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New records of alien species of the family Urticaceae in the Fujairah Emirate (UAE)

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Keywords: alien species, flora, Fujairah emirate, United Arab Emirates, Urticaceae.

Summary. During floristic research in 2017–2020 in the Emirate of Fujairah in the United Arab Emirates (UAE), the authors made new findings of species from family Urticaceae that complement the species composition of the flora of vascular plants in the territory of the emirate and the UAE as a whole. The article presents data on 4 new to the UAE alien ergasiophytes from Urticaceae – *Laportea interrupta* (L.) Chew. (a weed in the plant nursery in Al Bidiya), *Pilea microphylla* (L.) Liebm. (a weed in nurseries in Al Dibba and Al Bidiya), *Pouzolzia zeylanica* (L.) Benn. (a weed in the seaside promenade of city of Al Fujeirah), and *Pilea microphylla* and *Pouzolzia zeylanica* also for Arabia in general. A preliminary assessment of the species diversity of family Urticaceae in the Arabian Peninsula is also given. Taking into account new records, 7 species from 6 genera belonging to this family have been identified in the UAE. The herbarium materials were transferred to the Herbarium of the Komarov Botanical Institute (LE, Saint-Petersburg, Russia), the duplicates – to the Herbarium of Altai State University (ALTB, Barnaul, Russia) and the Scientific Herbarium of Fujairah (FSH, Wadi Wuraya, Fujairah, United Arab Emirates).

Новые находки чужеродных видов из семейства Urticaceae во флоре эмирата Фуджейра (ОАЭ)

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Ключевые слова: адвентивные виды, ОАЭ, флора, эмират Фуджейра, Urticaceae.

Аннотация. В ходе флористических исследований в 2017–2020 гг. в эмирате Фуджейра в Объединённых Арабских Эмиратах (ОАЭ) авторами были сделаны новые находки, дополняющие видовой состав флоры сосудистых растений территории эмирата и ОАЭ в целом. В статье приводятся данные по 4 новым чужеродным для ОАЭ видам-эргазиофитам и эргазиофигофитам из сем. Urticaceae – *Laportea interrupta* (L.) Chew. (сорное в питомнике в пос. Эль Бидия), *Pilea microphylla* (L.) Liebm. (сорное в питомниках в Эль Диббе и Эль Бидии), *Pouzolzia zeylanica* (L.) Benn. (сорное на набережной в г. Эль Фуджейра), а *Pilea microphylla* и *Pouzolzia zeylanica* – также для Аравии в целом. Также приведена предварительная оценка видового разнообразия сем. Urticaceae на Аравийском полуострове. С учётом новых находок, в ОАЭ на настоящий момент выявлено 7 видов из 6 родов сем. Urticaceae. Гербарные материалы были переданы в Гербарий Ботанического института

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This research is a part of the project "Flora of Fujairah, United Arab Emirates", under a cooperation agreement between the Office of the Crown Prince of Fujairah and the V. L. Komarov Botanical Institute of the Russian Academy of Sciences, St. Petersburg (Byalt et al., 2020a, b). In the course of field research in 2017–2020 and as a result of study of collected materials, the authors clarified information on the distribution of new alien (adventive) plant species in the territory of the Emirate of Fujairah (United Arab Emirates – UAE). We quite agree that the study of the processes of anthropogenic transformation of flora and monitoring of alien species are an important part of regional floristic research (Pyšek et al., 2004; Zykova, Shaulo, 2020; etc.). There is still insufficient information about the alien component of the Fujairah flora represented by species that were accidentally introduced and escape from the cultivation (Byalt, Korshunov, 2018, 2020a–d). Our recent studies of the flora of the region make a feasible contribution to the study of the biodiversity of Fujairah including its adventive element.

