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Rediscovery of *Potentilla balansae* Soják (Rosaceae) from Turkey

Barış Bani and Nezaket Adıgüzel

Department of Biology, Arts and Sciences Faculty, Gazi University, 06500, Teknikokullar-Ankara, Turkey

Abstract: *Potentilla balansae* Soják was collected by Balansa for the first time in 1856 and described in 1859. It was recollected in 2006-2008 period, after 150 years. In this study, morphological description of *Potentilla balansae* was expanded, new threat category and the conservation activities were recommended.

Key words: Conservation · IUCN · Rosaceae · *Potentilla* · Rediscovery · Turkey

INTRODUCTION

Potentilla L. account of Turkish Flora is represented by 60 species containing 64 spesific and infraspesific taxa. 22 of them are endemic to Turkey [1-4]. This shows that Turkish flora is highly rich in terms of *Potentilla* taxa.

Potentilla balansae was collected by Balansa from Kayseri province in 1856 and described by Boissier and Balansa for the first time in 1859.

After the first collection, this plant has not been found since 1856. During the years 2005-2008, many plant specimens were collected from Tahtalı mountains by the authors. *P. balansae* was gathered from its type locality and the other collections were made from neighbouring areas of type locality in Tahtalı range.

MATERIALS AND METHODS

The Flora of Turkey and recent papers were consulted for the identification of the specimens [1-6]. For confirming the identification, the type photo of the species has been seen from the Herbarium of the Conservatoire botanique de la Ville de Genève (G). Authorities for all cited plant names are given according to Authors of Plant Names [7]. The herbarium vouchers were preserved in GAZI.

For scanning electron microscopy (SEM) investigations, the seeds were put on stubs, sputter-coated with gold plate and examined under a Jeol JSM-6060 scanning electron microscope.

New threat category assessment of *P. balansae* was made according to IUCN criteria [8].

RESULTS AND DISCUSSION

The description of *Potentilla balansae* in Flora of Turkey has been expanded based on our recent collections:

Potentilla balansae Soják in Folia Geobot. Phytotax. 4:206, (1969). Syn: *P. balansae* Peşmen in Davis, Fl. of Turkey, 4: 56 (1972); *P. nudicaulis* Boiss. & Balansa in Boiss., Diag. ser. 2 (6): 69 (1859) non Willd ex Schlecht. (1816) (Fig. 1).

Erect, perennial with a thick rootstock. Flowering stems 11-30 cm, patently hirsute or ± spreading villous, with some sessile or stalked glands. Basal leaves, digitate or subpinnate, petiole 1,7-7 cm; leaflets 5, obovate-cuneate, 10-20 (-24) x 6-10 (-12) mm, crenate-dentate with 2-4 pairs of teeth at apex, sparsely adpressed-hirsute and with some sessile glands on both sides. Inflorescens few-flowered cymes. Epicalyx segments oblong to ovate, 3-4 (-4.5) mm, c. ½ as long as sepals, obtuse, sometimes ± acute. Sepals lanceolate, 6-8 (-9) mm, acute. Petals yellow, broadly obovate to obcordate, 7-9.5-11.5 x 7-11 mm, emarginate. Achenes glabrous, brown, reniform, rugulose, 1.9-2.6 x 1.1-1.63 mm; style subterminal, conical at the base, 3.8 mm, c. twice as long as achene.

Type: Turkey B6 Kayseri: in regione superiori alpina montis Aslandach (Aslantaş), 05 August 1856, *Balansa* 571 (holo. G, photo !). (Fig. 2).

