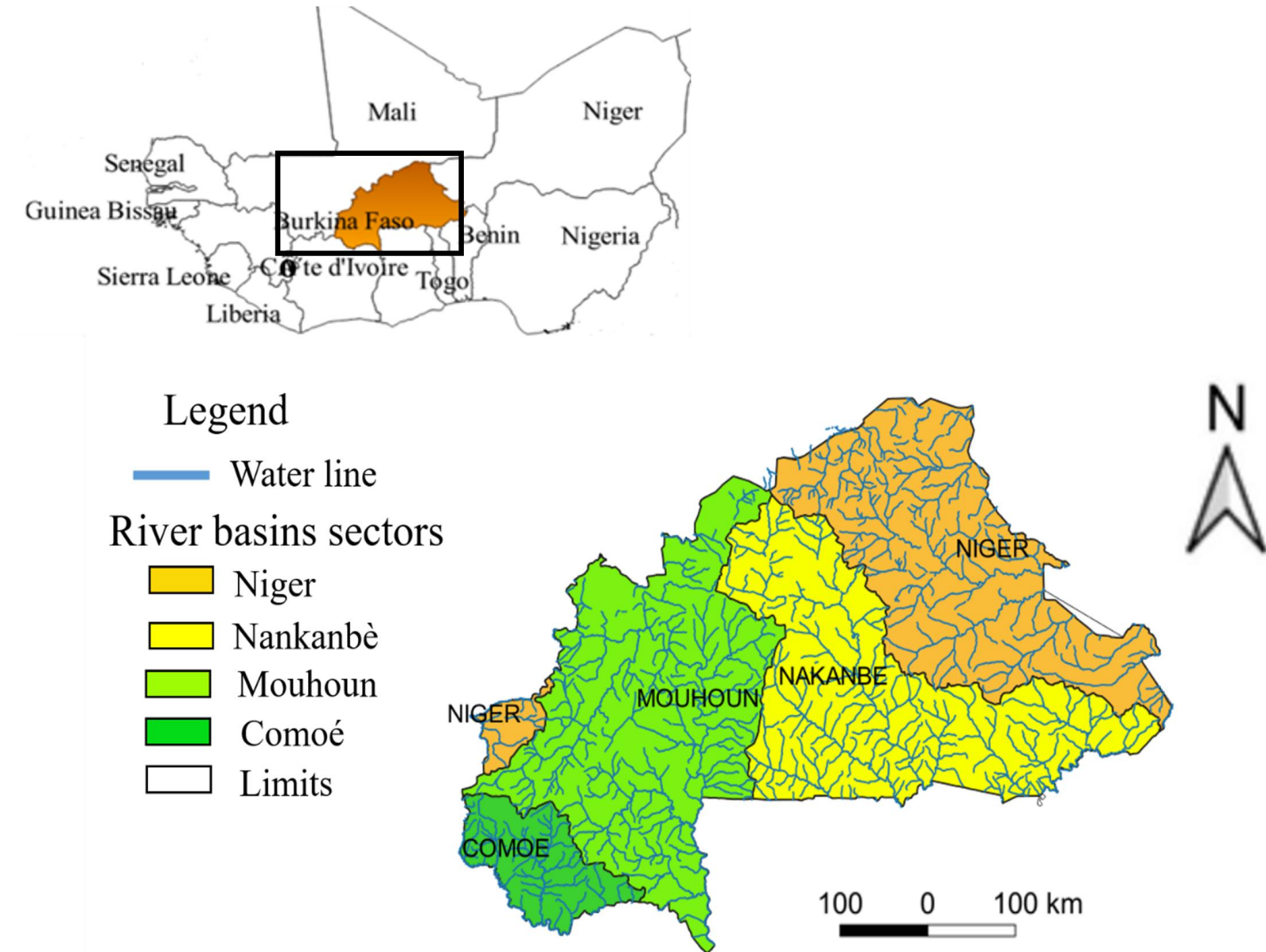


Figure 1 map of West Africa showing Burkina Faso location with its main river basins (Kabore et al. 2025).

