



First Data On Amphibia Inventory And Distribution (Ordre Des Anoura) In Northwestern Algeria (Tiaret Area)

Omar Yamina^{1*}, Abderrabi Khadidja¹, Mehdeb Djamilia³, Dahmani Walid¹, Safa Omar¹, Negadi Mohamed¹, Belaid Imane², Frerer Riyus Joan⁵, Camarasa Arboç Sebastia⁴, Ait Hammou Mohamed¹

¹Laboratory of Agro-biotechnology and Nutrition in Semi-Arid Areas. Faculty of Life and Natural Sciences, University of Tiaret, Departement of Ecology and Environment and Biotechnology, 14000, Tiaret, Algeria.

²University Ibn Khaldoun, Tiaret –Algeria-

³Biotechnology applied laboratory to agriculture and environmental preservation, Higher School of Agronomy, Mostaganem, 27000, Algeria.

⁴University of Lleida. Departement of Animale Production (Wild fauna) Av. Rovira Roure 191, 25198, Lleida

⁵Societat Catalana d'Herpetologia, Museu de Ciències Naturals de Barcelona. Museu Blau, Plaça Leonardo da Vinci 4-5, 08019, Barcelona.

*Corresponding Author: Omar Yamina

^{*}Laboratory of Agro-biotechnology and Nutrition in Semi-Arid Areas. Faculty of Life and Natural Sciences, University of Tiaret, Departement of Ecology and Environment and Biotechnology, 14000, Tiaret, Algeria, Email: yamina.omar@univ-tiaret.dz

Received: 02 Sept 2023
Revised: 16 Dec 2023
Accepted: 22 Dec 2023

Abstract

In the northwest of Algeria, we find the Tiaret area, which is characterized by a remarkable diversity of ecosystems, mainly composed of forests, scrub, cereal plain, steppe, a dune corridor, wetlands, Chott, Daya, dams, reservoirs of hill waters, ponds, wadis and cliffs. This diversity provides favorable and essential conditions for various species of amphibians that frequent this area with a semi-arid climate. The present work aims to carry out an inventory of amphibians in the Tiaret region, as well as their distributions in these various ecosystems.

We were able to inventory around 05 species of amphibians, distributed among 04 families and 01 order, distributed, in the different remarkable areas of the study region. Most of the species are frequent and abundant, cited in the bibliography (*Pelophylax saharicus*, *Bufo boulengeri*, *Sclerophrys mauritanica* and *Discoglossus pictus*); except for one species (*Hyla meridionalis*), which is very rare in our study area.

CC License
CC-BY-NC-SA 4.0

keywords: Tiaret, wetlands, diversity, Amphibians, species.

1. Introduction

The Tiaret region is located in the northwest of Algeria, it is characterized by various remarkable ecosystems, noting forests, maquis, steppe, wetlands, Daya, dams, hill water reservoirs, cereal plain, a dune corridor, temporary and permanent pools, temporary and permanent Chott wadis, and cliffs. This eco-landscape diversity offers micro-climates and conditions favorable to the development of exceptional and remarkable fauna.

The works on the herpetological fauna in Algeria and in the Tiaret area is still rare and occasional. Some works which affected certain regions, include Doumergue (1901) on the herpetofauna of Oranie areas and Schleich et al. (1996) who worked on the study of reptiles and amphibians in North Africa. For the Tiaret region, only one study has been published by Ferrer et al. (2015), relating to the study of the herpetofauna of the Tiaret region and surrounding areas.

The main objective of this preliminary work, is to carry out an inventory and distribution of amphibians species throughout the Tiaret region, this is how, we start with prospecting on the area, to carry out a sampling for all the sites and biotopes of this semi-aride region;

The following sub-objectives were targeted:

- Distribution of amphibians in the study region;
- Inter- and intra-specific relationships of the recorded amphibian's species;
- Relationships between the inventoried amphibians and the main environments sampled.

2. Material and methods

The present work tooks approximately 8 years, from 2008 to 2015; during this period, all homogeneous and heterogeneous zones were sampled, throughout the territory of the study region.

