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Article

Adventive Species of the Asteraceae Juss. Family in the Urban Flora of Andijan

Nodirbek M. Sidikjanov

Department of Ecology and Botany, Andijan State University, Andijan, Uzbekistan

Abstract: This article aims to provide a comprehensive list of these species and explore their presence in the local urban and natural environments. In the urban flora of Andijan city, 355 species belonging to 47 families and 218 genera have been identified, with the Asteraceae family comprising 54 species. Of these, 22 species belong to the adventive fraction.

Kew words: Andijan, urban flora, plant distribution, invasive, ecological categories, life forms.

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Introduction

In recent times, one of the key aspects of plant evolution has been the growing process of anthropogenic transformation, where natural plant communities are increasingly being replaced by species that are more resistant to human impact. This trend results in a decline in the native composition of natural species. This change is particularly noticeable in urban ecosystems, where artificial ecotopes are created, leading to significant alterations in species diversity and their habitats. Consequently, the prevalence and density of non-native species increase, and the interactions between these species and native species intensify, which in turn influences the population dynamics of the native species (Li, J., Wang, Y., & Zhou, Q. 2021).

Recent studies have shown that the expansion of Andijan city, the development of new buildings and infrastructure, in additionally the rise in the number of motor vehicles have caused a significant shift in the population of native species within the urban flora (Roberts, K., & Taylor, J. 2018).

Materials and methods

During the ecological and botanical research in Andijan city, various ecotopes were surveyed, including vacant lots, waste sites, streets, roads, railway areas, residential neighborhoods with both multi-story buildings and private sectors, city lawns, playgrounds, sports complexes, and more. Herbarium materials were collected throughout the entire vegetation period, with multiple visits to the same locations to ensure a comprehensive collection of specimens. Additionally, the herbarium collections

of the Department of Botany and Ecology at Andijan State University, along with published data, were thoroughly studied.

RESULTS

Within the administrative boundaries of Andijan city, 355 plant species belonging to 47 families and 218 genera have been recorded. Among them, 129 are adventive species, with 58 being invasive or potentially invasive. The study revealed that the presence of Asteraceae species in the local phytocenoses of Andijan city is minimal. A total of 54 Asteraceae species were identified during the survey, including 21 adventive species (39%). In recent decades, the local species composition of the Compositae family has been enriched due to the introduction of adventive species, making this family the leader among other vascular plant families in the Fergana valley.

1. Helianthus tuberosus L. Sp. Pl.: 905 (1753). Perennial. Hemicryptophyte. North America. Waste grounds, roadside, lawns. Adventive. Ergaziophyte. Xeromesophyte. Rarely encountered.

2. Cichorium intybus L. Sp. Pl.: 813 (1753). Common chicory. Perennial. Hemicryptophyte. Europe-Ancient Mediterranean. Settlements, roadsides, dumps, parks, gardens, irrigated lands. Adventive (invasive). Xenophyte. Medicinal, nectariferous, fodder, seasoning. Mezoxerophyte. Very common. Active species.

3. Lactuca serriola L. Cent. Pl. II. 29. 1756. Wild lettuce. Annual or biennial. Therophyte. Europe-Ancient Mediterranean. Dumps, waste places, roadside. Adventive. Xenophyte. Xeromesophyte. Medicinal, fodder. Very common. Active species.

4. Sonchus asper (L.) Hill. Herb. Brit. 1: 47. 1769. Prickly sowthistle. Annual. Therophyte. Pleuriregional. Around factories, vegetable gardens, dumps. Adventive (invasive). Xenophyte. Mezoxerophyte. Fodder. Very common. Active species.

5. Sonchus oleraceus L. Sp. Pl. 2: 794. 1753. Common sowthistle. Annual. Therophyte. Pleuriregional. Around factories, fields, vegetable gardens, dumps. Adventive (invasive). Xenophyte. Mezoxerophyte. Very common. Active species.

6. Taraxacum sect. Taraxacum F.H.Wigg. (T. officinale F.H.Wigg.). Prim. Fl. Holsat.: 56 (1780). Dandelion. Perennial. Hemicryptophyte. Pleuriregional. Settlements, riverbanks, meadows, gardens, around factories, roadsides, dumps. Adventive (invasive). Xenophyte. Xeromesophyte. Very common. Active species.

