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Ecological Dynamics and Public Health Implications of *Ambrosia artemisiifolia* L. and Other Invasive Alien Plants in Peri-Urban Landscapes

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Abstract: *Peri-urban areas combine disturbed soils, abandoned farmland, transport corridors and neglected green spaces, conditions that favour invasive alien plants. This review synthesises recent evidence on the ecological dynamics and public health implications of* Ambrosia artemisiifolia *L. and of* Ailanthus altissima*,* Solidago canadensis *and* Reynoutria japonica *along the urban–rural gradient. Paved, heavily trafficked roads, railways and persistent seed banks drive the spread and persistence of ragweed, while the other species exploit paved surfaces, riverbanks and wastelands in the same belt. Airborne ragweed pollen showed an increasing trend in Timișoara between 2000 and 2010, and ragweed allergy was estimated to cost Europe €7.4 billion per year before 2013. Integrated control and surveillance of peri-urban areas are therefore a public health priority.*

• Introduction

Cities are extraordinarily rich in alien plant species, and allergic reactions are the most studied ecosystem disservice of urban alien plants. Peri-urban landscapes, where built-up land meets farmland, combine roads, railways, construction sites, abandoned fields and riparian corridors, and are divided among many owners.

Common ragweed (*A. artemisiifolia*), an annual, wind-pollinated species native to North America, is one of the most problematic invasive weeds worldwide because of its highly allergenic pollen. In Romania, its control is compulsory under Law 62/2018.

Aim: to synthesise the ecological drivers of spread of ragweed and co-occurring invaders in peri-urban landscapes and their public health implications, in order to identify priorities for western Romania.

• Material and method

Narrative review of peer-reviewed literature identified in Web of Science, Scopus and Google Scholar, focused on articles published in 2016–2026 in Web of Science-indexed journals and complemented by earlier field studies and by national and EU legislation. The 32 sources were grouped into five themes: dispersal pathways, persistence, co-occurring invaders, public health and management.

Table 1. Main peri-urban habitats and drivers of spread

Habitat or driver	Species	Main evidence
Paved, heavily trafficked roads	*A. artemisiifolia*	Present at 81–97% of paved-road sites vs. 13% of unpaved
Railways, transport land	*A. artemisiifolia*	49% of records on railways
Set-asides, wastelands	*A. artemisiifolia*, *S. canadensis*	Up to 4,477 seeds m^{-2}; *Solidago* dominance
Paved surfaces, recreational areas	*A. altissima*	Seedlings about 5× denser than on lawns
Riverbanks	*S. canadensis*, *Reynoutria* spp.	Rhizome biomass rises with river length

• Results and discussions

- **Transport corridors.** Ragweed occurred at 97% of paved regional and 81% of paved local road sites, but at only 13% of unpaved roads; population growth was highest where heavy traffic coincided with high disturbance. In the Czech Republic, 49% of records came from railway corridors.
- **Persistence.** Living seed banks of 536-4,477 seeds m^{-2} and higher recruitment after disturbance allow recolonization; ragweed is more abundant at field edges and in smaller fields.
- **Other invaders.** *A. altissima* seedlings are about five times denser on paved surfaces and in ruderal vegetation; *S. canadensis* can dominate post-agricultural wastelands; *Reynoutria* spp. have major negative impacts on native plants.
- **Public health.** In Timișoara, airborne ragweed pollen showed an increasing trend in 2000–2010, peaking between 15 August and 15 September. In Bucharest, ragweed occurs from the centre to the periphery and caused 24.2% of respiratory allergy cases at a reference centre. Exposure also depends on Amb a 1 load, atmospheric transport and air pollution.
- **Burden.** About €7.4 billion per year in Europe before 2013; sensitisation may rise from 33 to 77 million people by 2041–2060.
- **Management.** Priority mowing of heavily trafficked roads, two cuts per season, ideally after male flowers appear but before pollen release, habitat-specific methods (mulching, hand weeding, sowing native grasses), halauxifen-methyl (95% control in sunflower; 90–95% with a biostimulant in alfalfa) and biological control with *Ophraella communa*, recorded in Romania since 2020.

• Conclusions

Peri-urban landscapes concentrate transport corridors, disturbance, fragmented field margins and abandoned land, which favour ragweed and other invaders. Effective control requires coordinated action by local authorities under Law 62/2018 and integrated surveillance linking plant mapping, aerobiological monitoring and health data.

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