Other collections; Turkey, B6 Adana: Tufanbeyli, Ayvat village, Kızılgöl mt., Sarıkayabaşı hill, stony slopes, 2300-2400, 05 June 2006, *B.B.* 3768; ibid., 2450-2600 m, *B.B.* 3755; Tozlu village, Beydağ mt, Çekirdekliboyun hill, stony slopes, 2300-2500 m, 10 July 2006, *B.B.* 4472; Kayseri: Pınarbaşı, Mezgitli-Değirmentaş villages,

Corresponding Author: Barış Bani, Department of Biology, Arts and Sciences Faculty, Gazi University, 06500, Teknikokullar-Ankara, Turkey

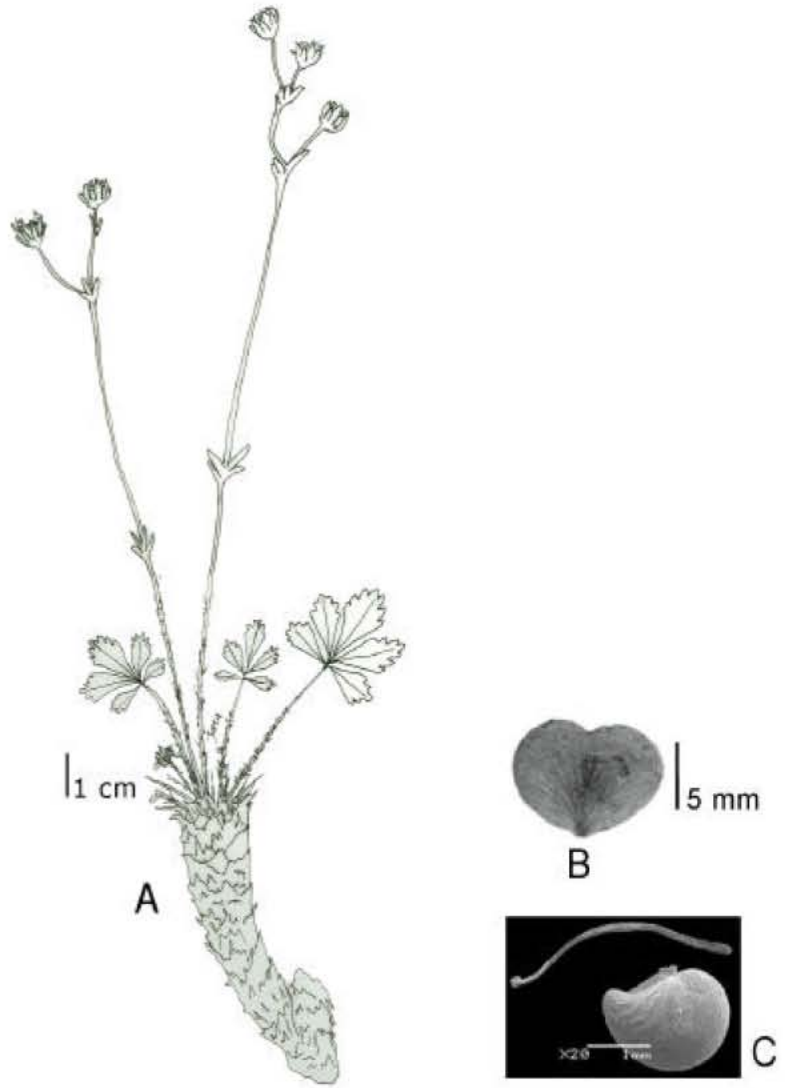

Fig. 1: *Potentilla balansae,* (A) habit, (B) petal, (C) achene and style

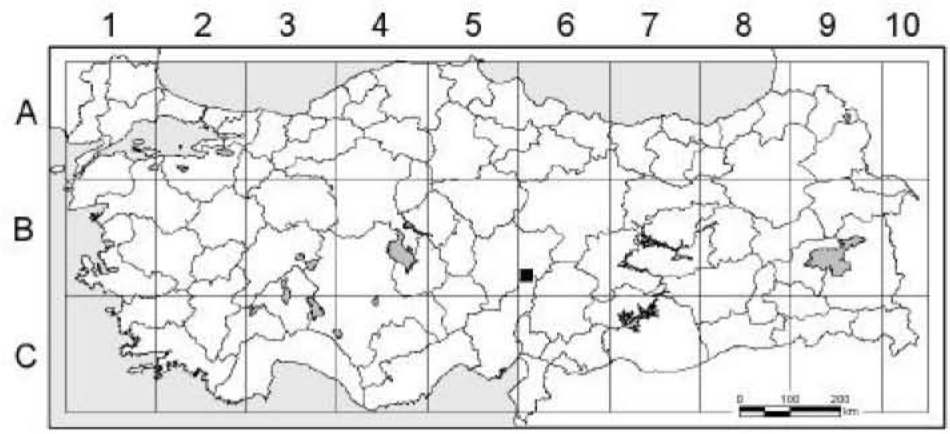

Fig. 2: Distribution map of *Potentilla balansae* (■).

Soğanlı mt., above Aslanbeyli yayla, Kurubel-Kırınsivri hills, stony slopes, 2200-2300 m, 27 May 2008, *B.B.* 5979; Tomarza, above Aslantaş village, Kızılgöl mt., stony slopes, 2300 m, 24 June 2008, *B.B.* 6248 (Fig. 2).

Potentilla balansae is related to *P. anatolica* Peşmen and *P. umbrosa* Steven but differs from both in its fewer toothed leaflets, not papillose styles and usually subpinnate leaves.

Key to P. balansae and the closest species

- Leaflets with 2-4 teeth on each side; styles not papillate..... *P. balansae*
- Leaflets with 5-8 teeth on each side; styles papillate
- Leaflets crenate or crenate-serrate, always 5; plant adpressed-pilose with long silky hairs..... *P. umbrosa*
- Leaflets serrate or incised-serrate, 5 (-7); plant densely spreading pubescent with sort hairs..... *P. anatolica*

Phenology: Flowering in late May to mid July, fruiting in July to mid August.

