



A New Moss Record for Algeria: *Orthotrichum macrocephalum* F. Lara, Garilleti & Mazimpaka

Amira Mazari^{(1,2)#}, Nacira Boulaacheb^(3,2), Rosa M. Ros^(4,5)

⁽¹⁾Department of Plant Biology and Ecology, Faculty of Natural and Life Sciences, Ferhat Abbas University Setif, Setif, Algeria; ⁽²⁾Laboratory of Projet Urbain, Ville et Territoire; ⁽³⁾Department of Pharmacy, Faculty of Medicine, Ferhat Abbas University Setif, Setif, Algeria; ⁽⁴⁾Department of Plant Biology, Faculty of Biology, Campus de Espinardo, Murcia University, Murcia, Spain; ⁽⁵⁾Laboratory of Sistemática Molecular, Filogenia y Conservación en Briófitos.



THE BRYOFLORA of the Setifian High Plains, which situated in the Northeastern region of Algeria is poorly known. Megriss Mountain is one of the most important ecosystems in this region. The examination of Orthotrichaceae samples collected during bryophytes diversity investigations in the northern part of Megriss resulted in the identification of the epiphytic species; *Orthotrichum macrocephalum* F. Lara, Garilleti & Mazimpaka. The identification was made based on its leaves with rounded or obtuse apices, recurved margins, pluripapillose laminal cells, the presence of propagules, emergent capsule with eight longitudinal orange ribs and star-shaped mouth when dry, scarcely constricted below the mouth, immersed stomata in the capsule wall and the papillose endostome segments. This acrocarpous moss with a marked affinity for the Mediterranean climate has never been recorded in the Algerian bryoflora. A comprehensive description, microphotographs, and distribution map in Algeria of this species are provided. Moreover, its ecology is also discussed.

Keywords: Algeria, Mediterranean Region, Megriss Mountain, Orthotrichaceae, Setifian High Plains.

Introduction

Bryophytes are a group of non-vascular plants (Patiño & Vanderpoorten, 2018; Das et al., 2022) that include mosses, liverworts, and hornworts (Mishler, 2001). Approximately 18,000-25,000 species of bryophytes have been identified globally (Sabovljević et al., 2022), which makes them considered as the most diverse group after the flowering plants (Mishler, 2001; Renzaglia et al., 2007; Goffinet et al., 2009; Bahuguna et al., 2013; Chandra et al., 2016). Among the bryophytes, mosses are the most diverse in terms of species richness (Crandall-Stotler & Bartholomew-Began, 2007), with about 12,000 (Vanderpoorten & Goffinet, 2009) and 14,000 (Asakawa & Ludwiczuk, 2017; Das et al., 2022) species worldwide. Moreover, bryophytes are ubiquitous plants (Hodgetts et al., 2019) that can

occupy a variety of habitats (Crandall-Stotler & Bartholomew-Began, 2007; Budke et al., 2018; Taha, 2020; Dziwak et al., 2022) compared to vascular plants (Sabovljević et al., 2022). Due to their structure, bryophytes are very sensitive to environmental conditions (Sabovljević et al., 2022), which makes them good indicators for environmental changes (Hallingback & Hodgetts, 2000; Mishler, 2001; Das et al., 2022), especially the epiphytic bryophytes which are predictably sensitive to global warming because of their direct connection to atmospheric conditions (Gradstein, 2008).

Despite the progress of research for this group in general and epiphytes in particular, there remains a paucity of knowledge regarding their ecology and geographical distribution, mainly in countries where they are understudied or

#Corresponding author emails: amira.mazari@univ-setif.dz, a.mazari1995@gmail.com Tel.: +213668652215

Received 13/03/2023; Accepted 23/12/2023

DOI: 10.21608/ejbo.2023.199586.2279

Edited by: Prof. Dr. Monier M. Abd El-Ghani, Faculty of Science, Cairo University, Giza 12613, Egypt.

©2024 National Information and Documentation Center (NIDOC)

neglected, the case of Algeria. Indeed, vascular plants are extensively studied and updated. In contrast, except for the only study conducted in northeastern Algeria by Boukhatem et al. (2017), all bryological explorations in Algeria are very ancient (Jelenc, 1955, 1967). Ros et al. (1999) summarized all available sources to compile an annotated bryophyte checklist of North Africa that was also updated in the Mediterranean checklists of liverworts and mosses (Ros et al., 2007, 2013). To update the Algerian bryoflora, particularly that of the northern part of the Setifian High Plains, Megriss Mountain was chosen to be explored, which is considered one of the most interesting and important ecosystems in terms of biological and landscapes diversity (Boulaacheb, 2013). This landscape diversity allows the creation of microhabitats and offers favorable conditions for the growth of bryophytes, such as trees on which epiphytic bryophytes develop. According to Bahuguna et al. (2013), epiphytic bryophytes play a crucial role in water balance and humus formation in habitats, specifically in gymnosperm forests.

