
Rapid assessment of cave-dwelling bat diversity in the Chebket ES–Sellaoua Mountains (Eastern Algeria)

Y. Mokrani, F. Mimeche, Y. Nouidjem, M. Saheb

Mokrani, Y., Mimeche, F., Nouidjem, Y., Saheb, M., 2018. Rapid assessment of cave-dwelling bat diversity in the Chebket ES–Sellaoua Mountains (Eastern Algeria). *Arxius de Miscel·lània Zoològica*, 16: 112–120.

Abstract

Rapid assessment of cave-dwelling bat diversity in the Chebket ES–Sellaoua Mountains (Eastern Algeria). Information about the ecology and lifestyle of bats (Chiroptera) in Algeria is scarce. In this paper, we present the results of an inventory study of Chiroptera fauna in the Chebket ES–Sellaoua Mountains in Eastern Algeria, conducted between January 2014 and December 2015. Surveys were carried out in 10 caves throughout the region by means of a visual survey and animal captures. Five species were detected: *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Myotis punicus*, *Miniopterus schreibersianus* and *Pipistrellus kuhli*, belonging to three families: Rhinolophidae, Miniopteridae and Vespertilionidae.

Data published in Mendeley ([doi:10.17632/vh83vg9n9j.2](https://doi.org/10.17632/vh83vg9n9j.2)).

Key words: Bats, Caves, Inventory, Chebket ES–Sellaoua, Algeria

Resumen

Valoración rápida de la diversidad de murciélagos que habitan las cuevas de las montañas de Chebket ES–Sellaoua (este de Argelia). La información sobre la ecología y hábitos de vida de los murciélagos de Argelia es muy limitada. Este trabajo recoge los resultados de un estudio realizado para inventariar la fauna de quirópteros de las montañas de Chebket ES–Sellaoua (este de Argelia) entre enero de 2014 y diciembre de 2015. Las prospecciones incluyeron observaciones visuales y capturas de especímenes. Se identificaron cinco especies, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Myotis punicus*, *Miniopterus schreibersianus* y *Pipistrellus kuhli* pertenecientes a tres familias, Rhinolophidae, Miniopteridae y Vespertilionidae.

Datos publicados en Mendeley ([doi:10.17632/vh83vg9n9j.2](https://doi.org/10.17632/vh83vg9n9j.2)).

Palabras clave: Murciélagos, Cuevas, Inventario, Chebket ES–Sellaoua, Argelia

Resum

Valoració ràpida de la diversitat de ratpenats que habiten les coves de les muntanyes de Chebket ES–Sellaoua (est d'Algèria). La informació sobre l'ecologia i els hàbits de vida dels

ratpenats d'Algèria és molt limitada. Aquest treball recull els resultats d'un estudi destinat a inventariar la fauna de quiròpters de les muntanyes de Chebket ES–Sellaoua (est d'Algèria) entre gener de 2014 i desembre de 2015. Les prospeccions van incloure observacions visuals i captures d'espècimens. Es van identificar cinc espècies, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Myotis punicus*, *Miniopterus schreibersi* i *Pipistrellus kuhli* pertanyents a tres famílies, Rhinolophidae, Miniopteridae i Vespertilionidae.

Dades publicades a Mendeley ([doi:10.17632/vh83vg9n9j.2](https://doi.org/10.17632/vh83vg9n9j.2)).

Paraules clau: Ratpenats, Coves, Inventari, Chebket ES–Sellaoua, Algèria.

Rebut: 04/10/17; Conditional acceptance: 03/01/18; Final acceptance: 28/05/18

Yassmina Mokrani & Menouar Saheb, Dept. of Natural and Life Sciences, Univ. of Oum El-Bouaghi, Oum El-Bouaghi, Algeria.– Fateh Mimeche, Dept. of Agricultural Sciences, Fac. of Sciences, Univ. of M'sila, M'sila, Algeria.– Yassine Nouidjem, Dept. of Natural and Life Sciences, Fac. of Sciences, Univ. of M'sila, M'sila, Algeria.