This is how we proceeded as follows:

- **Choice of site:** All sites sampled during the conduct of this study, were chosen subjectively, based on the knowledge and the experience of the researcher.
- **General information on the site:** Geographical location (latitude, longitude and altitude), orientations (north, south, west and east), type of forest or steppe, absence or presence of water; was noted, the extract relationship of this fauna and the environmental characteristics.
- **Sampling:** the sampling method developed during this study is the subjective; since it seemed to us the most reliable, to inventory all the amphibians in the study area.

2.1. Amphibian sampling

In order to better understand the composition of amphibians in our study area, the method consists of surveying the ground, by walking at a slow speed, in order to see and locate the species of amphibians, in their natural shape; also we used fish nets, for checking and capturing species (Adults and larva) underwater. A search among the bushes, under the stones was carried out or by hearing their noise while fleeing into the waters.

2.2. Photography

Each captured individual is photographed in its environment. These photos will be used for the identification of species with the identification guides which concern North Africa and Europe, according to the criteria of each species. Several cameras were used (Canon 400D, Canon 600D and Nikon P900)

2.3. Identification

For identification, we used the determination guides of Bons and Geniez, (1996); Bons, (1959, 1967); Bons and Girot, (1962); Schleich et al., (1996). Certain species that were difficult for and good identification were the subject of genetic analysis at the laboratory of the University of Lleida, Spain.

2.4. Study area

Located in the northwest of Algeria, in the highlands, the Tiaret region is limited to the north by the Tellien Atlas, to the south the steppe; dotted by cereal plains, which are found from north to south. Thus a remarkable mountain range, located to the south east of this region, the mountain range of Nador, characterized by specific vegetation and climate.

