

Two new localities for *Apteranthes munbyana* (Decne. ex Munby) Crespo & Mateo (Apocynaceae) in the mountains of eastern Morocco

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Abstract

Apteranthes munbyana (Decne. ex Munby) Crespo & Mateo is an endemic species of Morocco, Algeria and Spain. This Apocynaceae is reported for the first time in three localities in northeastern Morocco. Previously, its occurrence was restricted to Jbel Hamra in the south of Oujda, approximately 40 km from Nador towards Guercif, and in the Boccoyas along the Moroccan Mediterranean coast. In Morocco, it is recognized as a very rare and endangered species. The following note provides the details on the precise geographical locations of the two newly discovered localities.

Keywords: *Apteranthes*, chorology, Moroccan flora, new locations, rare species.

Resumen

Dos nuevas localidades para *Apteranthes munbyana* (Decne. ex Munby) Crespo & Mateo (Apocynaceae) en las montañas del este de Marruecos

Apteranthes munbyana (Decne. ex Munby) Crespo & Mateo es una especie endémica de Marruecos, Argelia y España. Esta Apocynaceae se cita por primera vez en tres localidades del noreste de Marruecos. Anteriormente, su presencia se limitaba a Jbel Hamra en el sur de Oujda, a unos 40 km de Nador hacia Guercif, y en las Boccoyas a lo largo de la costa mediterránea marroquí. En Marruecos, está reconocida como una especie muy rara y en peligro de extinción. La siguiente nota proporciona los detalles sobre las ubicaciones geográficas precisas de las dos localidades recién descubiertas.

Palabras clave: *Apteranthes*, corología, flora marroquí, nuevas localizaciones, especies raras.

Apteranthes munbyana (Decne. ex Munby) Meve & Liede was originally described as *Boucerosia munbyana* Decne. ex Munby, F. Alger: 25 (1847), from plants found on the rocks of Santa Cruz, on the western coast of Algeria, near Oran. The plant was reported abundant in the same region between Mers-el-Kébir, Cap Falcon and Oran. Its current distribution is limited in the southwest of the Mediterranean basin: Morocco, Algeria, and the southeast of Spain (Alicante, Murcia, Albacete, and Valencia) (Ortiz & Arista, 2011). A recent study by Fuentes *et al.* (2024) extends its known distribution to the south of the Iberian Peninsula, specifically in Andalusia. The synonymy established by World Flora Online (WFO) includes: *Caralluma munbyana* (Decne.) N. E. Br., Gard. Chron. Ser. 3 12: 278 (1892) and *Borealluma munbyana* (Decne.) Plowes, Haseltonia 3: 63 (1995).

The species currently includes subsp. *hispanica* (Coincy) M.B. (Crespo & Mateo, 2006) as a synonym. This taxon was described to distinguish populations in south-eastern Spain as a variety of *Boucerosia munbyana* by Coincy in 1898 (J. Bot. (Morot) 12: 250 (1898)). Other synonyms for this taxon are *Boucerosia hispanica* (Coincy) Coincy, J. Bot. (Morot) 13: 336 (1899), *Caralluma munbyana* var. *hispanica* (Coincy) Maire, Cat. Pl. Maroc 3: 582 (1934), *Caralluma munbyana* subsp. *hispanica* (Coincy) M.B. Crespo & Mateo, Acta Bot. Malacitana 20: 285 (1995).

The Moroccan plants were attributed by Maire to the var. *hispanica* (Jahandiez & Maire, 1934). These plants were collected by Ducellier at Jbel Hamra (700-900 m) south of Oujda and in the Boccoyas by Font Quer (Jahandiez & Maire, 1934). Valdés (2013) reported the presence of the species around 55 km from Nador towards Guercif, at an altitude of 500 m. Other sources confirm the presence of the species in the above locations (Fennane & Ibn Tattou, 1998; Raynaud, 1986; Raynaud, 2007; Sauvage & Vindt, 1952). We recently confirmed the presence of this species at Jbel Hamra.

Ancient localities in northeastern Morocco

Locality of Jbel Hamra (Op-1)

In close proximity to Oujda, situated at an elevation ranging from 700 to 900 m, the species thrives on rocky, limestone slopes (Jahandiez & Maire, 1934). We have recently reaffirmed the species' occurrence in the identical locality at an altitude of 690 m on the southern slopes. The species predominantly coexists with: *Calicotome intermedia* C. Presl, *Atractylis caespitosa* Desf., *Ornithogalum sessiliflorum* Desf. and *Cosentinia vellea* (Aiton) Tod.

