Chenopodium pumilio (*Chenopodiaceae*): a new species to the Bulgarian flora

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Received: June 06, 2007 ▷ Accepted: July 23, 2007

Abstract. *Chenopodium pumilio* is reported as a new species to the Bulgarian flora. It was discovered in the Thracian Lowland and the Eastern Balkan Range during an extensive research of genus *Chenopodium* in the country. A chromosome number $2n = 18$ has been established. Information about the species' morphology, habitats and distribution is provided.

Key words: *Chenopodium pumilio*, distribution, karyology, morphology

Introduction

Chenopodium L. is represented by 17 or 18 species (Delipavlov 2003; Assyov & Petrova 2006) in the Bulgarian flora. Most of them are ruderal plants, widely distributed in the country. In 2005–2006, during field work in the Thracian Lowland and the Balkan Range (*Eastern*), a new species from the genus was found: *C. pumilio* R. Br. So far, the species has been reported from the Czech and Slovak Republics (Dostálek & al. 1990) and from several countries in West and Central Europe (Akeroyd 1993). Uotila & Tan (1997) reported *C. pumilio* for the flora of Greece, wherefrom the species has most probably been introduced into Bulgaria.

Material and methods

The morphological description of the species is mainly based on personal data, as well as on data from *Flora Europaea* (Akeroyd 1993), Uotila & Tan (1997) and Uotila (2002).

Morphology of the species was studied by measuring the quantitative and recording the qualitative characteristics of 53 specimens from three studied populations. The characteristics were, as follows: 1. height of plant; 2. length of basal leaf; 3. width of basal leaf (length/width ratio); 4. length of basal leaf petiole; 5. length of middle leaf; 6. width of middle leaf (length/width ratio); 7. length of middle leaf petiole; 8. length of upper leaf; 9. width of upper leaf (length/width ratio); 10. length of upper leaf petiole; 11. number of perianth lobes; 12. length of lobes; 13. width of lobes; 14. diameter of flower; 15. length of seed; 16. width of seed (length/width ratio); 17. thickness of pericarp. The following qualitative features were noted down: colour of stem; type of inflorescence; degree of perianth concrescence; presence of keeled perianth lobes; colour of perianth, seed and pericarp.

The perianth and seed morphology, structure of pericarp and seed surface have been studied by a scanning electron microscope (SEM).

The karyotype was examined from squashed root tips. Seeds were germinated in laboratory conditions in Petri dishes. Root tips were treated with 0.05 %

Colchicin for 40–45 min and then fixed in Clarke's fixation agent for 24 h in a refrigerator. Hydrolysis was conducted in ethyl ether: HCl (1:1) for 10 min, at 60 °C. Then the root tips were washed in distilled water and stained with Haematoxylin after Gomori (Melander & Wingstrand 1953) for 30 min at 60 °C, and for 40 min at room temperature, squashed in 45 % acetic acid and mounted in Euparal. The photographs were made with HP Photosmart camera and Olympus CX21 microscope, Japan.

The voucher specimens are kept in the herbarium of the Institute of Botany, Bulgarian Academy of Sciences (SOM).

The locality and chorological data are presented on a UTM grid map of Bulgaria, following the recommendations by Kožuharov & al. (1983).

Results and discussion

The species belongs to subgenus *Ambrosia* A.J. Scott. (Uotila & Tan 1997), section *Orthosporum* R. Br. (Aellen 1960). Morphologically, *C. pumilio* resembles *C. botrys* L. by its branched stem and ovate to elliptic leaves with 2–4 lobes on either side, but differs by its narrow, non-contiguous tepals, with several glands and hairs on the rounded back close to and on the apex, which become hard and white in the fruit.

