Forest Research

Distribution and impact of emerald ash borer *Agrilus planipennis* (Coleoptera:Buprestidae) in the Moscow region of Russia and the threat to Europe

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Emerald Ash Borer (EAB), *Agrilus planipennis*

- native of China, Japan, Korea & Russian Far-East
- Asian ash relatively resistant to EAB
- in 2002, identified as the cause of widespread dieback and death of ash trees in Michigan, USA
- since killed millions of ash trees over a vast area of N. America
- N. American ash highly susceptible to EAB
- also identified & reported in Moscow, Russia in 2007 (first observed in 2003/4)
- European ash susceptible to EAB

EAB in Russia

- How did it get into Moscow?
- Wood packaging material – wooden cable spools/pallets/wooden crates
- Imported nursery stock of *F. pennsylvanica*
- Infested logs/trees transported via Trans-Siberian railway from east to west

- Distribution of European ash (*F. excelsior*) in Russia
- Edge of its geographic range - generally very scarce north and west of Moscow
- Have to travel at least 150km south of Moscow before *F. excelsior* becomes apparent as a component of broadleaved forests
- However, green ash (*F. pennsylvanica*) planted in towns and cities, and also along major roads/motorways as wind breaks

- Very little information available as to what is happening with EAB in Russia!

- Ash is a very common tree species throughout Europe

There is no native *Agrilus* species in the UK that attacks ash
(although *A. cyanescens* discovered in East London in 2008 is polyphagous)

However in Europe *A. convexicollis* feeds on dead/dying ash

(EAB attacks healthy, live trees)

EAB - Europe

- Major concern within Europe as to when and where EAB is going to occur, and how susceptible is European species of ash (*F. excelsior*, *F. angustifolia*, *F. ornus*).

- It was first identified and reported in Moscow, Russia in 2007 (observed in 2003/4, but probably arrived a decade before its discovery!)

- Where is it now though!

EAB in Russia

- Visit to Moscow (2013) was an opportunity to try and answer some of the following key questions.

- Host relations
- Which species of ash are attacked, and are other tree and shrub species attacked? How susceptible is *Fraxinus excelsior* to attack?

- Damage symptoms
- What is the best way to survey and detect for EAB?

- Pathways
- How far does the beetle disperse naturally?
- What are the human mediated methods of dispersal?

- Interactions
- Does ash dieback disease (*Hymenoscyphus fraxineus*) influence the impact of EAB in anyway?

EAB in Russia

- * Proximity to rest of Europe *
- Most importantly – how close to the borders with Belarus and Ukraine is EAB? How far has it spread from Moscow?

- Control, management, monitoring options
- What is being implemented?

- So a grand tour of western Russia ensued in July 2013!

- Essentially it is quite easy to follow the destructive trail of EAB along motorways and major routes out of Moscow!

Canopy dieback

Epicormic shoots

D-shaped exit holes

S-shaped galleries

Adult feeding damage

Woodpecker damage

Centre of Moscow

Canopy dieback
D-shaped exit holes
Epicormic shoots
Larval galleries
Adult feeding damage
Woodpecker damage