The specimens exhibit severe stem degradation attributed to the ravages of noctuid caterpillars.

Locality of Boccoyas (LM-1)

In the south-west of Al-Hoceima, this species has been recorded at Boccoyas (Jahandiez & Maire, 1934). The authors provided a concise mention of the locality but did not provide specific details.

Locality 55 km from Nador to Guercif (Op-1)

The specimens were collected in 1992 approximately 55 km from Nador along the road to Guercif on limestone slopes subjected to extensive grazing at an elevation of 500 m (Valdés, 2013).

New Localities in Northeastern Morocco

Locality of Beni Snassen (Om-1)

In the Aghbal Commune, Berkane Province, located at coordinates 34° 52' N, 2° 08' W, within an elevation range of 670 m to 800 m on the southern slopes of Jbel Ichauouene and another population on the summit on October 14, 2023, H. Hannaoua and A. Jdaini (Figure 1A). The species coexists with: *Chamaerops humilis* L., *Ceratonia siliqua* L., *Squilla maritima* (L.) Steinh, *Calicotome intermedia* and *Pancratium foetidum*. Pomel

Locality of Ras Asfour (Om-2)

In Ras Asfour Commune, Jerada Province, situated at coordinates 34° 31' N, 1° 50' W, at an elevation of 1100 m on the south-western and southern slopes of Jorf el Ouazene, on November 6, 2023, recorded by H. Hannaoua and A. Jdaini (Figure 1B). The species accompanies: *Tetraclinis articulata* (Vahl) Mast., *Juniperus oxycedrus* L., *Asparagus albus* L., *Pistacia lentiscus* L., *Stipa tenacissima* L. and *Bituminaria bituminosa* (L.) C.H. Stirt. This locality is presently recognized as the southernmost limit of the species.

Habitat: Typical of the majority of stapeliads, *Apteranthes munbyana* thrives on south-facing limestone rocks in locality 2, while in locality 1 it exhibits a south-west exposure, on rocks especially on fairly gentle slopes. The species manifests as compact clumps with thick stems.

Climate: Jerada and Berkane, are two localities situated in the eastern region of Morocco. Berkane is in close proximity to the Mediterranean Sea providing a more Mediterranean influence, while Jerada has a more continental influence, despite these differences, both locations share a semi-arid Mediterranean climate with hot summers. According to the Köppen-Geiger classification, summers in both localities are

characterized by high temperatures and arid conditions, while winters exhibit milder and wetter conditions in Berkane and colder and wetter conditions in Jerada. The average annual temperature typically ranges between 18 and 24°C in Berkane and 16.7°C in Jerada. Annual rainfall varies between 300 and 400 mm in Berkane and 287.2 mm in Jerada. These climatic conditions contribute to the overall characterization of the region's climate as semi-arid Mediterranean. The prevalent bioclimate in the region is thermo-Mediterranean with the floristic composition of: *Tetraclinis articulata* (Vahl) Mast., *Pistacia lentiscus* and *Lavandula dentata* L. being the main plant species of this bioclimate.

