

A new dicotyledonous weed species was detected in Hungary: (*Persicaria bungeana* (Turz.) Nakai ex T. Mori)

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Summary

The indicated and identified plant '*Persicaria bungeana* (Turz.) Nakai ex T. Mori' known by synonym as '*Polygonum pennsylvanicum*, *Polygonum bungeana* and *Polygonum chanelii*' and by common name as 'Prickly smartweed' – is native in Northeast Asia (North-China, Mandshuria, Korea, Japan, Far East Russia), in pastures or meadows, along roads and canals, in gardens and disturbed or ruderal areas below 1700 m altitude. It can be found in cultivated fields in corn, potato, rice, soybean and cereals. The EPPO name is POLBU (<https://gd.eppo.int/taxon/POLBU>).

This new weed species belongs to the Polygonaceae family and *Persicaria* genus (Takenoshin Nakai, 1922). First it was detected as perennial weed (*Polygonum bungeanum*) in 1840 in Far East Russia by Nikolai Turczaninow, Russian biologist. Its detection and classification was cleared in 1922 by Takenoshin Nakai, Japanese biologist. Later, this species was detected in Sweden in 1924, in the Netherlands in 1925, in Denmark in 1939, in the USA in 1984 and also in Ukraine, in the European part of Russia, in Italy (Veneto province) and in the United Kingdom. It is reported as an invasive species in the USA in soybean fields (in Illinois, Minnesota, Iowa and Missouri states).

Persicaria bungeana is an annual summer weed. Plants germinate in April-May and flower in July-August. Stems are erect or ascending, 30-200 cm tall. The lower parts of the stems are covered with small prickles. In the terminal part peduncles are densely covered with glandular hair. Leaves are of a typical lance form or are narrowly elliptic. The typical bisexual *Persicaria* flowers have inflorescences of 2,5-6 cm length and of 0,4-0,8 cm width. Petals are white or pale pinkish, 5-parted. Seeds measure about 3 mm and have an onion form without any appendix.

The detected location (approximately in 250-300 m² in sunflower) was in a typical agricultural area in Eastern-Hungary close to Debrecen, in the R&D Station of University of Debrecen in Látókép in August 2019. The field area was treated by Arylex active product which selected this species. It was not found in corn right next

to sunflowers. These fields have been used for seed trials in the last decade, so presumably it is imported by seeds.

Native *Persicaria* species are *Persicaria lapathifolia*, *Persicaria maculosa*, *Persicaria hydropiper*, *Persicaria amphibia*, *Persicaria dubia*, *Persicaria minor*, *Persicaria orientalis*, *Persicaria bistorta* (protected species) in Hungary.

According to us, *Persicaria bungeana* will not become an invasive species in agricultural areas because in summer crops (corn, sunflower) it can be controlled easily by cultivation and weed control. It is very important to use seed cleaning and to avoid additional use of infected seeds.

Key words: *Persicaria*, *bungeana*, prickly smartweed, plant, weed,

Taxonomy

Kingdom: Plantae

Phylum: Tracheophytes

Clade: Angiosperms

Clade: Dicotyledons

Class: Magnoliopsida

Subclass: Caryophyllidae

Order: Polygonales

Familia: Polygonaceae

Genus: *Persicaria*

Species: *Persicaria bungeana* (Turz.) Nakai ex. T. Mori

The EPPO name is POLBU (<https://gd.eppo.int/taxon/POLBU>).

Synonyms: *Polygonum pennsylvanicum* Bunge, Enum. Pl. China Bor 57. 1833, not Linnaeus (1753), *Polygonum bungeana* (Turz.) Nakai ex. T. Mori, *Polygonum chantii* H. Léveillé (Flora of China)

Description of *Persicaria bungeana* (Turz.) Nakai ex. T. Mori

Scape: *Persicaria bungeana* (Turz.) Nakai ex. T. Mori is an annual summer dicot plant. Stems are erect or ascending, 30-80 cm tall, branched, retrorsely prickly (Flora of China). The lower part of the stems are covered with spread small prickles.



Figure 1. Stem covered by small prickles (photo by Zoltán Papp)

In the terminal part peduncles are densely covered with glandular hair. It flowers in August and September (Agroatlas). Some plants were found 150-200 cm tall, mainly ascending in Hungary. Plants germinate in April-May and flower in July-August.