Urticaceae family is rather poorly represented in the flora of the Arabian Peninsula, in comparison with the tropics of America, Africa, South and East Asia (Lenardi, 1964; Chen et al., 2003; Monro, 2009; Neto, Gaglioli, 2010; etc.). While for the Arabian Peninsula and island Socotra Miller and Cope (1996) recorded a total of only 19 species from 9 genera: *Debregiasia saeneb* (Forsskal) Hepper et J. R. I. Wood, *Droguetia iners* (Forsskal) Schweinf, *Forsskaolea griersonii* A. G. Miller, *F. tenacissima* L., *F. viridis* Ehrenb. ex Desf., *Girardina diversifolia* (Link) I. Friis, *Laportea aestuans* (L.) Chew, *L. interrupta* (L.) Chew, *Parietaria alsinifolia* Delile, *P. debilis* G. Forster, *P. judaica* L., *P. umbricola* A. G. Miller, *Pilea tetraphylla* (Steud.) Blume, *Pouzolzia auriculata* Wight, *P. mixta* Solms-Laub., *P. parasitica* (Forsskal) Schweinf., L., *Urtica pilulifera* L., and *U. urens* L. Heller and Heyn (1994) listed 25 species and 2 subspecies from 8 genera of Urticaceae for the whole of the Middle East including the Arabian Peninsula.

Yemen and Saudi Arabia are the richest in the number of species and genera in Arabia. So, in Yemen, 14–18 species from 8–9 genera have been identified (Miller, Cope, 1996; Wood, 1997; Al Khulaidi, 2013). According to various sources (Collenette, 1985, 1999; Migahid, 1996; Miller, Cope, 1996; Chaudhary, 1999), 10 species from 5 genera were found in Saudi Arabia. In Oman (Ghazanfar, 1992; Mosti et al., 2012): 6 species from 4 genera. In Qatar (Abdel Bary, 2012): 4 species from 3 genera. In the flora of the UAE (Jongbloed et al., 2003; Karim, Fazwi, 2007; etc.), only 3 species from 2 genera have been reported so far – *Forsskaolea tenacissima* L., *F. viridis* Ehrenb. ex Desf. and *Parietaria alsinifolia* Delile. At the same time, in two Arabian states, Bahrain (Cornes C., Cornes M., 1989) and Kuwait (Daoud, Al-Rawi, 1985), there are no native species of Urticaceae at all, although the alien *Urtica urens* was found in Kuwait (Miller, Cope, 1996).

We found that the distribution of Urticaceae in Arabia is very uneven and their greatest number is confined to the southwest and north of the peninsula (Yemen and Saudi Arabia), while the desert and waterless east of Arabia are poor in them, up to their absence in flora.

Our research shows that family Urticaceae in the UAE flora is represented by a minimum number of native species and, apparently, an increase in its species diversity is possible only due to alien ones. This is fully confirmed by our new data. As a result of the research carried out in the Fujairah emirate, we have identified rare and new species of this family (4 species from 4 genera) for the emirate.

When identifying groups of alien species, the modernized F.-G. Schroëder (Schroëder, 1969; Baranova et al., 2018) classification is used. Latin names of plants are given according the "Catalog of Life" (Hassler, 2020) and "Plants of the world online" (POWO, 2020).

To determine the status of an alien species, the following criteria were used: a large separation of the locality from the main range, data on its introduction into a neighboring region, the presence of the species only in cultivation, as well as its presence exclusively in disturbed anthropogenic habitats (Egorov et al., 2016; Baranova et al., 2018). The discovered new alien species were identified in all kinds of disturbed habitats. For each species, data from the herbarium label in English (as in the original) are provided, as well as, if available, information on the distribution in the UAE and, if necessary, brief comments on the distribution in Arabia with the greatest specification for Oman, Qatar, Bahrain and adjacent territory of Saudi Arabia.

Material and methods

The herbarium specimens were collected in several localities in the territory of the Emirate of Fujairah (United Arab Emirates – UAE) (Fig. 1).

The collected specimens were identified using the keys and descriptions in all available local Floras and guides for UAE (Western, 1989; Jongbloed et al., 2003; Karim, Fawzi, 2007) and Floras for neighbouring countries (Colenette, 1985, 1999; Cornes C., Cornes M., 1989; Migahid, 1989; Ghazanfar, 1992; Miller, Cope, 1996; Wood, 1997; Jongbloed et al., 2003; Norton et al., 2009). The materials were transferred to the Herbarium of the V. L. Komarov Botanical Institute (LE, Saint-Petersburg, Russia), the duplicates – to the Herbarium of Altai State University (ALTB, Barnaul, Russia) and the Scientific Herbarium of Fujairah (FSH, Wadi Wuraya, Fujairah, United Arab Emirates) (Byalt et al., 2020).

The online resource, Global Biodiversity Information Facility (GBIF, 2020) was used for additional information on the distribution of studied taxa which was first critically analysed by the authors of this paper. The names of the taxa, authors' abbreviations and places of publication were checked against the protologues and records in the International Plant Name Index (IPNI, 2021) and the World Checklist of Vascular Plants (WCVP, 2020).

