

## ***PHEMERANTHUS CONFERTIFLORUS*: NEW ALIEN SPECIES TO EUROPE**

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**Abstract:** *Phemeranthus confertiflorus* (Montiaceae) is reported as a new alien species to Europe. It is native to North America and used as decorative in rock gardens. The specimens of this plant were collected in Bucharest (Romania) and deposited in BUC. The mode of introduction of the plant is unknown, most likely escaped from cultivation. Data about habitat and population of the taxon are presented. One of the plants that accompany *Phemeranthus confertiflorus* is also an alien to Europe – *Portulaca pilosa* and this is the first record of this plant for Romania.

**Kew words:** alien species, Europe, invasive plants, *Phemeranthus*, *Portulaca*, Romania.

### **Introduction**

*Phemeranthus* belongs to the family Montiaceae (fameflowers, rockpinks, sunbrights), part of the traditionally recognized Portulacaceae s.l. [NYFFELER & EGGLI, 2010]. *Phemeranthus* species are almost entirely North American, with one exception *P. punae* (Fries) Carolin found in northern Argentina. The centre of diversity of this genus is northern Mexico and the south-western United States [PRICE, 2012].

*Phemeranthus* has been included for a long time in the genus *Talinum* Adans. as *Talinum* sect. *Phemeranthus* [KIGER, 2001]. Morphological data such as the shape of the basis leaf, the capsule dehiscence and structure, the seed surface texture [CAROLIN, 1987, 1993; HERSHKOVITZ, 1993; FERGUSON, 2001] and molecular phylogenetic investigations [HERSHKOVITZ & ZIMMER, 1997, 2000; APPLEQUIST & WALLACE, 2001; NYFFELER & EGGLI, 2010] suggest that the two groups are not closely related.

Over time, new combinations have appeared through the transfer of the *Talinum* species to *Phemeranthus*. For this reason, the genus comprises a various number of species according to different authors: 25 [PRICE, 2012], 30 [NYFFELER & EGGLI, 2010], 25-30 [KIGER, 2003], 27 [OCAMPO, 2003] or 20 according to The Plant List [<http://www.theplantlist.org>].

The genus comprises species of succulent, herbaceous perennials with terete leaves and fleshy roots, most of them growing in xeric habitats.

No previous literature reference on the occurrence of *Phemeranthus* in Europe was found.

During our floristic investigations on flora from Bucharest (Romania), we recorded specimens of the genus *Phemeranthus*. The preliminary survey showed that the collected material belongs to *Phemeranthus confertiflorus* (Greene) Hershkovitz. A review

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of the literature data revealed that this taxon had not been yet recorded for the flora of Romania and Europe.

### Material and methods

Plant material was photographed, collected and herborised. The herbarium specimens were deposited in the Herbarium of the Botanical Garden “D. Brandza”, University of Bucharest (BUC). The location of the population was registered with a hand-held Garmin GPS model eTrex Legend C, using WGS84 system. The morphological description, ecological features and the plant species associated were based on field observations and on individuals collected and were compared with data from the literature [FERGUSON, 2001; KIGER, 2003; PRICE, 2012]. Based on detailed photographs, Taina Price from the Washington University in St. Louis helped us identify the species.

### Results and discussion

*Phemeranthus confertiflorus* (Greene) Hershkovitz belongs to Montiaceae family and is native to south-western United States and northern Mexico [PRICE, 2012].

#### Nomenclature:

*Phemeranthus confertiflorus* (Greene) Hershkovitz, Taxon 46(2): 222, 1997.

= *Talinum confertiflorum* Greene, Bulletin of the Torrey Botanical Club 8(11): 121, 1881.

= *Talinum gracile* J. N. Rose & Standl., nom. illeg. hom. [non Colla, 1833], Contributions from the United States National Herbarium 13(8): 285, 1911.

= *Talinum rosei* P. Wilson, North American Flora 21(4): 287, 1932. nom. nov. for *Talinum gracile* J. N. Rose & Standl.

= *Talinum gooddingii* P. Wilson, North American Flora 21(4): 287, 1932 [as “*Gooddingii*”].

= *Talinum fallax* Poelln., Berichte der Deutschen Botanischen Gesellschaft 51(2): 113, 1933.

The species is closely related to *P. parviflorus* (Nutt.) and has generally been treated as synonym [PRICE, 2012; BAIR & al. 2006]. The key differences between the two taxa are:

1a Inflorescence white (rarely) to magenta; sepals early deciduous, obtuse; fruit split open at maturity, dark brown to black seeds ..... *Phemeranthus parviflorus*

1 b Inflorescence more congested, white to pink flowers; sepals usually persistent, often with dark purplish pigment apically; fruit persistent at maturity (but delicate), dark grey seeds ..... *Phemeranthus confertiflorus*

**Voucher specimens:** Romania, Bucharest: Balta Văcărești (44°24'16"N, 26°08'02"E), 65 m alt., 17.07.2013, leg. E. Nagodă, P. Anastasiu, P. Comănescu, G. Negrean; det. Taina Price [BUC 400625].

