



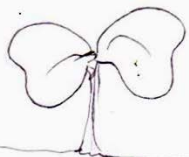
Institute of Botany



Department of Integrative Biology  
and Biodiversity Research

# MANAGEMENT OF INVASIVE ALIEN PLANT SPECIES IN RIPARIAN FOREST HABITATS

Katharina Lapin, Karl-Georg Bernhardt



*Lapin Katharina 2014*

5th CASEE Conference "Healthy Food  
Production and Environmental Preservation  
– The Role of Agriculture, Forestry and  
Applied Biology"

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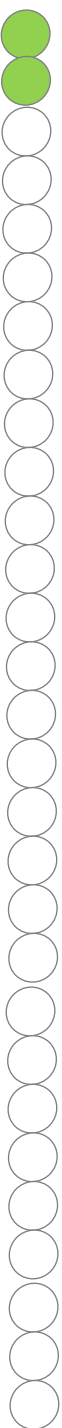
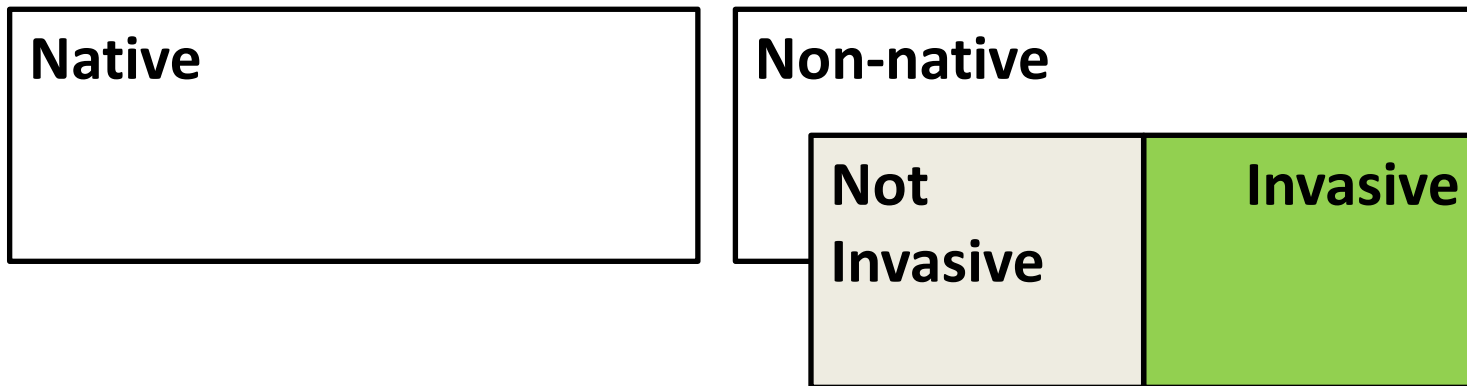
University of Novi Sad, Faculty of Agriculture, Serbia



# INVASIVE ALIEN SPECIES (IAS)

*Invasive alien species are animals, plants or other organisms introduced by man into places out of their natural range of distribution, where they become established and disperse, generating a negative impact on the local ecosystem and species.*

*(IUCN, 10.09.2013)*



# GLOBAL DIMENSIONS

**economical & ecological cosequences**

Changes of species composition

Monotypic stands

Loss of diversity

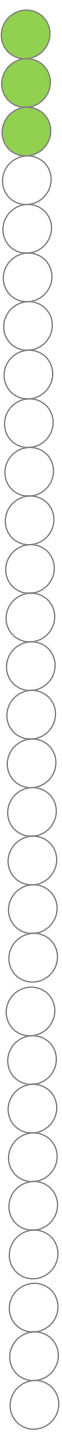
Hybridisation

suppression of native plants

environmental changes



Invasive Species Specialist Group (ISSG) ,  
[www.issg.org](http://www.issg.org), 30.04.2014



