



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention



Department
for Environment
Food & Rural Affairs



@RJABuggs

Plant Health, Climate and Biodiversity: Seeking solutions for Ash Trees

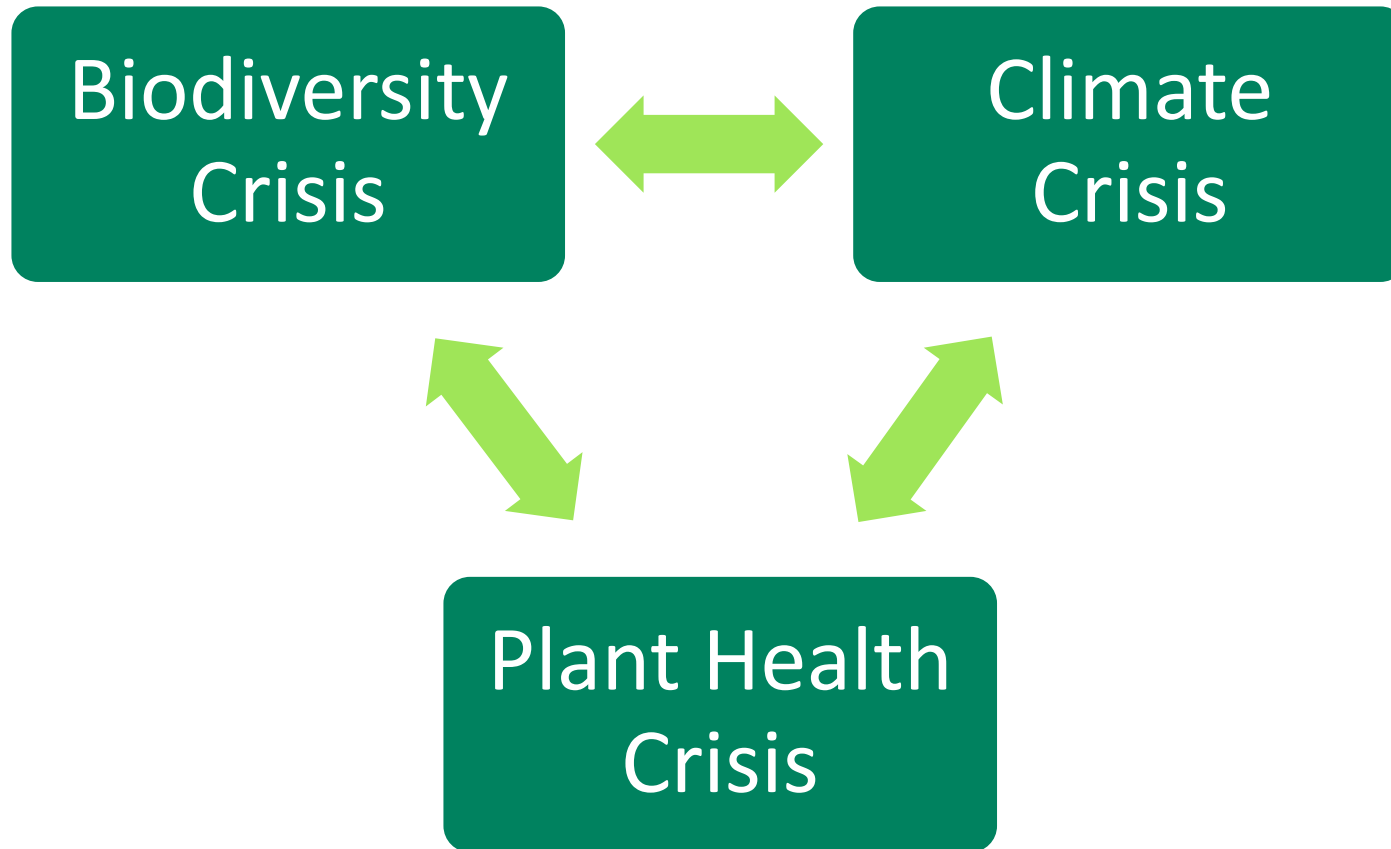
Professor Richard Buggs

Royal Botanic Gardens Kew & Queen Mary University of London

London, 21 – 23 September 2022

