

# GRIS – North Macedonia: Invasive Alien Woody Plants



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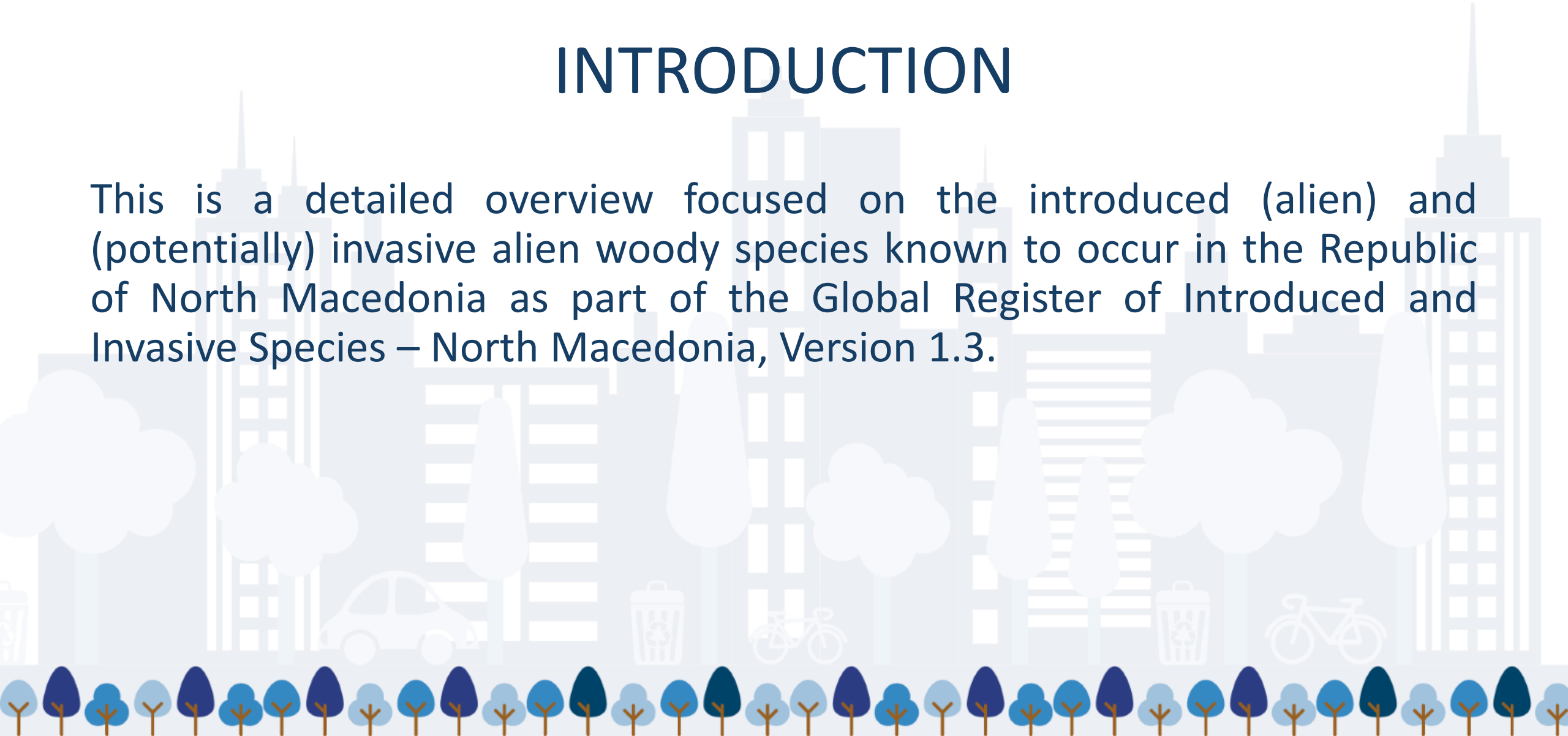
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# INTRODUCTION

This is a detailed overview focused on the introduced (alien) and (potentially) invasive alien woody species known to occur in the Republic of North Macedonia as part of the Global Register of Introduced and Invasive Species – North Macedonia, Version 1.3.