Chenopodium pumilio **R. Br., Prodr. Fl. Nov. Holl. 1: 407. 1810**

An annual herbaceous plant, densely covered with eglandular, multicellular long hairs and short glands (Plate I, Figs 2-3). Stem (23)30.1–41.2(43) cm, usually branched at base, branches up to 17(21) cm, prostrate to ascending, lateral branches short. Leaf lamina (1.1)1.3–2.8(3.2) cm × (0.3)0.5–1.2(1.5) cm, petioles (0.5)0.8–1.5(1.75) cm. Basal leaves [length/width ratio (1.3)1.32–2.33(2.7)] ovate-elliptic to lanceolate, with 2–3(4) lobes on either side; middle leaves (length/width ratio 1.35–2.4) lanceolate, with 2–3 lobes on either side; and upper leaves [length/width ratio (0.5)0.74–0.92(1.3)] narrow lanceolate, with 2 lobes on either side (Fig. 1). Flowers bisexual, sessile, 4–6 in small axillary glomerules. The glomerules arranged in leafy to apical inflorescences. Tepals 5, seldom 4, (0.6)0.75–0.87(1) × (0.2)0.32–0.38(0.4) mm, narrow lanceolate, free nearly to the base, not keeled, with eglandular hair on the apex, hard and white in fruits (Plate I, Fig. 1). Stamens 0–2(3). Pollen grains with smooth surface (Plate I, Fig. 4). Stigmas 2. Pericarp light-yellowish, semi-transparent, not adherent to the seed, 7–9 μm in diameter (Plate II, Fig. 1). Seed vertical [length/width ratio 1.23–1.25(1.3)], 0.6–0.8 mm in diameter (Plate II, Figs 2-3). Testa brown to reddish-brown, equally sculptured on both sides of seed in the form of almost evenly located wally longitudinal and transverse lines, forming typical identical sections (Plate II, Fig. 4).

Phenology. Flowering and fruiting from July to September.

Habitat and ecology. Especially in ruderal places, by roadsides, on waste grounds, up to 850 m. Most commonly, the accompanying species are plants and grasses, such as *Chenopodium botrys* L., *Trifolium repens* L., *Portulaca oleracea* L., *Polygonum aviculare* L., *Dactylis glomerata* L., *Herniaria hirsuta* L., and *Cynodon dactylon* (L.) Pers.

Distribution in Bulgaria. The species has been found in the following three localities (Fig. 2):

Balkan Range (*Eastern*): Sinite Kamuni Nature Park, in ruderal places in the Karandila locality, at 850 m, MH-42, 42°42' N, 25°20' E, 27.08.2005, coll. *N. Grozeva* (SOM 163845).

Thracian Lowland: Stara Zagora town, in ruderal places, at 195 m, LG-89, 42°25' N, 25°38' E, 15.09.2006, coll. *N. Grozeva* (SOM 163844); Chirpan town, in ruderal places, at 168 m, LG-67, 42°12' N, 25°20' E, 8.09.2006, coll. *N. Grozeva* (SOM 163843).

General distribution. Native to Australia; introduced with wool shipments and naturalized in New Zealand, Africa, North and South America and parts of West, Central and South Europe, and the Balkan Peninsula (Greece) (Dostálek & al. 1990; Akeroyd 1993; Uotila & Tan 1997).

Karyology

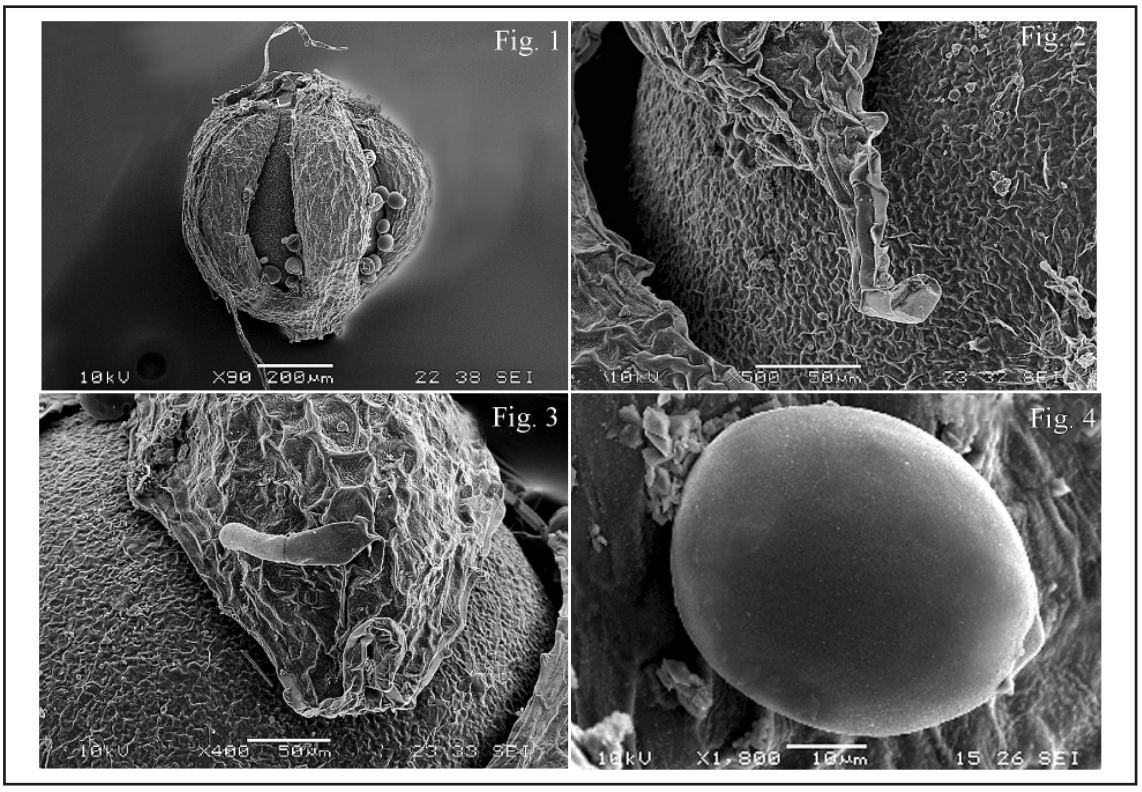
$2n = 18$ (Fig. 3)