# RIPARIAN FOREST HABITATS

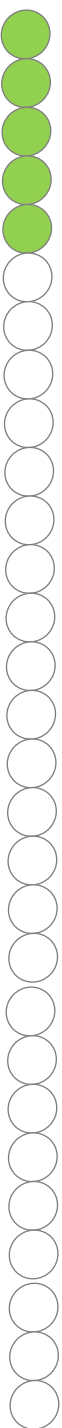


*Orchis ustulata*, *Euonymus europea* , Foto (right corner): [www.diepresse.at](http://www.diepresse.at), 2013



# QUESTIONS

- Who are the invaders?
- What are the consequences for species composition and vegetation development?
- What supports the spread of IAS?
- What are the consequences for forest managements?

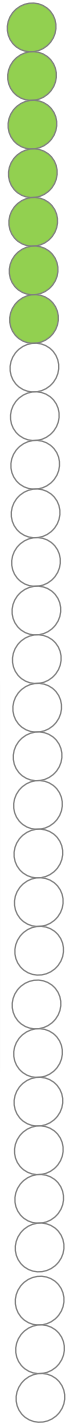


# STUDY AREA

River Traisen

Danube Floodplain Forest

Lower Austria



# STUDY AREA NATURA 2000



**NATURLAND NIEDERÖSTERREICH** (2013,  
<http://www.naturland-noe.at/europaschutzgebiet-tullnerfelder-donau-auen>)

**Size**  
17.533 ha FFH  
17.764 ha Birds Directive

**protectorate's status**  
European nature reserve

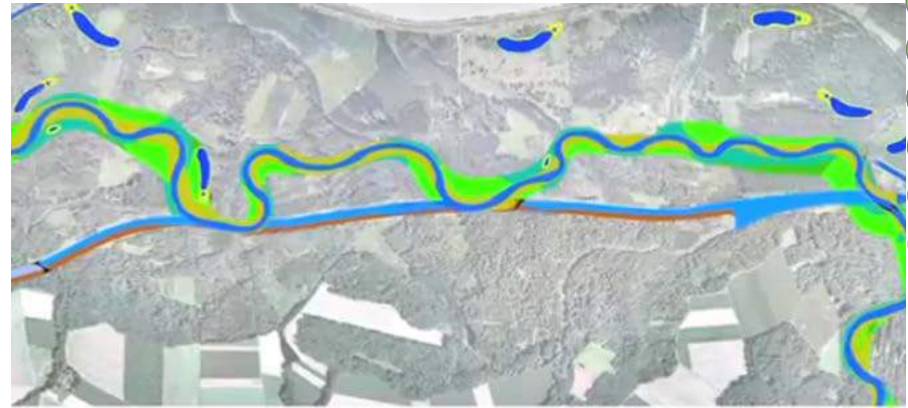
**Districts**  
Korneuburg, Wien Umland, Tulln, Krems,  
Statutarstadt Krems, St. Pölten, Melk



**largest connected floodplain forests of Austria**



# STUDY AREA PROJECT LIFE+ TRAISEN





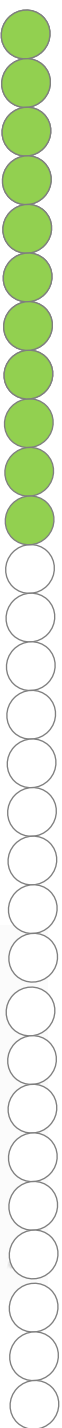
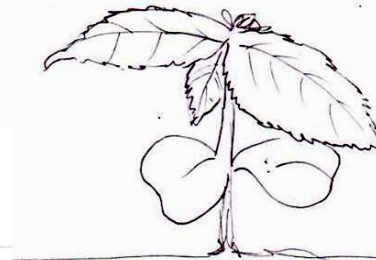
# METHODS