7. Scorzonera laciniata L. Sp. Pl.: 791 (1753). Biennial. Waste places. Adventive. Mezoxerophyte. Rarely encountered.

8. Carduus arabicus Jacq. ex Murray. J.A. Murray (ed.), Syst. Veg., ed. 14.: 724 (1784). Arabian thistle. Annual. Therophyte. Euro-Asia. Irrigated lands, waste places, ditch banks, railways, cemeteries, roadsides. Adventive (invasive). Xenophyte. Xeromesophyte. Very common.

9. Centaurea iberica Trevir. ex Spreng. Syst. Veg. 3: 406 (1826). Cornflower. Biennial. Therophyte. Pontic-Ancient Mediterranean. Roadsides, wastelands, cemeteries, railways. Adventive (invasive). Xenophyte. Xeromesophyte. Medicinal. Common.

10. Leuzea repens (L.) D.J.N.Hind (Acroptilon repens (L.) DC.). Prodr. A. P. de Candolle 6: 663. 1838. Creeping Rhaponticum. Perennial. Hemicryptophyte. Europe-Siberia-Central Asia. Around roads and railways, croplands, wastelands. Adventive (invasive). Xenophyte. Xeromesophyte. Medicinal, essential oil, toxic.

11. Eclipta prostrata (L.) L. Mant. Pl. 2: 286 (1771). Annual. Therophyte. Pleuriregional. Roadsides, wet areas, fields. Adventive (invasive). Xenophyte. Xeromesophyte. Medicinal. Very common.

12. Galinsoga quadriradiata Ruiz & Pav. Syst. Veg. Fl. Peruv. Chil. 1: 198 (1798). Annual. Therophyte. Pleuriregional. Roadsides, around factories, lawns, near water, promenades, railways. Adventive (invasive). Xenophyte. Mezoxerophyte. Very common.

13. Galinsoga parviflora Cav. Icon. 3: 41, t. 281 (1796). Smallflowered Galinsoga. Annual. Therophyte. Pleuriregional. Parks, railways and roads, meadows, settlements, around factories. Adventive (invasive). Xenophyte. Mezoxerophyte. Very common. Active species.

14. Senecio vulgaris L. Sp. Pl.: 867 (1753). Common groundsel. Annual. Therophyte. Pleuriregional. Settlements, roadsides. Xeromesophyte. Rarely encountered.

15. Calendula officinalis L. Sp. Pl.: 921 (1753). Pot marigold. Annual. Therophyte. Holarctica. Settlements, roadsides, promenades, irrigated lands. Adventive. Ergaziophyte. Mezoxerophyte. Common.

16. Erigeron canadensis L. (Conyza canadensis (L.) Cronquist). Sp. Pl. 2: 863 (1753). Canadian horseweed. Annual. Therophyte. Pleuriregional. Settlements, roadsides, irrigated lands. Adventive (invasive). Xenophyte. Medicinal, vitamin-rich, essential oil, fodder. Mezoxerophyte. Active species.

17. Artemisia annua L. Sp. Pl.: 847 (1753). Annual wormwood. Annual. Therophyte. Holarctica. Settlements, gardens, parks, roadsides. Adventive (invasive). Xenophyte. Xeromesophyte. Very common. Active species.

18. Tripleurospermum inodorum (L.) Sch.Bip. Tanaceteen: 32 (1844). Annual. Therophyte. Pleuriregional. Roadsides, wastelands. Adventive (invasive). Xenophyte. Mezoxerophyte. Very common.

19. Xanthium strumarium L. Sp. Pl. 2: 987 (1753). Common cocklebur. Annual. Therophyte. Pleuriregional. Roadsides, railways, settlements, croplands. Adventive (invasive). Xenophyte. Xeromesophyte. Very common. Active species.

20. Xanthium spinosum L. Sp. Pl. 2: 987 (1753). Spiny cocklebur. Annual. Therophyte. Pleuriregional. Settlements, roadsides, railways, cemeteries, parks, croplands. Adventive (invasive). Xenophyte. Xeromesophyte. Very common. Active species.

21. Symphyotrichum novi-belgii (L.) G.L.Nesom. Phytologia 77: 287 (1995). Perennial. Hemicryptophyte. Holarctica. Roadsides, waste places, settlements, near water, promenades, roadsides, railways, lawns. Adventive (invasive). Ergaziophyte. Xeromesophyte. Very common.

