

***SOLIDAGO ALTISSIMA* (ASTERACEAE: ASTEREA) ADVENTIVE IN TURKEY**

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ABSTRACT

Solidago altissima var. *altissima* is documented as adventive in Turkey on the west side of the city of Bartın near the Black Sea coast.

The Late Goldenrod *Solidago altissima* L. is native to prairie, fields, roadsides, and disturbed habitats in North America (Semple 2022). The species includes three varieties and diploids $2n=18$, tetraploids $2n=36$ and hexaploids $2n=54$. Var. *altissima* occurs in the central and northern portion of the eastern deciduous forest region of the USA and adjacent Canada with hexaploids occurring exclusively in much of the range and with some tetraploids in the Ozark Plateau region. Var. *pluricephala* occurs in the southeastern USA from North Carolina to central Florida and west to eastern Oklahoma and Texas with a few scattered populations extending up the Rio Grande valley to southern New Mexico; hexaploids occurs throughout the range and tetraploids occur frequently in southern Texas and scattered further east to Florida. Var. *gilvovaneszens* (Rydb.) Semple occurs on the Great Plains of Canada and the central U.S. and eastward in the prairie peninsula to Indiana with a few scattered and possibly introduced populations as far west as southern British Columbia and Washington; diploids occur in the northern half of the range with tetraploids being more widely distributed, and hexaploids known only in the southern portion of the range.

Solidago altissima has been become established in multiple locations outside North America in the past century or more. Hexaploid var. *altissima* has been reported to be rare in western Europe (Verloove et al. 2017) and invasive in Japan (Sakata et al. 2015). Chen and Semple (2011) listed var. *altissima* as invasive and well established in eastern China and noted it was often identified as *S. canadensis*. Cheek and Semple (2016) reported the rare presence of var. *pluricephala* in South Africa. Semple and Useugi (2017) reported var. *pluricephala* as invasive in Australia, Tonga, and Hawaii. Semple and Rao (2017) reported var. *pluricephala* as invasive and established in southern India.

The second author discovered a population of *Solidago altissima* in northern Turkey (Bartın Province, W side of Bartın, ruderal wet places, waste places, roadsides, riverside, 10 m elev., 41° 38' 27.32" N, 32° 18' 12.89" E, between Hwy D755 and the navigable Bartın Stream, ca. 12 mi SE of the Black Sea coast) in September 2021. Associated species were *Ambrosia artemisiifolia*, *Daucus carota*, *Dittrichia graveolens*, *Erigeron canadensis*, *Galega officinalis*, *Înula graveolens*, *Symphotrichum squamatum*, *Verbena brasiliensis*, and *Xanthium strumarium*. He took photographs then and more in 2023 and contacted the first author to confirm the identification in December 2023. The images were used to create Figs. 1 and 2, which clearly show *S. altissima* var. *altissima*. Collections were dried for future reference. The location is in an area with low hills in northern Turkey on the southern coast of the Black Sea. This is the first confirmed report for the species in Turkey at a latitude roughly that of New York and Chicago in the USA, i.e., the middle zone of var. *altissima* in its native range.

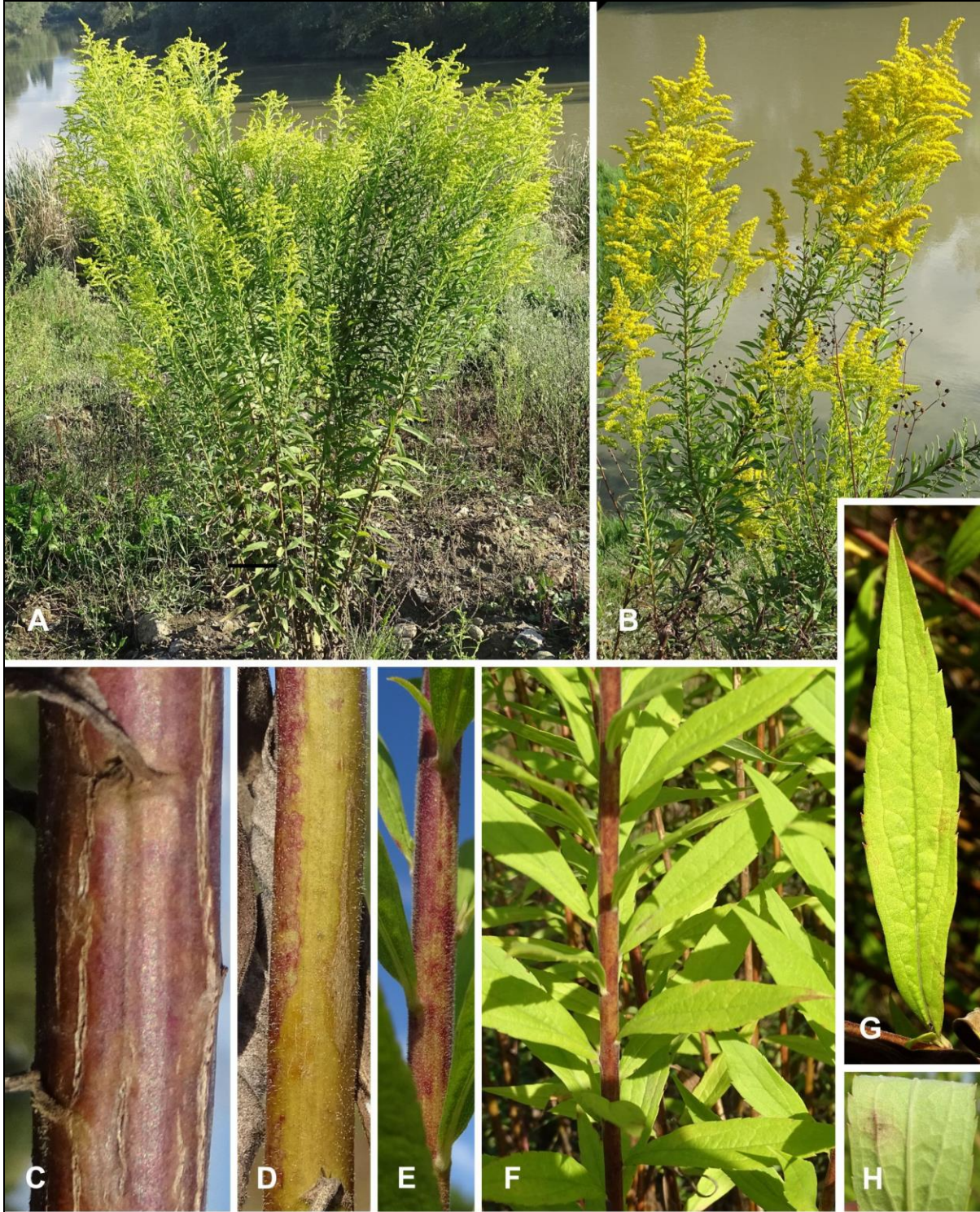


Figure 1. Morphology of *Solidago aaltissima* var. *altissima* in northern Turkey. **A.** Multi-stemmed plant. **B.** Flowering stems. **C.** Lower stem with most epidermal hairs dehisced. **D-E.** Lower and upper stems with numerous short hairs. **F-G.** Lower mid stem leaves. **H.** Dense short hairs on abaxial surface of lower mid stem leaf. Images by Hasan Yaşayacak.



Figure 2. Flowering heads of *Solidago altissima* var. *altissima* in northern Turkey. **A.** Inflorescence branches. **B.** Involucre; scale bar = 1 mm. Images by Hasan Yaşayacak.

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