



Article

The Study of Exotic and Invasive Plant Species in Gullele Botanic Garden, Addis Ababa, Ethiopia

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Abstract: The Gullele Botanic Garden was established to preserve and safeguard indigenous, rare, endemic, endangered, and economically important plant species. The objective of this study was to identify and map the exotic, invasive, and potentially invasive plant species that are present in the garden's various land use types, such as natural vegetation, plantations, roadsides and garden edges. The research involved laying plots at different distances in each land use type and collecting vegetation data with geo-location information. Sorensen's similarity index was used to measure the floristic similarity between the sampled land use types. Data on species density and abundance were analyzed using the corresponding formula. The Shannon–Wiener diversity index and evenness were used to compute the diversity of the species in each land use type using R packages. ArcGIS version 10.5 was used to track the geographical distribution and map the exotic, invasive, and potentially invasive species that exist in all land use types of the garden. A total of 80 plant species belonging to 70 genera in 44 families were recorded in the garden. *Asteraceae*, *Myrtaceae*, and *Fabaceae* comprised the highest number of species. *Acacia decurrens*, *Acacia melanoxylon*, *Cuscuta campestris*, *Galinsoga parviflora*, *Nerium oleander*, and *Cyathula uncinulata* were the most prevalent invasive and potentially invasive species. The study found that the roadside and garden edge land use types had the most diverse exotic and invasive plants. The total density of exotic species was 2.36 plants/m². The potential possibility of these plants in displacing the native plant species is quite high unless the introduction of exotic plant species is inspected and appropriate management strategies for invasive species are put in place.

Keywords: ex situ conservation; exotic species; invasive species; native species; non-native



Citation: Girmay, M.; Gebrehiwot, K.; Atinafe, E.; Tareke, Y.; Belay, B. The Study of Exotic and Invasive Plant Species in Gullele Botanic Garden, Addis Ababa, Ethiopia. *J. Zool. Bot. Gard.* **2024**, *5*, 36–50. <https://doi.org/10.3390/jzbg5010003>

Academic Editor: László Bakacsy

Received: 27 November 2023

Revised: 18 December 2023

Accepted: 26 December 2023

Published: 3 January 2024



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1. Introduction

An exotic species or alien species is any non-native plant, animal, or other organism introduced into a place that was never part of its natural range. The presence of exotic taxa in specific places is mostly the result of either anthropogenic activities or natural processes [1,2]. For example, certain exotic species require human involvement or cultivation in order to be introduced into a certain area. On the other hand, some species may naturalize by sustaining their own populations in the absence of human interference [3]. The manner of occurrence and introduction may either be intentional for certain economic and other values, or species may be introduced accidentally or unintentionally with other vectors [4].

The planting and rehabilitation efforts of parks, gardens and several agroecosystems depend on non-native (exotic) plant species. However, introducing these species leads to a serious threat to plants or to the entire biodiversity in an ecosystem from their potential