The karyotype of the three studied populations consists of meta- and submetacentric chromosomes.

The chromosome number counted in the Bulgarian material is in agreement with an earlier count given by Schwarzová (1978) from Zahorska Nizina in Slovakia. It doesn't agree with the earlier reports of $2n = 16$ given by Giusti (1970) from Argentina and by Keener (1970) from USA.

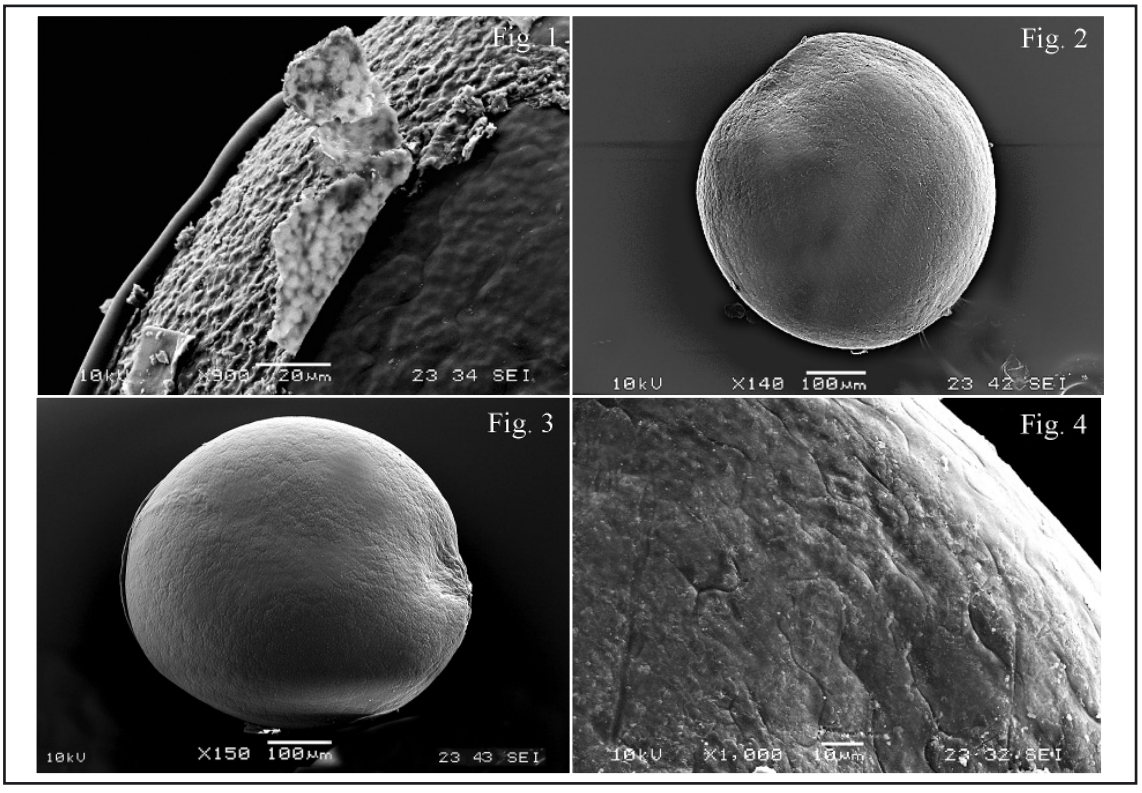
Acknowledgements. The author is grateful to the anonymous reviewer for the valuable advice.