The present work aims to provide knowledge on the geographical distribution and the ecology of an epiphyte moss reported for the first time in Algeria. Knowledge of the distribution and ecological conditions is very important for the future conservation of the species in general and for those rare and threatened in particular. Their survival and existence depend on the preservation of their habitat.

Materials and Methods

Study area

Megriss Mountain culminates at 1737m elevation. It is a part of the Setifian High Plains, which are situated in northeastern Algeria on latitude $36^{\circ}19'54''$ N and longitude $5^{\circ}21'14''$ E (Fig. 1). It is characterized by a sub-humid bioclimatic stage with a cold winter variant. Average annual rainfall is 500 mm, of which an important quantity falls as snow; the warmest month is August, with a maximum of 26.4°C , while January is the coldest one, with a minimum of -0.6°C (Boulaacheb, 2013).

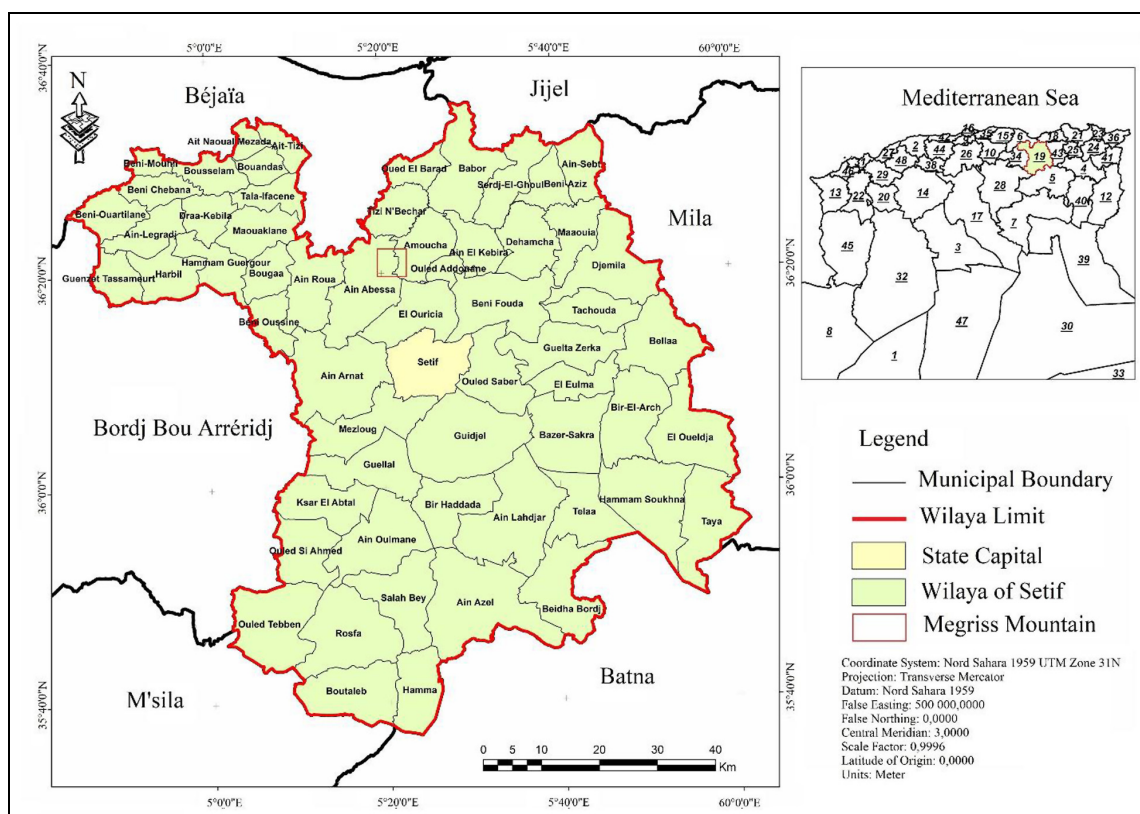


Fig. 1. Study area location in Northern Algeria [Megriss Mountain belongs to the Wilaya of Setif (number 19 in the upper right map), situated northwards of the city of Setif (the base map is from GeoJamal website with the permission of the author)]

The study area constitutes a heterogeneous ecosystem (lowlands, grasslands, streams, temporary pools, matorral of *Quercus ilex* L. and reforestation of *Cedrus atlantica* (Endl.) Manetti ex Carrière (Boulaacheb, 2013). Additionally, there are a few species of trees such as *Fraxinus angustifolia* Vahl, *Populus alba* L., and *Salix alba* Kern (Boulaacheb, 2009).