**Description** (Fig. 1): Perennial plants 5–36 cm tall in the observed field specimens [5–25 cm according to PRICE (2012)], erect. *Stems* short, slender, branching, arising from an elongated, fleshy taproot (Fig. 1C). *Leaves* alternate, sessile, tightly clustered, terete, fleshy, acute, 1–5 cm long (Fig. 1C). *Inflorescences* terminal, many flowered dichasia. Divisions of inflorescence subtended by scale-like bracts. *Peduncles* erect, wiry, straw-coloured, scape-like (8–20 cm long). *Pedicels* green, 3–5 mm long. *Flowers* slightly fragrant, ephemeral, opening in the afternoon, for about one hour (between 5 and 6 p.m.).

*Sepals* two, broadly ovate, acute to acuminate, purplish apically, persistent in fruit (Fig. 1E, F). *Petals* 5, 3.5–5 mm long [3.5–7 cm according to PRICE (2012)], pale pink, obovates, with rounded or mucronate apex, flower of about 10–12 mm diameter (Fig. 1B, D). *Stamens* 5, erect, equal to the length of the style (Fig. 1B). Filaments glabrous, 2–4 mm long, white. *Stigma* capitate. *Fruit* capsule ovoid, 3–4 mm long, dehiscent by three valves beginning at apex, persisting for a short time after dehiscence (Fig. 1 F). Each fruit contains around 15–30 small seeds. *Seeds* smooth, dark grey, cca. 0.7–1 mm wide (Fig. 1G).

**Distribution:** *Phemeranthus confertiflorus* seems to be the most widespread species of the genus [FERGUSON, 1995]. It is spread in North America, from central Chihuahua and north-eastern Sonora in Mexico to central Utah, Wyoming, and North Dakota, eastward into western Texas, Oklahoma, Kansas, and Nebraska [FERGUSON, 1995].

In Romania we recorded a single population of *Phemeranthus confertiflorus*, in Bucharest, on the north part of an area named “Balta Văcărești” (Fig. 2), with about 175 individuals (N44°24'16", E26°08'02").

“Balta Văcărești” was conceived as part of the complex development of the river Dâmbovița and remains an unfinished hydrologic project in South Bucharest. “Balta Văcărești” stretches over an area of 190 hectares and is surrounded by a concrete dam. The river bed of “Balta Văcărești” includes swampy areas with reedbeds, grassland and ponds fed by underground springs (Fig. 2).

**Habitat:** *Phemeranthus confertiflorus* can be found in a wide range of habitats from near desert to mountain forest [FERGUSON, 1995]. It grows in sunny places on shallow, sandy and rocky soils with the rhizome resting on bedrock.

We recorded the specimens of this species on shallow soil pockets (3–8 cm) at the boundary (the angle) between the inclined concrete edge of the dam and the horizontal vegetation layer (grassland). The soil, with little organic matter, provides by silt deposited on the dam along the time.

According to PRICE (2012), the plants are active during warm weather, growing, flowering, and bearing fruit in the hottest, driest part of the summer. The plants are highly resistant to drought and can remain in dormant state for prolonged periods.

The place where we identified the population of *Phemeranthus confertiflorus* receives plenty of sun, and is located in a marginal habitat. This is explained in the literature through the fact that the plant prefers harsh conditions (lack of water and nutrients) in order to exclude possible competitors [WARE, 1969; BASKIN & BASKIN, 1988; WARE, 1991; PRICE, 2012; FERGUSON, 2001].

The following taxa accompanied the species *Phemeranthus confertiflorus* in the identified location: *Portulaca pilosa* (Fig. 1A), *Tragus racemosus*, *Sedum acre*, *Setaria viridis*, *Lotus tenuis*, *Portulaca oleracea* subsp. *oleracea*, *Vulpia myuros*, *Eragrostis minor*, *Eragrostis pilosa*, *Echium vulgare*, *Erigeron annuus* s.l., *Digitaria sanguinalis*, *Galium humifusum*, *Cichorium intybus*, *Berteroa incana*, *Convolvulus arvensis*, *Petrorhagia prolifera*, *Plantago lanceolata*, *Bromus tectorum*.