Corresponding author: Fateh Mimeche. E-mail: mimechefateh@gmail.com

Introduction

Bats (Chiroptera) are a diverse mammal order that is unified by the ability to fly (Banfield et al., 1977; Tremblay and Jutras, 2010). Most bats are nocturnal, resting during the day and becoming active at night. They commonly roost in cracks in rock walls, in cliffs or old walls, in hollow trees, caves, old mines and nooks of buildings such as granaries (Dietz et al., 2009). Besides specific locations (López–Baucells et al., 2012), bats have been studied in North African countries such as Morocco (Laurent, 1937; Panouse, 1951; Strinati, 1953; Brosset, 1955; Hill, 1964; Dieuleveut et al., 2010), Tunisia (Deleuil and Labbe, 1955; Aellen and Strinati, 1970; Baker, 1976), and Libya (Hufnagel and Craig-Bennett, 1972; Benda et al., 2004) (Ahmime, 2017).

Algerian bats have been the subject of work by Laurent (1944), Anciaux de Favaux (1976), Gaisler (1983), Kowalski and Rzebik–Kowalska (1991), who established an initial list of species and reported the existence of 26 species of bats; and Ahmime and Moali (2013). The Chiroptera reported from Algeria belong to the Palaearctic region (Corbet, 1978).

However, knowledge of this fauna is relatively poorly in Eastern Algeria. In the present study, we provide a new check list of bats found in caves of Chebket ES–Sellaoua in Eastern Algeria over two consecutive years.

Material and methods

Study area

Located in the eastern part of the Algeria, the Chebket ES–Sellaoua Mountains are situated in the region of AinArko (Municipality of Tamlouka) in the province of Guelma; geographic coordinates being 36° 5' 28" N and 7° 6' 52" E (fig. 1).

The area has a semi–arid Mediterranean climate that is typically continental. It is located in the region of high plains and has a medium altitude that exceeds 800 m. The annual rainfall rate is 501.0 mm and the average temperature is 14.1°C. The nature of the rock is

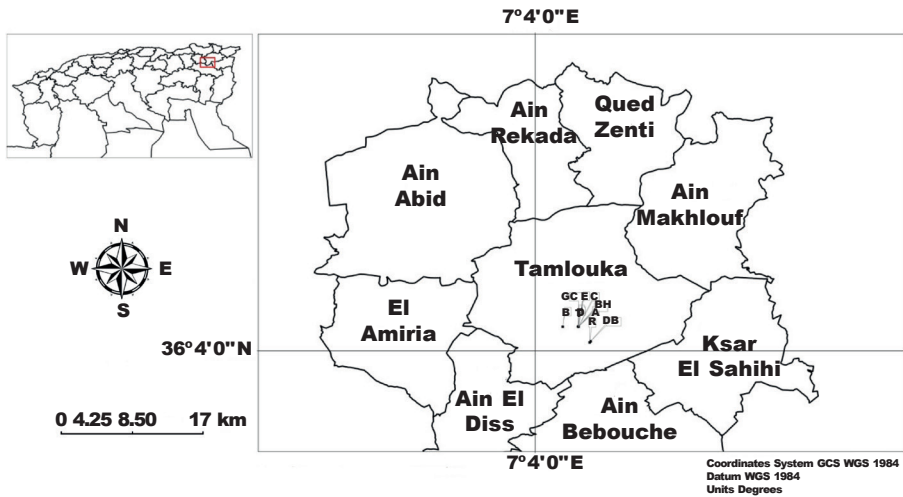


Fig. 1. Map of study area in the eastern part of the Algeria. Cave name and codes: A, Bouchadjra; B, Bouchkara; BH, Bouhadjra; C, Zone n° 4; D, Dhib; DB, El Dharbane; E, Zone n° 8; GC, Gaz Carbonique; R, El Rmel; T, Thour.