Data collection

The collection of samples was carried out in the northern part of Megriss Mountain on two ecologically different localities; the first one is a private property next to a gabion by the road side characterized by a more or less dry soil and temperate atmosphere and the second one is a forest of *Cedrus atlantica* with a rich soil on organic matter and a humid atmosphere (Fig. 2).

Samples were macroscopically and microscopically examined in the *laboratory of urban project, city and territory* (PUViT) which is affiliated with the Department of Architecture, team of Urban-Periurban Ecology and Biodiversity, using Zeiss stemi 2000-c stereomicroscope and Optika microscope. Photomicrographs

of the studied samples were captured using Optika proview 4,8,15529 software. For mosses nomenclature, Hodgetts et al. (2020) was followed.

Results

During the fieldwork, a new Algerian record of Orthotrichaceae was found: *Orthotrichum macrocephalum* F. Lara, Garilleti & Mazimpaka.

Specimens studied

Algeria. Sétif: Djebel Megriss Mountain, Ain Guelou, 36°21'40.0"N 5°20'19.8"E, ca 1108 m a.s.l., on the lower part of the bark of *Fraxinus angustifolia*, 01.06.2021, leg. A. Mazari 11, Boulaacheb private herbarium n° 95; *Idem*, 04.10.2022, leg. A. Mazari 12, Boulaacheb private herbarium N° 67; Djebel Megriss Mountain, Oued El Bordj, 36°20'5.8"N 5°20'31.5"E, ca 1554 m a.s.l., on the lower part of the bark of *Cedrus atlantica*, 01.06.2021, leg. N. Boulaacheb 10, Boulaacheb private herbarium n° 66; *Idem*, 25.10.2022, Leg. N. Boulaacheb 03, Boulaacheb private herbarium N° 94.

