



Article

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**Records of new and rare native species of flowering plants in Fujairah
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Abstract

The discovery of newly recorded species of Asteraceae (*Artemisia sieberi* Besser, *Crepis kotschyana* (Boiss.) Boiss., *Garhadiolus hedypnois* Jaub. & Spach), *Lactuca orientalis* (Boiss.) Boiss., Brassicaceae (*Clypeola aspera* (Grauer) Turrill), Caryophyllaceae (*Velezia fasciculata* Boiss.) and Poaceae (*Aegilops kotschyi* Boiss. and *Poa sinaica* Steud.) is reported for Fujairah Emirate (United Arab Emirates). Of these species, *Crepis kotschyana*, *Garhadiolus hedypnois*, *Clypeola aspera*, *Lactuca orientalis* are new for the United Arab Emirates (UAE) as a whole and *Velezia fasciculata* is new for UAE and Oman (Musandam). All of them were found in the mountains at altitudes between 1300–1360 m in the environs of Al Tawyeen (Fujairah, UAE).

Key words: *Artemisia*, Asteraceae, Brassicaceae, Caryophyllaceae, *Clypeola*, *Crepis*, Fujairah, *Garhadiolus*, *Lactuca*, new records, *Poa*, Poaceae, United Arab Emirates, *Velezia*

Introduction

During 2017–2022 we studied the flora of Fujairah Emirate, United Arab Emirates (UAE), surveyed several places in Fujairah and collected native and alien plants (Byalt and Korshunov, 2020 a–d, Byalt *et al.*, 2020, Byalt and Korshunov, 2021 a, b; Korshunov and Byalt, 2021; Orlova *et al.*, 2021). In March, 2020, and April, 2022, we visited the high mountains in two places on the border with Oman (Musandam), where small numbers of several new species for Fujairah were found on rocky ledges, in rock crevices of the high plateau and on stony slopes, at an altitude of 1300–1360 m, in the northern part of Fujairah (Fig. 1).



Figure 1. Rocky ledges and stony slopes in high mountains near the border with Oman. Photographs by V. Byalt

Material and methods

The collected specimens were identified using the available descriptions in original sources and floras (Besser, 1836; Boissier, 1849, 1875; Steudel, 1855; Poljakov, 1961; Podlech, 1986), the online resources, *Global Biodiversity Information Facility* (GBIF, 2022) and *JSTOR Global Plants* (2022). They were placed at LE and FSH (Herbarium codes are given as in Thiers, 2022). The names of the taxa, author's abbreviation and places of publication were checked against those in *International Plant Names Index* (IPNI, 2022). The names of taxa, that are accepted by the authors of the current paper are in bold. The taxonomic decisions were made by analysis of the literature and the available taxonomic databases, *Catalogue of Life* (CoL, 2022), *Plants of the World Online* (POWO, 2022), *Tropicos* (2022)

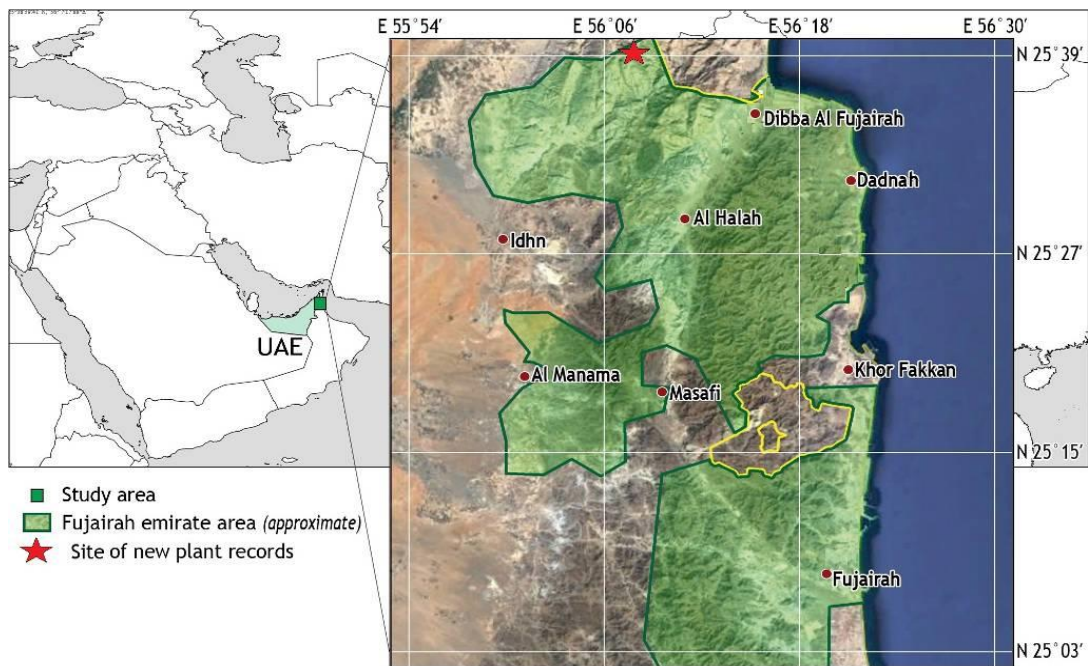


Figure 2. Map of Fujairah and sites of new plant records (based on Google Earth).

and the *World Checklist of Vascular Plants* (WCVP, 2022). Distribution is given as recommended in the *World Geographical Scheme for Recording Plant Distributions* (Brummitt, 1992), and using updates on the website of the *Taxonomic Database Working Group* (TDWG, 2022).

