

# Molecular genetics of the Emerald ash borer invasion in European Russia and Eastern Europe

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# The emerald ash borer, *Agrilus planipennis*

**Natural range:**
East Asia (Russian Far East, China, Mongolia, Japan, Taiwan)

**Invasive range:**
North America
European part of Russia + Siberia
Ukraine, Belarus (new)

**Host plants:**
*Fraxinus* spp.

**Damage in the natural range:**
No

**Damage in the invasive range:**
Significant



A peer-reviewed open-access journal
NeoBiota
Advancing research on alien species and biological invasions

**Kirichenko N.I. et al.** (2021) Economic costs of biological invasions in terrestrial ecosystems in Russia. *NeoBiota* 67: 103–130.

# Current range

## INVASION HISTORY*

2002 – North America
2003 – Moscow
2019 – Eastern Europe (Ukraine, Belarus)

# Current range

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ВНИИКР

PLANT HEALTH AND QUARANTINE

RUSSIAN-ENGLISH SCIENTIFIC JOURNAL

**Situation in Russia*:**

- A significant expansion of the invasive range.
- The area of established phytosanitary zones for the pest increased in 2025 notably.

*National report on the quarantine phytosanitary state of the territory of the Russian Federation in 2025.

# The aims of the study

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- to verify the western frontier of *A. planipennis* secondary range,

- to clarify the route of the invasion by studying haplotypes of *A. planipennis.*

The study is performed with the support by Russian Science Foundation

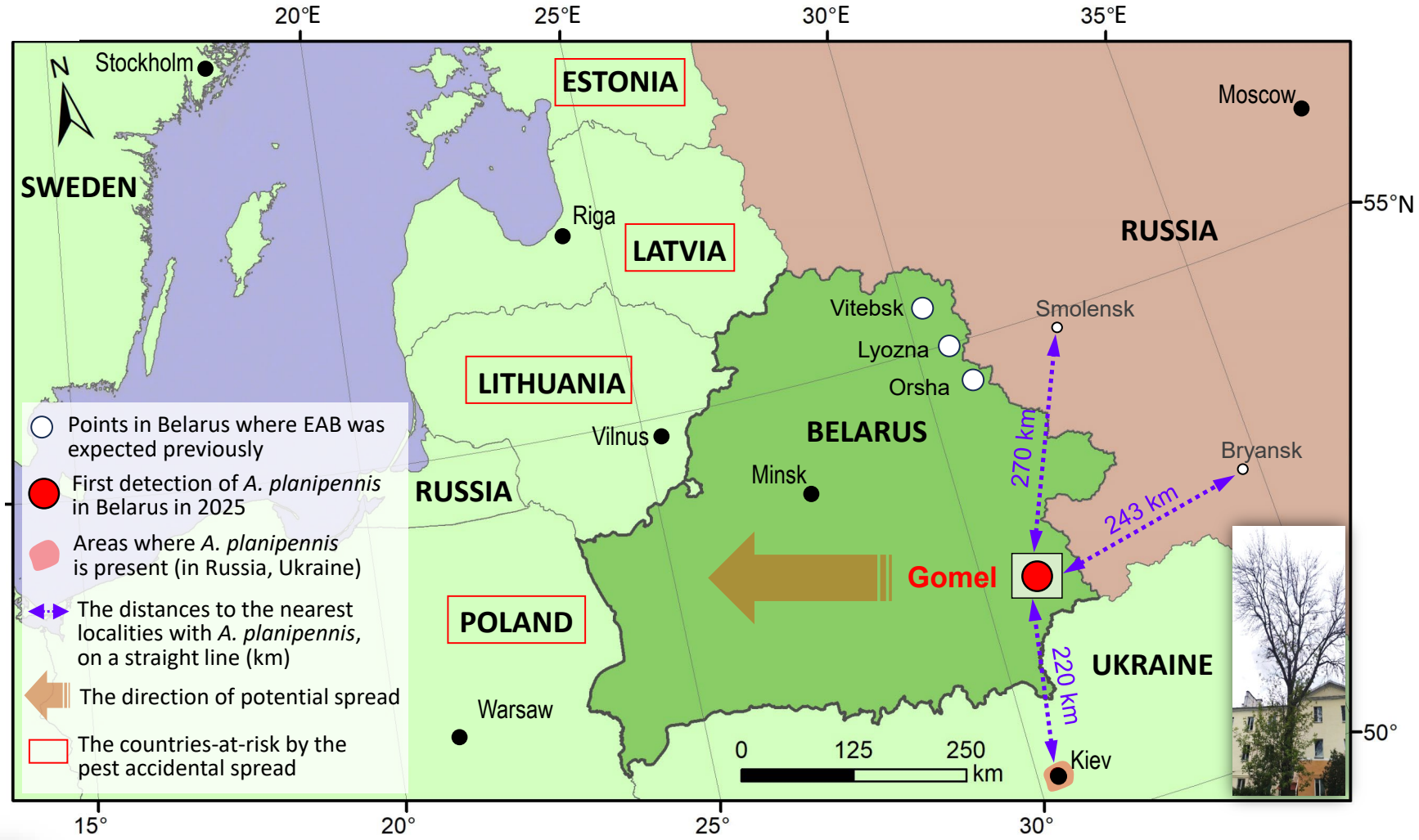
# *A. planipennis* in Belarus: recorded in 2025