Leaves: Leaves are of a typical lance form or narrowly elliptic. Petiole 5-10 mm; leaf blade green adaxially, lanceolate or narrowly elliptic, 4-13 × 1-3 cm, adaxially hispidulous, adaxially glabrous, usually hispidulous along midvein, base cuneate, margin ciliate, apex acute or subacuminate; ocrea tubular, 1-1.5 cm, membranous, apex truncate, long ciliate (Flora of China).

Inflorescence: Inflorescences are 2,5-6 cm long, 0,4-0,8 cm wide, they are typical bisexual *Persicaria* flowers. Terminal or axillary, spicate, 5-10 mm, usually branched, interrupted at base; peduncle densely glandular hairy; bracts green, funnel-shaped, not ciliate, glabrous, often with few glandular hairs. Pedicels shorter than bracts. Perianth white or pinkish, 5-parted; petals elliptic, 3-4 mm. Stamens 8, in 2 whorls, included. Styles 2, connate to below middle; stigmas capitate. Achenes included in persistent perianth, black, dull, orbicular, biconvex, ca. 3 mm (Flora of

China). Petals are white or pale pinkish, 5-parted. Seeds are 3 mm in size and of an onion form without any appendix. It is in flower from July to August, and the seeds ripen from August to September.

(<https://pfaf.org/user/Plant.aspx?LatinName=Persicaria+bungeana>)

Detection and spread in the world

First it was detected as perennial weed (*Polygonum bungeanum*) in 1840 in Far East Russia by Nikolai Turczaninow, Russian biologist. Its detection and classification was cleared in 1922 by Takenoshin Nakai, a Japanese biologist. *Persicaria bungeana* (Turz.) Nakai ex. T. Mori was detected in several countries in the world. It is native in Far East and Northeast Asia (Northeast China, Mandsuria, Korea, Japan, Far East Russia, Siberia (Altai)), in pastures or meadows, along roads and canals, in gardens and disturbed or ruderal areas below 1700 m altitude. It is found on sandy soils near willows, near canals in rice fields, in fields, gardens, along roads, and in disturbed areas. *Persicaria bungeana* is a weed plant in the fields of row (soybean, corn, potatoes) and cereal crops, on the slopes of irrigation canals in rice plantations and in the ruderal places (Agroatlas). This species was detected in Sweden in 1924, in the Netherlands in 1925, in Denmark in 1939 (<https://www.gbif.org/species/5334306>), in the USA in 1984 and in the Ukraine (http://www.agroatlas.ru/en/content/weeds/Persicaria_bungeana), in the European part of Russia, in Italy in Veneto province (https://www.actaplantarum.org/flora/flora_info.php?id=8412) and in the United Kingdom (<http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:694932-1>). It is reported as an invasive species in the USA (www.cambridge.org/core/journals/weed-science/article/prickly-smartweed-polygonum-bungeanum-a-new-weed-in-north-america/F578A5D2BDA79A4407778AD78480F793) in soybean fields (in the states of Illinois, Minnesota, Iowa and Missouri). It is not known how or when it was introduced into the Midwestern United States (http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242336759). *Persicaria bungeana* is recognized as an invasive weed in the US (<https://www.invasiveplantatlas.org/subject.html?sub=78759>). Control measures include seed cleaning by a seed-cleaning machine and well-timed harvesting of the crop (Agroatlas).

Characteristics of the detection place in Hungary

The detected location (approximately in 250-300 m² in sunflower) was in a typical agricultural area in Eastern-Hungary close to Debrecen, in the R&D Station of University of Debrecen in Látókép in August 2019.