The herbarium specimens were collected in one locality in the territory of the Emirate of Fujairah (UAE) (Fig. 2).

New records in Asteraceae (Compositae)

Artemisia sieberi Besser (Fig. 3), Bull. Soc. Imp. Naturalistes Moscou, 9: 80. 1836. ≡ *Seriphidium sieberi* (Besser) K.Bremer & Humphries ex Y.K.Ling, Bull. Bot. Lab. N.-E. Forest. Inst., Harbin, 11(4): 18. 1991.

= *Artemisia herba-alba* Asso var. *laxiflora* Boiss., Fl. Orient.: 365. 1875.

– *Artemisia herba-alba* auct., non Asso, 1779: Ghazanfar, Scripta Bot. Belg. (Annot. Catal. Vasc. Pl. Oman), 2: 42. 1992.

– *Seriphidium herba-alba* auct. non (Asso) Soják, Čas. Nár. Muz., Rada Přír. 152: 22. 1983: Rawi, Dep. Agr. Tech. Bull. 14: 106. 1964.



Figure 3. *Artemisia sieberi* Besser on rock ledges and stony slopes in high mountains near Al Tawyeen. Photograph by V. Byalt

Comments: The accepted name, *Artemisia sieberi*, is recorded in the taxonomic databases CoL, (2022), GBIF (2022), POWO (2022), and the WCVP (2022). Its native distribution range is reported to be eastern Mediterranean area, western Afghanistan, Iran, Iraq, the Arabian Peninsula, to Tunisia (POWO, 2022). On the Arabian Peninsula, *A. sieberi* is found on the higher summits of the Hajar Mountains in Northern Oman, above 1000 m a.s.l. (Ghazanfar, 1992, 2018; Jongbloed *et al.* 2003; Feulner, 2011). One location, McLeish 3656 (E00121504),

is recorded from Mussandam according to GBIF (2022). However, according to updated records this is a common species in Mussandam (Northern Oman) (Feulner, 2011), where it grows in areas of alluvial or colluvial soils and is codominant at high elevations, above 1200 m. This species is a principal component of “*Artemisia* steppe.” It is the species that was identified in most Arabian literature as *Artemisia herba-alba* or *Seriphidium herba-alba* (Asso) Soják (Ghazanfar, 1992; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007). It was once thought to be a phenotypically variable species with a widespread distribution from the Mediterranean to Iran, but, as understood today, it is limited to the westernmost Mediterranean area (N. Kilian in Feulner, 2011). Kilian and some other authors also consider that phylogenetic analyses of DNA markers support the inclusion of *Seriphidium* within *Artemisia* (Watson *et al.*, 2002; Kilian in Feulner, 2011; Malik *et al.*, 2017).

For Fujairah Emirate, this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007), but it was found, very rarely, in the Ras Al-Khaimah Emirate to Sham mountains (near the border with Mussandam) (Karim and Fawzi, 2007). Thus, it is a newly recorded species for the flora of Fujairah Emirate and rare for the UAE as a whole.

Our plants match the herbarium specimens of *Artemisia sieberi* and *Seriphidium sieberi* at JSTOR, POWO (2022) and GBIF (<http://data.rbge.org.uk/herb/E00121504>) and the original description of *Artemisia sieberi* given by Besser (1836), as well as descriptions of this species given in *Flora Iranica* (Podlech, 1986) and in *Flora of the U.S.S.R.* (Poljakov, 1961, 2000).

Specimens examined: E00574927!, E00574819!, E00574822!, E00574816!, FR0036299!, JE00009397!, K000942198!, K0009442197!, W0014792!, W18890285177!

Distribution worldwide: Eastern Mediterranean area, Egypt, Algeria, Tunisia, Arabian Peninsula, Iran to Afghanistan (POWO, 2022).

Distribution in UAE: Fujairah Emirate, Al Tawyeen (Taween) area, small village 0.8 km west-north-west of the mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1200–1360 m, on rock ledges, 13.III.2020, V.V. Byalt, M.V. Korshunov 405., fr. senil., veg. (LE!; FSH!). (Fig. 3). United Arab Emirates, Fujairah Emirate, Al Tawaian (Tawyeen) area, high mountains on border with Musandam (Oman), small village 0.8 km west-north-west of mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1350–1367 m [point 6/ 707a]: on limestone mountain rock ledges, 18.IV.2022, V.V. Byalt, V.M. Korshunov, D.G. Melnikov 137, fr. senil. (LE); United Arab Emirates. Emirate of Fujairah, environs of Tawaian, high mountains on border with Musandam (Oman), 25°38' N, 56° 07' E, 1000–1126 m alt. [point 707d]: on sides and

bottom of dry pond near small village, 18.IV.2022, V.V. Byalt, V.M. Korshunov, D.G. Melnikov 99, veg. (LE).