Forest Research

40-50km outside Moscow

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80-100km outside Moscow

120-140km outside Moscow

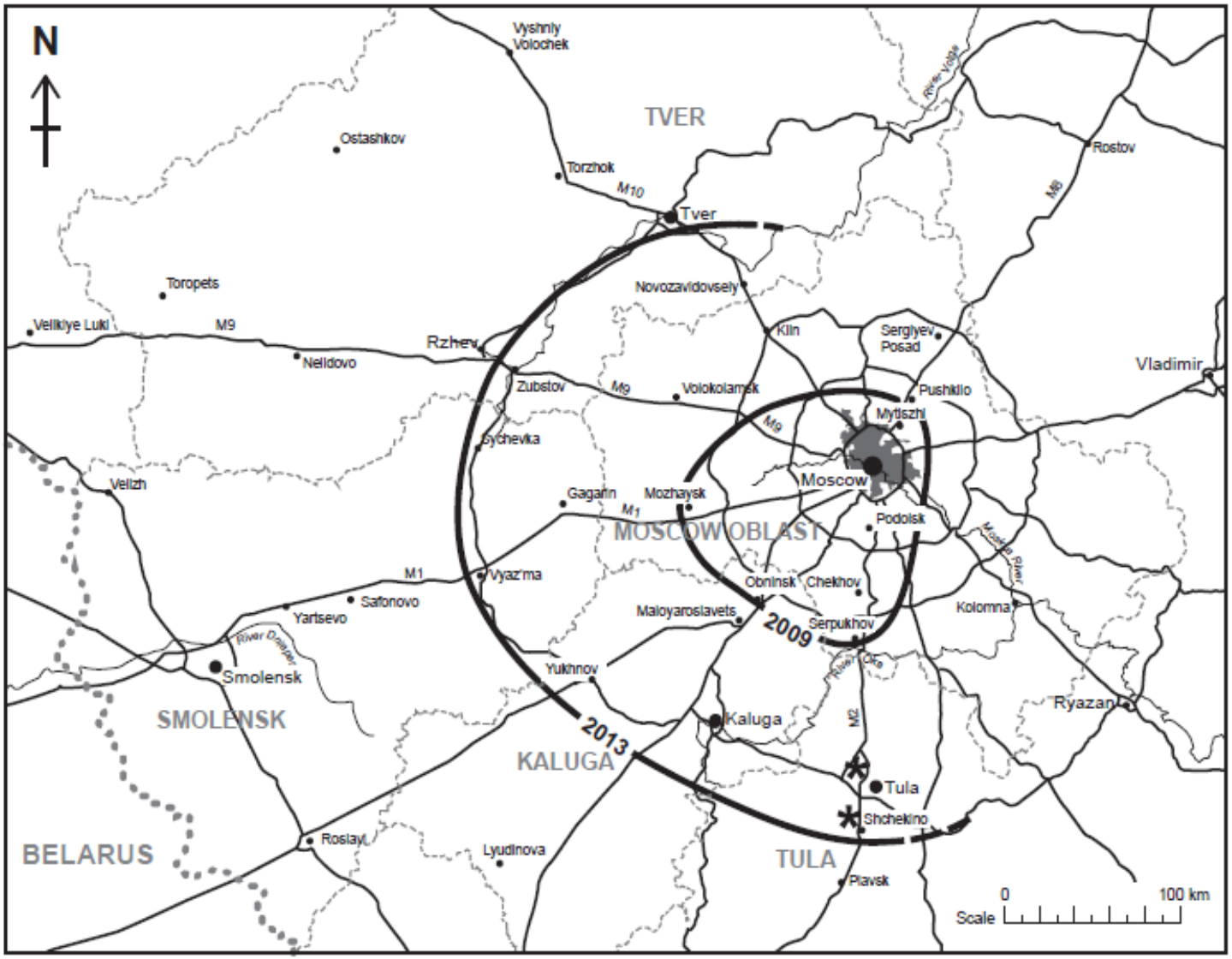
~200km outside Moscow

400km west of Moscow

Healthy trees

No signs of EAB

Range of EAB in 2013 - Russia



EAB at least 200+km south and west of Moscow in 2013 Only another 200km to the border with Belarus