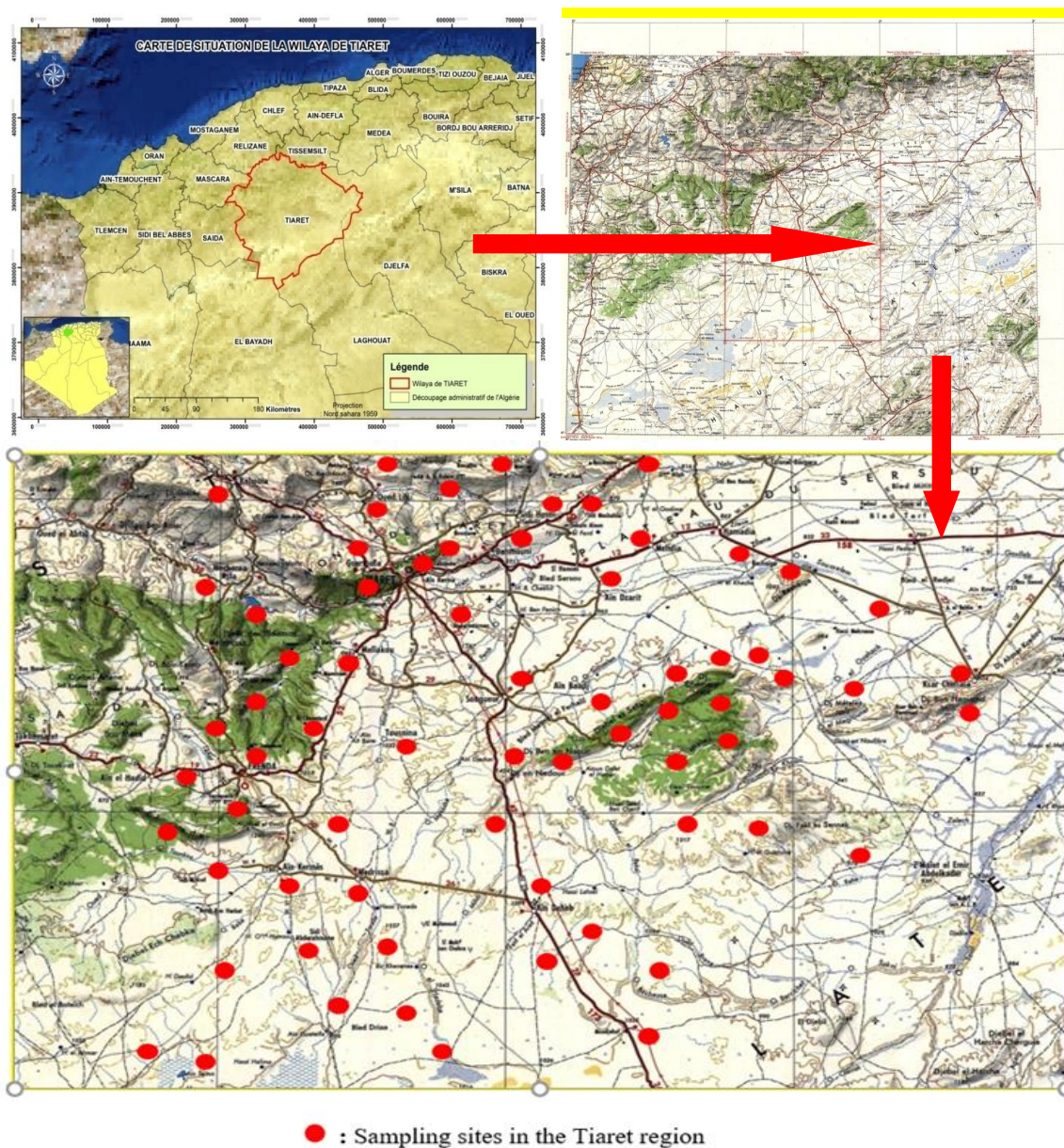


Figure 1: Geographical location of the Tiaret region and the sampling stations

3. Results

After a long field survey, about 8 years of work, we were able to inventory approximately 5 species of amphibians. Following these results obtained, we can deduce that the Tiaret region is rich and diverse, in terms of specific diversity of amphibians, also according to their distribution in the different biotopes, namely forests, steppe, wetlands, etc.

3.1. List of amphibians inventoried in the Tiaret region:

Only one order with 4 families and 05 species were inventoried in the Tiaret region. The names of the species encountered are mentioned in the following table:

Table 1: list of amphibian species inventoried in the Tiaret region

N°	Class	Order	Family	Gender	Latin name
1	Amphibia	Anoura	Bufonidae	Bufotes	<i>Bufotes boulengeri</i>
2				Sclerophrys	<i>Sclerophrys mauritanica</i>
3			Discoglossidae	Discoglossus	<i>Discoglossus pictus</i>
4			Ranidae	Pelophylax	<i>Pelophylax saharicus</i>
5			Hylidae	Hyla	<i>Hyla meridionalis</i>

3.2. Structure of inventoried amphibians

➤ Amphibian families

Following the histogram in Figure 03, we note that the Bufonidae family is the highest, with 2 species recorded, so 40% of the total of the population, the rest of the families Discoglossidae, Ranidae and Hylidae, are represented only by 01 species, with 20% each one.

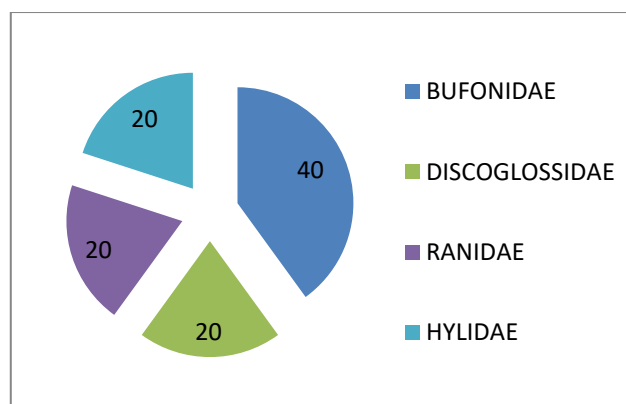


Figure 2: Proportion of amphibian families in the Tiaret region

➤ Amphibian species

The amphibian species inventoried in our study area, as well as their abundance-dominances, are mentioned in tab. 02. The most abundant species, with an number exceeding 100 specimen by sites and founded in the majority of sampled sites, those are *Pelophylax saharicus*, *Sclerophrys mauritanica* and *Bufotes boulengeri*. The moderately abundant species, whose numbers of individuals are high per site, but which are only found in half of the sites surveyed, are *Discoglossus pictus*. Finally, a single rare species, encountered in only two sites, we speak of *Hyla meridionalis*.