Data collection and processing

Two wise steps were used to for data collection. Firstly, field data of Stoneflies fauna were gathered using a hand net (25 x 25cm, Mesh size 500µm), and sample were fixed in alcohol (70) labelled. In the laboratory, prior to sorting out the organisms, samples and the animals were identified with the dichotomic macroinvertebrates keys manuals. In addition, the relevant narrative literature review includes recent selected papers dealing with Stoneflies from other Ouest African countries were used

Results

Plecoptera families Afrotropical region

From our literature review, two large groups of stonefly including Eusthenioidea and Systellognatha are mostly distributed in Afrotropical area, and particularly in Western Africa region. The two large groups were represented by four families: Nemouridae, Notonemouridae, Perlidae and Perlodidae (Fig 2). But most species recorded in major basins, such as Niger, Senegal and Volta belong to the one family of Perlidae.

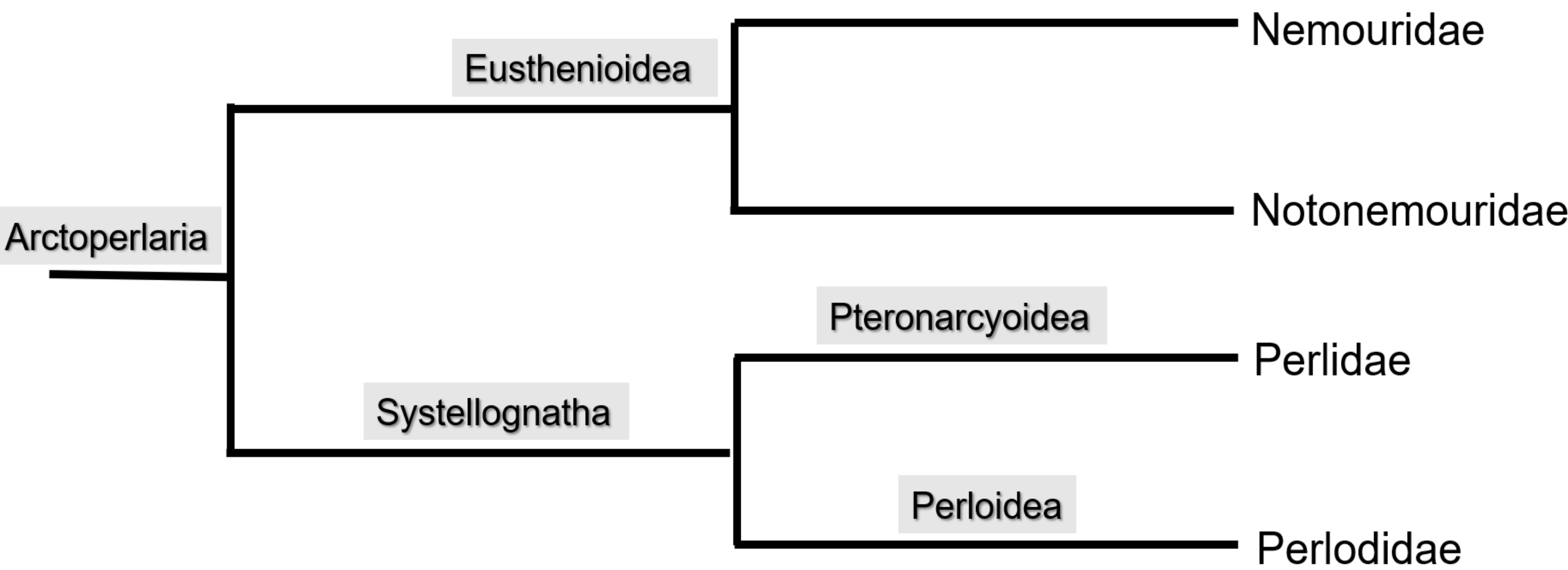


Figure 2 Plecoptera Phylogeny and family in Afrotropical region (adapted from Zwick, 2000)

Plecoptera families in West African regions

From detail analysis in West Africa region, two suspicious stoneflies families were reported: Nemouridae and Notonemouridae, but they are very poorly documented in many neighbor countries leading to misunderstanding.