# INTRODUCTION

The International Union for Conservation of Nature (IUCN) describes an Introduced/Alien and Invasive alien species as follows:

An **Introduced or Alien species** means a species, subspecies, or lower taxon occurring outside of its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could not occupy without direct or indirect introduction or care by humans) and includes any part, gametes or propagule of such species that might survive and subsequently reproduce.

An **Invasive Alien Species** is an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity.



CHECKLIST DATASET | REGISTERED OCTOBER 17, 2018

# Global Register of Introduced and Invasive Species - North Macedonia

Published by [Invasive Species Specialist Group ISSG](#)

Trajanovski S • Simovski B • Nikolov B • Wong L J • Pagad S

DATASET TAXONOMY PROJECT METRICS [DOWNLOAD](#) [HOME PAGE](#)

63 RECORDS 1 CITATION

The Global Register of Introduced and Invasive Species (GRIIS) presents validated and verified national checklists of introduced (alien) and invasive alien species at the country, territory, and associated island level. Checklists are living entities, especially for biological invasions given the growing nature of the problem. GRIIS checklists are based on a published methodology and supported by the Integrated Publishing Tool that jointly enable ongoing improvements and updates to expand their ... [More](#)



Project ID: GRIIS

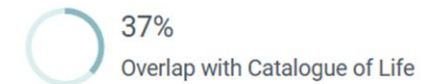
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Description

Description

Trajanovski S., Simovski B., Nikolov B., Jenna Wong L., Pagad S. (2020). Global Register of Introduced and Invasive Species – North Macedonia. Version 1.3. Invasive Species Specialist Group ISSG. Checklist dataset <https://doi.org/10.15468/xdl73t> accessed via GBIF.org on 2024-05-28

# PURPOSE

The pioneering input in this global online register (GRIIS) supports the country towards achieving targets of the Convention on Biological Diversity:

Target 7: 'To create and establish appropriate policies for the evidence, control and protection from invasive alien species'

Target 13: 'To establish monitoring of biodiversity and natural processes' and Related Strategic Goals/Aichi Biodiversity Target 9: 'Invasive alien species' (IAS) and Targets: 9, 11, 12, 13 & 19, respectively.







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Mechanisms > National Biodiversity Strategies and Action Plans (NBSAPs) > Search National Targets

## Find National Targets

**The national targets (or equivalent) presented in this database are taken from the NBSAPs received since COP-10, fifth national reports or separate submissions and provide examples of national targets established by Parties that contribute to the implementation of the Aichi Biodiversity Targets. The mapping of national targets to the Aichi Biodiversity Targets by the Party concerned is indicated in the last column "Related Aichi Target(s)". All Parties are encouraged to undertake this mapping exercise and to submit this information to SCBD for incorporation in this database.**

In addition, national biodiversity targets (primarily quantitative), and other relevant targets, for 2010 and beyond 2010, based on the information provided in the fourth national reports and other related information published by countries, are available [here](#). Although these targets have not been specifically established within the framework of the Aichi Biodiversity Targets, certain national targets can nevertheless be linked to the Aichi Biodiversity Targets and the 2020 implementation framework.

Search Criteria

Country:

Related Strategic Goals/Aichi Targets:

Title contains:

Results 1 to 2 of 2 results found

Reference	Target	Related Strategic Goals/Aichi Targets
Target 7	To create and establish appropriate policies for the evidence, control and protection from invasive alien species.	9
Target 13	To establish monitoring of biodiversity and natural processes.	9, 11, 12, 13, 19

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# MATERIAL AND METHODS

Investigation area: Republic of North Macedonia.

Sampling and taxonomic scope: Plantae – introduced and invasive woody species.

The draft checklist is compiled by collating data and information through a comprehensive literature overview. Taxonomic harmonization and normalization are made using the GBIF – Global Biodiversity Information Facility taxonomic backbone.