Habitat and Ecology: *P. balansae* grows on stony alpine slopes. Its altitudinal range varies between 2300 and 2600 m. Other species share same habitat with *P. balansae* are as follows: *Aethionema eunomioides* Bornm., *Alyssum condensatum* Boiss. & Hausskn. ex Boiss., *Alyssum baumgartnerianum* Bornm. ex Baumgartner, *Draba bruniifolia* Steven, *Arenaria balansae* Boiss., *Silene odontopetala* Fenzl, *Astragalus dumanii* Ekici & Aytaç, *Hedysarum laxum* Boiss., *Oxytropis engizekensis* H. Duman & Vural, *Asperula lilaciflora* Boiss. subsp. *phrygia* (Bornm.) E. Schonbeck-Temesy, *Tanacetum armenum* (DC.) Sch.Bip., *Veronica cinerea* Boiss. & Balansa, *Lamium eriocephalum* Benth. subsp. *eriocephalum*, *Alopecurus lanatus* Sibht. & Sm., *A. textilis* Boiss., *Bromus cappadocicus* Boiss. & Balansa, *Festuca cataonica* (Hack. ex Boiss.) Markgr.-Dann.

Before this study, there is no available information or evidence about presence of *Potentilla balansae*. Its IUCN category was DD (Data Deficient) [9]. So during the field trips to Tahtalı mountains for the purpose of determining their flora, especially the plants with DD category only known from the research area, such as *P. balansae*, were given particular interest to collect them again.

The extent of occurrence of *Potentilla balansae* was found wider than known previously. Balansa collected this plant from northwest slope of Kızılgöl mountain in Kayseri province. In addition to this collection, the author collected the specimens of *P. balansae* from different points in same range.

