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Supplementary Information (S3)

Scott-Brown A.S., Rial-Lovera K., Giannitsopoulos M.L., Rickson R.J., Staton, T., Walters K.F.A., Burgess P. J. (2022), Farmland trees and integrated pest management: A review of current knowledge and developing strategies for sustainable systems

S3: Scoping literature (section 4.2.1)

Methods

Literature searches were undertaken to highlight evidence for farmland trees' associations with a) arthropods, b) pests, and c) natural enemies, with d) additional specific search terms for associations that were specifically relevant to arable settings. Fifteen representatives, including common native tall trees, small trees and woody shrubs found on farmland across England and Wales, were selected on the basis of abundance (Dover, 2019). We include one widespread, naturalised species *Populus alba* L. (Woodland Trust, 2024). Searches included both binomial nomenclature and common names of each tree or shrub species and were conducted using Boolean terminology in Web of Science (core collections, all fields), on 19th November, 2024 (Fig.1, Moher et al., 2009).

Results

Numbers presented at the end of the search represents the number of hits from Web of Science Search terms, with the number in parenthesis (final search only) representing studies that have relevance to agricultural landscapes: -

1. ("English Oak" OR "Pedunculate oak" OR "Quercus robur") AND (arthropod* OR insect* OR invertebrate*) **395**

("English Oak" OR "Pedunculate oak" OR "Quercus robur") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") **52**

("English Oak" OR "Pedunculate oak" OR "Quercus robur") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") **87**

("English Oak" OR "Pedunculate oak" OR "Quercus robur") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") **25 (9)**

2. ("common beech" OR "Fagus sylvatica") AND (arthropod* OR insect* OR invertebrate*) **308**

("common beech" OR "Fagus sylvatica") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") **39**

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("common beech" OR "Fagus sylvatica") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 39

("common beech" OR "Fagus sylvatica") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 19 (6)

3. ("Silver birch" OR "Betula pendula") AND (arthropod* OR insect* OR invertebrate*) 250

("Silver birch" OR "Betula pendula") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 20

("Silver birch" OR "Betula pendula") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 41

("Silver birch" OR "Betula pendula") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 9 (2)

4. ("hawthorn" OR "Crataegus monogyna") AND (arthropod* OR insect* OR invertebrate*) 241

("hawthorn" OR "Crataegus monogyna") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 24

("hawthorn" OR "Crataegus monogyna") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 46

("hawthorn" OR "Crataegus monogyna") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 21 (14)

5. ("black alder" OR "common alder" OR "European alder" OR "Alnus glutinosa") AND (arthropod* OR insect* OR invertebrate*) 169

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("black alder" OR "common alder" OR "European alder" OR "Alnus glutinosa") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 11

("black alder" OR "common alder" OR "European alder" OR "Alnus glutinosa") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 22

("black alder" OR "common alder" OR "European alder" OR "Alnus glutinosa") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 9 (3)

6. ("hornbeam" OR "Carpinus betulus") AND (arthropod* OR insect* OR invertebrate*) 115

("hornbeam" OR "Carpinus betulus") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 18

("hornbeam" OR "Carpinus betulus") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 16

("hornbeam" OR "Carpinus betulus") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 7 (4)

7. ("common ash" OR "European ash" OR "Fraxinus excelsior") AND (arthropod* OR insect* OR invertebrate*) 114

("common ash" OR "European ash" OR "Fraxinus excelsior") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 16

("common ash" OR "European ash" OR "Fraxinus excelsior") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 29

("common ash" OR "European ash" OR "Fraxinus excelsior") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 7 (2)

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8. ("common hazel" OR "Corylus avellana") AND (arthropod* OR insect* OR invertebrate*)

75

("common hazel" OR "Corylus avellana") AND (arthropod* OR insect* OR invertebrate*)

AND ("natural enem*" OR "predator*" OR "parasitoid*") 12

("common hazel" OR "Corylus avellana") AND (arthropod* OR insect* OR invertebrate*)

AND ("pest*" OR "herbiv* insect*") 33

("common hazel" OR "Corylus avellana") AND (arthropod* OR insect* OR invertebrate*)

AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND

("agricultur*" OR "arable" OR "farm*" OR "crop*") 14 (5)