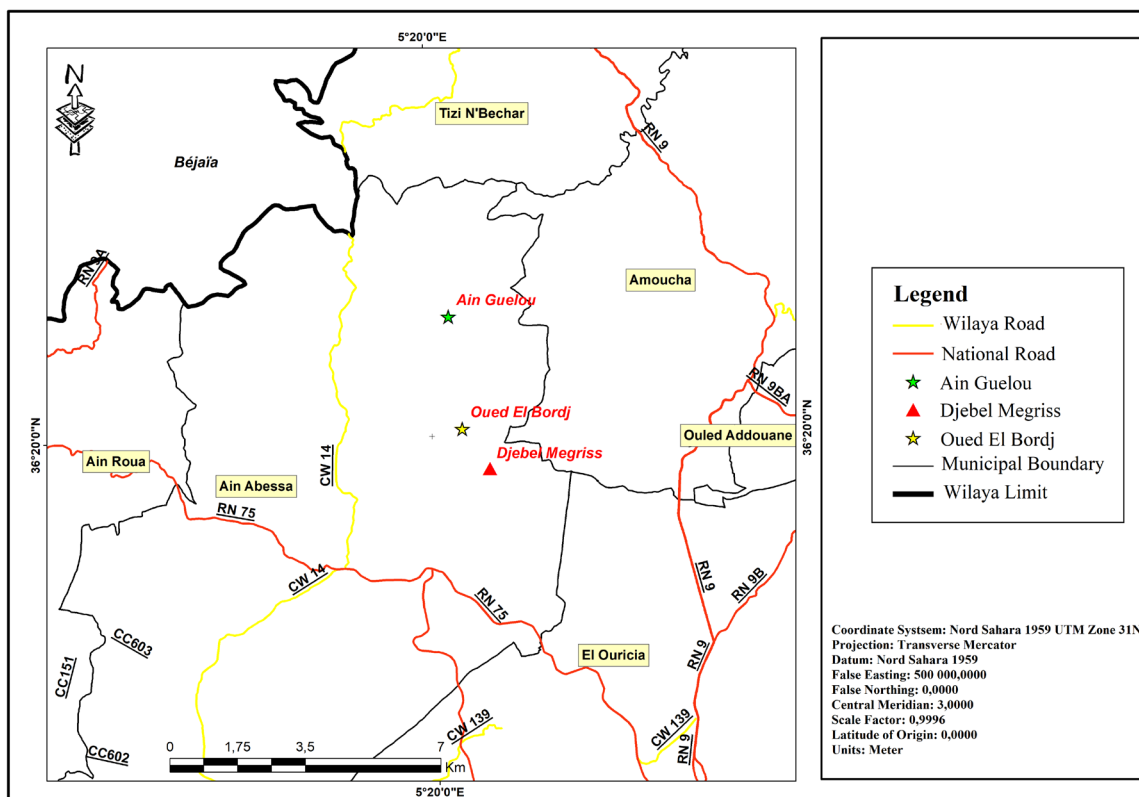


Fig. 2. Sampling localities in Megriss Mountain

Morphological characteristics

Orthotrichum macrocephalum was readily recognized as the samples showed all the diagnostic characteristics stated by Lara et al. (2009) and Lara & Garilleti (2014): small-sized plants, lingulate or lanceolate-lingulate leaves with rounded or obtuse apices and costa ending below the apex, recurved and unistratose margins,

pluripapillose and unistratose laminal cells, cylindrical gemmae with 6 to 15 cells. Other morphological characters observed were the emergent capsule with eight longitudinal orange ribs and star-shaped mouth when dry, scarcely constricted below the mouth, immersed stomata, and very papillose endostome segments (Fig. 3).