The lack of clear information on these taxa and their originate speciation in the study area can lead to the confusion and needed to pay a particular attention (Fig 3).

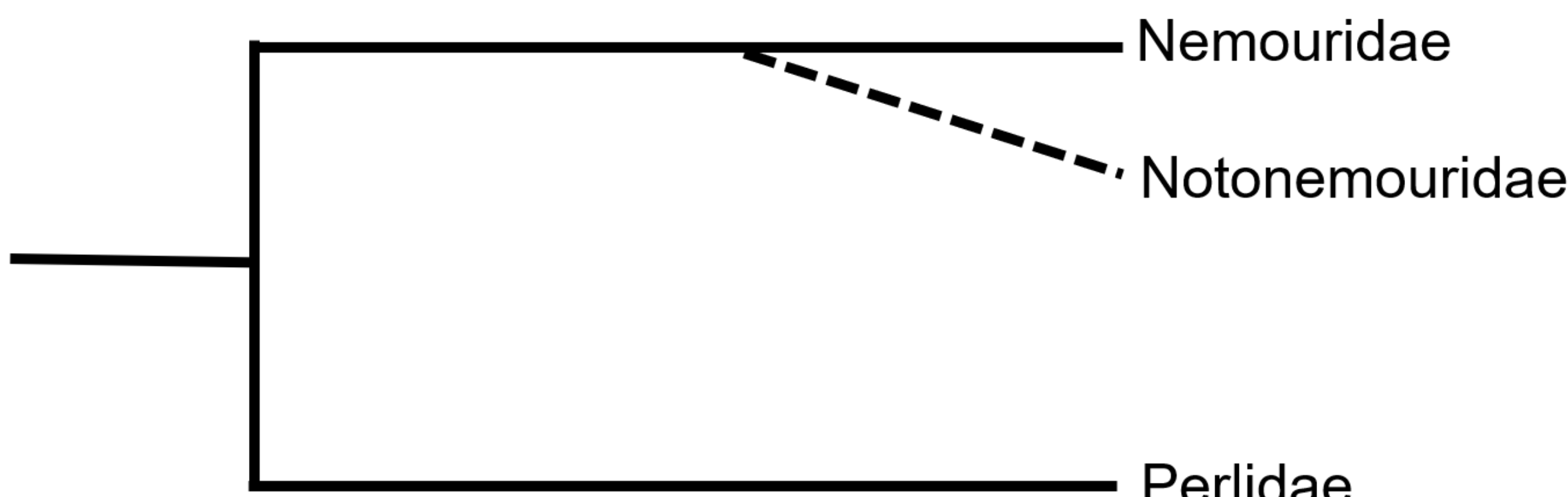


Fig 3 Plecoptera Phylogeny and family in Western Africa region (adapted from Zwick, 2000)

Thus, intensify researches on stonefly taxa in this area including genetic diversity major Western's Africa river basins including climate zones is crucial for clear understanding of taxa determination and species conservation planning in the whole region (Fig 4).

