

Research Trends and Results

Research on Control of Distribution Expansion of Alien Plants using Soil Seed Bank in Rivers

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1. Introduction

"The National Biodiversity Strategy of Japan 2012-2020" (Sep. 2012) established the country-specific goal of Japan to achieve the "Aichi Target," and as one of the specific measures in countermeasures against alien species, it is planned to promote countermeasures against alien species, considering the rapid expansion of alien species in rivers, survey and study alien vegetation etc., and examine effective countermeasures against alien species.

In addition, the Ministry of the Environment (Conference for Formulation of Action Plan to Prevent Adverse Effects on Ecosystems Caused by Alien Species) has placed focus on the early stage of invasion in the countermeasures against alien species to prevent spread. For that purpose, it is considered important to grasp seed supply source and formation of soil seed bank as well as vegetation on the ground in the countermeasures against alien plants in order to clarify the stage of invasion of alien plants and expected changes in vegetation including distribution expansion of alien plants.

2. Soil seed bank survey in rivers

In the above-mentioned circumstances, the Landscape and Ecology Division has been conducting research on the prevention of distribution expansion of alien plants using soil seed bank in rivers since fiscal 2014. In fiscal 2014, we conducted the survey of vegetation on the ground and soil sampling around the areas of six domestic rivers where alien including invasive alien species(plants) such as lanceleaf tickseed and bur cucumber has grown. We also conducted germination experiment in a greenhouse on the premises of the National Institute for Land and Infrastructure Management (NILIM) using part of the soil samples collected in the fall. ^{Note:} Seedlings and sprouting were confirmed in many species including lanceleaf tickseed as an invasive alien species (plant). We are analyzing the data obtained from our research, and plan to analyze the distribution characteristics of soil seed bank in river space with the data such as flood frequency estimated from soil texture and water levels in the surveyed areas.

In addition, realization of the effective and efficient

Note: To conduct carrying and planting of soil containing the seeds and their organs like roots(which are stipulated by the Cabinet Ordinance according to invasive alien species (plants)) of invasive alien species (plants) for the purpose of academic research, etc., permission granted by the competent ministers is required under Article 5 of the Invasive Alien Species Act.

countermeasures against alien invasive species is considered to need "adaptive action" that feeds back the results of continuous monitoring to be conducted after implementation of countermeasures to next countermeasures as well as publication and sharing of the information.¹⁾ Accordingly, the information on the countermeasure technologies against alien species has been being disclosed on the website, etc. In response, in order to grasp the present state of countermeasure technologies against alien species, we conducted web research and document search on countermeasure technologies against alien species being implemented in main domestic rivers with focus on six species of alien plants including lanceleaf tickseed and bur cucumber.



lanceleaf tickseed

bur cucumber

Photo. Example of seedlings that sprouted in the germination experiment

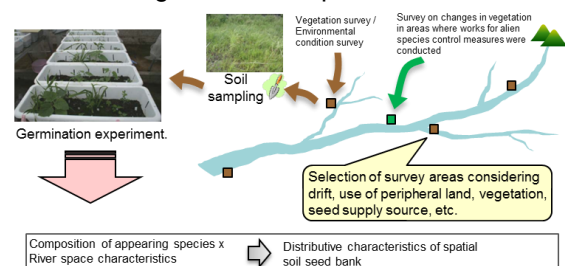


Figure. Image of Soil Seed Bank Survey in River

3. Conclusion

Based on the findings of this research, we intend to establish indicators for grasping the trend of invasion of alien plants from the species composition of soil seed bank and organize efficient countermeasure method against invasive alien species(plants) etc. using such indicators.

[Reference]

1) Manual for Countermeasures against Alien Species in Rivers (River Environment Division, MLIT, Dec. 2013) http://www.mlit.go.jp/river/shishun_guideline/kankyo/gairai/tebiki.html