Table 2: Abundance-dominance of amphibians species in the Tiaret region

Latin Name	Abundance-dominance
<i>Pelophylax saharicus</i>	05
<i>Sclerophrys mauritanica</i>	05
<i>Discoglossus pictus</i>	04
<i>Bufotes boulengeri</i>	05
<i>Hyla meridionalis</i>	02
Very abundant species	5
Moderately abundant species	4
Species located	3
Rare species	2
Species represented by 1 individual	1

3.3. Distribution of Amphibians on the sampled sites

Distributions of amphibians recorded in the Tiaret region are illustrated in the table below.

We note that the species *Sclerophrys mauritanica*, *Bufotes boulengeri* and *Pelophylax saharicus* are the most abundant, they are found in the majority of the sites sampled, for the species *Sclerophrys mauritanica*, witch is absent from some regions, such as Ain-Dheb, Rosfa and Naima; *Bufotes boulengeri* is absent from the regions of Mahdia, Oued-Lili, Rechaiga, Sebain, Sidi-Bakhti, Tagdemt and Tousnina ; while *Pelophylax saharicus* is absent from Ain-Dheb, Chehaima, Rosfa, Faidja, Naima and Rechaiga.

A single species is moderately abundant, *Discoglossus pictus* which is present in half of the sampled sites, we can find it in the regions of Ain-Bouchekef, Bougara, Dahmouni, Frenda, Mechraa-Sfaa, Oued-Lili, Sebain, Sidi-Bakhti, Sidi-Hosni and Tiaret.

The rarest species in our area is *Hyla meridionalis*, we only encountered it in 3 sites, Dahmouni, Tiaret and Tousnina.

Table 3: Distribution of amphibians sampled in different states of Tiaret

° Z	Latin name																														
		AIN-BOUCHEKIF	AIN-DHEB	AIN-KERMES	BOUGARA	CHEHAIMA	DAHMOUNI	ROSA	FAIDJA	FRENDA	GUERTOUSA	KSAR-CHELLALA	MAHDIA	MECHRAA-SFAA	MEDRISSA	MELAKOU	NADORAH	NAIMA	OUED-LILI	RAHOUIA	RECHAIGA	SEBAIN	SL-ABDELGHANI	SID-ABDERRAHMANE	SID-BAKHTI	SID-HOSNI	SOUQUEUR	TAGDEMT	TIARET	TOUSNINA	TAGUINE
1	<i>Bufoetes boulegeri</i>	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	0	1	0	1
2	<i>Sclerophrys mauritanica</i>	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	<i>Discoglossus pictus</i>	1	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	
4	<i>Pelophylax saharicus</i>	1	0	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	
5	<i>Hyla meridionalis</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

1 : Present 0 : Absent

3.4. Distribution of reptile species according to different types of environments

Following the factorial correspondence analysis (FCA) below, we note that there have 03 groups of the Amphibians class; of which they have direct relationships with the types of biotope where they live:

- **The first group**, composed of the following species: *Sclerophrys mauritanica*, *Pelophylax saharicus* and *Discoglossus pictus*, these species frequent the same biotopes, temporary and permanent ponds, temporary and permanent wadis; in the northern part of the Tiaret region;
- **The second group**, includes the species *Hyla meridionalis*; being the rarest species in our study, it's only found in two places, in the north between Tiaret city and Dahmouni city (Ouled Bouhaddou hillside water reservoir) and in the south in the cereal plains in Tousnina;
- **The third group**, including *Bufoetes boulegeri*, this species was encountered in almost the entire steppe region, and only a few stations to the north of the study area.