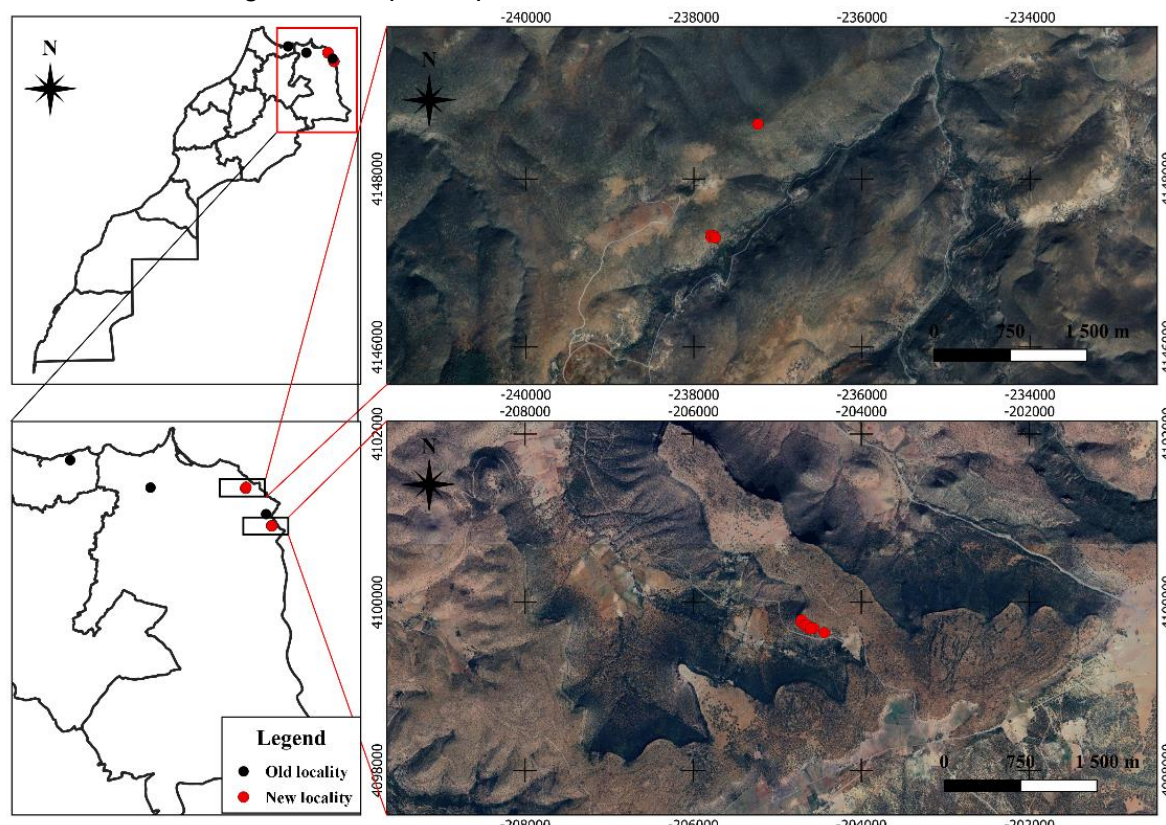


Figure 1. The black dots on the map show localities already reported in Morocco (Jbel Hamra south of Oujda, Boccoyas on the Mediterranean coast and c. 55 km from Nador towards Guercif). The Red dots show the new geographical locations: (A) Jbel Ichauouene, commune of Aghbal, province of Berkane 34° 52' N, 2° 08'; (B) Jorf el Ouazene, province of Jerada, 34° 31' N, 1° 50' W. The red dots on the right show *Apteranthes munbyana* populations. Image: google satellite map.

Figura 1. Los puntos negros del mapa muestran localidades ya señaladas en Marruecos (Jbel Hamra al sur de Oujda, Boccoyas en la costa mediterránea y a unos 55 km de Nador en dirección a Guercif). Los puntos rojos muestran las nuevas localizaciones geográficas: (A) Jbel Ichauouene, municipio de Aghbal, provincia de Berkane 34° 52' N, 2° 08'; (B) Jorf el Ouazene, provincia de Jerada, 34° 31' N, 1° 50' O. Los puntos rojos de la derecha muestran las poblaciones de *Apteranthes munbyana*. Imagen: mapa satélite de google.

Examined Material

Apteranthes munbyana

North east Morocco, Jerada Province, Ras Asfour Commune, 34° 31' N, 1° 50' W, 1100 m November 6, 2023, H. Hannaoua, N. Sahib & A. Jdaini (RAB 114640).

Morphological description of the new populations

Plant of 10 to 18 cm, with quadrangular stems, that are either erect or recumbent with undulating angles (Figure 2). These stems bear small, oval to slightly heart-shaped sessile leaves, particularly present on young stems, which exhibit prompt deciduousness. The inflorescences are organized in sub-terminal

pseudo-umbels, hosting 2 to 11 or more flowers (Figure 2) emitting a highly fetid scent. The pedicel is short, measuring 1 mm, and the calyx consists of 5 acute triangular sepals. The corolla is campanulate, with a diameter of 8 mm, displays a velvety purple-red color. The base around the staminal crown is yellowish in Jorf El Ouazene populations or exhibits yellowish spotting in Beni Snassen populations. The corolla exhibits 5 narrowly triangular lobes that fold outward (Figure 3), and the staminal crown appears blackish purple, bifid apically, providing protection for the anthers and pollinia. The species produces 8 cm follicles, inclined at the apex (Figure 3). The morphological traits observed in our study align with those described in the literature (Albers & Meve, 2004; Raynaud, 1986; Sauvage & Vindt, 1952).