Fig. 1. Mapa del área de estudio en la región oriental de Argelia. (Para el nombre de las cuevas y sus códigos, véase arriba.)

calcareous (rich in zinc), and the mountains are home to a number of plants; particularly *Artemisia herba alba*, *Asteraceae asterales*, *Zizyphus vulgaris*, *Thymelaea hirsuta* and *Olea europaea*.

Data acquisition and statistical analysis

Bats were studied using common techniques such as mist-netting, hand-netting, flip-netting, and observation in buildings and underground sites (Puechmaile et al., 2012). Two methods were mainly used to trap bats. The first was based on capturing bats in flight by means of a mobile trap (this device consists of a handle of 1.20 m long, to which is attached a fixed and rigid metal ring of 35 cm diameter connected to a net). The second method was hand-netting. We used the identification keys of Dietz and Von Helversen (2004), Dietz (2005) and Dieuleveut et al. (2010).

The captures were made in caves in the Chebket ES–Sellaoua Mountains (table 1) between January 2014 and December 2015 at intervals of one or two months. There are more than 20 caves in the study area, ten of which are inhabited by bats. These caves were excavated in 1873 by French companies conducting mining research during the colonial period, and official mining began in August 1905 with the creation of the Zinc Mining Society of Ain Arko (fig. 2). All visits were carried out for at least four hours, in calm weather, with little or no wind, and no rain in the morning.

Table 1. Caves characteristics: Lat, latitude; Long, longitude; A, altitude (in m); L, Length (in m); H, height (in m).

Tabla 1. Características de las cuevas: Lat, latitud; Long, longitud; A, altitud (en m); L, longitud (en m); H, profundidad (en m).

Site	ID	Lat	Long	A	L	H
El Dharbane	DB	N: 36° 04' 36.8"	E: 07° 07' 35.4"	896	350	1.85
El Rmel	R	N: 36° 04' 32.4"	E: 07° 07' 31.5"	886	400	2
Dhib	D	N: 36° 05' 33.1"	E: 07° 06' 47.7"	800	450	1.5
Bouchadjra	A	N: 36° 05' 33.7"	E: 07° 06' 47"	821	800	1.5
Bouchkara	B	N: 36° 05' 33.2"	E: 07° 05' 47"	819	550	1.8
Thour	T	N: 36° 05' 33.7"	E: 07° 06' 47.1"	822	30	1.5
Zone n° 4	C	N: 36° 05' 33.8"	E: 07° 06' 48.6"	823	120	1.5
Gaz Carbonique	GC	N: 36° 05' 33.9"	E: 07° 06' 46.8"	823	550	1.60
Zone n° 8	E	N: 36° 05' 34.1"	E: 07° 06' 48.3"	824	26	1.5
Bouhadjra	BH	N: 36° 05' 33.1"	E: 07° 06' 48.3"	806	4.5	1.30



Fig. 2. Cave Dhib (D).

Fig. 2. Cueva Dhib (D).

Table 2. Data on bats detected in Chebket ES–Sellaoua Mountains (2014–2015). M, method of identification: * capture; ** visual. See table 1 for the cavity codes. IUCN, IUCN Red List conservation status: LC, Least Concern; NT, Near Threatened; DD, Data Deficient.

Tabla 2. Datos sobre murciélagos detectados en las montañas Chebket ES–Sellaoua (2014–2015). M, método de identificación: * captura; ** visual. Véase la tabla 1 para los códigos de las cavidades. IUCN, estado de conservación según la Lista Roja de la UICN: LC, preocupación menor; NT, casi amenazadas; DD, datos insuficientes.