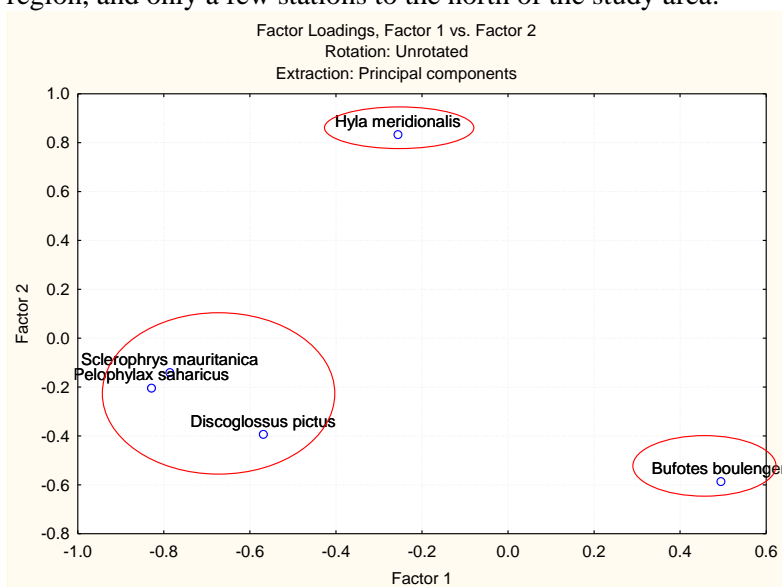


Figure 3: FCA of the distribution of Amphibians species according to different types of biotopes

3.5. Rare and occasional species

During this work, only one species, being rare, in the region was observed, we speak of *Hyla meridionalis*, a green anuran, which we observed it only twice, with a population who does't exceeds 30 individuals. This

species was encountered in the Dahmouni region, precisely in the locality of Ouled Bougheddou hillside water reservoir, and another observation was made in the cereal plain of the Tousnina region (in the vegetable crops).

Conclusion

Being a vast country, which is characterized by remarkable ecosystem diversity, Algeria has several types of ecosystems, the coastline in the north, the high plateaus and the Tell Atlas in the center, the steppe plain which separates the north from the Saharian Atlas and finally the great Sahara (Hamada, reg and erg). Works on herpetofauna in Algeria is rare and occasional.

In Tiaret region, studies are still increasingly rare, it still remains virgin on studies of fauna and especially regard to herpetofauna in particular. This is why we start a study on this little-known group.

The study of amphibians in the Tiaret region, was carried in approximately 8 years of field work (from 2008 to 2015), during this period several field trips, throughout the year, were carried out (winter, spring, summer and autumn). Around 5 species have been recorded in this virgin area.

Several sites were sampled, composed of a multitude of ecosystems, complete and remarkable; namely, the Aleppo pine forests, holm oak forests, prickly cedar forests, Atlas pistachio forests, cliffs, cereal farming, permanent and temporary wadis, temporary and permanent ponds, reservoirs hill waters, dams, chott, steppes, hamada and dunes, the cereal plain, temporary and permanent wadis, cereal farming, dams, hill water reservoirs, alpha steppe and steppe *Artemisia herba helba*.

The sampling method used was the subjective, since it seemed to us the most reliable, according to the experience and the knowledge of the researcher. So, a slow walk was carried out, in order to see or hear the amphibians in their natural environments; we also used fish nets to capture adults and larva of amphibian in ponds and wadis.

In total of 05 species of amphibians, reparted over 4 families and 1 order, have been recorded. According to the work of Bons and Geniez (1996); Bons (1959) and (1967); Bons and Girot (1962); Schleich *et al.* (1996), all species have been previously recorded. Only one species is rare in the region, *Hyla meridionalis* with only two observation points.



Sclerophrys mauritanica



Bufotes boulengeri



Discoglossus pictus



Pelophylax saharicus



Hyla meridionalis

Bibliographic references

1. **Bons J. et Geniez P., 1996** – Amphibiens et reptiles du Maroc (Sahara occidental compris) Atlas biogéographique. Association Herpétologica Espanola. Barcelona. 319p.
2. **Bons J. et Girot B., 1962** - Clé illustrée des reptiles du Maroc. *Int. Sci. Cherifien Rabat. N°26*. 66p.
3. **Bons J., 1959** - Les lacertiliens du Sud-ouest Marocain. Systématique, Répartition géographique, Ethologie, et Ecologie. *Fac. Scie. Maroc. N° 18*. 130p. Bons, 1967.
4. **Doumergue, F. 1901** – Essai sur la faune erpétologique de l'Oranie avec des tableaux analytiques et des notions pour la détermination de tous les reptiles et batraciens du Maroc, de l'Algérie et de la Tunisie. Oran, Algérie, L. Fouque.
5. **Schleich H. H., Kästle W. et Kabisch K., 1996** – amphibians and reptiles of North Africa. Koletz Scintific Books, Koenigstein. 630p. Heim de balsac (1936).