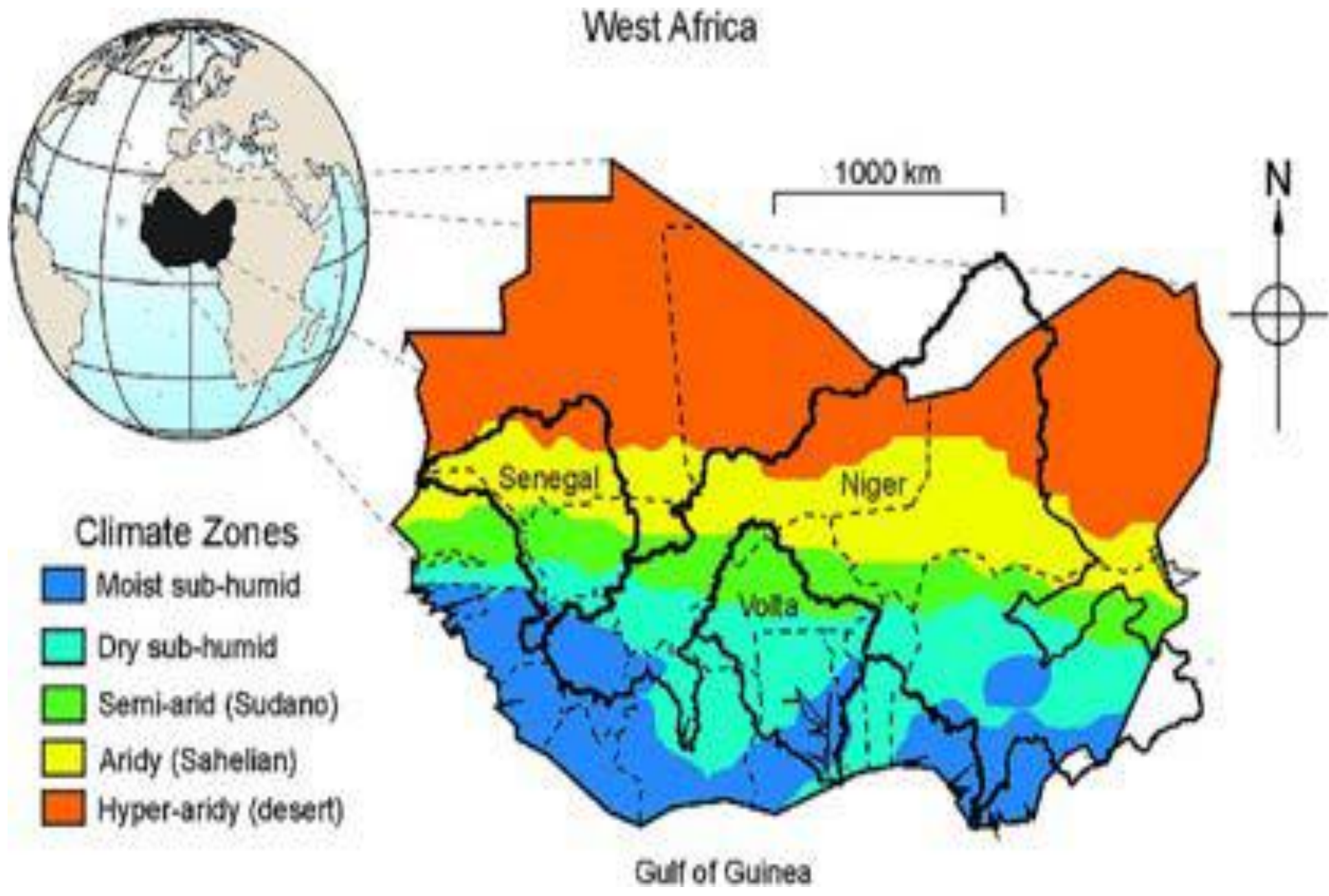


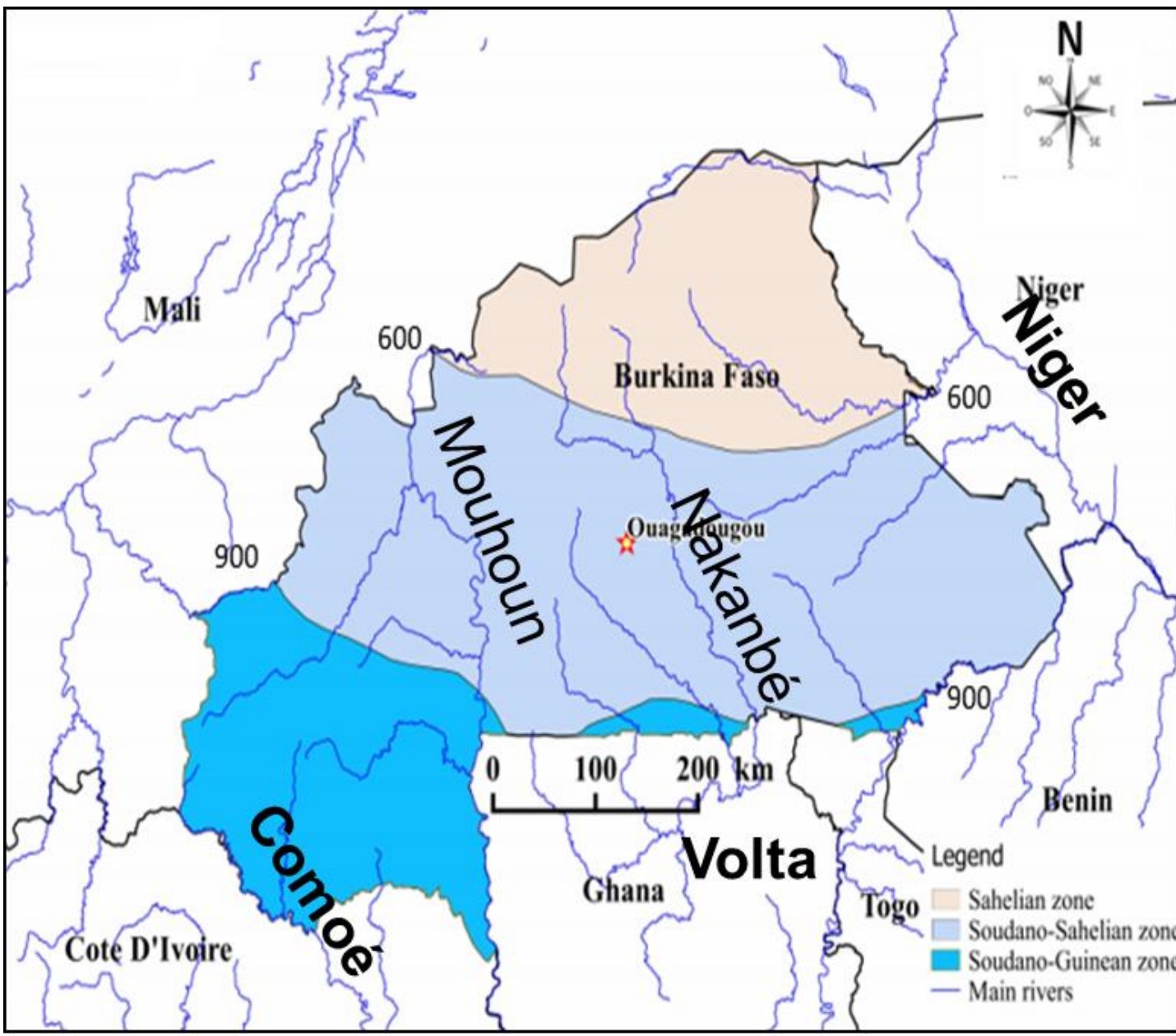
Fig 4 map of West Africa and its major river basins (i.e., Niger, Senegal, Volta) from rom Ferreira et al. (2019).

In Burkina Faso : decrease of relative abundances of Plecoptera

In Burkina Faso, a drastic decrease of Plecopteran is observed during the recent dedicate (Fig 5). Very few individuals of were reported in upper Mouhoun and Comoe from 2012 to 2024. But any individual of stonefly was not found in Nakanbé and Niger rivers (Fig 6).

However previous studies have revealed a high population of Perlidae in Nakanbé catchment due to the presence of suitable stream habitats, including vegetation and substrate. The same author have reported only one species of Perlidae (*Neoperla spio*).

From 2012, we have conducted intensive field works in the frame of Susfish and Susfish-Plus projects (<https://susfish.boku.ac.at/>) but we did not find any additional species up to now, worse, the individual's number of *Neoperla spio* were drastically decreased, and totally disappeared in nakanbé catchment.



