



Original article

A new record of generic vascular plant for the flora of Saudi Arabia: *Aspilia kotschy* (Asteraceae)

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ABSTRACT

The paper presents *Aspilia kotschy* (Sch.Bip. ex Hochst.) Oliv. (Asteraceae), a newly recorded genus of vascular plants, during the fieldwork in Fayfa region in the Southwest of Saudi Arabia. Flora books and scientific research papers dealing with the flora of Saudi Arabia have not mentioned any species of *Aspilia* genus. The taxon was found for the first time in Saudi Arabia, which makes a new addition and significant contribution to the flora of Saudi Arabia. The plant was seen near cultivated terraces and collected in September and October 2020 from Fayfa mountains, Jazan province, Southwest of Saudi Arabia. Morphological description, taxonomic remarks, distribution map, plant illustration, and plant photographs are provided.

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1. Introduction

Aspilia Thouars is native to Africa, Southern America and Yemen. The genus belongs to the family Asteraceae Bercht. & J. Presl. *Aspilia* plants are annual or perennial herbs, less often shrubs, Leaves opposite, scabrid or hispid, Capitula terminal, solitary or in lax cymes, or axillary and in congested corymbs, radiate; phyllaries 2–3-seriate, the outer herbaceous, the inner scarious; receptacle with conduplicate paleae, Ray florets with the ray 2-lobed at apex, with or without style, not producing mature achenes; disc florets tubular; anther bases obtuse or shortly sagittate, thecae and appendages often black; style branches gradually narrowing, pubescent at margins, fruits achenes obovoid, compressed, pubescent; pappus a lacinate cupule, often with a few setae (Beentje et al., 2005).

Aspilia Thouars is represented by 125 to 140 species (Ogundipe and Adegbite, 2008; Komakech et al., 2019; Okwuonu et al., 2017). The genus *Aspilia* has 261 scientific names for species; 103 are accepted species names (The Plant List, 2020).

Aspilia genus is native to Africa, Southern America, and Yemen, according to the flora of tropical East Africa (Beentje et al., 2005). There are 21 species of the genus *Aspilia* recorded from Africa (Wild, 1966).

Some authors have compounded the genus *Aspilia*, and considered it as a synonym of *Wedelia* Jacq. Still, others request more study to decide (Tadessa, 1999; Kadereit and Jeffrey, 2007). The distinction between *Aspilia* and *Wedelia* is in ray florets' capacity to develop mature (Adams, 1956).

The name *kotschy* in *Aspilia kotschy* (Sch.Bip. ex Hochst.) Oliv. is after Karl Georg Theodor Kotschy (1813–1866), an Austrian botanical explorer and plant collector. He collected thousands of plant specimens from Iran, Sudan, Cyprus, and northeast Africa (Edmondson and Lack, 1960). Within *Aspilia*, some characters such as the color of ray florets are detected; This leads to species varieties such as var. *kotschy*, and var. *alba* (Mesfin, 2004) and even to different species such as *A. kotschy* and *A. helianthoides* (Wood, 1997).

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Aspilia kotschyi is recognized in many research studies and plant taxonomic sites. *A. kotschyi* var. *kotschyi* is a synonym of *A. kotschyi* (The Plant List, 2020).

2. Materials and methods

A field trip to Fayfa region was conducted searching for unknown and undescribed plant species on 2 September 2020. The plant was observed in two geographical locations, predominantly agricultural mountain terraces, between latitude 17.2326017 and 17.229361; Longitude, 43.0772566, and 43.075971; elevations between 1055 and 1130 m (Fig. 1).

Plant observations and measurements were made on both vegetative and morphological characters compared with taxonomic key and description in the published sources (Mesfin, T. (2004)). Botanical identification was confirmed at King Abdulaziz University and the University of Albaha by using available references and literature (Mesfin, 2004; Wood, 1997). The plant species was deposited at the herbarium of the University of Albaha, department of biology, Baljurashi, under the name (Alfaifi, 9-2020), duplicates are available in King Abdulaziz City for Science and Technology Herbarium (MUZ), Riyadh, under the name (Al-Namazi and Alfaifi, 10-2020), for future references.

Literature and herbarium searches (Collenette, 1999; Chaudhary, 1999, 2000, 2001; Qashash, 2007; Al-Surour, 2018) revealed that the plant and the genus had neither been reported nor collected in any herbarium in Saudi Arabia before.