Species	Cavity	Indiv.	Date	M	IUCN
<i>Rhinolophus hipposideros</i>	A	1	11/01/2014	*	LC
<i>Rhinolophus ferrumequinum</i>	T	2	15/05/2014	*	LC
<i>Pipistrellus kuhlii</i>	D	2	13/05/2015	*	LC
<i>Miniopterus schreibersii</i>	GC	3	20/02/2014	*	NT
<i>Myotis punicus</i>	DB	105	02/01/2014	**	DD
	R	nearly 2,000	16/01/2014	**	DD
	B	45	05/10/2014	**	DD
	C	27	18/05/2015	**	DD
	E	5	13/07/2015	**	DD
	BH	5	14/08/2015	*	DD
	D	37	03/05/2015	**	DD

Results and Discussion

This study is the first to evaluate bats occurring in Chebket ES–Sellaoua Mountains (eastern Algeria). A total of ten sites were visited during the study period. Three families were observed in this region: Vespertilionidae (two species), Rhinolophidae (two species), and Miniopteridae (one species). The five species were: *Myotis punicus*, *Pipistrellus kuhlii*, *Rhinolophus ferrumequinum*, *R. hipposideros*, *Miniopterus schreibersii* (table 2; Mendeley dataset: [doi:10.17632/vh83vg9n9j.2](https://doi.org/10.17632/vh83vg9n9j.2)). All species detected are cited as Endangered Species on the Red List of IUCN (IUCN, 2018), and are protected at the national level by Decree No. 12–235 of 24 May 2012 establishing the list of protected non-domestic animal species (Joradp, 2012).

Myotis punicus (Felten, Spitzenberger and Storch, 1977), the Maghrebian mouse-eared B

The most abundant species was *Myotis punicus*. It was found in seven caves (fig. 3). The area of distribution is wide, ranging from the littoral coasts to the south of the Saharan Atlas (Ahmime, 2017). It is the most frequently observed species in Algeria according to Aulagnier and Thévenot (1986). This species was reported by Ahmime (2014) at Aokas and Souk El Thenine (littoral coasts) with a relative abundance of 24.35%. It was observed throughout the study period with maximum numbers during the hibernation period in winter (January 2014) because this area provides ideal conditions (very high humidity, low temperature, no disturbance) (table 2).



Fig. 3. Specimen of *Myotis punicus*.

Fig. 3. Espècimen de *Myotis punicus*.

Pipistrellus kuhlii (Kuhl, 1819)

Pipistrellus kuhlii was seen only in Dhib cave with *M. punicus* (fig. 4). This bat was previously considered as being two distinct species, *P. deserti* and *P. kuhlii*, but the recent work of Ahmime (2014) showed that it was ultimately Kuhl's pipistrelle. This species is encountered from the littoral coasts to the central and western part of the Sahara. It is a known species in the south (Ahmime, 2017).

Rhinolophus ferrumequinum (Schreber, 1774)

Two individuals of *Rhinolophus ferrumequinum* were observed in the Thour cave (fig. 5). This species is a common species in northern Algeria, found from the littoral coasts to



Fig. 4. Specimen of *Pipistrellus kuhlii*.

Fig. 4. Espècimen de *Pipistrellus kuhlii*.



Fig. 5. Specimen of *Rhinolophus ferrumequinum*.

Fig. 5. Espécimen de Rhinolophus ferrumequinum.

the Saharan Atlas (Loche, 1858, 1867). It was recently encountered by Ahmime (2014) in Chaabet El Akhra (Kherrata) and Tichy (Bejaia) with a relative abundance of 36.44%.

Rhinolophus hipposideros (Bechstein, 1800)

One specimen of *Rhinolophus hipposideros* was captured in January 2014 in Bouchadjra cave (fig. 6). This bat has a fairly wide range; it is relatively common in the northern part

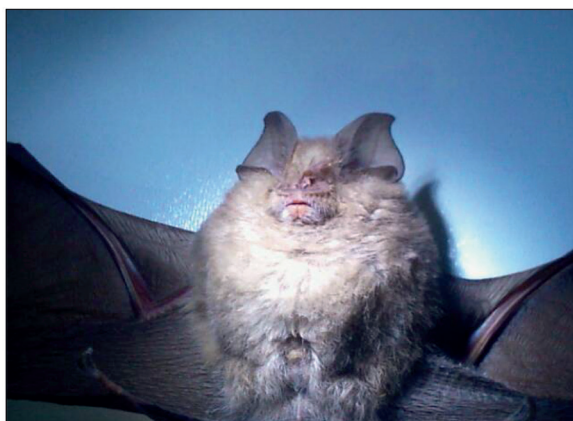


Fig. 6. Specimen of *Rhinolophus hipposideros*.