# METHODOLOGY

Method steps:

Data collation and categorization-> Data filtering and categorization/classification-> Taxonomic harmonization and normalization-> Data validation-> Data verification

The published methods underpinning GRIIS and each Checklist are described in: Pagad S, Genovesi P, Carnevali L, Schigel D, McGeoch MA (2018) Introducing the Global Register of Introduced and Invasive Species. *Scientific Data*, 5, 170202. <https://www.nature.com/articles/sdata2017202>





# INTRODUCED & INVASIVE ALIEN WOODY SPECIES (GRIIS – North Macedonia v.1.3)

<i>SPECIES_Name</i>	Kingdom	Phylum	Class	Order	Family	Environment_system	<i>SPECIES_status</i>
<i>Acer negundo</i> L.	Plantae	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Terrestrial	Alien
<i>Ailanthus altissima</i> (Mill.) Swingle	Plantae	Magnoliophyta	Magnoliopsida	Sapindales	Simaroubaceae	Terrestrial	Alien
<i>Amorpha fruticosa</i> L.	Plantae	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Terrestrial	Alien
<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent.	Plantae	Magnoliophyta	Magnoliopsida	Rosales	Moraceae	Terrestrial	Alien
<i>Buddleja davidii</i> Franch.	Plantae	Magnoliophyta	Magnoliopsida	Lamiales	Scrophulariaceae	Terrestrial	Alien
<i>Gleditsia triacanthos</i> L.	Plantae	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Terrestrial	Alien
<i>Koelreuteria paniculata</i> Laxm.	Plantae	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Terrestrial	Alien
<i>Robinia pseudoacacia</i> L.	Plantae	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Terrestrial	Alien



# Acer negundo L.

Note: Spread in riparian zones.

First introduce: **1919 – 1929. Afforestation** near the city of Kumanovo (Old Muslim graveyards locality), among other tree species ashleaf maple (**626 individuals**) have been planted.

First record source: *O. Krstić, Le reboisement dans la Serbie du Sud de 1913 À 1930, Revue Forestière (1934) 4-6: 152–178. [in Serbian, with French résumé]*

OCCURRENCE		INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Occasionally present casual, occasional, vagrant, migratory...		Invasive	Common	No
INTRODUCTION_type		PATHWAY_class	PATHWAY_subclass	
Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement		



# *Ailanthus altissima* (Mill.) Swingle

Note: Very high potential invasiveness due to climate change.

First introduced: **1919 – 1929**. Unspecified broadleaf species (just the total number of 1,034,725 seedlings has been noted) have been distributed to the local people of Kumanovo-Kriva Palanka region for **afforestation and ornamental use**. Recorded production of broadleaf species in the forest nurseries of this region include: black locust, tree of heaven (**produced 11,000 individuals**), sweet chestnut, mulberry, honey locust, and black walnut.

First record source: O. Krstić, *Le reboisement dans la Serbie du Sud de 1913 À 1930, Revue Forestière* (1934) **4-6**: 152–178. [in Serbian, with French résumé]

OCCURRENCE	INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Established	Invasive	Widespread	No

INTRODUCTION_type		PATHWAY_class	PATHWAY_subclass
Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement	
IMPACT_evidence (Y/N)	Impact_mechanism	Impact_outcome	
Yes	Competition	Environmental Ecosystem - Habitat; Environmental Species - Population; Socio-Economic	
Impact_outcome_subclass			
Unspecified ecosystem modification; Modification of successional patterns; other; Modification of landscape; Damage to ornamentals			



# *Amorpha fruticosa* L.

Note: Spread in riparian zones.

First introduce: **1937/1938. Shelterbelts (windbreak) afforestation** near the city of Skopje ('Rzhanichino village), among other tree species bastard indigo have been planted.