3. Results

3.1. Plant classification

Kingdom: Plantae

Subkingdom: Viridiplantae
 Infrakingdom: Streptophyta
 Phylum/ Division: Tracheophyta
 Subphylum (Subdivision): Spermatophytina
 Class: Magnoliopsida
 Superorder: Asteranae
 Order: Asterales
 Family: Asteraceae (Compositae)
 Subfamily: Asteroideae
 Tribe: Heliantheae
 Subtribe: Ecliptinae
 Genus: *Aspilia*
 Species: *Aspilia kotschyi* (Sch.Bip. ex Hochst.) Oliv.
 (Wild, 1966; Beentje et al., 2005; CWG, 2020; Hassler, 2017)

3.2. Plant synonyms

Aspilia courtetii O.Hoffm. & Muschl.
Aspilia kotschyana Benth. & Hook.f.
Aspilia polycephala S.Moore
Coronocarpus kotschyi Benth.
Coronocarpus prieurianus Benth.
Dipterothera kotschyi Sch.Bip. ex Hochst.
Wedelia kotschyi (Sch.Bip.) Isawumi
Wedelia kotschyi (Sch.Bip.) Soldano
Wirtgenia kotschyi Sch.Bip. (POWO, 2020)

3.3. Type

Herbarium name: Missouri Botanical Garden (MO), MO-391380; Collection Date 1839/10/01; Collector/number T. Kotschy, #103; Country Sudan (Arasch-Cool mountains).

3.4. Plant description

Erect Annual branched herb (Fig. 2), up to 70 cm high, erect, stem cylindrical, scabrid-hispid, and hairy with purple spots at their base. Leaves simple, opposite, sessile to sub-sessile, ovate to narrowly lanceolate, 3–12 cm long, 1–4 cm wide, base obtuse to semi-amplexicaul, margins sub-entire with long white hairs along the veins and margins, apex acute to attenuate, hispid on adaxial and abaxial surfaces. Capitula terminal, axillary, solitary, and subsessile on adaxial leaves; involucre ovoid, 3-seriate, 6–12(–26) mm long; phyllaries green, hispid to scarious brown at base; darker tips; apex acute to obtuse, reddish tips, paleae 6–10 mm long. Ray floret dark red, oblong to ovate, about 1–5 cm long, without styles but petal with two short teeth; tube 3.5–8 mm long, glabrous. Disc florets, dark red, tubular, glabrous, up to 5 mm long, lobes puberulous; anther appendages dark red. Cypsela brown, obovoid, 5–6 × 2–3 mm, villose; pappus 1 mm long often with 2 short 3 mm long bristles (see Fig. 3).

3.5. Distribution and habitat

Widely distributed in tropical Africa. It is native to Angola, Benin, Botswana, Burkina, Cameroon, Central African Repu, Chad, Congo, Eritrea, Ethiopia, Gabon, Guinea-Bissau, Kenya, Mali, Mozambique, Nigeria, Senegal, Sudan, Tanzania, Togo, Uganda, Yemen, Zambia, Zimbabwe (POWO, 2020). In Saudi Arabia, the plant grows successfully in moisture soil on a mountain terrace following a rainy season. Flowering and fruiting were observed from August to October.

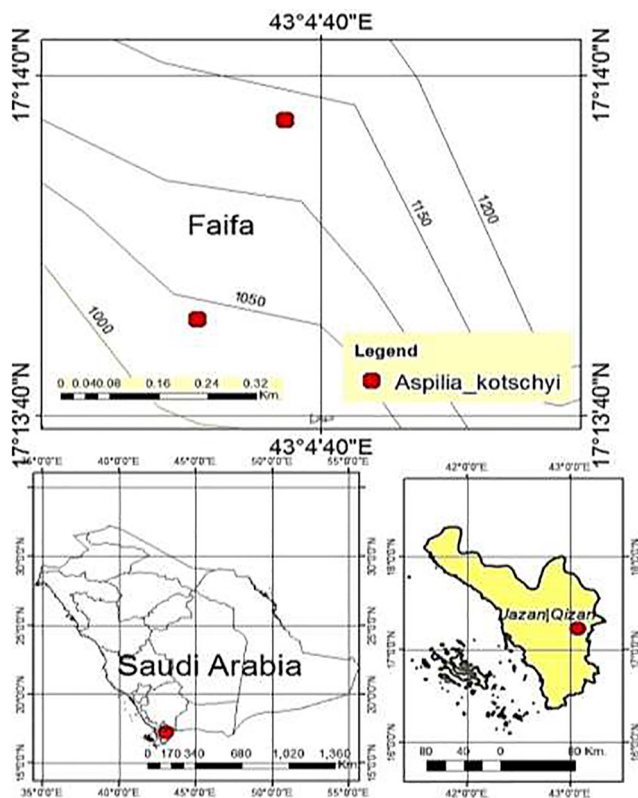


Fig. 1. Distribution map of *Aspilia kotschyi* (Sch.Bip. ex Hochst.) Oliv. in Fayfa in Southwest of Saudi Arabia (Credit to Al-Khulaidi, 2020).



Fig. 2. The habit of *Aspilia kotschyi* (Sch.Bip. ex Hochst.) Oliv. 1 km East of Jabal Shumeila, Fayfa, Southwest of Saudi Arabia (Photo by Alfaifi, 2020).

3.6. Conservation status

Not Evaluated, the plant is generally rare in its locality, only seen twice. Intensive fieldwork is highly recommended for further

information on its density and frequency to get a good conservation status for this newly discovered plant.