DISCUSSION

The study of the Asteraceae family within the urban flora of Andijan city has revealed significant insights into the distribution and ecological roles of adventive species. A total of 54 Asteraceae species were identified, among which 21 were classified as adventive. This finding highlights a substantial presence of non-native species within the local flora, a trend that aligns with the global patterns of urban ecological transformation.

Prevalence and Impact of Adventive Species. The presence of adventive species such as *Cichorium intybus*, *Lactuca serriola*, and *Sonchus asper* is particularly noteworthy (Figure 1).

Figure 1. Biotope of the plant species *Sonchus asper*

These species, having originated from various regions including Europe and North America, have established themselves in Andijan's urban environments. Their ability to thrive in disturbed habitats, such as roadside verges and vacant lots, suggests their high adaptability and resilience to anthropogenic pressures (Sidikjanov, 2023). This observation corroborates the findings of similar studies conducted in other urban areas, where adventive species often dominate due to their ecological plasticity and competitive advantages (Smith et al., 2018; Zhang et al., 2020).

Ecological Implications. The dominance of certain adventive species in Andijan's urban flora reflects broader ecological trends observed in rapidly urbanizing areas. These species contribute to the alteration of native plant communities and can potentially disrupt local ecological balance. For instance, species like *Taraxacum officinale* and *Xanthium strumarium* have been shown to outcompete native flora (Figure 2), leading to changes in species composition and ecosystem functions (Jones & Brown, 2017).

Figure 2. Biotope of the plant species *Taraxacum officinale*

This shift can affect not only plant biodiversity but also the associated fauna and ecosystem services.

Comparison with Other Urban Floras. When compared with urban floras from other cities, the diversity of adventive Asteraceae species in Andijan is relatively high. Studies from cities such as Moscow and Beijing have reported lower proportions of adventive species in the Asteraceae family (Kozlov et al., 2019; Li et al., 2021). This discrepancy may be attributed to the unique urban development patterns and climatic conditions of Andijan, which provide suitable niches for these species to establish and proliferate.

Conservation and Management Recommendations. Given the prevalence of adventive species, it is crucial to implement management strategies to mitigate their impact on native ecosystems. Monitoring programs should be established to track the spread of these species and assess their effects on local biodiversity. Additionally, conservation efforts should focus on protecting and restoring native plant communities, particularly in areas vulnerable to invasion (Sidikjanov, 2023). The integration of ecological restoration practices and public awareness campaigns can also play a significant role in maintaining the ecological integrity of urban areas (Anderson., & Clarke, M., 2016).

Future Research Directions. Future research should aim to explore the long-term ecological impacts of adventive Asteraceae species on Andijan's urban ecosystems. Studies could investigate the interactions between these species and native flora, as well as their influence on ecosystem services (Kozlov, M., Sokolov, A., & Ivanov, P., 2019). Furthermore, comparative studies across different urban areas can provide deeper insights into the factors driving the success of adventive species and their ecological consequences.These adventive species have established themselves in the urban and natural landscapes of Andijan, showcasing their adaptability and ecological impact (Sidikjanov, 2023). Understanding their distribution and effects on local ecosystems is crucial for managing biodiversity and urban flora.

GENERAL CONCLUSION

This study analyzed the adventive species of the Asteraceae Juss. family within the urban flora of Andijan city, revealing that out of 54 identified Asteraceae species, 21 are adventive, indicating the significant role of alien species in the urban environment. The high proportion of adventive species (39% of the total) demonstrates substantial ecological changes in urban settings and the rapid dominance of these species in the local flora. For example, species such as *Cichorium intybus* and *Lactuca serriola* have proliferated in urban ecosystems, posing risks to local biodiversity and ecological balance. The high diversity of adventive Asteraceae species in Andijan reflects a general trend of increasing presence of such species in urban areas, necessitating the implementation of specific monitoring and management measures. Effective management strategies are required to control the spread of alien species, assess their ecological impacts, and preserve local biodiversity. Future research on the long-term ecological consequences of adventive species and comparative studies across various urban areas can provide a deeper understanding of their impacts on local flora and fauna. Thus, the presence of adventive Asteraceae species in Andijan's urban flora underscores the need for proactive management strategies to maintain ecological balance.

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