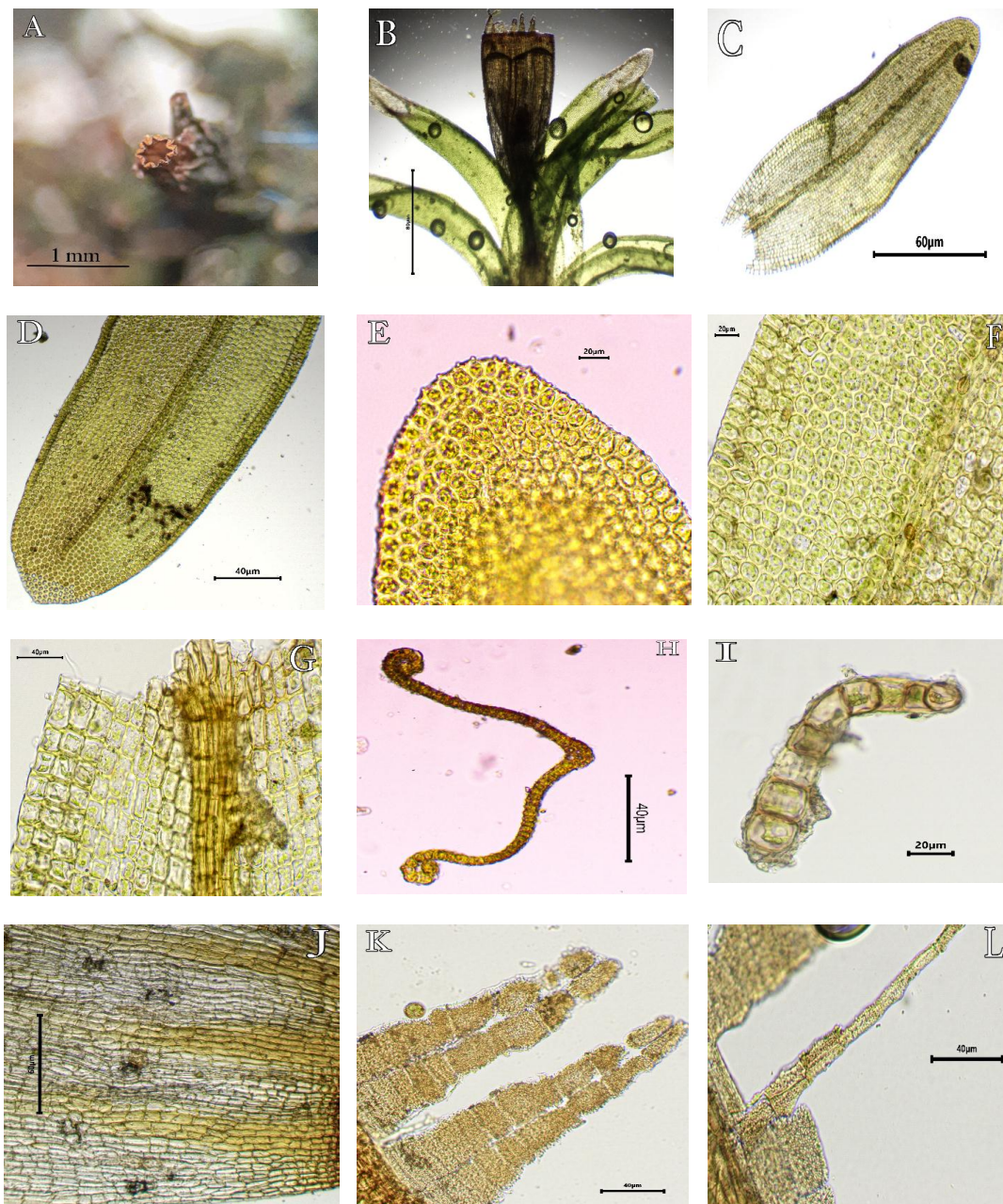


Fig. 3. Microphotographs of *Orthotrichum macrocephalum* from Djebel Megriss (Boulaacheb private herbarium n° 95 and n° 66) [(A) capsule showing the star-shaped mouth, (B) habitus of the plant, (C-D) leaves, (E) apical cells, (F) median cells, (G) basal cells, (H) leaf cross-section at the basal part, (I) gemmae, (J) capsule wall showing ribs and immersed stomata (K) exostome teeth, (L) endostome segment. A,B,J,K,L MAZ 11 C,D,E,F,G,H,I. BOU 10]

Discussion

Orthotrichum macrocephalum is a neutrophytic and toxitolerant epiphyte (Garilleti et al., 1997). It extends in Mediterranean climate areas, and it was known from Spain, Morocco, Tunisia, Corsica, Sicily, Greece, Turkey, and Cyprus (Lara & Garilleti, 2014), this species has now also been recorded in Algeria, as was expected by Garilleti et al. (1997).

The specimen collected in Ain Guelou locality was growing at 1108 m on the lower part of the bark of *Fraxinus angustifolia* with other epiphytic mosses such as *Orthotrichum diaphanum* Brid. and other Orthotrichaceae species, as well as *Syntrichia laevipila* Brid. while in Oued El Bordj, it was growing at 1554m on the lower part of *Cedrus atlantica* bark. According to Lara et al. (1994) and Garilleti et al. (1997), *O. macrocephalum* grows on the trunks of angiosperms, especially the Fagaceae (*Quercus canariensis* Willd., *Q. faginea* Lam., *Q. ilex*, *Q. suber* L.) and the Oleaceae (*Fraxinus angustifolia*). The species also grows on bases and trunks of different phorophytes between 1000 and 2600m (Draper et al., 2006). In Oued El Bordj locality, the species was observed to grow for the first time on *Cedrus atlantica*, one of the endemic Northern Africa species and which is ecologically the most important of the Mediterranean mountains (Demarteau et al., 2007). Probably this xerophytic moss (Draper et al., 2006) appears to thrive in the humid atmosphere of cedars. This new habitat provides an opportunity to gain insight into the ecology of the *Orthotrichum* genus generally, which typically grows in dry, sunny habitats as epiphytes on the bark of deciduous trees or shrubs (Plášek & Ochyra, 2020) and of the species *O. macrocephalum* particularly; Additionally, this finding can help to provide more information on the tolerance and ecological requirements of Mediterranean epiphytes. Unfortunately, the species may be endangered due to climate change threatening *Cedrus atlantica*.

O. macrocephalum can sometimes be confused with *Nyholmia obtusifolia* (Brid.) Holmen & E. Warncke (*Orthotrichum obtusifolium* Brid.) due to their similar small size, compact habit, rounded leaf apex, and often with propagules. *O. macrocephalum* has, however, leaves with recurved margins and pluripapillose laminal cells while *N. obtusifolia* has erect-incurved margins

with a single central papilla (Lara & Garilleti, 2014).

According to the checklist of Ros et al. (2013), a total of 16 species and one variety of the genus *Orthotrichum s.l.* were reported from Algeria, which at present correspond to *Pulvigerella lyellii* (Hook. & Taylor) Plášek, Sawicki & Ochyra, five species of *Lewinskya*, and ten species and one variety of *Orthotrichum s.s.* The last one through this discovery reaches 11 species in Algeria, and the number may well increase if surveys further. Compared to the Grand Maghreb countries, *Orthotrichum s.l.* is well represented with 40% of the total 40 Mediterranean species. In order to update the Algerian bryoflora, it is necessary to widen the explorations, including all the geographical areas. With more collections and discoveries, our knowledge of the bryophytes of the country, especially the Orthotrichaceae, will be better.

