

## PHYTOSTABILIZATION AND HERBICIDE-FREE WEED CONTROL ON RAILWAYS

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### TOPICALITY

The railway transport influence on the environment is underestimated and underrepresented in modern science. It happens because railways are thought to be more ecologically-friendly than automobile transport. The approximate ratio between the articles devoted to investigating the railway and road impacts on wildlife is 1 to 15. Although railway transport has a lot of advantages compared to automobile transport, its operation can also result in significant chemical, parametrical, biological and biocenotic pollution. Thus, it is important to pay more scientific attention to the ecological problems of railways, which are still understudied.

In the last 20 years, railway transport has been understood to be a source of the environmental contamination with heavy metals.



### AIM OF RESEARCH

The increase of the level of ecological safety of railway lands due to

01

reducing the negative heavy metal impact on the environment

02

using environmentally-friendly alternatives to herbicides for weed control



### MAIN TASKS:

- ✓ To investigate and assess sources of heavy metals on railways (ballast, herbicides, friction processes and others)
- ✓ To develop the methods of protecting air, water and soil from contamination with heavy metal on railways
- ✓ To combine the above methods with herbicide-free weed control
- To check the effectiveness of the developed methods
- To justify implementing the developed methods in the scope of both ecological and traffic safety



It is important to know if the chosen grass mixtures will protect the soil from the railway dust (play a filter role), mostly accumulate heavy metals in roots; if these grasses are able to germinate through and under the ballast. Which mixture will be a better choice?

### METHODS

The research can be carried out by means of XRF, AES and AAS (for the detection of heavy metals)

### MATERIALS FOR THE POT-EXPERIMENT

Grasses (seed rate – 400 g per 10-15 m<sup>2</sup>)

#### MIXTURE 1

30% red fescue Reverent  
40% red fescue Roland  
10% perennial ryegrass Fancy  
12,5% red modified fescue Aida  
7,5% sheep fescue Spartan

#### MIXTURE 2

35% perennial ryegrass Fancy  
20% perennial ryegrass Henrietta  
20% red fescue Reverent  
20% annual ryegrass Mendoza  
5% reed fescue Borneo

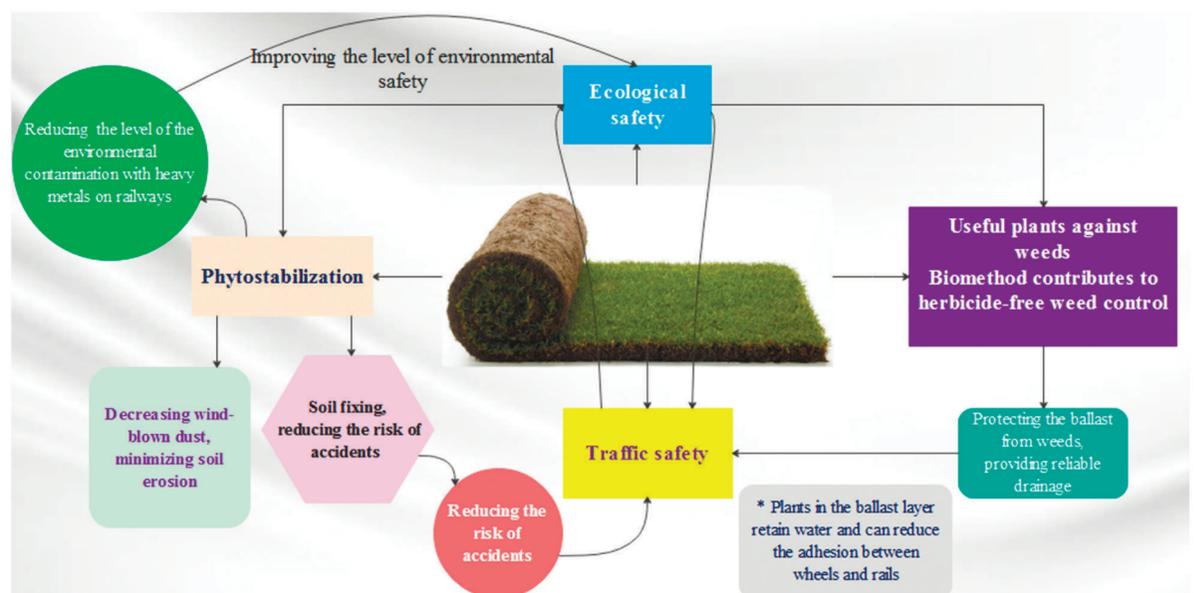
Pollutant – “railway dust” (from the machining of wheels)

Pot dimensions: V = 5 L, length = 40 cm, width = 18 cm, height = 14 cm

2 pots – mixture 1 (+1 control pot)

2 pots – mixture 2 (+1 control pot)

### EXPECTED RESULTS



### CONCLUSIONS

Phytostabilization is an ecologically-friendly method, which can significantly improve the level of ecological safety of the lands contaminated with heavy metals. This method is also well-suitable for railways. Due to phytostabilization it is possible to increase not only the level of ecological safety, but also that of traffic train safety.