We mention that *Portulaca pilosa*, native to Asia (Japan, China, Singapore) [PIER, 2005], is known as alien to Europe (DAISIE 2009), being reported from Hungary and Italy (<http://www.europe-aliens.org/speciesFactsheet.do?speciesId=8004#>). For Romania this is the first record. The plant is represented in “Balta Văcărești” by numerous flowering and fruiting individuals. In Romania there are two other species of *Portulaca*:

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*Portulaca oleracea* L., as spontaneous, and *Portulaca grandiflora* Hook., cultivated and often escaped from cultivation. We provide an identification key for these three species:

- 1a Leaves oblong-lanceolate ..... *Portulaca oleracea*  
1b Leaves linear ..... 2  
2a Flowers cca 4-5 cm diameter ..... *Portulaca grandiflora*  
2b Flowers cca 1 cm diameter ..... *Portulaca pilosa*

**Invasiveness:** In “Balta Văcărești”, *Phemeranthus confertiflorus* blooms, bears fruits and produces seeds and many of them have more than one above-ground stem. Even though it is found on a small area (approx. 200 m<sup>2</sup>), the specimens are not distributed homogenously. They are grouped in four points and with a few sparse individuals.

According to Ware (1968), cited by PRICE (2012), this species usually does not flower their first year as seedlings in the field. Also, *Phemeranthus* plants grow very slowly in nature and young plants may have a linear, semi-erect rhizome and single above-ground stem for several years [WARE, 2011]. For these reasons we consider *Phemeranthus confertiflorus* as established in “Balta Văcărești”, Bucharest.

In the context of the current climate changes, its high resistance to drought, the ability to remain dormant over long periods of time and to survive in shallow soils, and the small number of possible competitors suggest this plant could become invasive. In the future, the population will be monitored and analysed from this perspective.

As regards the way of introduction we have not certain data, but we suppose the plant is escaped from cultivation. Cacti and succulent plants collectors all over the world usually have this species in their collections. Further, as the plant is fairly easy to grow and has great decorative values, gardeners are seeking to introduce this plant in rock gardens and greenroofs [GETTER & al. 2009; DVORAK, 2010].

### **Conclusion**

A new alien plant is reported from Europe – *Phemeranthus confertiflorus*, native in North America. Probably escaped from cultivation, the plant is established in a single location, “Balta Văcărești” from Bucharest. One of the species that accompany *Phemeranthus confertiflorus* is *Portulaca pilosa*, also an alien and new record for Romania.

**Acknowledgements:** We would like to express our utmost gratitude to Taina Price from the Washington University in St. Louis for her great help in identifying the species. We wish also to address many thanks to Andreea Anastasiu for the English version of this paper.