Although numerous and recent studies have contributed significantly to the understanding of this botanic family, their knowledge and diversity worldwide are still moderately known (Draper et al., 2022). According to Lara & Mazimpaka (2001), the high species diversity exhibited by *Orthotrichum s.l.* suggests that the Mediterranean region may represent a center of the diversity of this group. Algeria, such a large Mediterranean country and characterized by its varied geography and climate, can considerably contribute to this context.

The variability of the Algerian climate and landscapes can give rise to the richness and diversity of bryophytes. The discovery of a new moss species pushes us to broaden surveys to update our bryoflora on the one hand and on the other hand to contribute to a better understanding of the ecology and distribution of the Orthotrichaceae in general and the species *O. macrocephalum* in particular.

Conclusion

This study identified new moss record of the family Orthotrichaceae in Algeria: *O. macrocephalum*. The leaves with rounded or obtuse apices, recurved margins, pluripapillose laminal cells, the star-shaped mouth of capsule when dry, scarcely constricted below the mouth are important distinguishing features of this

new recorded species. Moreover, the study provides useful information to differentiate between the two morphologically similar species, *O. macrocephalum* and *N. obtusifolia* (*O. obtusifolium*). Further detailed bryological surveys in Algeria may reveal other interesting discoveries regarding bryophytes in the region.

Acknowledgements: Our deepest thanks are due to Dr. Ricardo Garilleti for his precious contribution in confirming the new record and to Drs. Adouani Imene and Saouli Nacira for their valuable reviews of this document. Also, to Mr. Chaaouan Djamel for giving us permission to use the base map to create our study location map.

Conflicts of interest: The authors declare no conflict of interest.

Authors' contributions: Amira Mazari and Nacira Boulaacheb were responsible for collecting, analyzing, and interpreting the data, as well as writing the initial draft. Rosa María Ros contributed to interpreting the data, reviewing, and revising the final draft.

Ethics approval: Not applicable.

References

- Asakawa, Y., Ludwiczuk, A. (2017) Chemical constituents of bryophytes: Structures and biological activity. *Journal of Natural Products*, **81**(3), 641–660.
- Bahuguna, Y.M., Gairola, S., Semwal, D.P., Uniyal, P.L., Bhatt, A.B. (2013) Bryophytes and ecosystem. In: “*Biodiversity of Lower Plants*”, R.K Gupta, M. Kumar (Eds.), I.K. International Publishing House, New Delhi, India.
- Boukhatem, A., Benslama, M., Abed-Belouahem, D. (2017) Biodiversity and ecology of mosses in Northeastern Algeria: Case of the Watershed Tonga. *Synthèse: Revue des Sciences et de la Technologie*, **35**, 59-68.
- Boulaacheb, N. (2009) Étude de la végétation terrestre et aquatique de Djebel Megriss (Nord Tellien, Algérie). Analyse floristique, phytosociologique et pastorale. *Ph.D. Dissertation*, Ferhat Abbas Setif 1 University, Setif, Algeria
- Boulaacheb, N. (2013) Les paysages végétaux du djebel Megriss (Tell septentrional, Algérie) : diversité des écosystèmes, richesse floristique, ampleur de l’anthropisation. *Physio-Géo - Géographie Physique et Environnement*, **7**, 183-210.
- Budke, J.M., Bernard, E.C., Gray, D.J., Huttunen, S., Piechulla, B., Trigiano, R.N. (2018) Introduction to the Special Issue on Bryophytes. *Plant Science*, **37**(2-3), 102-112.
- Chandra, S., Chandra, D., Pankaj, A.B., Pandey, R.K., Sharma, I.P. (2016) Bryophytes: Hoard of remedies, an ethnomedicinal review. *Journal of Traditional and Complementary Medicine*, **7**(1), 94–98.
- Crandall-Stotler, B.J., Bartholomew-Began, S.E. (2007) Morphology of mosses (Phylum Bryophyta). In: “*Flora of North America Editorial Committee*” (Eds.) *Flora of North America North of Mexico*. New York & Oxford.
- Das, K., Kityania, S., Nath, R., Das, S., Nath, D., Talukdar, A.D. (2022) Bioactive compounds from Bryophytes. In: “*Bioactive Compounds in Bryophytes and Pteridophytes*”, H.N. Murthy (Ed.), Springer, Cham.
- Demarteau, M., Francois, L., Cheddadi, M., Roche, E. (2007) Réponses de *Cedrus atlantica* aux changements climatiques passés et futurs. *Revue Internationale de Géologie, de Géographie et d'écologie Tropicales (International Journal of Tropical Geology, Geography and Ecology)*, **31**, 105-146.
- Draper, I., Lara, F., Albertos, B., Garilleti, R., Mazimpaka, V. (2006) Epiphytic bryoflora of the Atlas and AntiAtlas Mountains, including a synthesis of the distribution of epiphytic bryophytes in Morocco. *Journal of Bryology*, **28**, 312-330.
- Draper, I., Villaverde, T., Garilleti, R., Burleigh, J.G., McDaniel, S.F., Mazimpaka, V., Calleja, J.A., Lara, F. (2022) An NGS-based phylogeny of Orthotricheae (Orthotrichaceae, Bryophyta) with the proposal of the new genus *Rehubryum* from Zealandia. *Frontiers in Plant Sciences* **13**, 882960.
- Dziwak, M., Wróblewska, K., Szumny, A., Galek, R. (2022) Modern Use of Bryophytes as a Source of Secondary Metabolites. *Agronomy*, **12**(6), 1456.
- Garilleti, R., Lara, F., Mazimpaka, V. (1997) *Orthotrichum ibericum* and *O. macrocephalum*
- Egypt. J. Bot.* **64**, No. 2 (2024)