Along with *Artemisia sieberi* some other rare plants grow on the plateau and on ledged rocky slopes, such as *Crepis kotschyana* (Boiss.) Boiss. (see below), *Echinops erinaceus* Kit Tan (Fig. 4), *Prunus arabica* (Olivier) Meikle (*Amygdalus arabica* Olivier) (Fig. 5), *Pallenis hierochuntica* (Michon) Greuter (Fig. 6), *Jurinea berardioides* (Boiss.) O.Hoffm., *Anthemis odontostephana* Boiss., *Jurinea carduiformis* (Jaub. & Spach) Boiss. (Fig. 7), *Farsetia aegyptia*



Figure 4. *Echinops erinaceus* Kit Tan in upper part of stony gorge with dry spring. Photograph by V. Byalt



Figure 5. *Prunus arabica* (Olivier) Meikle hanging from rock in upper part of stony gorge with dry spring. Photograph by V. Byalt



Figure 6. *Pallenis hierochuntica* (Michon) Greuter on plateau. Photograph by V. Byalt



Figure 7. *Jurinea carduiformis* (Jaub. & Spach) Boiss. on rocky ledges. Photograph by V. Byalt



Figure 8. *Senecio coronopifolius* Burm. f. on rocky ledges. Photograph by V. Byalt

Turra, *Senecio coronopifolius* Burm.f. (Fig. 8), *Convolvulus ulicinus* Boiss., *Ephedra pachyclada* Boiss. In places, *Artemisia* sp. grows in quite large numbers in fine soil on ledges and slopes between them, as well as at the bottom of a temporary pond and its banks.

Crepis kotschyana (Boiss.) Boiss., Fl. Orient. 3: 852. 1875. ≡ *Barkhausia kotschyana* Boiss., Diagn. Pl. Orient. ser. 1, 7: 13. 1846.

– ?*Crepis foetida* auct., non L., Sp. Pl. 807. 1753: Ghazanfar, Scripta Bot. Belg. (Annot. Catal. Vasc. Pl. Oman), 2: 43. 1992.

Comments: The accepted name, *Crepis kotschyana*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVF (2022). Its native distribution range is reported to be Eastern Mediterranean area to Central Asia and Pakistan. On the Arabian Peninsula, *C. kotschyana* is found in the Hajar Mountains and Mussandam in Northern Oman (Ghazanfar, 1992, 2015; Jongbloed *et al.*, 2003; Feulner, 2011). One site is recorded from Mussandam according to the GBIF (2022) – Mussandam, Jabal Harim area, silty plateau within Sahasa plateau, 1451 m, 25°57'18" N, 56°12'10" E, Patzelt 4541/III (E00903492). It is rare in Mussandam (North Oman), but possibly overlooked (Feulner, 2011). It grows on silt among rocks at an elevation of 250–1350 m. Otherwise known from Southern Iran. Earlier Western recorded *Crepis* sp. as locally common in the Ru'us al-Jibal (Jongbloed *et al.*, 2001). N. Kilian believes material determined as *C. foetida*, collected by Radcliffe-Smith from near Khasab at ca. 100 m elevation (Ghazanfar 1992; Feulner, 2011), by Western (1989) from near Masafi (UAE) in the northern Hajar Mountains and by Whitcombe from Jebel Akhdar (Oman) is *C. kotschyana*. Another species of *Crepis*, *C. micrantha* Czerep., has been recorded by Karim from Masafi in the northern Hajar Mountains (Karim and Fawzi, 2007). As for Fujairah directly this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007). Thus, it is a newly recorded species for the flora of Fujairah Emirate and for the UAE as a whole. Our plants match the herbarium specimens of *Crepis kotschyana* and *Barkhausia kotschyana* Boiss. at JSTOR, the herbarium specimens at GBIF (<http://data.rbge.org.uk/herb/E00903492>), at POWO (2022), in LE, and the original description of *C. kotschyana* given by Boissier (1846, 1875), as well as its description given in *Flora of the U.S.S.R.* (Czerepanov, 1964, 2000).

Specimens examined: BM000996300!, G00223664!, H1013321!, K000808176!, K000808177!, K000808175!, K000808178!, LE 01189037!, LE 01189038!, LE 01189039!, LE 01189040!, LE 01189041, LE 01189042, LE 01189043!, LE 01189044!, LE 01189045!, LE 01189046!, LE 01189047!, LE 01189049!, LE 01189050!, LE 01189051!, LE 01189052!,



Figure 9. Scanned herbarium specimen of *Crepis kotschyana* (Boiss.) Boiss. at LE (LE 01182674)

LE 01189053!, LE 01189054!, LE 01189055!, LE 01189056!, LE 01189057!, LE 01189058!, M0030855!, M0030854!, P00691234!, P00691244!, S10-16630!, WAG0004144!

Distribution worldwide: Afghanistan, Iran, Iraq, Lebanon-Syria, Pakistan, Israel/Palestine, Tadjikistan, Turkey, Turkmenistan, Uzbekistan (POWO, 2022).