First record source: *B. Jovković, Les premiers résultats des travaux sur les rideaux forestiers en Macedonia, Revue Forestière (1950) 6: 221–234. [in Serbian]*

OCCURRENCE		INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Undefined		Not specified	Rare / Sporadic / Localised	No
INTRODUCTION_type	PATHWAY_class	PATHWAY_subclass		
Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement		





IMPACT_evidence (Y/N)	Impact_mechanism	Impact_outcome
No	Competition	Environmental Ecosystem - Habitat; Environmental Species - Population; Socio-Economic

## Impact\_outcome\_subclass

Modification of hydrology/water regulation, purification and quality /soil moisture; Unspecified ecosystem modification; other; Modification of landscape



# *Broussonetia papyrifera* (L.) L'Hér. ex Vent.

Note: Potential impact in urban and peri-urban forests.

OCCURRENCE		INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Undefined		Not specified	Rare / Sporadic / Localised	No

INTRODUCTION_type	PATHWAY_class	PATHWAY_subclass
Intentional legally	Release	Landscape/flora/fauna improvement



IMPACT_evidence (Y/N)	Impact_mechanism		Impact_outcome
No	Competition	Socio-Economic	

### Impact\_outcome\_subclass

Modification of cultural, educational, aesthetic, religious and ornamental values



# *Buddleja davidii* Franch.

OCCURRENCE	INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Undefined	Uncertain	Rare / Sporadic / Localised	No

INTRODUCTION_type	PATHWAY_class	PATHWAY_subclass
Intentional legally	Release	Landscape/flora/fauna improvement

IMPACT_evidence (Y/N)	Impact_mechanism	Impact_outcome
No	Unknown	Unknown



# *Gleditsia triacanthos* L.

First introduce: **1919 – 1929**. Unspecified broadleaf species (just the total number of 1,034,725 seedlings has been noted) have been distributed to the local people of Kumanovo-Kriva Palanka region for **afforestation and ornamental use**. Recorded production of broadleaf species in the forest nurseries of this region include: black locust, tree of heaven, sweet chestnut, mulberry, honey locust (**produced 3,000 individuals**), and black walnut.

*First record source: O. Krstić, Le reboisement dans la Serbie du Sud de 1913 À 1930, Revue Forestière (1934) 4-6: 152–178. [in Serbian, with French résumé]*

OCCURRENCE	INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Undefined	Not specified	Rare / Sporadic / Localised	No





**INTRODUCTION\_type    PATHWAY\_class    PATHWAY\_subclass**

Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement
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**IMPACT\_evidence (Y/N)    Impact\_mechanism    Impact\_outcome**

No	Competition	Socio-Economic
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**Impact\_outcome\_subclass**

Modification of cultural, educational, aesthetic, religious and ornamental values



# *Koelreuteria paniculata* Laxm.

Note: Impact in peri-urban forests.

First introduce: **1937/1938. Shelterbelts (windbreak) afforestation** near the city of Skopje ('Rzhanichino village), among other tree species goldenrain tree have been planted.

First record source: *B. Jovković, Les premiers résultats des travaux sur les rideaux forestiers en Macedonia, Revue Forestière (1950) 6: 221–234. [in Serbian]*

OCCURRENCE		INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Undefined		Not specified	Rare / Sporadic / Localised	No
INTRODUCTION_type	PATHWAY_class	PATHWAY_subclass		
Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement		



IMPACT_evidence (Y/N)	Impact_mechanism	Impact_outcome
Yes	Competition	Environmental Ecosystem - Habitat; Environmental Species - Population; Socio-Economic

### Impact\_outcome\_subclass

Unspecified ecosystem modification; Modification of successional patterns; other; Modification of landscape; Damage to ornamentals



# *Robinia pseudoacacia* L.

First introduce: **1914**. **First afforestation in the country**, with black locust (**8,000 individuals**) near the city of Kriva Palanka (Bair locality).