Vegetation sampling

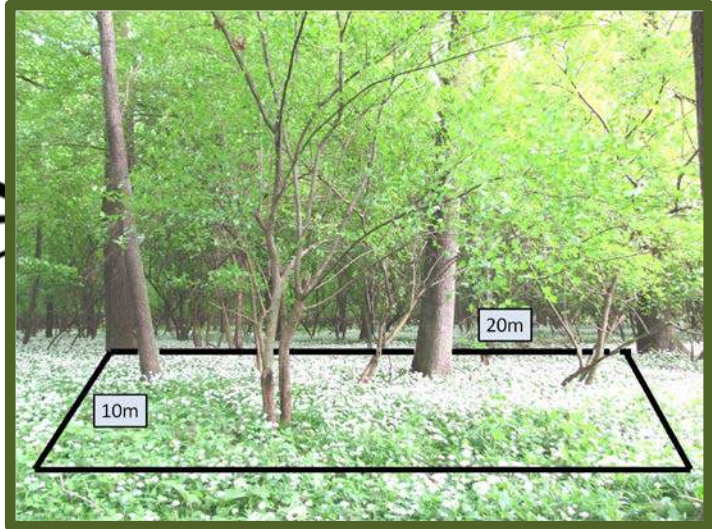
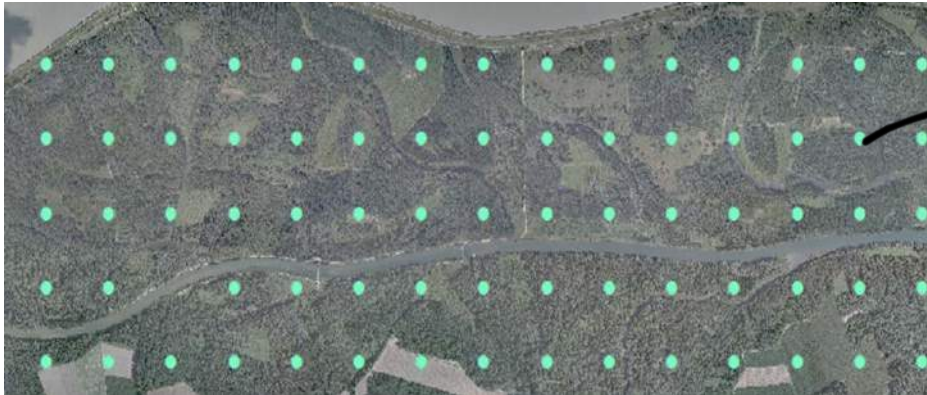
Vegetation mapping

Phenological analysis

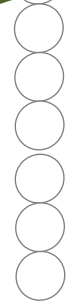
Test of control methods



# quality & development of plant diversity



- Random grid
- **142 recording surfaces**
- 200m<sup>2</sup> (10m x 20m)
- Braun-Blanquet