ABS Acta Biologica Sibirica

**Zviagintsev V.B., Kirichenko N.I., Chernik M.I., Seraya L.G., Baranchikov Y.N.** (2025) The Emerald ash borer *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae) invaded Belarus. *Acta Biologica Sibirica* 11: 847–861.

# *A. planipennis* in Belarus: recorded in 2025




- If *A. planipennis* continues spreading in Belarus, **it may reach neighboring countries.**
- Further spread is mainly due to **unintentional transportation** rather than natural dispersal.
- **Sudden outbreaks** in distant locations may happen.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# Involvement of researchers and volunteers



Collecting samples of *A. planipennis* for the phylogeographic study (in collaboration with the EPPO Network of experts working on surveillance, monitoring, and control of the Emerald ash borer, *Agrilus planipennis*)

# DNA barcoding


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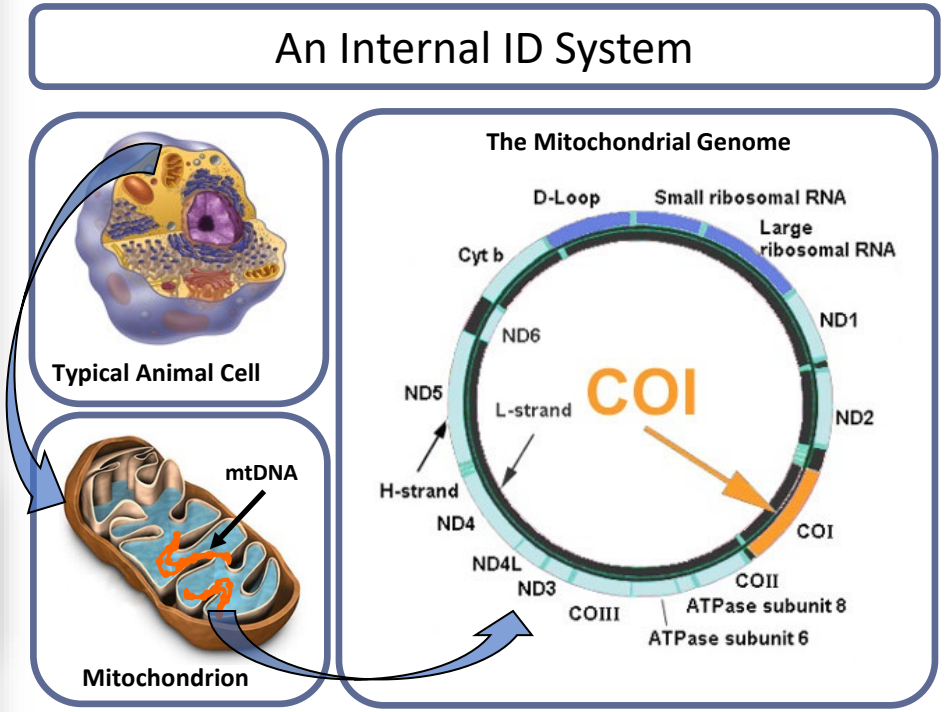


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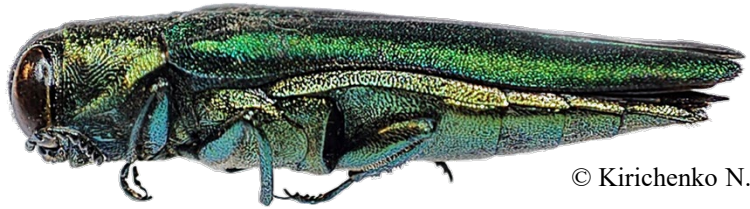