*First record source: O. Krstić, Le reboisement dans la Serbie du Sud de 1913 À 1930, Revue Forestière (1934) 4-6: 152–178. [in Serbian, with French résumé]*

OCCURRENCE		INVASIVENESS	ABUNDANCE	Weed/pest/disease of Agriculture (Y/N)
Established		Invasive	Widespread	No
INTRODUCTION_type	PATHWAY_class	PATHWAY_subclass		
Intentional legally	Release	Erosion control/ dune stabilization; Landscape/flora/fauna improvement		



IMPACT_evidence (Y/N)	Impact_mechanism	Impact_outcome
Yes	Competition	Environmental Ecosystem - Habitat; Environmental Species - Population; Socio-Economic

### Impact\_outcome\_subclass

Unspecified ecosystem modification; Modification of successional patterns; other; Modification of landscape; Damage to infrastructures;





# INTRODUCED & INVASIVE ALIEN WOODY SPECIES (GRIIS – North Macedonia v.1.3)

	SPECIES_Name	Family	SPECIES_status	OCCURRENCE	INVASIVENESS	ABUNDANCE
	<i>Acer negundo</i> L.	Sapindaceae	Alien	Occasionally present casual, occasional, vagrant, migratory...	Invasive	Common
EPPO-LIAP/04	<i>Ailanthus altissima</i> (Mill.) Swingle	Simaroubaceae	Alien	Established	Invasive	Widespread
EPPO-LIAP/06	<i>Amorpha fruticosa</i> L.	Fabaceae	Alien	Undefined	Not specified	Rare / Sporadic / Localised
EPPO-OLIAP/19	<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent.	Moraceae	Alien	Undefined	Not specified	Rare / Sporadic / Localised
EPPO-LIAP/06	<i>Buddleja davidii</i> Franch.	Scrophulariaceae	Alien	Undefined	Uncertain	Rare / Sporadic / Localised
	<i>Gleditsia triacanthos</i> L.	Fabaceae	Alien	Undefined	Not specified	Rare / Sporadic / Localised
	<i>Koelreuteria paniculata</i> Laxm.	Sapindaceae	Alien	Occasionally present casual, occasional, vagrant, migratory...	Invasive	Common
	<i>Robinia pseudoacacia</i> L.	Fabaceae	Alien	Established	Invasive	Widespread

**EPPO-LIAP** = European and Mediterranean Plant Protection Organization (EPPO) List of invasive alien plants.

[https://www.eppo.int/ACTIVITIES/invasive\\_alien\\_plants/iap\\_lists#iap](https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists#iap) (accessed via EPPO.int on 2024-05-28)

**EPPO-OLIAP** = EPPO Observation List of invasive alien plants. (Note: Moved one level up in 2019 from EPPO Alert List) ↑

[https://www.eppo.int/ACTIVITIES/invasive\\_alien\\_plants/iap\\_lists#observ](https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists#observ) (accessed via EPPO.int on 2024-05-28)

**EPPO Alert List (extract):** *Paulownia tomentosa* Steud. (2021) ↑

[https://www.eppo.int/ACTIVITIES/invasive\\_alien\\_plants/iap\\_lists#alert](https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists#alert) (accessed via EPPO.int on 2024-05-28)



# CONCLUSIONS

- The checklist/dataset on woody plants within the GRIIS database for North Macedonia consists of 8 terrestrial alien species introduced in the first half of the 20<sup>th</sup> century for two main purposes:
  - erosion mitigation measures, and
  - ornamental use.

- Native to:
  - Asia 50%, and
  - North America 50%.
- Growth form:
  - 6 species are trees, and
  - 2 species are shrubs.
- Most represented botanical family:
  - Fabaceae with 3 species, and
  - Sapindaceae with 2 species.
- Each of the species is classified as different genera.

- Beside some uncertainties for potentially invasive and invasive alien woody plants so far, one species underlines the matrix of invasiveness in all lookups:

- ***Ailanthus altissima***.

This species has been introduced intentionally and legally, and it has been well-established, invasive, widespread, highly competitive species, with both environmental and socio-economic impact.