Distribution in UAE: UAE, Fujairah emirate, 0.6 km east-north-east of the cell tower on the mountain peak, 3.5 km west of Ghub, 8 km west-south-west of Dibba. 25°34'34.49"N, 56°10'6.31"E, elevation 730 m: on mountain sides upper of stone wadi, 24.III.2020, V.V. Byalt, M.V. Korshunov s.n., fl., fr., (LE; FSH); UAE, Fujairah Emirate, Al Tawaian (Tawyeen) area, high mountains on border with Musandam (Oman), small village 0.8 km west-north-west of mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1350–1367 m [point 6/ 707a]: on limestone mountain rock ledges, 18.IV.2022 Leg: V.V. Byalt, V.M. Korshunov, D.G. Melnikov 132, fl., fr. (LE 01182674) (Fig. 9).

Garhadiolus hedyinois Jaub. & Spach, Ill. Pl. Orient. 3(29): 119, t. 284. 1850. ≡ *Rhagadiolus hedyinois* Fisch. and Mey. Index Seminum [St. Peterburg (Petropolitanus)] 4: 46. 1838, nom. illeg. ≡ *Koelpinia hedyinois* H. Baill. Ann. Sci. Nat. sér. 6, 16: 330. 1883.

= *Garhadiolus angulosus* Jaub. and Sp. Ill. Pl. Or. 3(29): 122, t. 285. 1850.

= *Hedyinois minutissima* Bunge, Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans 7: 372. 1851 ≡ *G. minutissimus* (Bunge) Kitam., Acta Phytotax. Geobot. 17: 36. 1957.

Comments: The accepted name, *Garhadiolus hedyinois*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVP (2022), and its native range is Eastern Mediterranean area to Central Asia and Western Himalayas (POWO, 2022). On the Arabian Peninsula, *G. hedyinois* is found on the higher summits of the Hajar Mountains in Northern Oman (Mussandam), above 1000 m a.s.l. (Feulner, 2011; Ghazanfar, 2015) and in Dhofar in S. Oman (Ghazanfar, 1992), but it is very rare everywhere. There are no sites recorded from the Arabian peninsula according to GBIF (2022).

Reported as rare on Mt. Ru'us al-Jibal in Mussandam (Oman), at high elevation (Feulner, 2011; Ghazanfar, 2015). A few specimens are known from fields, gravel terraces, and stony slopes at 1150–1500 m in northern Ru'us al-Jibal. Kilian mentions that this species was collected from the same area by Radcliffe-Smith in 1976, but the record was never published (Feulner, 2011). For Fujairah Emirate and the UAE generally, this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007). We found and photographed this species in the spring of 2020 in the mountains at 1300 m a.s.l.

in the environs of Al Tawyeen, Fujairah (Fig. 10). Thus, it is a newly recorded species for the flora of Fujairah Emirate and for the UAE as a whole.

Our plants match the herbarium specimens of *Garhadiolus hedyinois* and *Rhagadiolus hedyinois* at JSTOR (2022), in LE, and the original description of *R. hedyinois* given by De Candolle (1838), Boissier (1875), as well as the description of *R. hedyinois* given in *Flora of the U.S.S.R.* (Vassilczenko, 1964, 2000).

Specimens examined: E00488881!, E00488883!, E00488872!, G00488894!, G00488813!, LE 01189032!, LE 01189033!, LE 01189034!, LE 01189035!, LE 01189036! SAV0001259!, SAV0001260!

Distribution worldwide: Afghanistan, Cyprus, Egypt, Iran, Iraq, Kazakhstan, Kirgizstan, Lebanon-Syria, North Caucasus, SW Oman, Pakistan, Israel/Palestine, Saudi Arabia, Sinai,



Figure 10. *Garhadiolus hedyinois* Jaub. & Spach on rocky ledges with silt. Photograph by V. Byalt

Tadzhikistan, Transcaucasus, Turkey, Turkmenistan, Uzbekistan, West Himalaya (POWO, 2022).

Distribution in UAE: Fujairah Emirate, Al Tawyeen (Taween) area, small village 0.8 km west-north-west of the mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1200–1360 m, on rock ledges, 13.III.2020, V.V. Byalt, M.V. Korshunov s.n., fl., fr. juv. (LE!).

So far, this is the only place that *Garhadiolus hedyinois* has been found in UAE and the species should therefore be recommended for inclusion in the Red Data Books of the UAE and Fujairah. Along with *G. hedyinois* some other rather rare plants, such as *Anthemis*

odontostephana, *Jurinea carduiiformis* (Jaub. & Spach) Boiss., *Farsetia aegyptia*, *Senecio coronopifolius*, *Convolvulus ulicinus*, *Ephedra pachyclada* Boiss., grow on the plateau and on ledged rocky slopes, practically forming a unique community.

Lactuca orientalis (Boiss.) Boiss. Fl. Orient. 3: 819. 1875. ≡ *Phaenixopus orientalis* Boiss. Voy. Bot. Espagne 2: 390. 1841. ≡ *Scariola orientalis* (Boiss.) Soják, Novit. Bot. Delect. Seminum Horti Bot. Univ. Carol. Prag.: 46. 1962.