# 8 INVASIVE ALIEN PLANT SPECIES



***Ailanthus altissima* (Mill.)**  
Simaroubiaceae, N-China



***Robinia pseudoacacia* L.**  
Fabaceae, N-America



***Acer negundo* L.**  
Aceraceae, N-America



***Rudbeckia laciniata* L.**  
Asteraceae, N-America



***Impatiens glandulifera* Royle**  
Balsaminaceae, W-Asia

***Impatiens parviflora* DC**  
Balsaminaceae, Himalaya

***Solidago gigantea* Aiton**  
Asteraceae, N-America

***Bunias orientalis* L.**  
Brassicaceae, W-Asia



# ECOLOGICAL EFFECTS

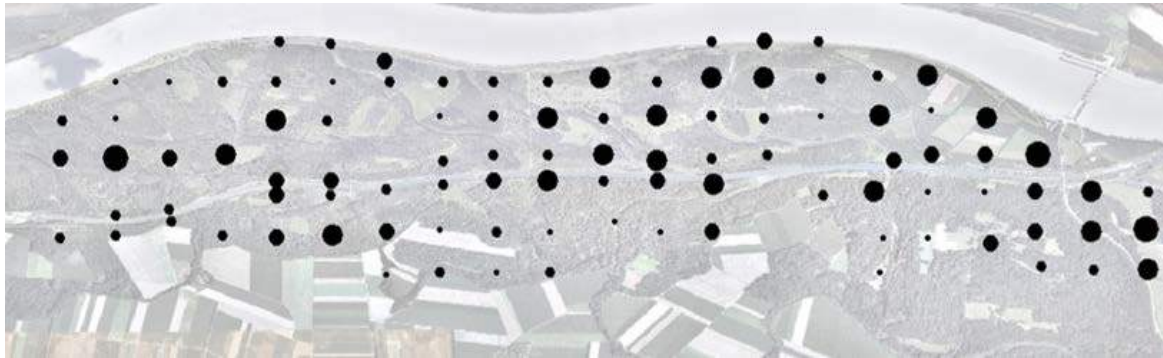
effect	species	<i>A. altissima</i>	<i>A. negundo</i>	<i>B. orientalis</i>	<i>I. glandulifera</i>	<i>I. parviflora</i>	<i>R. lanciniata</i>	<i>R. pseudoacacia</i>	<i>S. gigantea</i>
Introduction reasons		ornamental	ornamental	indirect	indirect	indirect	ornamental	ornamental, forestry	ornamental
changes in succession pattern *			+				+	+	+
changes in species composition		+	+	+	+	+	+	+	+
pathway - forest road				+		+		+	+
pathway - river stream			+	+	+		+		



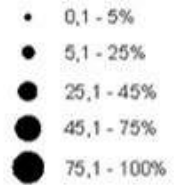
# INVASION IN THE HERB LAYER

Herb layer

0 to 5 m

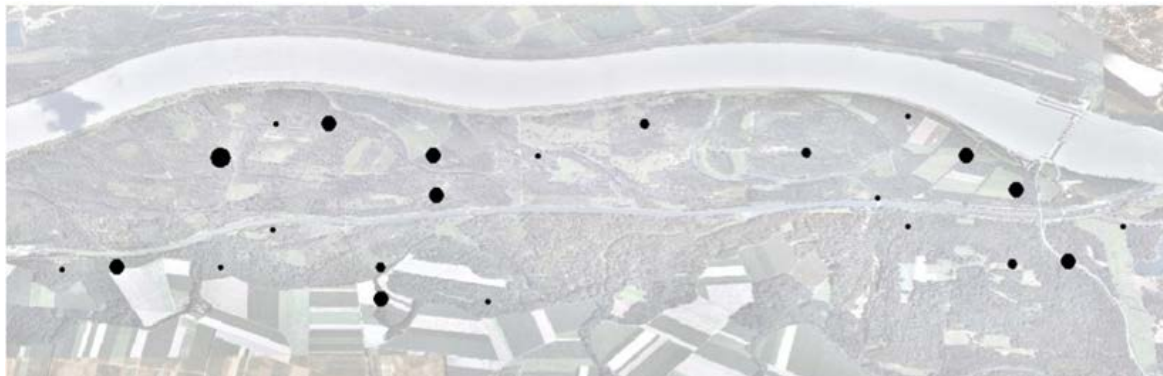


Neophytenanteil (%)