Accepted abbreviations: UAE – United Arab Emirates, fl. – with flowers, fr. – with fruits, veg. – in a vegetative state, juv. – young, underdeveloped. LE – Herbarium of BIN RAS, FSH [not yet acronym] – Fujairah Scientific Herbarium (Byalt et al., 2020). The labels are in English as in the original. The numbers in square brackets indicate the place of our research, recorded by GPS "[point 776] and others." They are given on the labels for the convenience of working with the herbarium.

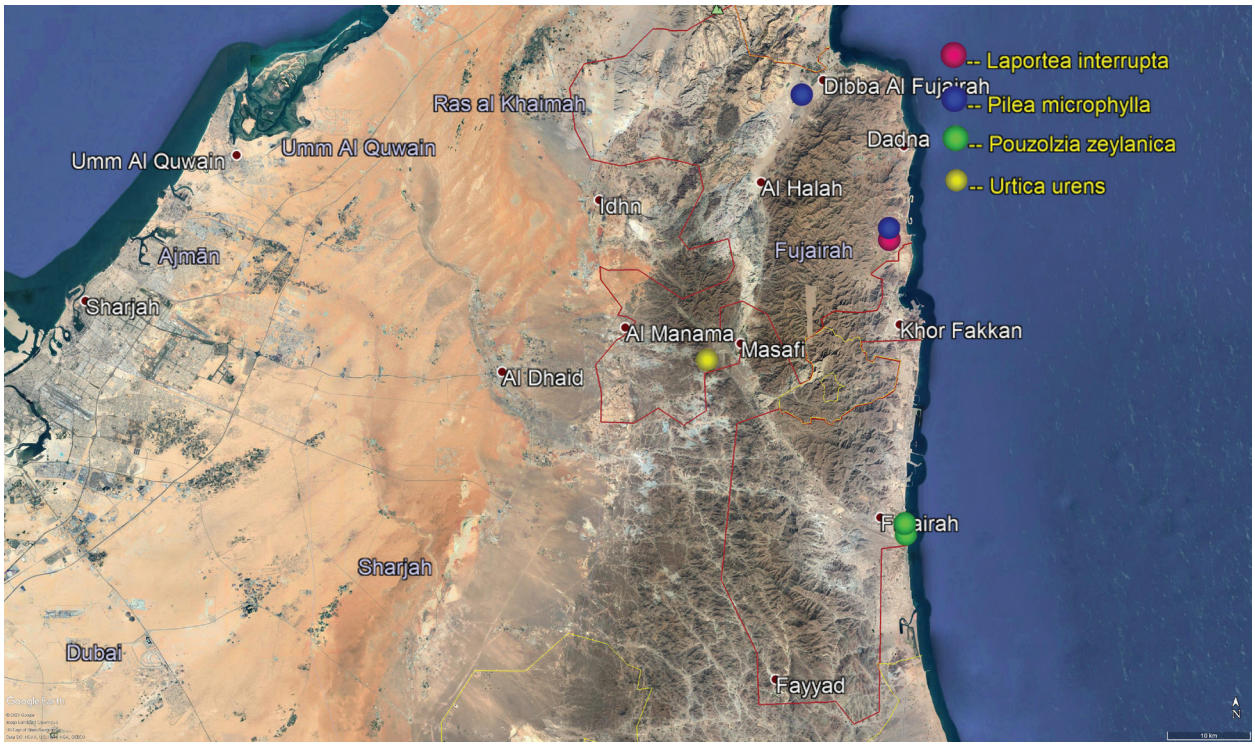

Fig. 1. Map of the distribution of new alien plants in Emirate of Fujairah (based on map of Google Earth).

New alien species of family Urticaceae in the flora of the Emirate of Fujairah (UAE)

Below are the findings of alien species of vascular plants, new to Fujairah, made in the territory of the emirate.