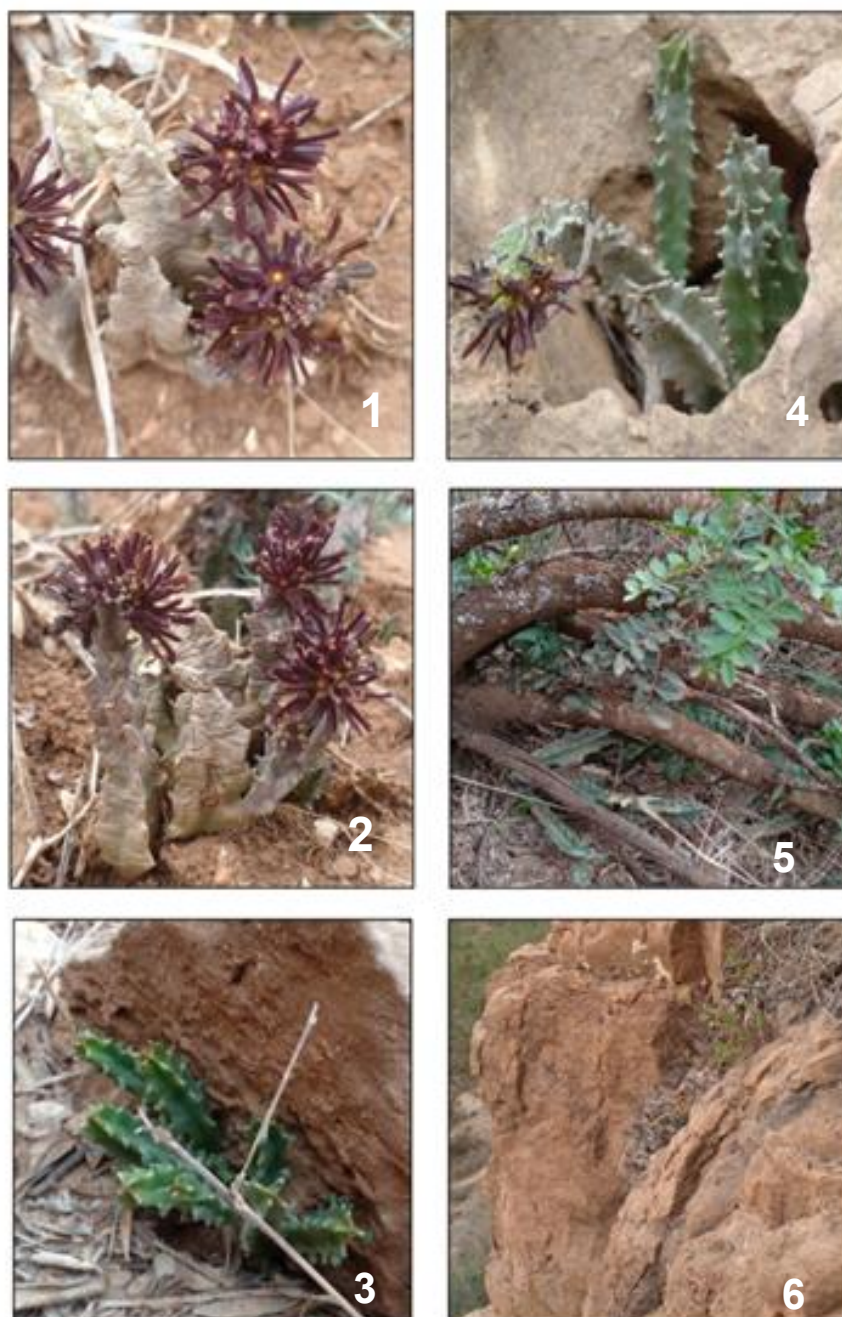


Figure 2. Specimens of *Apteranthes munbyana* (1, 2, 3) commune of Aghbal, province of Berkane 34° 52 'N, 2° 08'W between 670 m and 800 m on the southern slopes of Jbel Ichauouene (4, 5, 6) province of Jerada, 34° 31'N, 1° 50'W, at 1100 m on the south. Author: H. Hannaoua.

Figura 2. Individuos de *Apteranthes munbyana* (1, 2, 3) municipio de Aghbal, provincia de Berkane 34° 52 'N, 2° 08'O entre 670 m y 800 m en la vertiente sur de Jbel Ichauouene (4, 5, 6) provincia de Jerada, 34° 31'N, 1° 50'O, a 1100 m al sur. Autor: H. Hannaoua.