International Plant Health Conference



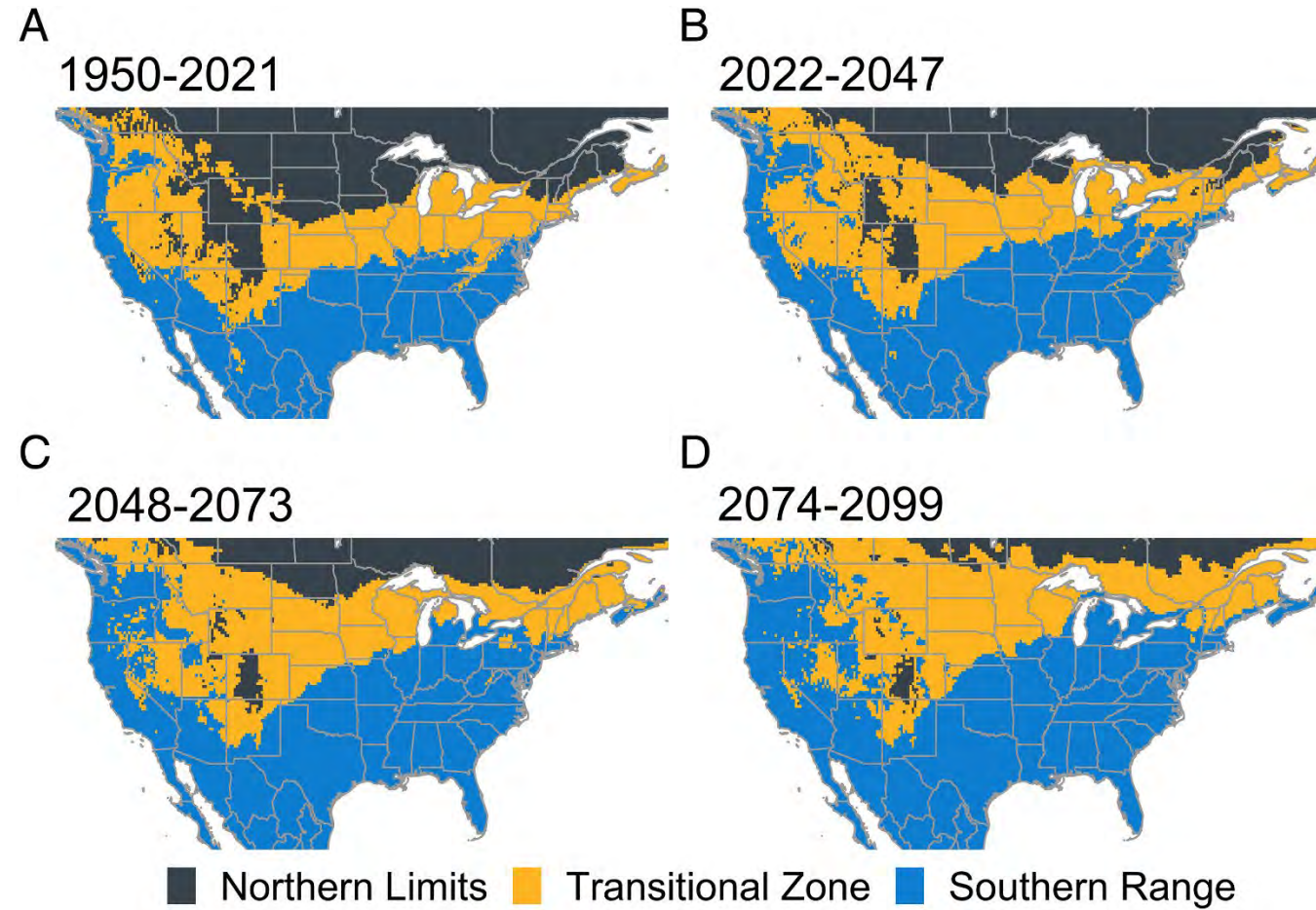


Climate



Plant Health

Corn earworm overwintering zone area 1950-2099



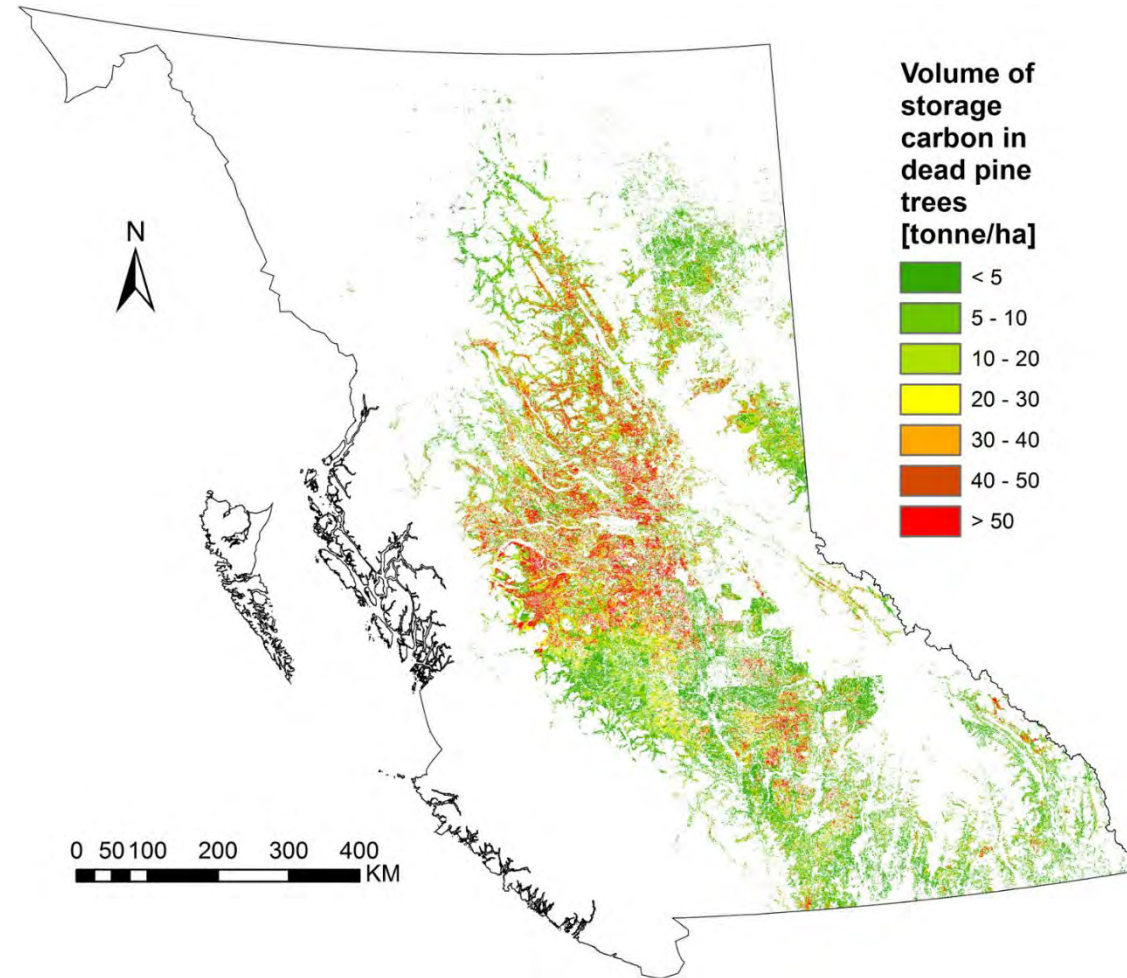
Lawton et al. (2022) PNAS

Climate



Plant Health

Mountain pine beetle (MPB) outbreak in Canada



Release of 263.73 Mt carbon to the atmosphere.

Comparable to 5.8 years of emissions from Canada's transport sector

Dhar et al. (2018) Scan. J. For. Res



Examples of plant pests and pathogens introduced by humans

Ash dieback

Emerald ash borer

Myrtle rust

Fall army worm

Red turpentine beetle

Tomato leaf miner

Chestnut blight

Dutch elm disease

Phytophthora spp.