- new for Northern Africa. *Lindbergia*, **22**, 33-35.
- Goffinet, B., Buck, W.R., Shaw, A.J. (2009) Morphology and classification of the Bryophyta. In: “*Bryophyte Biology*”, B. Goffinet, A.J. Shaw (Eds.), Cambridge University Press, Cambridge, USA.
- Gradstein, S.R. (2008) Epiphytes of tropical montane forest - impact of deforestation and climate change. In: “*The Tropical Mountain Forest. Patterns and Processes in a Biodiversity Hotspot*”, S.R. Gradstein, J. Homeier, D. Gansert (Eds.), Göttingen University Press, Germany.
- Hallingback, T., Hodgetts, N. (2000) Mosses, liverworts, and hornworts: status survey and conservation action plan for bryophytes. IUCN - World Conservation Union, Gland, Switzerland.
- Hodgetts, N., Cáliz, M., Englefield, E., Fettes, N., García Criado, M., Patin, L., Nieto, A., et al. (2019) A miniature world in decline: European Red List of Mosses, Liverworts and Hornworts. IUCN, Brussels, Belgium.
- Hodgetts, N.G., Söderström, L., Blockeel, T.L., Caspari, S., Ignatov, M.S., Konstantinova, N.A., et al. (2020) An annotated checklist of bryophytes of Europe, Macaronesia and Cyprus. *Journal of Bryology*, **42**(1), 1-116.
- Jelenc, F. (1955) Muscinées de l’Afrique du Nord (Algérie, Tunisie, Maroc, Sahara). *Bulletin de la Société de géographie et d’archéologie de la province d’Oran*, **72, 73, 74, 75, 76**, 1-152.
- Jelenc, F. (1967) Muscinées de l’Afrique du Nord (Supplément). *Revue Bryologique et Lichenologique*, **35**, 186-215.
- Lara, F., Mazimpaka, V. (2001) Diversité et originalité du genre *Orthotrichum* Hedw. (Orthotrichaceae) dans le bassin méditerranéen occidental. *Bocconea*, **13**, 101-106.
- Lara, F., Garilleti, R. (2014) *Orthotrichum*. In: “*Flora Briofítica Ibérica*”, J. Guerra, M.J. Cano, M. Brugués (Eds.), Vol. 5, pp. 50-135. Universidad de Murcia - Sociedad Española de Briología, Murcia, Spain.
- Lara, F., Garilleti, R., Mazimpaka, V. (1994) *Orthotrichum macrocephalum* sp. nov., a New Moss of Section *Diaphana* from the Iberian Peninsula. *The Bryologist*, **97**(4), 402-408.
- Lara, F., Garilleti, R., Medina, R., Mazimpaka, V. (2009) A new key to the genus *Orthotrichum* in Europe and the Mediterranean Region. *Cryptogamie, Bryologie*, **30**, 129-142.
- Mishler, B. (2001) The biology of bryophytes: bryophytes aren’t just small tracheophytes. *American Journal of Botany*, **88**(11), 2129-2131.
- Patiño, J., Vanderpoorten, A. (2018) Bryophyte Biogeography. *Plant Science*, **37**, 175-209.
- Plášek, V., Ochyra, R. (2020) *Orthotrichum alpestre*, a New Addition to the Moss Flora of Poland, with Notes on *O. schimperi* (Orthotrichaceae: Bryophyta). *Acta Societatis Botanicorum Poloniae*, **89**(3), 1-16.
- Renzaglia, K.S., Schuette, S., Duff, R.J., Ligrone, R., Shaw, A.J., Mishler, B.D., Duckett, J.G. (2007) Bryophyte phylogeny: Advancing the molecular and morphological frontiers. *The Bryologist*, **110**(2), 179-213.
- Ros, R.M., Cano, M.J., Guerra, J. (1999) Bryophyte checklist of Northern Africa. *Journal of Bryology*, **21**, 207-244.
- Ros, R.M., Mazimpaka, V., Abou-Salama, U., Aleffim, M., Blockeel, T.L., Brugués, M., Cano M.J., et al. (2007) Hepatics and Anthocerotales of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie*, **28**, 351-437.
- Ros, R.M., Mazimpaka, V., Abou-Salama, U., Aleffim, M., Blockeel, T.L., Brugués, M., et al. (2013) Mosses of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie*, **34**(2), 99-283.
- Sabovljević, M.S., Ćosić, M.V., Jadranin, B.Z., Pantović, J.P., Giba, Z.S., Vujičić, M.M., Sabovljević, A.D. (2022) The Conservation Physiology of Bryophytes. *Plants*, **11**(10), 1282.
- Taha, M. (2020) Illustration and Description of the Recent Bryaceae Records from Bahariya Oasis — Egypt. *Egyptian Journal of Botany*, **60**(2), 575-582. doi: 10.21608/ejbo.2020.21728.1424.
- Vanderpoorten, A., Goffinet, B. (2009) “*Introduction to Bryophytes*”. Cambridge University Press, Cambridge, USA.

