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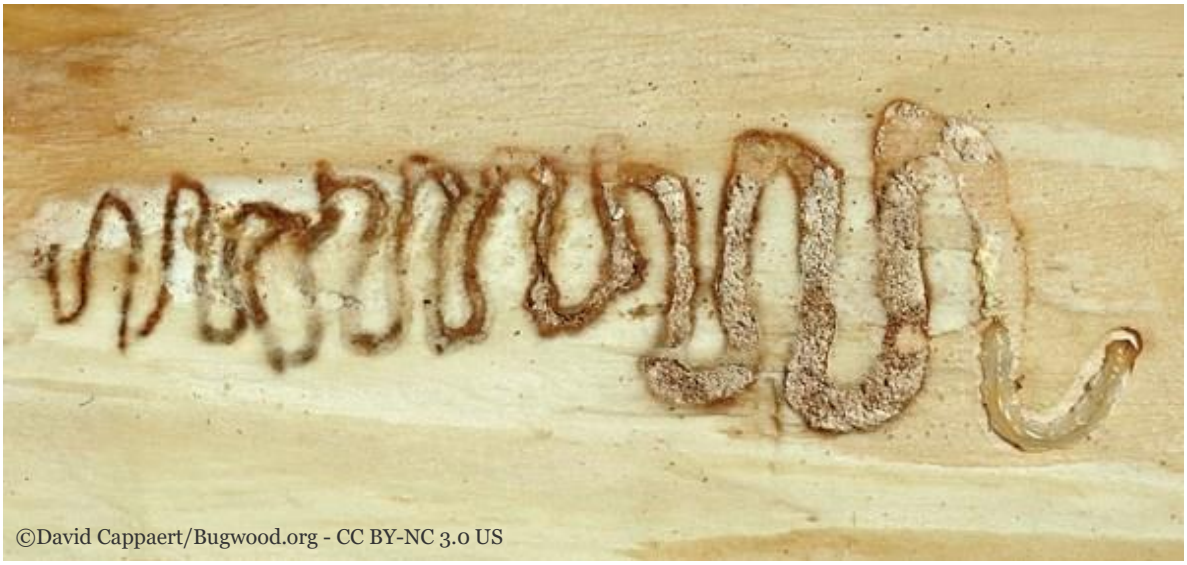
Assessment of suitability for EAB invasion for Scotland and the UK

Policy Summary



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Policy Summary

Emerald Ash Borer (EAB) has become a significant threat to ash trees in several countries (including USA and Russia) but is not yet present in the UK. We quantified climate and ecological factors affecting EAB suitability using native range data and conclude that southern England is a highly suitable habitat for EAB. Although currently less favourable, we project that Scotland will become increasingly suitable for EAB under climate change. Thus, EAB could threaten Scotland via trade with areas where it is present or, through spread from populations if established in England or Western Europe. Rapid spread of EAB has been observed in its US invasion. We therefore recommend further study and vigilance against EAB introductions into the UK.

1.1 Background

- EAB has the highest possible score for Unmitigated Risks in the UK Plant Health Risk Register (PHRR), including for Entry and Establishment.
- Native range is in East Asia where it is not regarded as a pest. Large expanding invasion in USA since 2002 has caused significant economic damage (USD$10 – 12 billion). Smaller recent incursion in Russia (first recorded 2007) is a further potential threat to European ash.
- Invasion of UK could result from global trade especially with USA or East Asia, or spread through Europe from Russia but quantifying likelihood of introduction is challenging.

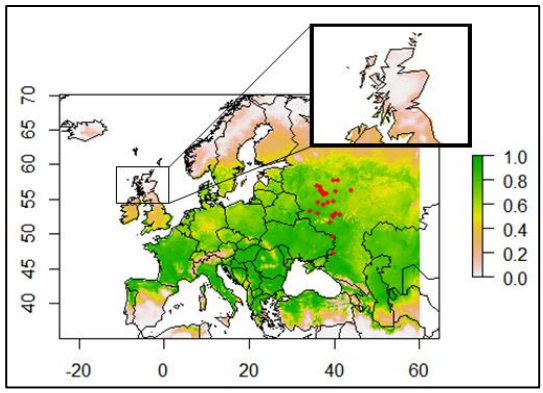

Fig 1 - EAB suitability scores: – colour scale represents suitability (green: high, white: low) and red dots represent known occurrence (2018-19).

1.2 Assessment of EAB threat to Scotland

- Species distribution modelling and data on native range was used to quantify potential climate and ecological suitability for EAB across Europe including UK/Scotland currently (Fig. 1) and by 2050 (Fig. 2).
- Results suggest existing EAB suitability in southern UK and across continental Europe (Fig.1).
- Analysis of future climate scenarios combined with Growing Day Degrees (GDD) analysis

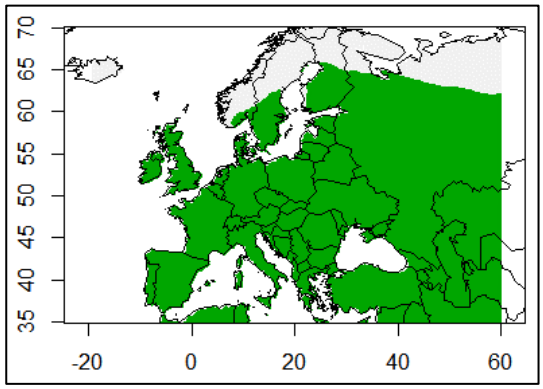

Fig 2 - Future predicted suitability for June by 2050: - GDD above EAB emergence threshold (240GDD; green).

suggests that by 2050 Scotland is likely to have a climate conducive to EAB establishment and spread (Fig. 2).
- Further work is needed to assess how rapidly the population might spread into and across Scotland, including by natural and human-assisted spread.

1.3 Recommendations

- Ongoing vigilance and monitoring of trade and other entry points are needed to reduce the risk of EAB establishing in the UK.
- Further climate suitability and epidemiological modelling are needed to predict risk of spread once EAB becomes established, to quantify impact, and formulate and test possible control strategies.
- Given the potential suitability of southern UK, collaboration across the UK is needed to align the modelling and policy making.

1.4 Caveats to analysis

1 We have not assessed the likelihood of introduction of EAB into Scotland or the wider UK but evidence from the PHRR suggests both the unmitigated and mitigated risks are high.
2 Analysis was based on the MaxEnt approach widely used to model species distribution data, but other methods may perform differently.
3 Although our analysis performed well when assessed against the current extent of the North American EAB distribution there may be other significant factors affecting suitability.
4 We are not aware of relevant evidence that EAB may be able to adapt to local conditions and we therefore estimate suitability based on native range. However, more work is needed on assessing the reliability of its potential for predicting suitability in invaded areas.
5 Further analysis of the North American invasion using spatio-temporal models currently under development may shed light on 3 & 4.

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