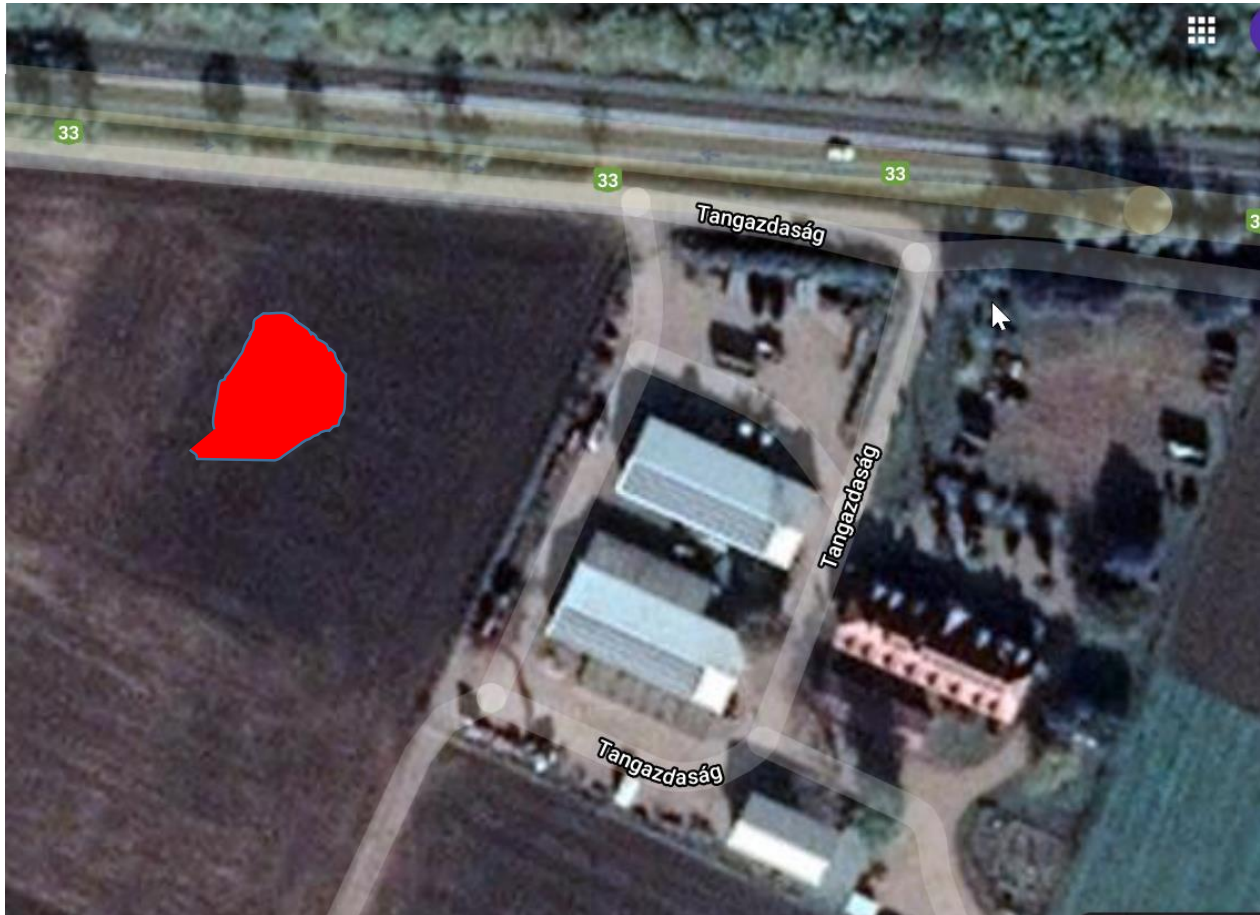


Figure 2. Location of detected *Persicaria bungeana* (Turz.) Nakai ex. *T. Mori* close to R&D Station of University of Debrecen

The soil was black prairie, chernozem with high productivity. The field area was treated by Arylex, an active product which selected this species. It was not found in corn right next to sunflowers, maybe it could be controlled by corn herbicides. These fields have been used for seed trials in the last decade, so presumably it is imported by seeds.



Persicaria bungeana found in a sunflower and corn trial area in Debrecen (phot by Zoltán Papp).

Detection and spread in Hungary

Persicaria bungeana (Turz.) Nakai ex. T. Mori was discovered first in Eastern Hungary close to Debrecen in 2019. There are no other data available on the appearance of this plant in other parts of Hungary. Presumably, we can expect more sites of presence by imported seeds in other parts of Hungary as well.

Materials and methods (Problem description mainly in terms of Nature and Plant Protection)

Persicaria bungeana (Turz.) Nakai ex. T. Mori is a new species in Hungary's flora. It has some relative species in *Persicaria* genus. We think that there is the risk of importing and spreading it by means of sending uncontrolled seeds to other parts of the country, especially in trial fields. We expect further discoveries of *Persicaria bungeana* (Turz.) in Hungary in the future. However, we suppose that it will not be able to spread in all the country because the *Persicaria* species can be weed controlled well in arable fields and no herbicide tolerance of *Persicaria bungeana*

(Turz.) Nakai ex. T. Mori is actually known. Other recommended solutions are seed cleaning and harvesting in time.

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