The extent of occurrence was determined as 340 km^2 (criterion EN B1) and its area of occupancy is only 156 km^2 (criterion EN B2). This plant could not be collected apart from the Tahtalı range, so it is only known from single location (criteria EN B1a+2a). Also it was inferred that quality of its habitat has been continuing decline (criteria EN B1b(iii)+2b(iii)). This plant is wide spread in these mountains and grows on stony alpine slopes between altitudes of 2300-2600 m. During our field surveys, total number of mature individuals that are quite healthy in the population was calculated as nearly 30.000 plants. This value seems to be very higher than criteria of CR, EN and VU categories, in terms of individual numbers. But considering the extent of occurrence, the area of occupancy, its presence in a single location and the habitat degradation, (criteria EN B1ab(iii)+2ab(iii)), new threat category of *P. balansae* should be EN (Endangered).

Threats on the Species: Almost everywhere in the Tahtalı range has been under over-grazing pressure, especially between May and October, by great number of goats, sheep and cattle belong to local people. This pressure caused changing in natural habits of the plants and seriously habitat degradation. The grazing pressure at the flowering and fruiting stage may decrease the chance of the survival by preventing the fertilization and seeding process.

Recommendations and the studies on conserving the species:

This species can be preserved by two fundamental approaches which are ex-situ and in-situ conservation.

Best way for *in-situ* conservation is establishing a protected area. Conservation strategies are often based on setting aside land for the preservation of species and ecosystems [10]. Presence of *Potentilla balansa* and other local endemics such as *Senecio inops* Boiss. & Balansa, *Silene balansae* Boiss., *Scorzonera boissieri* Lipsch., *Senecio jurineifolius* Boiss. & Balansa in this region, contributes to the plant diversity and increases importance of the area and also constitutes one of the reasons to determine a protected area in the range for in-situ conservation. When the Tahtalı mountains are taken into account with respect to the criteria of Turkish By-law on National Parks, appropriate parts of the mountains should be selected as a Protected Area for conserving the species in their natural habitats (The By-law on National Parks, Official Gazette: 12 December 1986, No.19309).

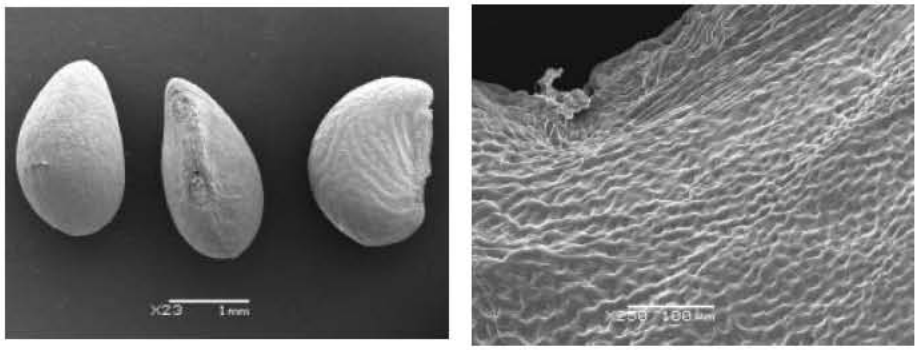

Fig. 3. Achene of *Potentilla balansae*; (A) general view, (B) surface

Seed collection may be one of the most practical and effective ways to sample plant genetic diversity and the resulting the seed samples can become a valuable resource for species conservation, habitat restoration, plant breeding and wider biological science [11]. Therefore, with the purpose of ex-situ conservation of *Potentilla balansae*, during the fruiting period in 2008, the seed collections were made and sent to Central Research Institute for Field Crops seed-bank in Ankara.

Fruit type of *Potentilla balansae* is achene. Every fruit contains only one seed. Average amount of mature seed number per flower is about 5. Achenes brown, reniform, glabrous, sculpture ornamentation reticulate-pitted (the cellular pattern consist of polygonal cells), 1.9-2.6 x 1.1-1.63 mm. Hilum ovate, 0.2-0.4 mm. Average weight 0,00162 gr (Fig. 3).

These conservation activities will also conduce to the national biodiversity strategy and action plan of Turkey developed under CBD (Convention on Biological Diversity) and GSPC (Global Strategy for Plant Conservation).

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