4. Discussion

In Arabian Peninsula, only one species of *Aspilia* (*A. kotschyi*) and one subsp. (*A. helianthoides* subsp. *ciliata*) are recorded from Yemen (Wood, 1997; Al-Khulaidi, 2013). *Aspilia kotschyi* can be utilized economically (e.g. medicinal) (Adamu et al., 2018); another plant of this genus (*A. africana*), is widespread in Africa and considered as an important economic plant, and is used to treat numerous disease conditions such as healing of wounds and stop bleeding (Komakech et al., 2019; Oluyemi, et al., 2007).

Fayfa region is very rich in flora and characterized by high plant diversity. Few new plant species for the flora of Saudi Arabia were discovered from this region. It is expected with the extra exploration of the vegetation and the flora of the region, to discover new plants that have not been previously recorded in the Flora of Saudi Arabia and the Arabian Peninsula.

To conclude, this study has been recorded the occurrence of *Aspilia kotschyi* in Saudi Arabia for the first time. The plant is characterized by its hispid indumentum with simple, opposite, sessile leaves and dark red flower colour. The present work will aid in the evaluation of the plant conservation status in Saudi Arabia and the Arabian Peninsula in general.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

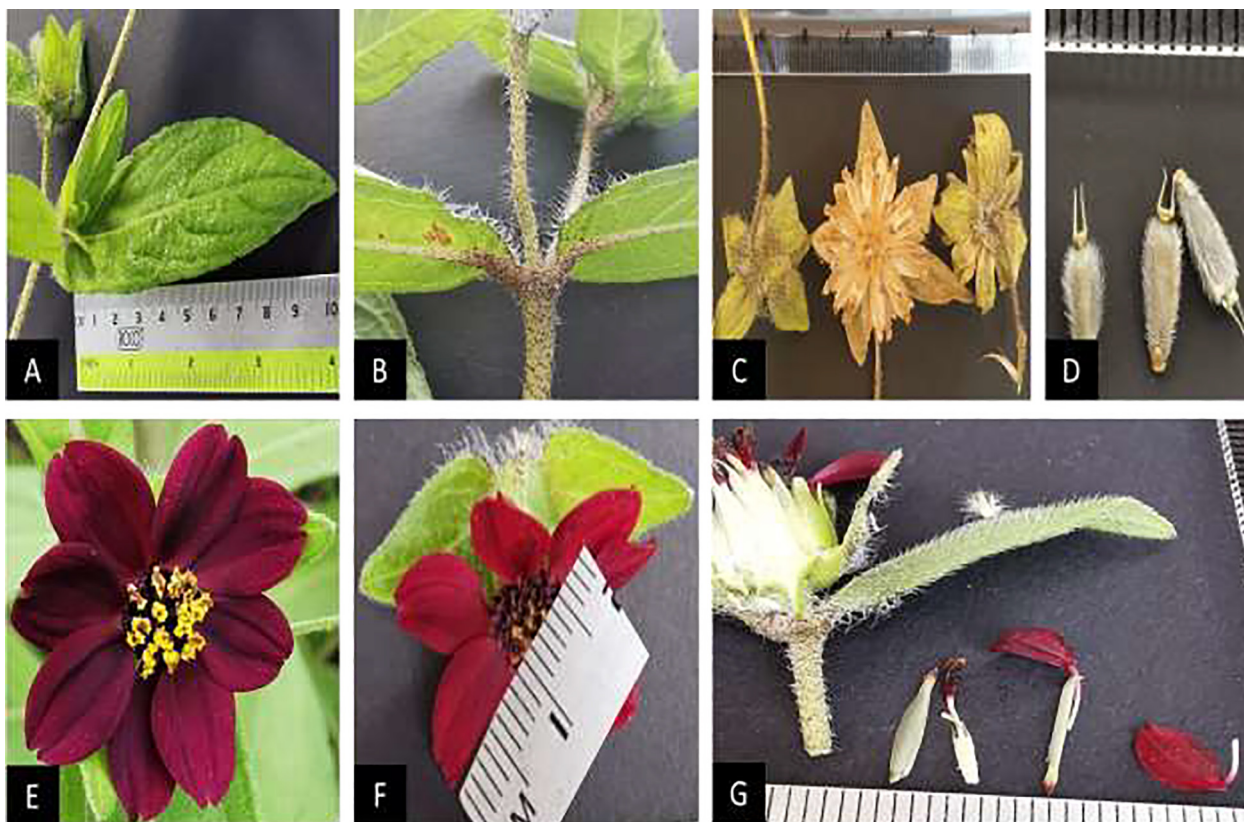


Fig. 3. Some morphological characteristics of *Aspilia kotschyi* (Sch.Bip. ex Hochst.) Oliv. plant. A, B: The plant leaves; C: Flower phyllaries; D: Pappus often with two short bristles; E: Dark red petals; F: Flower measurement; G: Flower ray and disc florets (Photos by Alfaifi and Al-Namazi).

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