Tree layer

I & II 3 bis 20 m



# *IMPATIENS PARVIFLORA* BETWEEN 2010 AND 2013

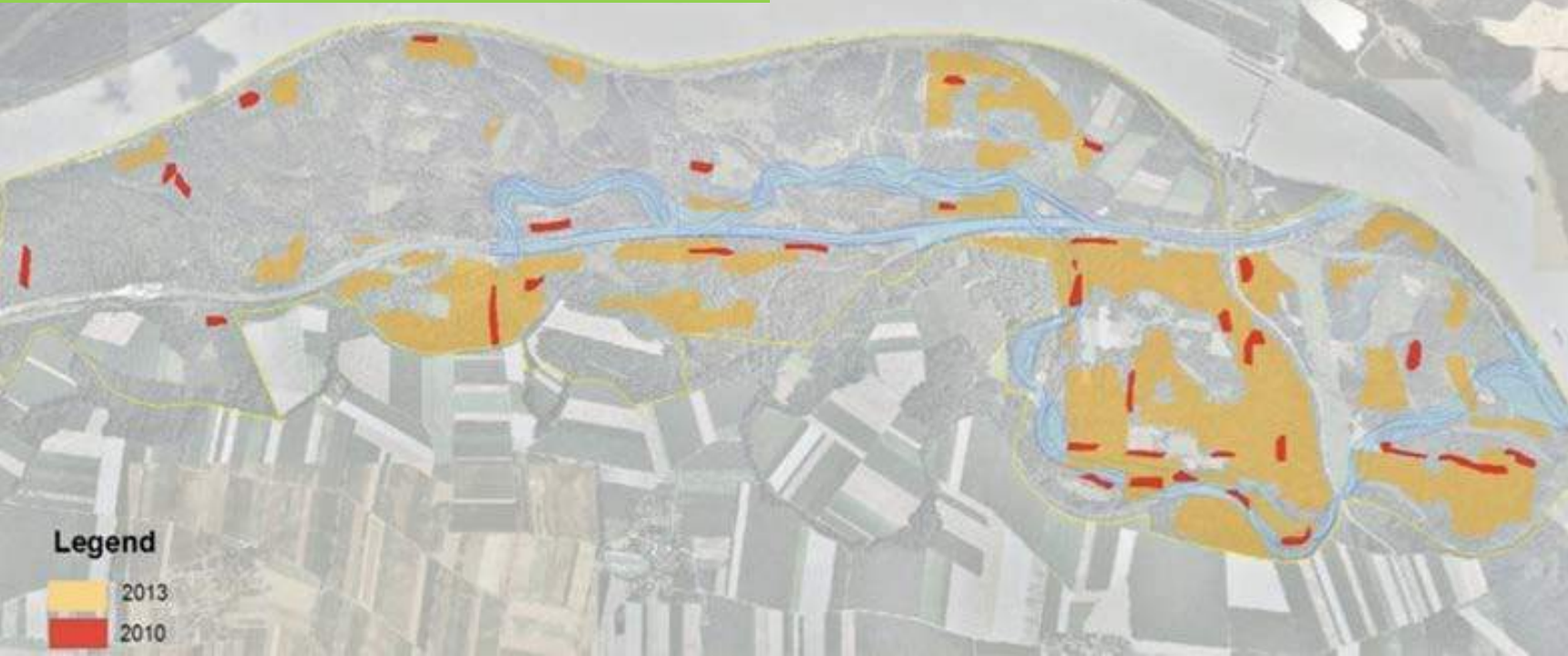
Mean Cover **2011**: 2.52%

Number of plots: 37

Mean cover **2013**: 11.53%

Number of plots: 61

(Mann–Whitney correlation  $p < 0.01$ )