9. ("common elder" OR "European elder" OR "Sambucus nigra") AND (arthropod* OR insect*

OR invertebrate*) 64

("common elder" OR "European elder" OR "Sambucus nigra") AND (arthropod* OR insect*

OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 10

("common elder" OR "European elder" OR "Sambucus nigra") AND (arthropod* OR insect*

OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 25

("common elder" OR "European elder" OR "Sambucus nigra") AND (arthropod* OR insect*

OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR

"parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 21 (9)

10. ("small-leaved lime" OR "Tilia cordata") AND (arthropod* OR insect* OR invertebrate*)

59

("small-leaved lime" OR "Tilia cordata") AND (arthropod* OR insect* OR invertebrate*) AND

("natural enem*" OR "predator*" OR "parasitoid*") 4

("small-leaved lime" OR "Tilia cordata") AND (arthropod* OR insect* OR invertebrate*) AND

("pest*" OR "herbiv* insect*") 10

("small-leaved lime" OR "Tilia cordata") AND (arthropod* OR insect* OR invertebrate*) AND

("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND

("agricultur*" OR "arable" OR "farm*" OR "crop*") 5 (2)

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11. ("white poplar" OR "Populus alba") AND (arthropod* OR insect* OR invertebrate*) 59

("white poplar" OR "Populus alba") AND (arthropod* OR insect* OR invertebrate*) AND
("natural enem*" OR "predator*" OR "parasitoid*") 2

("white poplar" OR "Populus alba") AND (arthropod* OR insect* OR invertebrate*) AND
("pest*" OR "herbiv* insect*") 21

("white poplar" OR "Populus alba") AND (arthropod* OR insect* OR invertebrate*) AND
("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND
("agricultur*" OR "arable" OR "farm*" OR "crop*") 4 (1)

12. ("blackthorn" OR "sloe" OR "Prunus spinosa") AND (arthropod* OR insect* OR invertebrate*) 44

("blackthorn" OR "sloe" OR "Prunus spinosa") AND (arthropod* OR insect* OR invertebrate*)
AND ("natural enem*" OR "predator*" OR "parasitoid*") 2

("blackthorn" OR "sloe" OR "Prunus spinosa") AND (arthropod* OR insect* OR invertebrate*)
AND ("pest*" OR "herbiv* insect*") 5

("blackthorn" OR "sloe" OR "Prunus spinosa") AND (arthropod* OR insect* OR invertebrate*)
AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND
("agricultur*" OR "arable" OR "farm*" OR "crop*") 4 (2)

13. ("goat willow" OR "Salix caprea") AND (arthropod* OR insect* OR invertebrate*) 41

("goat willow" OR "Salix caprea") AND (arthropod* OR insect* OR invertebrate*) AND
("natural enem*" OR "predator*" OR "parasitoid*") 5

("goat willow" OR "Salix caprea") AND (arthropod* OR insect* OR invertebrate*) AND
("pest*" OR "herbiv* insect*") 6

("goat willow" OR "Salix caprea") AND (arthropod* OR insect* OR invertebrate*) AND
("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND
("agricultur*" OR "arable" OR "farm*" OR "crop*") 0

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14. ("common spindle" OR "*Euonymus europaeus*") AND (arthropod* OR insect* OR invertebrate*) 25

("common spindle" OR "*Euonymus europaeus*") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 0

("common spindle" OR "*Euonymus europaeus*") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 1

("common spindle" OR "*Euonymus europaeus*") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 0

15. ("field maple" OR "*Acer campestre*") AND (arthropod* OR insect* OR invertebrate*) 13

("field maple" OR "*Acer campestre*") AND (arthropod* OR insect* OR invertebrate*) AND ("natural enem*" OR "predator*" OR "parasitoid*") 2