Comments: The name *Lactuca orientalis* is accepted, and the native range of this species is Eastern Mediterranean area to Northwestern China and the Arabian Peninsula (POWO, 2022). On the Arabian Peninsula, it is found in Saudi Arabia (Collenette, 1985, 1999; Migahid, 1996 *et al.*) and in Oman (Feulner, 2011; Gahazanfar, 2015), but it is very rare everywhere according to GBIF (2022) only occurring at three locations in Saudi Arabia (Région de Ha'il in Prov. Ha'il, Al Hait in Al Madinah Prov. and Al Mafraq, in Prov. Tabuk, Saudi Arabia). It is occasionally found in Mussandam, Northern Oman, at elevation 500–1900 m, in silt among rocks, including field margins and wadi beds (Feulner, 2011). For Fujairah and the UAE generally, this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007). We found this species in the spring of 2020 in the mountains at 1300 m a.s.l. in the environs of Al Tawyeen, Fujairah. Thus, it is a newly recorded species for the flora of Fujairah Emirate and for the UAE at whole.

Our plants match the herbarium specimens of *Lactuca orientalis* at JSTOR (2022), the herbarium specimens at GBIF (<http://data.rbge.org.uk/herb/E00904815>), at POWO (2022), in LE, and the original description of *Lactuca orientalis* given by Boissier (1846, 1875), as well as the description in the *Flora of China* which is based on the descriptions by Zhu Shi, Kilian (2011) and a description *Lactuca orientalis* (as *Scariola orientalis*) given in *Flora of the U.S.S.R.* (Kirpicznikov, 1964, 2000).

Specimens examined: HBG505092!, JE00017138!, JE00017139!, K000815019!, K000815020!, LE 01189059!, LE 01189060!, LE 01189061!, LE 01189062!, LE 01189063!, LE 01189064!, LE 01189065!, LE 01189066!, LE 01189067!, LE 01189068!, LE 01189069!, LE 01189070!, LE 01189071!, LE 01189072!, LE 01189073!, LE 01189074!, LE 01189075!, LE 01189076!, LE 01189077!, LE 01189078!, LE 01189079!, LE 01189080!, LE 01189081!, WAG0004078!

Distribution worldwide: Afghanistan, Egypt, Iran, Iraq, Kazakhstan, Kirgizstan, Lebanon-Syria, Oman, Pakistan, Israel/Palestine, Saudi Arabia, Tadjhikistan, Transcaucasus, Turkey, Turkmenistan, Uzbekistan, West Himalaya, China (Xinjiang) (POWO, 2022)