Fig. 6. Espécimen de Rhinolophus hipposideros.

of Algeria (Anciaux de Faveaux, 1976). It was reported by Ahmime (2014) in Ifri, Kherrata and Tichy (Bejaia Department).

Miniopterus schreibersi (Kuhl, 1817)

Three individuals of *Miniopterus schreibersi* were captured in Gaz Carbonique cave. Kowalski et al. (1986) and Kowalski (1979) observed this species in Tlemcen, Oran and Constantine. Ahmime (2014) reported it in Aokas and Souk El Thenine.

The collected data show a low diversity of bats species in Chebket ES–Sellaoua mountains, with five species. However, the description of the region's bat population is incomplete and additional surveys may unveil new bat taxa or bat occurrences for the region. We suggest the creation of a management plan that will allow the conservation of this biodiversity in these ecosystems.

Acknowledgements

The authors thank Mr Sébastien Blache (LPO, Drome–France) for his help.

References

- Ahmime, M., Moali, A., 2013. The diet of four species of horseshoe bat (Chiroptera: Rhinolophidae) in a mountainous region of Algeria: evidence for gleaning. *Hystrix, the Italian Journal of Mammalogy*, 24(2): 174–176.
- Ahmime, M., 2014. Ecologie et biologie de la conservation des chiroptères de la région de babor (Algérie). PhD Thesis, University of Bejaia.
- 2017. Current status, distribution and conservation status of Algerian bats (Mammalia: Chiroptera). *Journal of Threatened Taxa*, 9(1): 9723–9733.
- Aellen, V., Strinati, P., 1970. Chauve souris cavernicoles de Tunisie. *Mammalia*, 34: 228–236.
- Anciaux de Faveaux, M., 1976. Distribution des chiroptères en Algérie, avec notes écologiques et parasitologiques. *Bulletin de la Société d'histoire naturelle d'Afrique du Nord*, 67: 69–80.
- Aulagnier, S., Thévenot, M., 1986. Catalogue des mammifères sauvages du Maroc. *Travaux Instituts Scientifiques Cherif. Série, Zoologie, Rabat*, 41: 1–164.
- Baker, J., 1976. Species of the subgenus Schizotrypanum other than *Trypanosoma cruzi* and their potential usefulness in the laboratory. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 70: 126–127.
- Banfield, A. W. F., Boudreau, N. J., Delvaux, M. C., Cayouette, R., 1977. *Les mammifères du Canada*. Le Musée national des sciences naturelles, Musées nationaux du Canada, Presses de l'Université Laval, Laval.
- Benda, P., Ruedi, M., Aulagnier, S., 2004. New data on the repartition of bats (Chiroptera) in Morocco. *Vespertilio*, 8: 13–44.
- Brosset, A., 1955. Observations sur la biologie des chiroptères du Maroc oriental. *Bulletin de la Société des Sciences Naturelles et Physiques Maroc*, 35: 295–306.
- Corbet, G. B., 1978. *The mammals of the Palearctic Region: A taxonomic review*. British Museum (Natural History), London and Ithaca N.Y.
- Deleuil, R., Labbe, A., 1955. Contributions à l'étude des chauves-souris de Tunisie. *Bulletin de la Société des Sciences Naturelles de Tunisie*, 8: 39–55.
- Dietz, C., 2005. *Illustrated identification key to the bats of Egypt*. Electronical publication, version 1.0, <http://www.mammalwatching.com/Palearctic/Otherreports/Bat%20Key%20for%20Egypt.pdf> [Visited: 26 May 2018].