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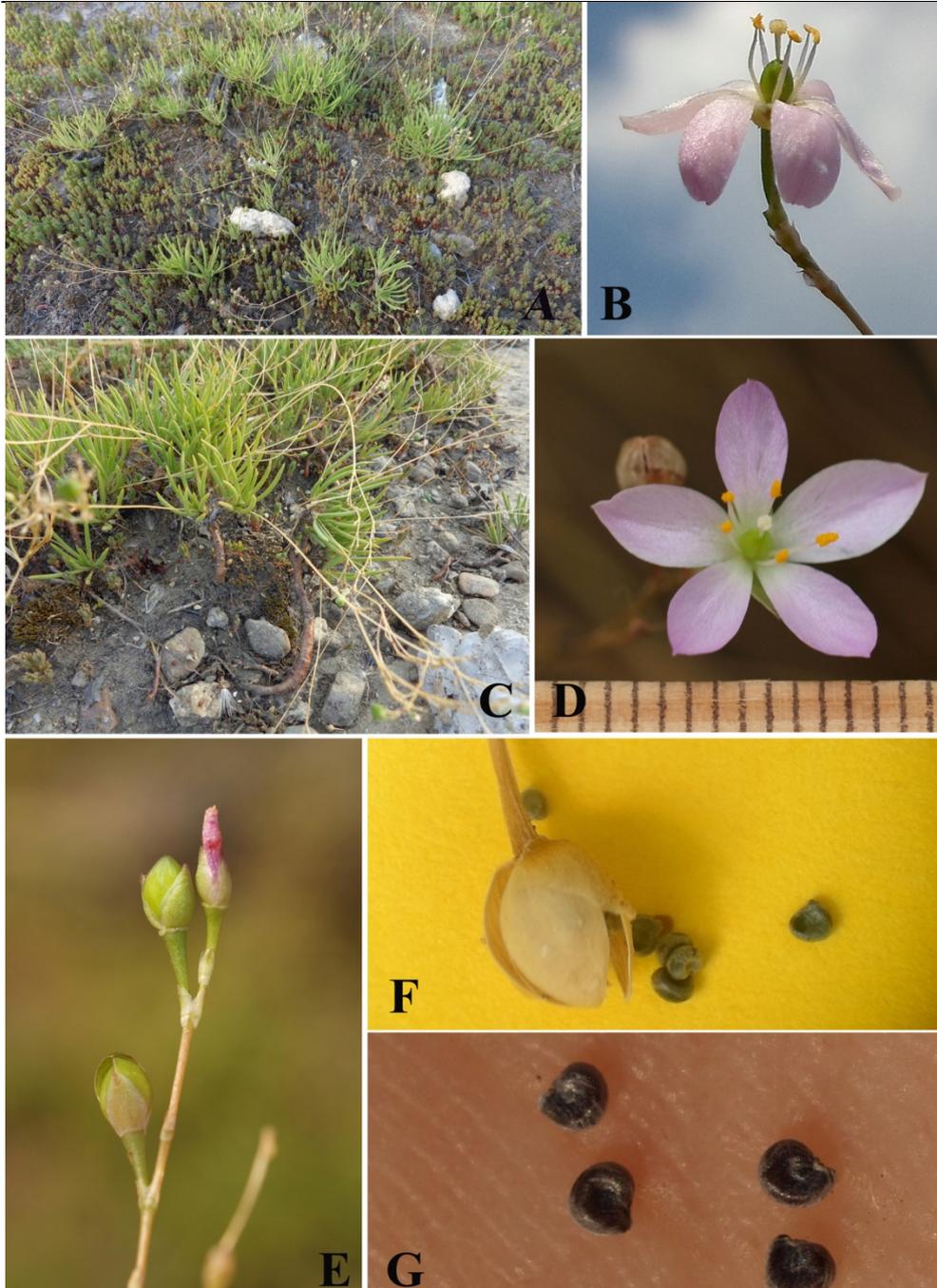
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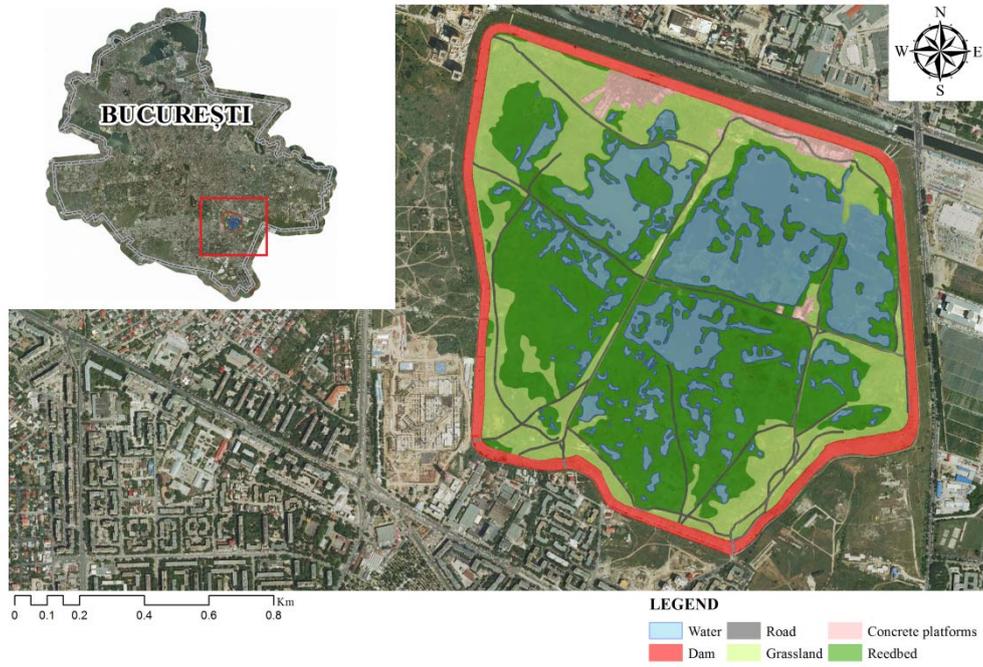
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Received: 9 October 2013 / Accepted: 19 October 2013

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**Fig. 1.** *P. confertiflorus*. A – habitat; B – flower, lateral view; C – habitus; D – fully open flower, frontal view; E – sepals persistent in fruit; F – fruit capsule dehiscing by three valves; G – seeds [Photos: Nagodă E. (Fig. 1A, C), Comănescu P. (Fig. 1B, F) & Anastasiu P. (Fig. 1 D, E, G)].



**Fig. 2.** The location of “Balta Văcărești” in Bucharest – *Phemeranthus confertiflorus* was recorded in northern part of this area (map compiled by Tiberiu Săhlean)