# REFERENCE LIST

*used in the checklist/dataset registered October 17, 2018:*

Reference type	Author	Year	Title	Journal	Pages	Date	Link	Publisher	City
Database		2018	EPPO Lists of Invasive Alien Plants				<a href="https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists">https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists</a>	European and Mediterranean Plant Protection Organization (EPPO)	
Abstract	Nikolov, B., Simovski, B., Minchev, I.	2017	Ailanthus altissima in the region of Malesh in FYR Macedonia	In (Trichkova T., R. Tomov, V. Vladimirov, H. Kalcheva, Y. Vanev, A. Uludağ, V. Tyufekchiev, eds.): Book of abstracts of the 7th ESENIAS Workshop with Scientific Conference 'Networking and Regional Cooperation Towards Invasive Alien Species Prevention and Management in Europe'	112	28-30 March	<a href="http://www.esenias.org/files/ESENIAS_Book_of_Abstracts_website.pdf">http://www.esenias.org/files/ESENIAS_Book_of_Abstracts_website.pdf</a>	IBER-BAS, ESENIAS	Sofia
Presentation	Simovski, B.	2016	2012-2015 Country report: Invasive Alien Plant Species in the Republic of Macedonia	ESENIAS-TOOLS WG4: 1st Workshop on data collection, analysis, standardisation and harmonisation on alien plant and fungi species		3-4 March	<a href="https://www.researchgate.net/publication/306098614_Country_report_Invasive_Alien_Plant_Species_in_the_Republic_of_Macedonia">https://www.researchgate.net/publication/306098614_Country_report_Invasive_Alien_Plant_Species_in_the_Republic_of_Macedonia</a>		Novi Sad
Abstract	Simovski, B., Acevski, J., Hadji Pecova, S., Prentović, T.	2012	Certain invasive alien species of the urban greenery in the city of Skopje	Book of abstracts of the International Symposium for Agriculture and Food - VII Symposium for Vegetable and Flower Production	102	12-14 December	<a href="http://www.fzhn.ukim.edu.mk/images/stories/symposium2012/symposium65_program.pdf">http://www.fzhn.ukim.edu.mk/images/stories/symposium2012/symposium65_program.pdf</a>	UKiM Faculty of Agriculture Sciences and Food	Skopje
Presentation	Simovski, B.	2011	IAS in forestry: Invasive alien woody species in the Republic of Macedonia	2nd Workshop: EEA/EIONET Balkan meeting on networking activities on Invasive Alien Species (IAS)		17-18 October	<a href="http://forum.eionet.europa.eu/nrc-biodiversity-and-ecosystems-indicators-and-assessments/library/invasive-alien-species/workshop-networking-ias-west-balkan-countries-and-its-neighbours-17-18-october/networking-simovski/download/en/1/networking-Simovski.pdf">http://forum.eionet.europa.eu/nrc-biodiversity-and-ecosystems-indicators-and-assessments/library/invasive-alien-species/workshop-networking-ias-west-balkan-countries-and-its-neighbours-17-18-october/networking-simovski/download/en/1/networking-Simovski.pdf</a>		Sofia
Government document		2004	Biodiversity Strategy and Action Plan of the Republic of Macedonia		66		<a href="https://www.cbd.int/doc/world/mk/mk-nbsap-01-en.pdf">https://www.cbd.int/doc/world/mk/mk-nbsap-01-en.pdf</a>	Ministry of Environment and Physical Planning of the Republic of Macedonia	Skopje

## *first record sources:*

- O. Krstić, Le reboisement dans la Serbie du Sud de 1913 À 1930, Revue Forestière (1934) **4-6**: 152–178. [in Serbian, with French résumé]
- B. Jovković, Les premiers résultats des travaux sur les rideaux forestiers en Macedonia, Revue Forestière (1950) **6**: 221–234. [in Serbian]







## Additional/up-to-date information used:

- <https://www.cbd.int/nbsap/targets/> (accessed via CBD.int on 2024-05-28)
- [https://www.eppo.int/ACTIVITIES/invasive\\_alien\\_plants/iap\\_lists#iap](https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists#iap) (accessed via EPP0.int on 2024-05-28)
- [https://www.eppo.int/ACTIVITIES/invasive\\_alien\\_plants/iap\\_lists#observ](https://www.eppo.int/ACTIVITIES/invasive_alien_plants/iap_lists#observ) (accessed via EPP0.int on 2024-05-28)
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*for your attention.*

Γοι λοσι αττεντιον.



# GRIS – North Macedonia: Invasive Alien Woody Plants



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