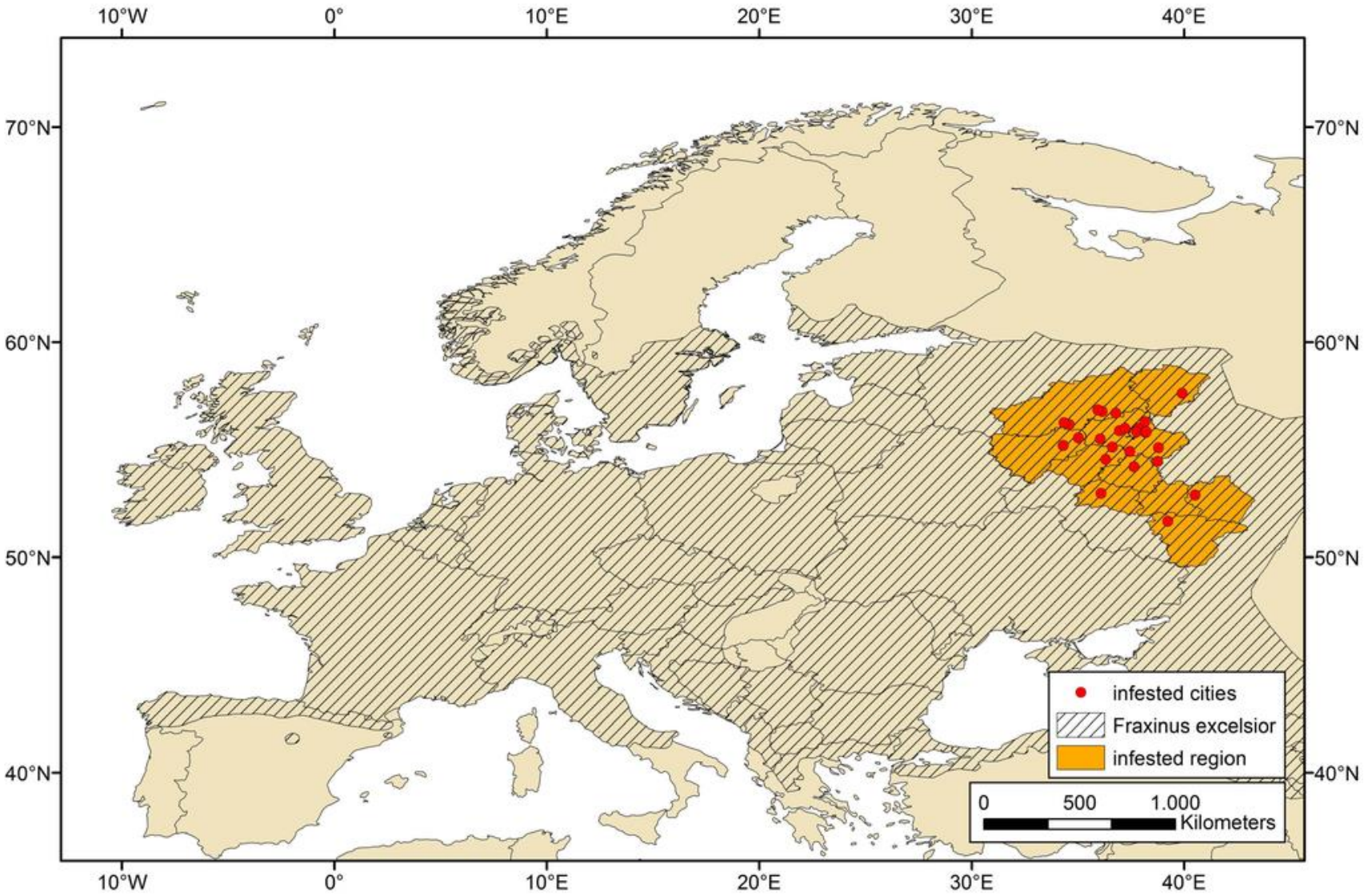
Rate of spread estimated to be 30-40km/year

- Not through natural dispersal
- hitchhiking

Range of EAB in 2013 - Russia

From M. J. Orlova-Bienkowskaja (2014) Found signs of EAB damage further south in Orel & Voronezh

EAB in Europe



From Valenta et al., (2015) Forests 6:3075-3086

Threat of EAB in Europe

- Most importantly – how far away from the borders with Belarus and Ukraine is EAB? – in 2013 approx. 200km!
- Almost no management, control, or monitoring of EAB
- No chance of stopping it dispersing into rest of Europe!
- Consensus of opinion suggests by 2020! (however it may already be present but as yet undetected!)

- <u>Influential factor</u>
- Interaction with ash dieback disease (*Hymenoscyphus fraxineus*)?
- Disease is causing widespread dieback & mortality of ash across Europe.
- Certainly increase susceptibility of ash to EAB.

Threat of EAB in Europe

Ash dieback symptoms – similar to EAB damage symptoms

Threat of EAB in Europe

- Ash dieback found throughout Europe now
- Moving east !
- EAB found in Moscow region
- Moving west !
- When they eventually meet
- potential demise of Ash in Europe !!!
- PREPSYS project – reason for visiting Canada/USA
- (Pest Risk Evaluation and Pest management SYStems)
- Management, control, monitoring
- One key aspect to explore is pathways
- Potential pathways of EAB and BBB introduction into Europe