Laportea interrupta (L.) Chew.: "UAE, Fujairah Emirate, Al Bidiya, Al Qalamoon Nursery, 0.3 km East from Eid Prayer Ground Bidyah, 25°25'24.70"N, 56°20'18.77"E, Elevation 22 m: weed on abandoned land in nursery and in temporally abandoned greenhose, in groups. 15 V 2020, fl. V. V. Byalt, M. V. Korshunov. № 2958" (LE; FSH). – Xenophophyte, colonophyte. Its natural range covers tropical and South Africa, the Arabian Peninsula, tropical and subtropical Asia and North-East, Australia (Queensland and Northern Australia) (POWO,

2020). On the Arabian Peninsula, it is found only in the Dhofar province of southern Oman (Miller, Morris, 1988; Ghazanfar, 1992, 2003; Mosti et al., 2012), but it is rather rare "on the wet escarpment woodlands". In Fujairah and the United Arab Emirates as a whole, this species has not been recorded (Western, 1989; Böer, 2000; Jongbloed et al., 2003; Karim, Fazwi, 2007) and was not found in cultivation. We managed to find this plant in a fairly large number in the "Al Qalamoon Nursery" in the village Al Bidiya, where it grows in large groups inside a big temporarily abandoned greenhouse and in a vacant lot between the nursery fence and the greenhouse. Some plants can be found in other parts of the nursery as well. Apparently *Laportea interrupta* was accidentally brought with plant material from India or Pakistan, where this plant is quite common, while we doubt that it could have come to Fujairah from southern Oman, where it grows in the wild. We believe that *Laportea interrupta* is not yet a potentially invasive species, since it was found only in one plant nursery (Fig. 2).

Fig. 2. *Laportea interrupta* (L.) Chew. growing as weed in a greenhouse at the plant nursery in Al Bidiya village (photo by V. Byalt).

Pilea microphylla (L.) Liebm.: "UAE, Fujairah Emirate, Al Bidiya, Al Qalamoon Nursery, 0.3 km East from Eid Prayer Ground Bidyah, 25°25'24.70"N, 56°20'18.77"E, Elevation 22 m: weed in and between plastic pots with cultivated plants (*Cycas revoluta*). 15 V 2020, fl. V. V. Byalt, M. V. Korshunov. № 2938" (LE; FSH); "UAE, Fujairah Emirate, Al Bidiya, Desert Oasis Nursery Bidyah, 0.7 km West from Bidiyah Association for Culture and Folklore. 25°26'9.06"N, 56°20'17.72"E, elevation 14 m: weed in plastic pot with *Cycas revoluta* and between pots. 4 VI 2020, fl. V. V. Byalt, M. V. Korshunov. № 3477" (LE; FSH); "UAE, Fujarah Emirate, Al Dibba town, Alamarey Nursery, 0.5 km South from Khalid Hadi Resort Dibba. 25°34'33.97"N, 56°14'6.15"E, elevation 45 m: weed in and between plastic pots with cultivated trees, in shade, on wet sand. 13 VI 2020, fl. V. V. Byalt, M. V. Korshunov. № 3582" (LE; FSH). – Ergasiophyte, ephemerophyte. Its natural range covers America from Mexico to the north of South America and Peru, southeast USA and the Caribbean, naturalized in some tropical and subtropical countries in Africa, Europe and Asia (POWO, 2020). In Fujairah, United Arab Emirates and in Arabia in general, this species is not registered either as culti-

vated or as an alien species (Colenette, 1985, 1999; Cornes C., Cornes M., 1989; Migahid, 1989; Western, 1989; Miller, Cope, 1996; Wood, 1997; Böer, 2000; Ghazanfar, 2003; Jongbloed, 2003; Karim, Fazwi, 2007; Norton et al., 2009; etc.). According to our observations, this plant is growing as occasional weed in a number of private plant nurseries in Fujairah in Dibba and the village Al Bidiya. It usually forms small clumps on damp sand (in places of regular and abundant watering) in the shade, in pots and between pots with cultivated plants. Most commonly found in and around *Cycas revoluta* L. (Cycadaceae) pots (Fig. 3). This may indicate that *Pilea microphylla* was accidentally introduced with plant material from India or Pakistan (from where *Cycas* are brought to nurseries and grown for sale – according to nursery staff) and where *Pilea* is a fairly common weed (POWO, 2020).

Fig. 3. *Pilea microphylla* L.) Liebm. growing as weed at the plant nursery in Al Bidiya village (photo by M. Korshunov).

