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Article title: *Distribution and invasiveness of four alien plant species in the ecosystems of the Chorokhi Delta (SW Georgia)*

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Abstract: Chorokhi Delta is distinguished by its peculiar diversity and specificity of habitats, which however, is being threatened by the existence and distribution of specific invasive plant species. Here, we studied the effects of four invasive plant species, namely *Ambrosia artemisiifolia*, *Solidago canadensis*, *Verbena brasiliensis*. These species appeared in the coastal area of Black Sea and specifically in Georgia for the first time in the first half of the last century. *Sicyos angulatus* is a very new plant of foreign origin for Georgia. Today, these species constitute a significant threat to certain biodiversity traits at local, national and global levels. Monitoring of the four specific invasive alien species took place during the period 2021-2022. During this period, sites with high density of the four selected invasive alien plant species were identified. For each species, 5 transects were randomly set, and along each of them, 10 plots (1 × 1 m) were surveyed. The density, frequency, coverage and the average height of the studied invasive alien species were measured in each plot. The measurements were performed twice per year for the two years (2021-2022). All these information will be used to take the appropriate management measures that could help to prevent the further expansion or control their population size. The results demonstrate that *Ambrosia artemisiifolia* is a species presenting the highest invasiveness and broadest distribution compared to the others. *Verbena brasiliensis* and *Sicyos angulatus* are also highly competitive species which can cause serious problems to the semi-natural habitats of the Chorokhi Delta and in the agricultural lands located close to the Delta. Contrary to these three species, *Solidago canadensis* is not widely distributed in the study area. However, its broad ecological requirements and its clonal growth leave no doubt that it is a highly dangerous invasive species, which in the future is expected expand its range and severely affect the semi-natural ecosystems and agricultural lands in the Chorokhi Delta. The results of the present study demonstrate the high adaptability of the studied species and their wide distribution in the near future.

Keywords: foreign origin; invasive alien species (IAS); environmental impact; Kolkheti, Georgia

Introduction:

In the modern world, one of the most important threats to biodiversity is invasive alien species (IAS). IAS are threatening with local extinction a number of species, specific populations, or natural habitats. As the distribution of most invasive alien plant species is climate driven, they can colonize areas and habitats outside of their natural



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distribution range and reproduce intensively, and cause ecological, economic and human health problems (Pyšek 1995; Richardson et al. 2000; Pimentel 2005; Pimentel et al. 2005; Richardson and Pyšek 2006; Simberloff et al. 2013; Blackburn et al. 2014; Colautti et al. 2014; Regulation EU 1141/2014; Mikeladze 2015; Aderoju et al. 2020).

The distribution of alien plants in Georgia began years ago and continues to this day. Their distribution is particularly intense in the Kolkheti lowlands, included in the Adjara floristic region, which is favoured for its geographical location and specific climatic conditions (Davitadze 2001; Davitadze 2002; Kikodze et al. 2010; Fisher et al. 2018; Mikeladze et al. 2019; Mikeladze and Sharabidze 2020; Mikeladze et al. 2021). From 1975 up to 2000, Davitadze (2001) recorded up to 50 new alien plant species for the Adjara region, including c. 20 species which were new for the flora of Georgia (*Tradescantia fluminensis* Vell., *T. virginiana* L., *Ophiopogon japonicus* (L.f.) ker. *Solanum pseudocapsicum* L., etc.). Moreover, between 2010 and 2020, several new alien species [*Sicyos angulatus* L., *Verbena brasiliensis* Vell., *Maclura tricuspidata* Carriere., *Lobelia urens* L., *Solidago canadensis* L., *Mazus pumilus* (Burm.f.) Steenis] were found for the first time in the floristic region of Adjara (Mikeladze et al. 2015; Mikeladze et al. 2017; Mikeladze et al. 2019; Mikeladze and Sharabidze 2020; Mikeladze et al. 2021).

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