تسجيل نوع جديد من الحزازيات في الجزائر. *Orthotrichum macrocephalum* F. Lara, Garilleti & Mazimpaka

أميرة مازاري (201)، نصيرة بولعشب (203)، روسا مازاري روس (4) (5)

(1) قسم بيولوجيا وبيئة النبات- كلية علوم الطبيعة والحياة- جامعة فرحات عباس سطيف 1- الباز- 19000 سطيف- الجزائر؛ (2) مخبر المشروع العمراني- المدينة والإقليم؛ (3) قسم الصيدلة- كلية الطب- جامعة فرحات عباس سطيف 1- الباز- 19000 سطيف- الجزائر؛ (4) قسم بيولوجيا النبات- كلية البيولوجيا- حرم إسبيناردو الجامعي- جامعة مورسيا- 30100 مورسيا- إسبانيا؛ (5) مخبر التصنيف الجزيئي- جغرافيا الأعراق والحفظ عند الطحالب.

إن النباتات الطحلبية الخاصة بالهضاب العليا لمنطقة سطيف، الواقعة في شمال شرق الجزائر غير معروفة بشكل جيد ويعتبر جبل مغرس أحد أهم النظم البيئية في هذه المنطقة. خلال الخرجات الميدانية والتي كان الهدف منها دراسة وجرد تنوع النباتات الطحلبية في الجزء الشمالي من جبل مغرس، أدى فحص عينات عائلة *Orthotrichaceae* إلى تسجيل نوع هوائي *Orthotrichum macrocephalum* F. Lara, Garilleti & Mazimpaka. وقد تم تحديده بناءً على أوراقه ذات القمم المستديرة أو المنفرجة والحواف المنحنية إلى الخارج، خلاياه الصفحية أحادية الحليمية، وجود الجيمات، كبسولته المغطاة جزئياً مع ثمانية خطوط برتقالية طولية وفم على شكل نجمة عندما جفافها، تضيق بشكل خفيف أسفل الفم، ثغور مغمورة في جدار الكبسولة والأسنان الداخلية الحليمية. لم يتم تسجيل هذه الحزازية وحيدة النفرع ذو التقارب الملحوظ لمناخ البحر الأبيض المتوسط في النباتات الطحلبية الجزائرية من قبل. قد تم توفير وصف شامل وصور دقيقة وخريطة توزيع في الجزائر لهذا النوع. علاوة على ذلك، تمت مناقشة بيئتها أيضاً.