Pouzolzia zeylanica (L.) Benn.: “UAE, Emirate of Fujaira, seafront of the city of Al Fujeira, 25°07'18.09"N, 56°21'22.92"E: weed in irrigated round between highway lanes at the middle of the seefront. – ОАЭ, Фуджейра, морская набережная г. Фуджейра, 25°06'38.35"N, 56°21'27.04"E: сорняк в поливном круге между полосами шоссе в середине набережной. 27 XI 2019, fl., fr. V. V. Byalt, M. V. Korshunov. № 1821” (LE); “UAE, Fujairah Emirate, Al Fujairah, wasteland near Fujairah Corniche road, opposite of Fujairah International Marine Club, 25°7'22.82"N, 56°21'23.00"E, Elevation 3 m: weed in irrigated rounds between highway lanes. 9 V 2020, fl. V. V. Byalt, M. V. Korshunov. № 2805” (LE). – Xenophyte, colonophyte. Herbaceous perennial or subshrub originating from South Asia and Northern Australia. According to the GBIF website, it is marked as alien in 2 countries of the world (*Pouzolzia zeylanica* ..., 2019). A study of the relevant literature sources on the flora of the UAE (Western, 1993; Jongbloed, 2003; Karim, 2007; etc.) shows that *Pouzolzia zeylanica* was not given for the UAE earlier. It is absent in other countries of the Arabian Peninsula (Miller, Cope, 1996) including Oman (Ghazanfar, 1992), Saudi Arabia (Collenette, 1985, 1999; Migahid, 1996; Chaudhary, 1999;

etc.), Qatar (Norton et al., 2009) and Yemen (Wood, 1997). A new alien species for Fujairah, UAE and the Arabian Peninsula in general. The plant is not of ornamental value, but it is used in medicine in Southeast Asia (Valkenburg, Bunyapraphatsara, 2001). Perhaps it was brought by the Hindustani living in Fujairah and is grown for medicinal purposes and has already begun to run wild, or it is a typical weed that accidentally came to the coast with planting material when landscaping the median strip of the highway on the seafront of Al Fujairah (Fig. 4). According to our data, planting material of woody plants is quite often imported from Pakistan or India and purchased from local nurseries for sale.

Fig. 4. *Pouzolzia zeylanica* (L.) Benn. growing as weed on the seaside embankment of Fujairah City (photo by M. Korshunov).

Urtica urens L.: "UAE, Fujairah Emirate, Masafi friday market, E88 Al Dhaid – Masafi road, 4 km to Masafi. 25°17'47.12"N, 56° 7'26.88"E, elevation 380 m: in plant market and plant nursery, between pots on wet sand. 23 III 2020, fl. V. V. Byalt, M. V. Korshunov. № 993" (LE). – Xenophyte, ephemerophyte. Its natural range covers the moderately warm regions of Eurasia (POWO, 2020). It is believed to come from Europe, although this cannot be considered fully proven (Geltman, 2004). It is actively recorded and found on all continents. According to the Global Biodiversity Information Facility (GBIF, 2020), it was accidentally introduced in more than 30 countries of the world including some countries on the Arabian Peninsula. According to the literature data, *U. urens* grows as weed in Saudi Arabia (Collenette, 1985, 1999; Migahid, 1996), Yemen, and isl. Socotra (Wood, 1997), Kuwait (Miller, Cope, 1996) and Qatar (Abdel Bary, 2012). In Fujairah and the United Arab Emirates, this species has not yet been recorded in local floras and checklists as an alien species (Western, 1989; Böer, 2000; Jongbloed et al., 2003; Karim, Fazwi, 2007) but was reported for the United Arab Emirates without indication the exact location in the "Flora of Arabian Peninsula" (Miller, Cope, 1996). We have repeatedly observed this plant in plant nurseries in the environs of Masafi, however, it occurs only in spring (during the rainy cool period) on damp sand between plant pots in a very small number of individuals. We assume that this weed enters the nursery with seedlings of plants (for example, from the Rosaceae family) from Spain or Portugal (i.e. from Europe), where *U. urens* is a common plantation weed. We believe that stinging nettle is not yet a potentially invasive species, since it is found in very small quantities and is quite hygrophilous.

Conclusion

Until now, the Urticaceae family has been represented on the Arabian Peninsula by 19 species from 9 genera (Miller, Cope, 1996; etc.). At the same time, taking into account our new records of *Laportea interrupta*, *Pilea microphylla*, *Pouzolzia zeylanica*, 7 species from 6 genera of this family have been identified in the UAE so far, and their number in Arabia has reached 21 species.

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