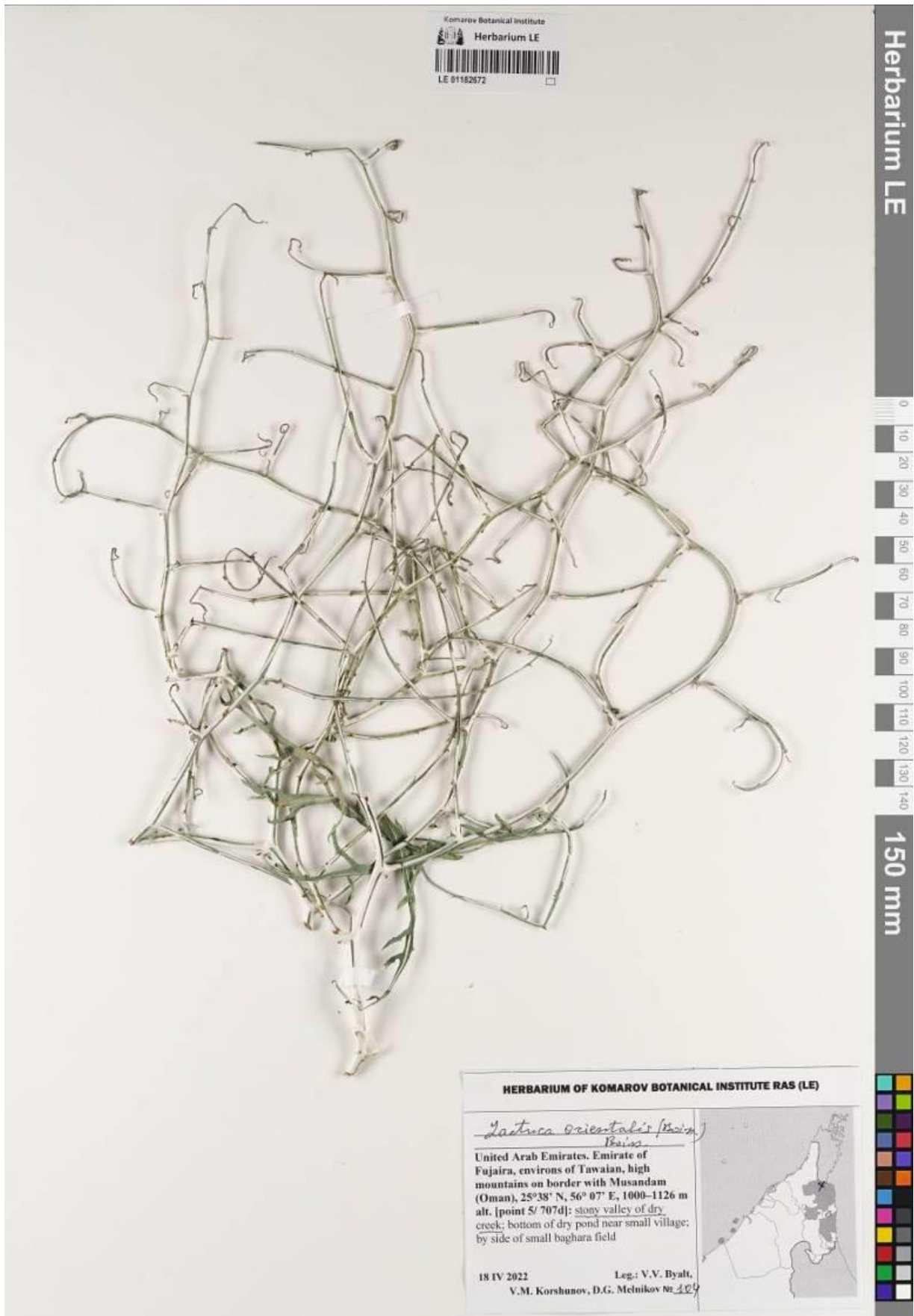


Figure 11. Scanned herbarium specimen of *Lactuca orientalis* (Boiss.) Boiss. at LE (LE01182672).

Distribution in UAE: UAE, Fujairah Emirate, 0.6 km east-north-east of the cell tower on the mountain peak, 3.5 km west of Ghub, 8 km west-south-west of Dibba. 25°34'34.49"N, 56°10'6.31"E, elevation 730 m [719a]: on mountain sides of upper stone wadi, 24.III.2020, V.V. Byalt, M.V. Korshunov 3100, veg., fl., fr. (LE); UAE, Emirate of Fujairah, environs of Tawaian, high mountains on border with Musandam (Oman), 25°38'N, 56° 07'E, 1000–1126 m alt. [point 707d]: stony valley of dry creek, 18.IV.2022, V.V. Byalt, V.M. Korshunov, D.G. Melnikov 104 (LE01182672) (Fig. 11).

New record in Brassicaceae

Clypeola aspera (Weber) Turrill, J. Bot. 60: 269, in obs. 1922. \equiv *Peltaria aspera* Weber, Pl. Min. Cogn. Decuria: 6. 1784.

The accepted name, *Clypeola aspera*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVP (2022). Its native distribution range is East Central & Southeastern Turkey to Central Asia and Western Pakistan and the Arabian Peninsula (POWO, 2022).

Comments: In Arabia it is occasionally found in Saudi Arabia (Miller, Cope, 1996) and on Ru'us al-Jibal in Musandam (Northern Oman) and in Ras al Khaima (UAE) at altitudes from 500 to, at least, 1400 m, but it is easily overlooked (Jongbloed *et al.*, 2003; Ghazanfar, 2003; Feulner, 2011). *Clypeola aspera* is mentioned as present in the UAE (Jongbloed *et al.*, 2003), but for Fujairah this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007). Thus, it is a newly recorded species for the flora of Fujairah Emirate and for the UAE as a whole.

Our plants match the herbarium specimens of *Clypeola aspera* at JSTOR (2022), GBIF (<http://data.rbge.org.uk/herb/E00903494>), POWO (2022) and LE, and the original description of *Clypeola aspera* given by Weber (1784), as well as the descriptions by Jafri in the *e-Flora of Pakistan* (2022) and Rechinger in *Flora Iranica* (1968).

Specimens examined: E00376738!, E00376730!, E00376729!, E00376742!, E00376732!, K000318578!, K000318577!, K000318576!, LE 01189082!, LE 01189083!, LE 01189084!, LE 01189085!, LE 01189086!, LE 01189087!, LE 01189088!, LE 01189089!, LE 01189090!, LE 01189091!

Distribution worldwide: Afghanistan, Gulf States, Iran, Iraq, Lebanon-Syria, Oman, Pakistan, Palestine, Saudi Arabia, Turkey, Turkmenistan, Uzbekistan (POWO, 2022)

Distribution in UAE: Fujairah Emirate, Al Tawyeen (Taween) area, small village 0.8 km west-north-west of the mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1200–1360 m, on rock ledges, 13.III.2020, V.V. Byalt, M.V. Korshunov 370, fl., fr. (LE!). (Fig. 12).



Figure 12. *Clypeola asperata* (Weber) Turill on rock ledges in high mountain near Al Tawyeen. Photograph by V. Byalt.

New record in Caryophyllaceae

Velesia fasciculata Boiss. Diagn. Pl. Orient. ser. 1, 8: 92. 1849 \equiv *V. rigida* var. *fasciculata* (Boiss.) Post, Fl. Syr.: 122. 1896.

Comments: The accepted name, *Velesia fasciculata*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVP (2022). Its native distribution range is reported to be the Eastern Mediterranean region (POWO, 2022). For Fujairah, the UAE and Arabia generally, this species has not been reported (Collenette, 1985; Daoud, Al-Rawi, 1985; Cornes and Cornes, 1989; Western, 1989; Ghazanfar, 1992; Migahid, 1996; Wood, 1997; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007; Norton *et al.*, 2009). For Arabia, only one species is given for the genus *Velesia*, *V. rigida* L. (Miller, Cope, 1996; Collenette, 1999), which is distributed in northern Saudi Arabia. It differs well from *V. fasciculata* by solitary flowers or in cymes of 2–3 bright pink flowers (and not in dense cymes of 6–8(10) flowers and pale pink or white as in *V. fasciculata*).