Plate I



Figs 1-4. Scanning electron micrographs of *C. pumilio*: **1,** flower; **2,** eglandular hair; **3,** gland; **4,** pollen grain.

Plate II



Figs 1-4. Scanning electron micrographs of *C. pumilio*: **1,** pericarp; **2-3,** view of the seed from two sides; **4,** seed surface.

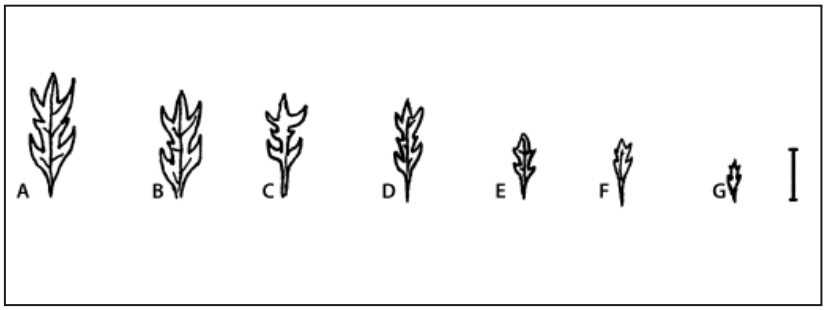


Fig. 1. *C. pumilio,* variation in shape of basal (A-B), middle (C-E) and upper

Fig. 3. Microphotograph of the metaphase plate of *C. pumilio*, 2*n* = 18.

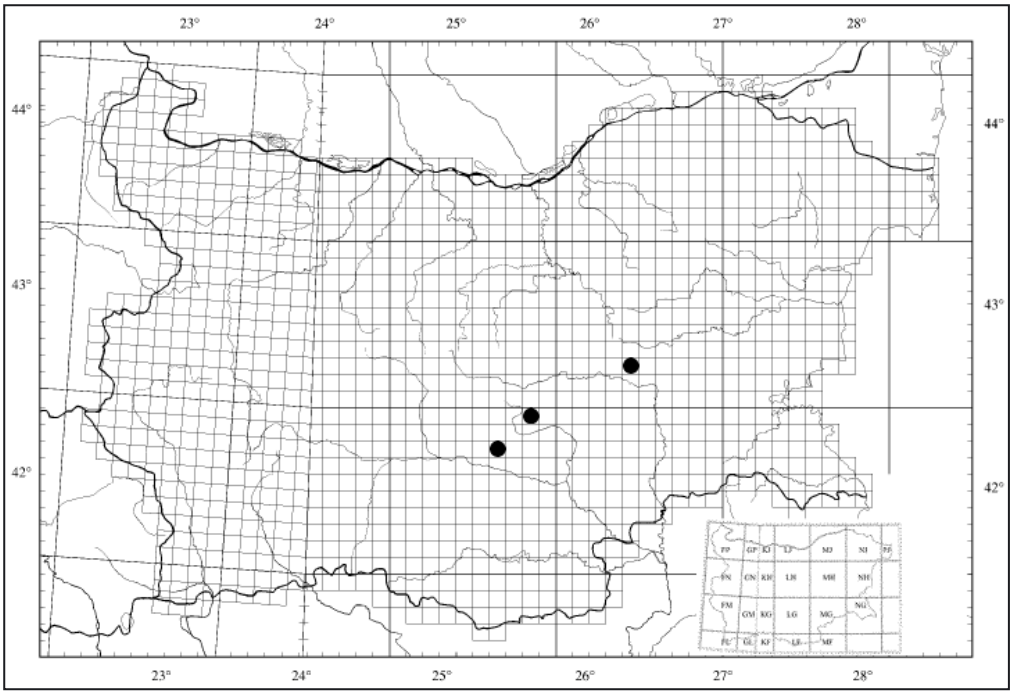


Fig. 2. Distribution map of *C. pumilio* in Bulgaria.

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