Close look to crucial factors:

- ✓ Intensive land use, and protected areas clearing and drastic decreasing,
- ✓ water quality and suitable habitats degradation
- ✓ Increasing mining activities and industries
- ✓ Climate warmings and droughts

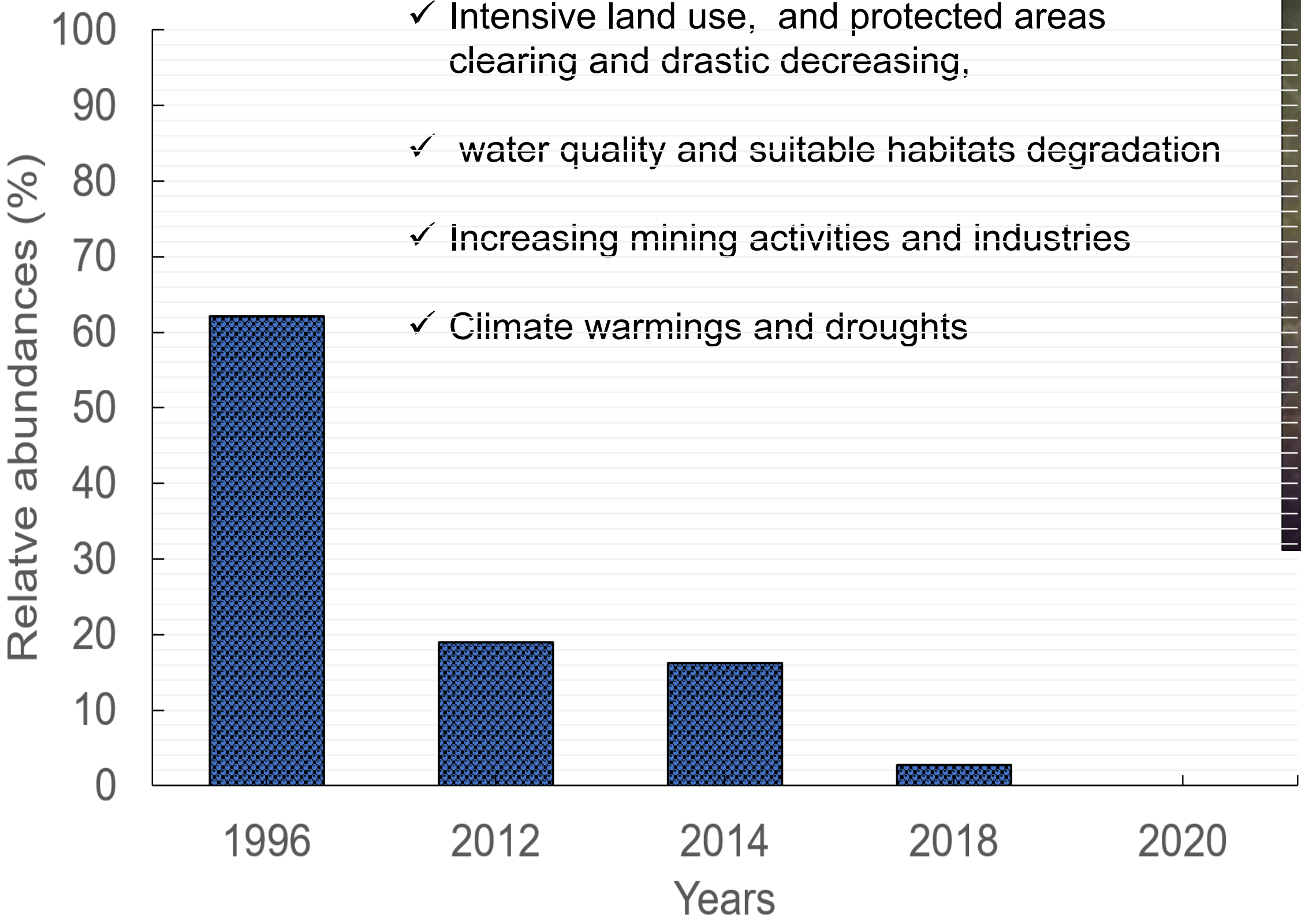


Fig 5 Burkina Faso' Water network, and Perlidae abundances variation from 1996 to 2020 in all catchments.



Conclusion

Understanding and conserving stonefly diversity in West Africa is essential for maintaining the health and resilience of freshwater ecosystems. By supporting research, promoting awareness, and taking action to protect their habitats, we can ensure the continued presence of these fascinating and ecologically important insects for future generations.