The Key is adapted from *Flora of Turkey* (Coode, 1967):

1. Inflorescence usually a \pm symmetrical, compact cyme, the ultimate fascicles 6–8 flowered; petals retuse ***Velesia fasciculata***

+ Inflorescence usually a ± lax, one sided, the flowers solitary, in pairs or 3 at most; petals bifid **Velezia rigida**

We found, photographed and collected specimens of *V. fasciculata* in the spring of 2020 (Fig. 13) in the mountains at ca. 1300 m a.s.l. in the environs of Al Tawyeen (Fujairah). In our opinion, the remaining unidentified plant (Feulner, 2011: Fig. 5.2.1) at Ru'us al-Jebal in Mussandam (Oman), also belongs to *Velezia fasciculata*. The picture (Fig. 13) shows the plant in buds, so it differs slightly from the typical *V. fasciculata* in having shorter peduncles and shortened flower calyxes, otherwise it is quite similar to the latter. *V. fasciculata* has not been reported for Oman earlier, and thus is a newly recorded species also for this country.

Our plants match the herbarium specimens of *Velezia fasciculata* at JSTOR (2022), the specimens of *V. fasciculata* at POWO (2022), in LE, and the original description of *V. fasciculata* given by Boissier (1849), as well as a description *V. fasciculata* given in *Flora of Turkey* (Coode, 1967).



Figure 13. Young plant of *Velezia fasciculata* Boiss. between stones (in centre) together with *Anagallis arvensis* L. and *Filago desertorum* Pomel. Photograph by V. Byalt

Specimens examined: K000077457!, LECB0000587!, K000077458!, LE 01189092!, LE 01189093!, LE 01189094!, LE 01189095!. PH00028696!

Distribution worldwide: Lebanon-Syria, Israel/Palestine, Turkey, Eastern Arabia. (POWO, 2022).

Distribution in UAE: Fujairah Emirate, Al Tawyeen (Taween) area, small village 0.8 km west-north-west of the mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1200–1360 m, on rock ledges, 13.III.2020, V.V. Byalt, M.V. Korshunov s.n., fl. juv., (LE!). (Fig. 13).

So far, this is the only place that *Velezia fasciculata* has been found in UAE and the species should therefore be recommended for inclusion in the Red Data Books of the UAE and

Fujairah. Along with *V. fasciculata* some other rather rare plants, such as *Prunus arabica*, *Echinops erinaceus*, *Senecio coronopifolius* grow on the plateau and on ledged rocky slopes (Figs. 4–8).

New records in Poaceae

Aegilops kotschy Boiss., Diagn. Pl. Or., ser. 1, 7: 129. 1846 ≡ *A. triuncialis* var. *kotschy* (Boiss.) Boiss., Fl. Or. 5: 674. 1884 ≡ *Triticum triunciale* subsp. *kotschy* (Boiss.) Asch. & Graebn., Syn. Mitteleur. Fl. 2(1): 707. 1902 ≡ *Triticum kotschy* (Boiss.) Bowden, Canad. J. Bot. 37: 675. 1959 ≡ *Aegilemma kotschy* (Boiss.) A.Löve, in Biol Zentralbl. 101: 207. 1982.

Comments: The accepted name, *Aegilops kotschy*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVF (2022). For Fujairah Emirate this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007), but it was reported as very rare in the Ras Al-Khaimah Emirate to Wadi Beh, near borders with Musandam (Cope *et al.*, 2007: 77). Thus, it is a newly recorded species for the flora of Fujairah Emirate and a rare plant for the UAE as a whole.

Our plants match the herbarium specimens of *Aegilops kotschy* at JSTOR (2022), in LE, and also the original description of *A. kotschy* given by Boissier (1846), as well as a good description given in the *Flora of Iraq* (Bor, 1968).

Specimens examined: K000979172!, K000979173!, LE01188940!, LE01189096–LE01189121!

Distribution worldwide: This species has a native range from Tunisia to Afghanistan (POWO, 2022). On the Arabian Peninsula it is known from the north of Saudi Arabia (Chaudhary and Cope, 1983; Cope *et al.*, 2007; Flora of Saudi Arabia – Checklist, 2011) and Northern Oman (Cope, 1985; Ghazanfar, 1992, 2018; Cope *et al.*, 2007; Feulner, 2011; Patzelt *et al.*, 2014), UAE (without specifying the exact location) (Cope *et al.*, 2007), and Kuwait (Al-Rawi, 1987; Cope *et al.*, 2007).

Distribution in UAE: United Arab Emirates, Fujairah Emirate, Al Tawaian (Tawyeen) area, high mountains on border with Musandam (Oman), small village 0.8 km west-north-west of mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1350–1367 m [point 6/ 707a]: on limestone mountain rock ledges, 18.IV.2022, V.V. Byalt, V.M. Korshunov, D.G. Melnikov 119 (LE01188940) (Fig. 14).



Figure 14. Scanned herbarium specimen of *Aegilops kotschyi* Boiss. var. *hirta* Eig at LE (LE01188940).

Rare, but possibly overlooked, is known for Fujairah only from this location.