- Dietz, C., Nill, D., Von Helversen, O., 2009. *Bats of Britain, Europe and Northwest Africa*. A&C Black, London.
- Dietz, C., Von Helversen, O., 2004. *Illustrated identification key to the bats of Europe*. Electronical publication, version 1.0. Available online at: https://auvergne-rhone-alpes.lpo.fr/images/chiroptere/telecharger/dietz_von_helversen_2004_1.pdf [Visited: 26 May 2018].
- Dieuleveut, T., Lieron, V., Hingrat, Y., 2010. Nouvelles données sur la répartition des Chiroptères dans le Maroc oriental. *Bulletin de l'Institut Scientifique, Rabat, Section Sciences de la Vie*, 8: 33–40.
- Gaisler, J., 1983. Nouvelles données sur les Chiroptères du nord algérien. *Mammalia*, 47(3): 359–369.
- Hill, J. E., 1964. Note on a collection of bats from Figuig. *Mammalia*, 28: 83–87.
- Hufnagel, E., Craig-Bennett, A., 1972. *Libyan mammals*. Orleander Press, Cambridge, United Kingdom.
- IUCN, 2018. IUCN Red List of Threatened Species. Version 2017–3, www.iucnredlist.org [Visited: 26 May 2018].
- Joradp, 2012. Executive decree No. 12–235 of 24 May 2012 establishing the list of protected non-domestic animal species, <https://www.joradp.dz/FTP/JO-FRANCAIS/2012/F2012035.pdf> [Visited: 26 May 2018].
- Kowalski, K., 1979. Note on bats from north-west Algeria. *African Small Mammals Newsletter*, 3: 19–21.
- Kowalski, K., Gaisler, J., Bessam, Issaad, C., Ksantini, H., 1986. Annual life cycle of cave bats in Northern Algeria. *Actatheriologica*, 31(15): 185–206.
- Kowalski, K., Rzebik-kowalska, B., 1991. *Mammals of Algeria*. Polish Academy of Science, Institute of Systematics and Evolution of Animals, Wrocław.
- Laurent, P., 1937. Une chauve-souris nouvelle pour le Maroc: la noctule, *Nyctalus noctula* Schreber, à Rabat. *Bulletin de la Société des Sciences Naturelles et Physiques Maroc*, 17: 145–150.
- 1944. Premiers baguages de chauves-souris en Afrique du nord. *Bulletin de la Société de géographie et d'archéologie de la province d'Oran*, 65: 49–51.
- Loche, V., 1858. Mammifères. In: *Catalogue des mammifères et des oiseaux observés en Algérie*: 1–32. Librairie d'Arthus Bertrand, Paris.
- 1867. Histoire naturelle des mammifères: Chiroptera. In: *Exploration scientifique de l'Algérie pendant les années 1840, 1841 et 1842*: 73–83. *Sciences Physiques et Zoologie*, Paris.
- López-Baucells, A., Flaquer, C., Puig-Montserrat, X., Freixas, L., Mohamed, L., 2012. Actualización del inventario de quirópteros y refugios en Ceuta: primera cita de *Pipistrellus pygmaeus* en el norte de África. *Barbastella*, 5(1): 43–50.
- Panouse, J. B., 1951. Les chauves-souris du Maroc. *Travaux Instituts Scientifiques Cherif. Série. Zoologie*, 1–120.
- Puechmaille, S. J., Hizem, W. M., Allegrini, B., Abiadh, A., 2012. Bat fauna of Tunisia: review of records and new records, morphometrics and echolocation data. *Vespertilio*, 16: 211–239.
- Strinati, P., 1953. Deuxième note sur les chauves-souris du Maroc. *Mammalia*, 17: 189–193.
- Tremblay, J. A., Jutras, J., 2010. Les chauves-souris arboricoles en situation précaire au Québec. *Le naturaliste canadien*, 134(1): 29–40.