

INFLUENCE OF INVASIVE WEED SPECIES ON BIODIVERSITY DEGRADATION AND ITS ECOLOGICAL CONDITION

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Анотація

Представлено особливості поширення інвазивних видів бур'янів на території західного Лісостепу України та проаналізовано фактори їх впливу на екологічний стан біорізноманіття. Узагальнено та запропоновано методи боротьби з інвазивними видами бур'янів для запобігання їх поширенню на нові території.

Ключові слова: бур'яни, вторгнення, контроль населення, екологія, деградація біорізноманіття.

Abstract

Peculiarities of distribution of invasive weed species on the territory of the western Forest-Steppe of Ukraine are presented and the factors of their influence on the ecological state of biodiversity are analyzed. Methods for controlling invasive weed species to prevent their spread to new areas have been summarized and proposed.

Keywords: weeds, invasion, population control, ecology, biodiversity degradation.

Introduction

The basis of the ecosystem is the diversity and density of flora. More than 60% of the natural ecosystems of our planet are already degraded, and invasive plant species are a threat to their existence. Experts at the global level have recognized invasive species as one of the five key factors (natural habitat change, climate change, invasive species, overexploitation, pollution (nitrogen, phosphorus) due to the impact on the natural ecosystems of the planet, of which only 40% have survived.

If the climatic conditions are favorable for "aliens", they compete successfully with native species because they have no or limited natural enemies. Therefore, local species are disappearing (the most depressed state!) from the settlements.

Scientists have been recording the migration of alien plant species to Eastern Europe for several decades, along with the growth of economic activity on the planet and the development of international trade. Global climate change is only accelerating this process.

When they appear in the new territory, invasive species show their rather aggressive characteristics: they suppress the plants that originally grew, break the established ties in ecosystems for millennia and lead to floristic pollution of the territory, which impoverishes the aboriginal flora.

Harmfulness of invasive species is determined not only by the allergenicity of pollen of many of them (all species of ragweed, cyclamen, etc.), which poses a threat to public health, but also significantly increases environmental and economic losses.

Ukraine's biodiversity is intensively "occupied" by well-known and still uncommon representatives of invasive plants: *Ambrosia artemisiifolia* L., *Heraclium sosnowskyi* Manden, *Solidago canadensis*, *Erigeron canadensis* L., *Delphinium*, *Cicutavivida* L., *Asclepias syriaca*, *Phytolacca americana* L., *Iva xanthiifolia*, *Acer negundo* L., *Xanthium albinum*, *Elaeagnus angustifolia* etc. Information about these plants should be as accessible as possible not only for agricultural professionals, but also for the general population (from preschools).

Due to the extinction of local plant species, local animal species, fungi, and various microorganisms that have built trophic relationships with the aboriginal flora for many centuries are disappearing. That is why the invasion of an alien species leads to the death of a large number of species of flora and fauna, and in such an environment is dominated by only one or more species of aliens.

Results

Since 2007 (Shuvar I.A., 2008; Shuvar I.A., Gudz V.P., Shuvar A.I., 2013; Shuvar I.A., 2018-2021, etc.)

on the territory of the western Forest-Steppe Ukraine is systematically determining the interaction of invasive plant species with climatic and agronomic factors, the passage of morphogenesis and ontogenesis, as well as their impact on aboriginal biodiversity using field, quantitative-weight and calculation methods. Since 2019, monitoring of the presence and spread of invasive weed species in this area has begun.

Our observations and references indicate that the physical characteristics of soils and climatic conditions (annual rainfall, average temperature, evaporation) are the main factors that mainly determine the prevalence of invasive weeds. It is established that uncompacted and light granulometric soils are favorable for the development of invasive plant species.

Recently, based on a comprehensive study of phytointvasions in North America, T. Stolgren et al. [15] concluded that the most favorable for invasions are mostly the richest in species composition of ecosystems. This suggests that the world's centers of unique biodiversity, especially island or geographically isolated, are vulnerable to new invasions confirmed in Australia, South Africa, Hawaii, California, the Mediterranean and some others.

Analysis of long-term meteorological data shows that the amount of precipitation during the summer period tends to decrease (and they are unevenly distributed) with an increase in average annual temperature, which implies an increase in annual evaporation. Under such conditions, the threat of expansion of alien plant species in Ukraine is growing.

Conclusions

A significant number of invasive plant control strategies start with species management and evolve into more integrated management strategies, in which it is important to consider the long-term ecosystem impact caused by the chosen control program.

In recent decades, the problem of invasion of rare plant species, including weeds, has become more and more threatening. Invasive plant species compete so successfully with other plants that they can displace them, thus creating a monoculture that inhibits and levels the growth of other plant species. Invasive plant species can upset the balance of the ecosystem. They are often larger, faster growing or more aggressive than native species, and can occupy the habitat where they grow.

Therefore, the first step in combating invasive species should be a ban on their planting / sowing, reproduction / breeding and distribution. Each species must be considered individually, depending on its invasive features. It is possible that some species can be allowed to be used only for landscaping residential areas, and some species should be prohibited from cultivating at all, including their cultivation, sale, import.

There are various hypotheses about the manifestation of a species of its invasive potential under certain natural conditions. Among the set of important measures to prevent the spread of invasive plants, we have identified the following:

- vehicles and equipment must be clean of invasive plants and seeds;
- minimization of soil disturbance during all construction and maintenance works;
- promoting the creation of a community of health plants;
- restricting the movement of soil or gravel affected and infested with weeds;
- use of certified weed-free seed mixtures;
- elimination of infestations of locations - neutralization of existing invasive groups of plants and control of new ones;
- keeping and restricting the movement of invasive plants from neighboring lands or administrative territories;
- motorways, railways and waterways are often corridors for the spread of invasive plants, so they need to be controlled to limit the spread of invasive plants;
- protection of areas free from invasive plants that are not infected;
- providing information to the general public about the limited distribution of weeds;
- production, distribution among the population and placement of informative materials (tables, posters, etc.) for acquaintance with the general population;
- keeping equipment and vehicles clean.

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