# FOREST HABITAT TYPES



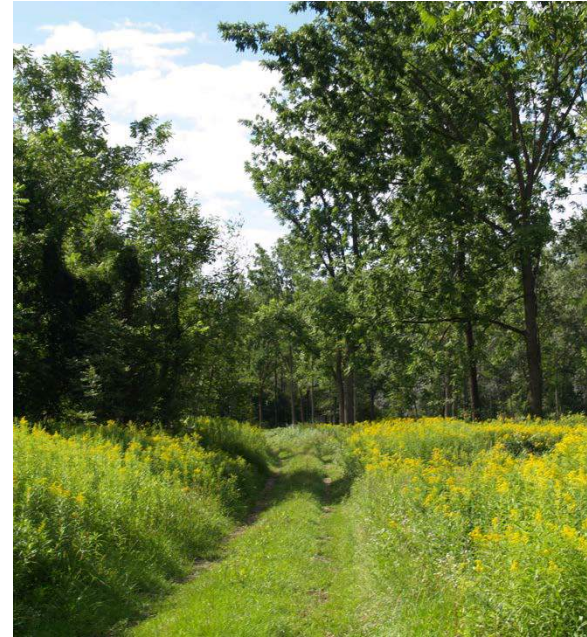
# DIFERSIFICATION: FOREST HABITAT TYPES

2013					
habitat type	plant cover		speies number		abundance IAS *
	Mean	±SD	mean	±SD	mean
ash tree forest	93.63	27.81	13.46	5.98	39.41
grey alder tree forest	95.26	18.09	12.35	3.82	23.43
cutover land	71.65	38.49	8.4	4.45	50.52
poplar tree forest	88.39	21.62	11.57	3.58	29.41
red pine tree forst	0	0	0	0	0
willow tree alluvial forest	111	0	10	0	31.53





# PATHWAY : FORST ROAD



*Impatiens parviflora*

*Impatiens glandulifera*

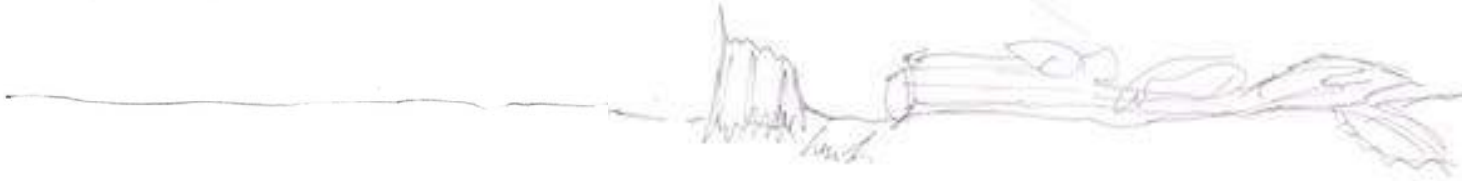
*Solidago gigantea*

(Wilcoxon test,  $p < 0.001$ )

No.	Road proximity	Description
1	On the roadside	Plot is directly influenced by a road or <b>in max. 2m distance</b>
0	Not on the roadside	Plot is not directly influenced by a road or <b>at least max. 2m away</b>



# CHALLENGES & PERSPECTIVES



# CONTROL, ERADICATION & MANAGEMENT

**Step one** Identification and Prevention

**Step two** Monitoring and early control

**Step three** defining the Outcomes of Control

**Step four** Choosing control Method

**Step five** eradication action

**Step six** Re-Introduction of native species

**Step seven** monitoring and evaluation



# MANAGEMENT OF ALIEN SPECIES: *SOLIDAGO SP.*



most effective way to fight *S. gigantea*:

early mowing **in July** and **removing the cuttings**



# MONITORING

active monitoring to **protect not invaded areas**

Wanted: Global, national and local **networks**

Research on **local variations** and dynamics



Seeds and flowers  
of *Impatiens glandulifera*



# LEGISLATIVE RESPONSE

*“to strictly control the introduction of non-indigenous species”*

(Bern Convention on the Conservation of European Wildlife and Natural Habitats, 1979)



*“eradicate those alien species which threaten ecosystems, habitats or species”*

(UN Convention on Biological Diversity, 1992)



**EU Biodiversity Strategy to 2020, Target 5:**

*“By 2020, Invasive Alien Species and their pathways are identified and prioritized, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.”*

(European Commission, 2011)

# CONCLUSION

Changes in **vegetation development**

intentional and unintentional introduction

Pathway: **forest road** & human disturbances

Invasion depends on **environmental conditions**,

intraspecific interactions and local habitat quality

Understanding the **characteristics** of invasive species'

biology



# CONCLUSION

Eradication of monotypic stands: **success uncertain**

Preventing the introduction of alien plant species

**cheapest** and **most effective** option





# THANK YOU FOR YOUR ATTENTION!

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