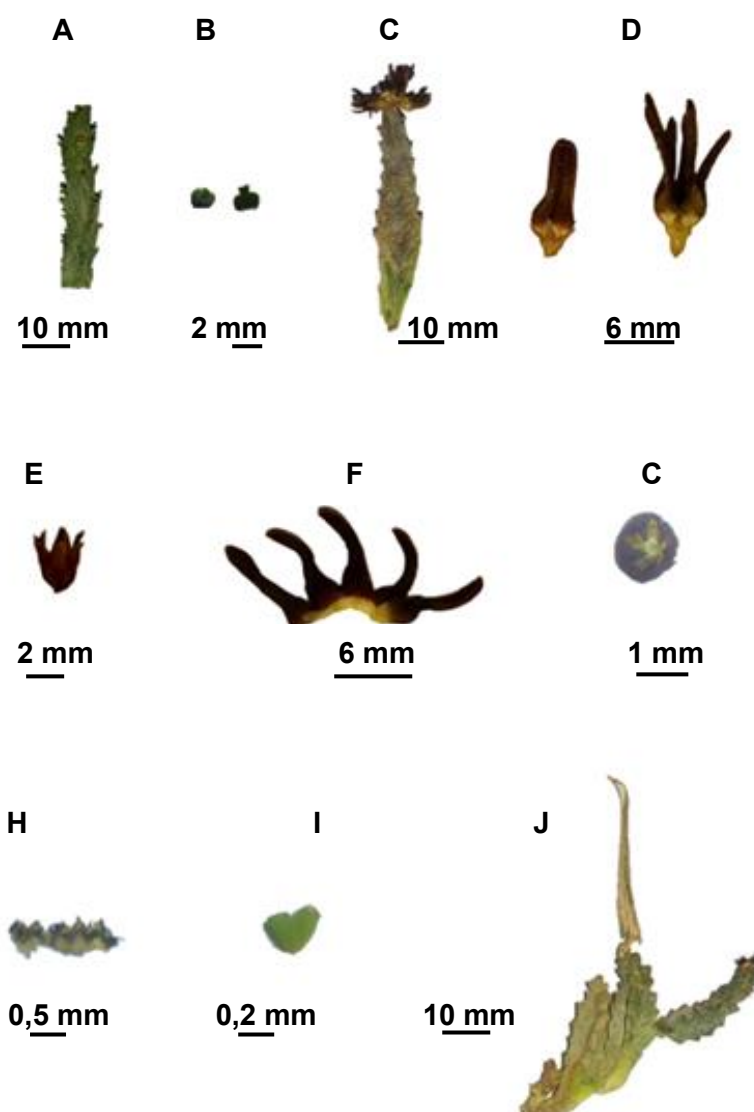


Figure 3. Sterile stem (A), leaves (B), flowering stem (C), close and open flower (D), calyx (E), spreading corolla (F), gynostem (G), spreading staminal crown (H), ovary (I), fruiting stem (J). All samples were from individuals collected from the Ras Asfour locality.

Figura 3. Tallo estéril (A), hojas (B), tallo floral (C), flor cerrada y abierta (D), cáliz (E), corola extendida (F), ginostoma (G), corona estaminal extendida (H), ovario (I), tallo fructífero (J). Todas las muestras fueron recolectadas de individuos de la localidad de Ras Asfour.

State of conservation

Apteranthes munbyana maintains a status of rarity and limited distribution within its indigenous habitat. In the Moroccan context, it is acknowledged as a very rare species (Fennane & Ibn Tattou, 1998), and has been designated a status of "endangered" according to Fennane (2017). Our *in situ* observations substantiate the imminent threat confronting the species. Notably, we documented the colonization of the plant by noctuid caterpillars (species yet to be identified) (Figure 4a). These caterpillars not only pose a direct threat by consuming the stems and regrowth but also weaken and exhaust the internal and mature parts of the plant, which impedes its complete development and ultimately affects the production of flowers and fruits (Fuentes *et al.*, 2024). This dual threat from the caterpillars and the species rarity underscores the urgent need for conservation efforts. Furthermore, the species faces additional pressures as it is

harvested and subsequently traded in local markets due to its applications in the folk phytotherapy (Figure 4b), compounded by anthropozoogenic activities within its habitat. Anthropozoological activity in the Jorf el Ouazene locality in Ras Asfour is characterized as moderate, primarily driven by sheep and goat grazing. In contrast, the Jbel Ichaouen in Beni Snassen locality features an organized grazing system, predominantly centered on cattle. Nevertheless, the species benefits from natural protection at the base of hard-to-reach rocks or at the foot of *Stipa tenacissima* L. and *Pistacia lentiscus* L., supplying a conducive environment for its relative preservation.



Figure 4. Threats to the species. A) caterpillar; B) traded in local markets. Authors: H. Hannaoua & A. Jdaini.

Figura 4. Amenazas para la especie. A) oruga; B) comercio en los mercados locales. Autores: H. Hannaoua & A. Jdaini.

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Conflict of interest

None.

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