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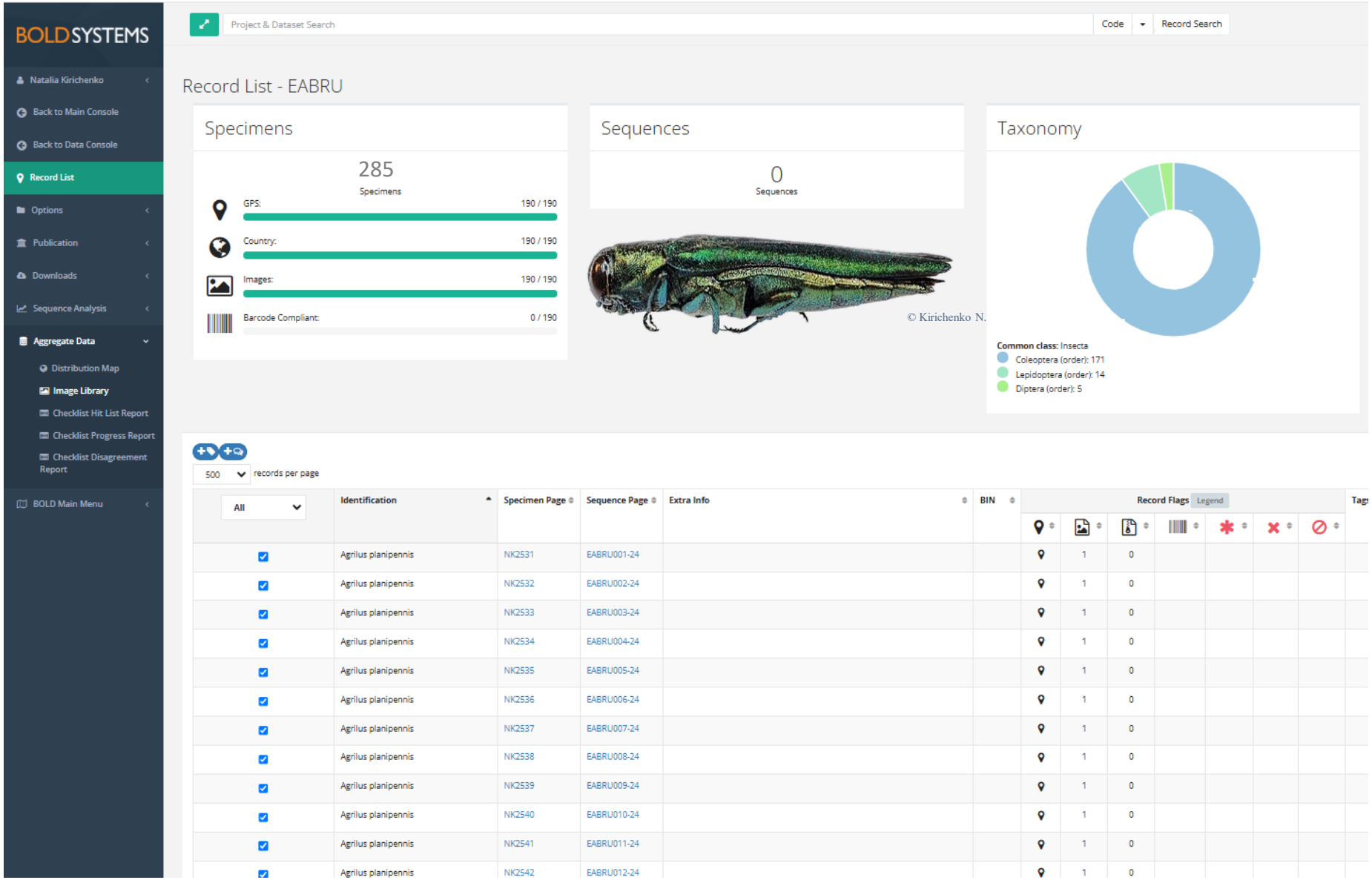
# Molecular genetics



# Molecular genetics

Specimens used for DNA barcoding (285 sequences)

# A phylogenetic trees

Will be published soon.

# Take home messages

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- The phylogeography of *A. planipennis* was studied across its current range in Eurasia based on 180 COI mtDNA sequences, among which six haplotypes were revealed, with one dominant haplotype (H1) widely distributed throughout the pest's invasive range.
- The phylogenetics and phylogeographic patterns suggest that the species' range expansion in Russia was due to the bridgehead effect – establishment of non-native populations from those already established in the neighbor regions, rather than from native range.
- *A. planipennis* is now present in Belarus. Based on the genetic data, the pest came from the neighboring Russian territories and Moscow Region (a long-distance jump).
- From Belarus, *A. planipennis* can soon reach neighboring Baltic countries and Poland.
- Further long-distance dispersal is expected to result primarily from unintentional human-mediated transportation rather than natural spread.

Thank you
to **all colleagues**
who provided specimens!


**The study was performed with the support from Russian Science Foundation, grant # 22-16-00075-P**

# Thank you for attention!

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