Brown marmorated stink bug

Butternut canker

Colorado potato beetle

Cotton Bollworm

Spotted wing *Drosophila*

Asian longhorn beetle

Asian citrus psyllid

Papaya mealybug

Potato psyllid

Box tree moth

European wood wasp

Beech bark disease

European gypsy moth

Hemlock woolly adelgid

Laurel wilt disease

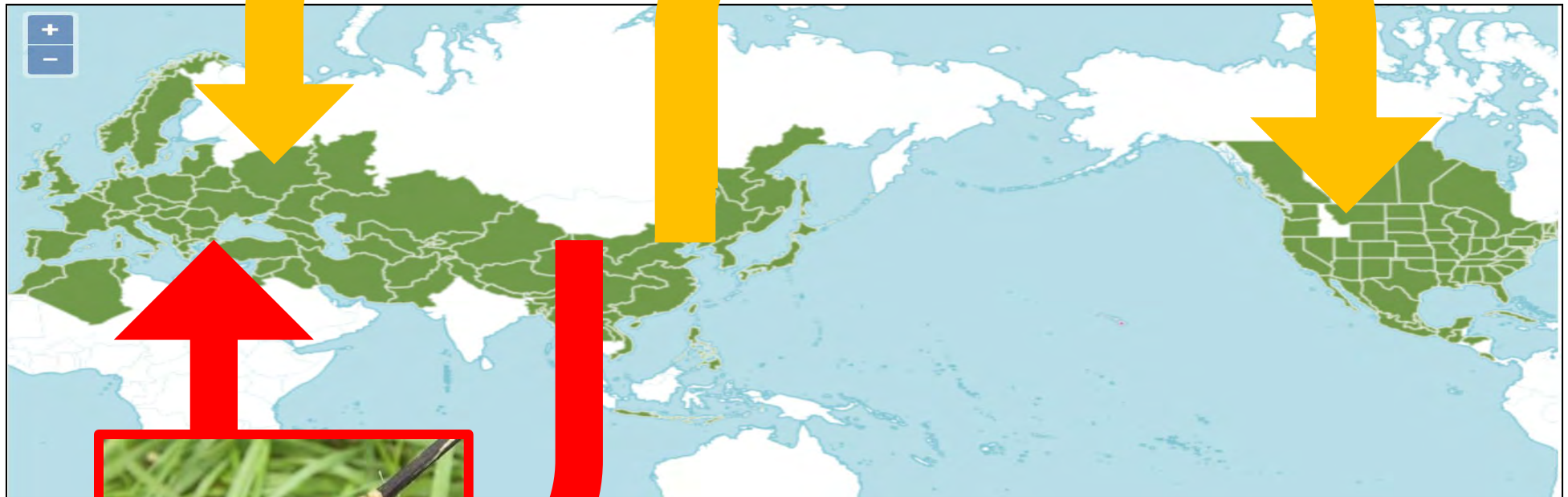




The genus *Fraxinus* (ash trees)



Emerald ash borer



Ash dieback

Biodiversity: 955 species associated with UK ash

Table 2. Number of species and level of association with ash for six types of organism

Organism	Level of Association					Total
	Obligate	High	Partial	Cosmopolitan	Uses	
Birds			7	5	2	12
Mammals			1	2	25	28
Bryophytes		6	30	10	12	58
Fungi	11	19	38			68
Lichens	4	13	231	294	6	548
Invertebrates	30	24	37	19	131	241
Total	45	62	344	330	174	955

Level of association – five different categories of association describing the strength of dependency of species that use ash on ash trees. Five levels are: 'Obligate' = Unknown from other tree species; 'High' = Rarely uses other tree species; 'Partial' = Uses ash more frequently than expected; 'Cosmopolitan' = Uses ash as frequently, or less frequently than expected; 'Uses' = Uses ash but the importance of ash for this species is unknown.



Broome et al. (2014) Quart. J. For.

Future ash trees

We need ash trees adapted to:

1. A changing UK climate
2. An invasive Asian fungus
3. An invasive Asian insect
4. The support of UK native species

How can we
do this?