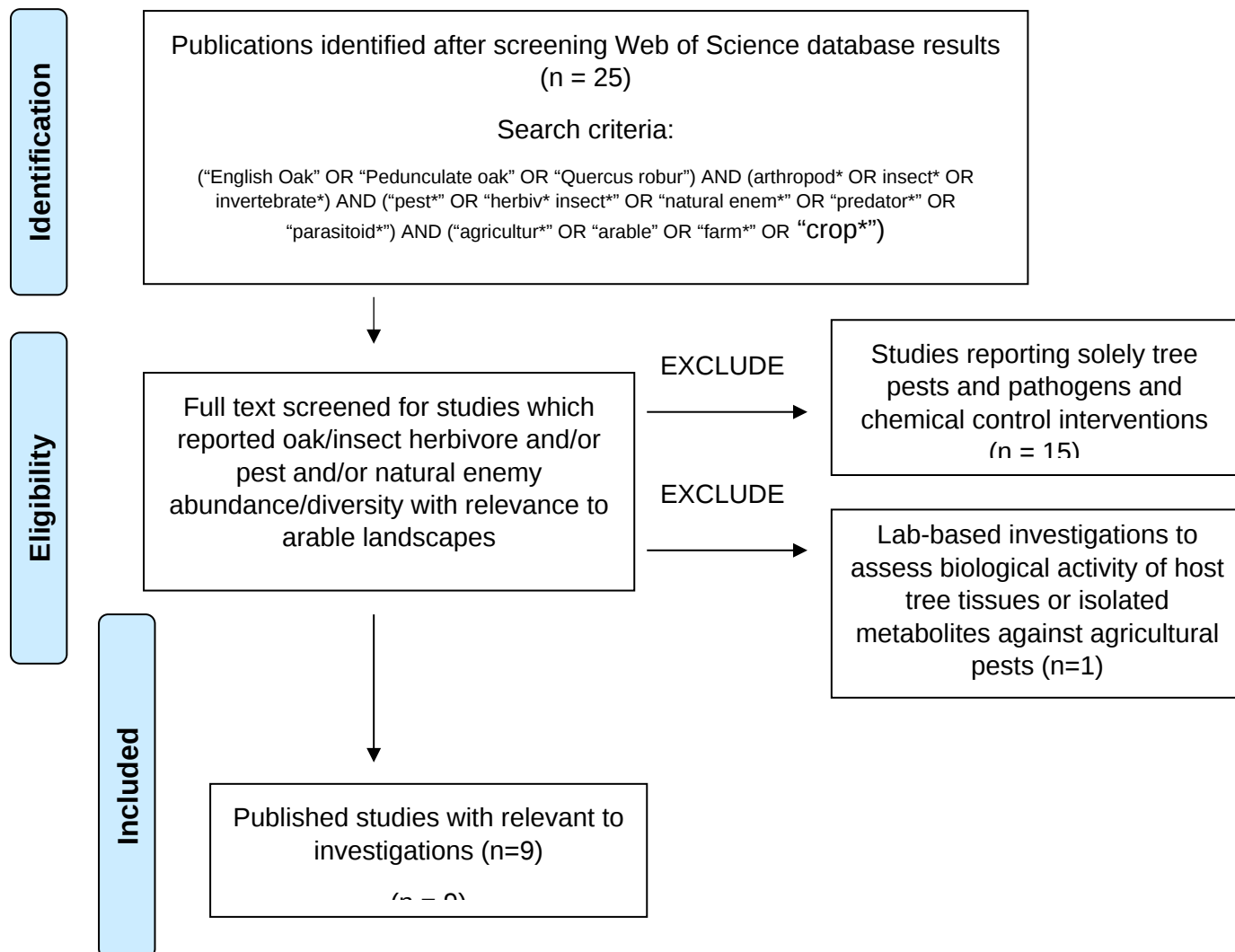
("field maple" OR "*Acer campestre*") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*") 3

("field maple" OR "*Acer campestre*") AND (arthropod* OR insect* OR invertebrate*) AND ("pest*" OR "herbiv* insect*" OR "natural enem*" OR "predator*" OR "parasitoid*") AND ("agricultur*" OR "arable" OR "farm*" OR "crop*") 2 (2)

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Figure 1. Using *Quercus robur* as an example, below shows a flow diagram for literature selection using adapted and simplified PRISMA methodology (Moher et al. 2009)



References

Dover J. (2019). *The ecology of hedgerows and field margins*. Oxford, UK: Routledge.

Moher D., Liberati A., Tetzlaff J., Altman D.G., PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *Annals of Internal Medicine*, **151**, 264. Available at: <http://annals.org/article.aspx?doi=10.7326/0003-4819-151-4-200908180-00135> [Accessed November 19, 2024].

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