This species is very similar to *Aegilops trijuncalis* L. but differs in the following features (Al-Rawi, 1987):

1. Culms up to 40 cm high. Spike on a long peduncle; spikelets more than 4, decreasing in size upwards. Nerves of lower glume unequally broad.....*A. trijuncalis*
+ Culms up to 25 cm high. Spike on a very short peduncle; spikelets usually 4. Inflated above the middle. Nerves on lower glume equally broad..... *A. kotschyi*

Poa sinaica Steud. Syn. Pl. Glumac. 1: 256. 1854 (publ. 1855). ≡ *Poa bulbosa* subsp. *sinaica* (Steud.) Tzvelev, Novosti Sist. Vyssh. Rast 10: 95. 1973.

Comments: The accepted name, *Poa sinaica*, is recorded in the taxonomic databases CoL (2022), GBIF (2022), POWO (2022), and the WCVF (2022). Its native distribution range is reported to be Eastern Mediterranean to Northwestern India (POWO, 2022).

For Fujairah Emirate this species has not been reported (Western, 1989; Böer, 2000; Jongbloed *et al.*, 2003; Karim and Fawzi, 2007), but it was recorded as very rare in the Ras Al-Khaimah Emirate to Wadi Beh (near borders with Mussandam) [Chaudhary & Böer (RIY 16313, herb. TERC 516)] (Böer, Chaudhary, 1999; Jongbloed *et al.*, 2000). Thus, it is a newly recorded species for the flora of Fujairah Emirate and a rare plant for the UAE as a whole.

Our plants match the herbarium specimens of *Poa sinaica* at JSTOR (2022), on POWO (2022), and also the original description of *Poa sinaica* given by Steudel (1855), as well as the figure and description of *P. sinaica* given in *Flora of Iraq* (Bor, 1968). Our specimen differs from other studied specimens by villous glumes and may be determined as var. *hirta* Eig.

Specimens examined: MPU027767!, BM000813078!, E00367897!, E00367911!, G00380175!, G00330292!, G00382995!, K000315609!, K000315607!, K000939202!, K000789588!, K000789587!, K000641312!, P02643473!, P02663419!, P02663422!, S05-10295!, TUB006568!, TUB006567!

Distribution worldwide: Afghanistan, Egypt, Greece, Gulf States, India, Iran, Iraq, Kuwait, Lebanon-Syria, Libya, Oman, Pakistan, Palestine, Saudi Arabia, Sinai, Transcaucasus, Turkey, West Himalaya (POWO, 2022). On the Arabian Peninsula it is known from the north of Saudi Arabia [“Saudi Arabia: H. Heemstra 3452, Al-Jauf near Tamaryaat: N. Munro 3363, northern Saudi Arabia (s. loc.)”] (Chaudhary and Cope, 1983; Cope, 2007; Flora of Saudi Arabia – Checklist, 2011) and Northern Oman (Cope, 1985; Ghazanfar, 1992; Feulner, 2011).

Distribution in UAE: UAE, Fujairah Emirate, Al Tawyeen (Taween) area, small village 0.8 km west-north-west of mountain peak. 25°38'59.41"N, 56°7'17.88"E, elevation 1360 m. [point 707]: on mountain rock ledges and cracks of big boulders, 13.III.2020, V.V. Byalt, M.V. Korshunov 368, 403, 497, fl., fr. (LE, FSH); UAE, Fujairah Emirate, Al Tawaian (Tawyeen) area, high mountains on border with Musandam (Oman), small village 0.8 km west-north-west of mountain peak, 25°38'59.41"N, 56° 7'17.88"E, elevation 1350–1367 m [point 6/ 707a]: on limestone mountain rock ledges, between boulders and in rock cracks, 18.IV.2022, V.V. Byalt, V.M. Korshunov, D.G. Melnikov 123, fr. (LE). (Figs. 15, 16).

Rare, but possibly overlooked. Recorded from UAE in Wadi Bih, Ras al-Khaima Emirate by Böer and Chaudhary (1999).

This species is very similar to *Poa bulbosa* but differs by the following features (based on Bor, *Flora of Iraq*, 1968: 110; Ali *et al.*, *Flora of Pakistan*, 1982: 401, Cope, 2021): lemmas 2–3 mm long, callus with at least a few strands of wool, spikelets ovate-oblong, 3–6 mm long, in *P. bulbosa* and lemmas 3.5–4.5 mm long, callus without wool, spikelets in *P. sinaica* spikelets oblong-elliptic, 6–8 mm long.



Figure 15. *Poa sinaica* Steud. on rocky ledges with silt. Photograph by V. Byalt



Figure 16. Spikelets of *Poa sinaica* Steud. Photograph by V. Byalt

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Authors' contributions

Vyacheslav V. Byalt (VB) initiated the project: together with MK collected, preserved, identified and labelled plants, analysed material prepared by MK, wrote the manuscript, participated in discussion and revision of the manuscript, and coordinated the project.

Mikhail V. Korshunov (MK) together with VB collected, preserved and identified plants, participated in the discussion of the manuscript.

Vladimir V. Korshunov (VK) initiated the project with VB, made photos of plants, participated in the discussion of the manuscript.

Denis G. Melnikov (DM) together with VB collected, preserved, scanned and identified plants, participated in the discussion of the manuscript.

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