



AGROFORESTRY FOR GROWERS

Mon 30th November 2015

Programme

- 10am:** Why agroforestry? Jo Smith (ORC) and Iain Tolhurst (Tolhurst Organic Partnership CIC)
- Fruit trees: selection and management. Stella Cubison (Associate of Garden Organic)
- 11.15:** Coffee
- 11.30:** Field visit to new agroforestry system
- 1.30pm:** Lunch
- 2.15pm:** Design workshop (all)
- Q&A session (all)
- Grants and funding (Luke Everitt, Woodland Trust)
- 3.30pm:** End of workshop





AGROFORESTRY

“Land-use systems in which woody perennials (trees, shrubs etc.) are grown in association with herbaceous plants (crops, pastures) or livestock; there are usually both **ecological and **economic** interactions between the trees and the other components of the system”**

Lundgren, 1982

Riparian buffers



Shelter belts



Contour planting



Forest gardens





Silvopastoral = trees and livestock





Silvoarable = trees and crops



Trees and vegetables.....

The Organic Research Centre



.....**silvohorticultural systems?**



Shillingford Organics, Devon





Duchy Home Farm, Gloucestershire



Tolhurst Organic Partnership CIC



Benefits of Agroforestry

- 🌳 **Increased Productivity**
- 🌳 **Soil management**
- 🌳 **Shade (humans, crops and livestock)**
- 🌳 **Animal welfare**
- 🌳 **Microclimate modification (wind speed, precipitation, transpiration)**
- 🌳 **Pest & disease control**
- 🌳 **Increased biodiversity**
- 🌳 **C sequestration and GHG mitigation**



Products

Food

Fuel

Fodder and forage

Timber

Fibre

Gums and resins

Thatching and hedging

Gardening materials

Medicinal products

Craft products

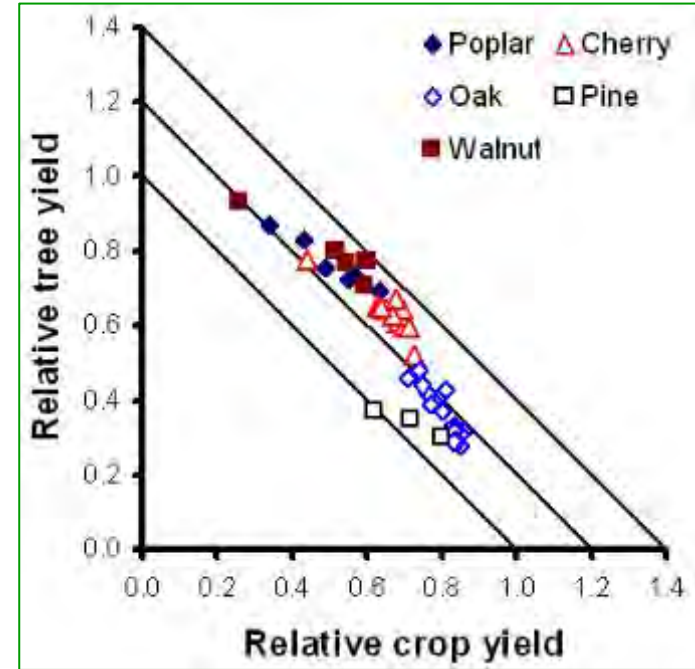
Recreation



Productivity

Land Equivalent Ratio (LER)

the ratio of the area needed under sole cropping to the area of intercropping at the same management level to obtain a particular yield



Modelled relative tree and crop yields for 42 tree-crop combinations
<http://www.cranfield.ac.uk/sas/naturalresources/research/projects/safe.jsp>

Agroforestry systems LER's:

Annual LER 1.6 in early stages to 1.0 in later stages

Over rotation LER 1.2 i.e. 4ha of AF = 5 ha of sole crops

Microclimate regulation

Reduced wind speeds: 30 times the height of windbreak on the leeward side

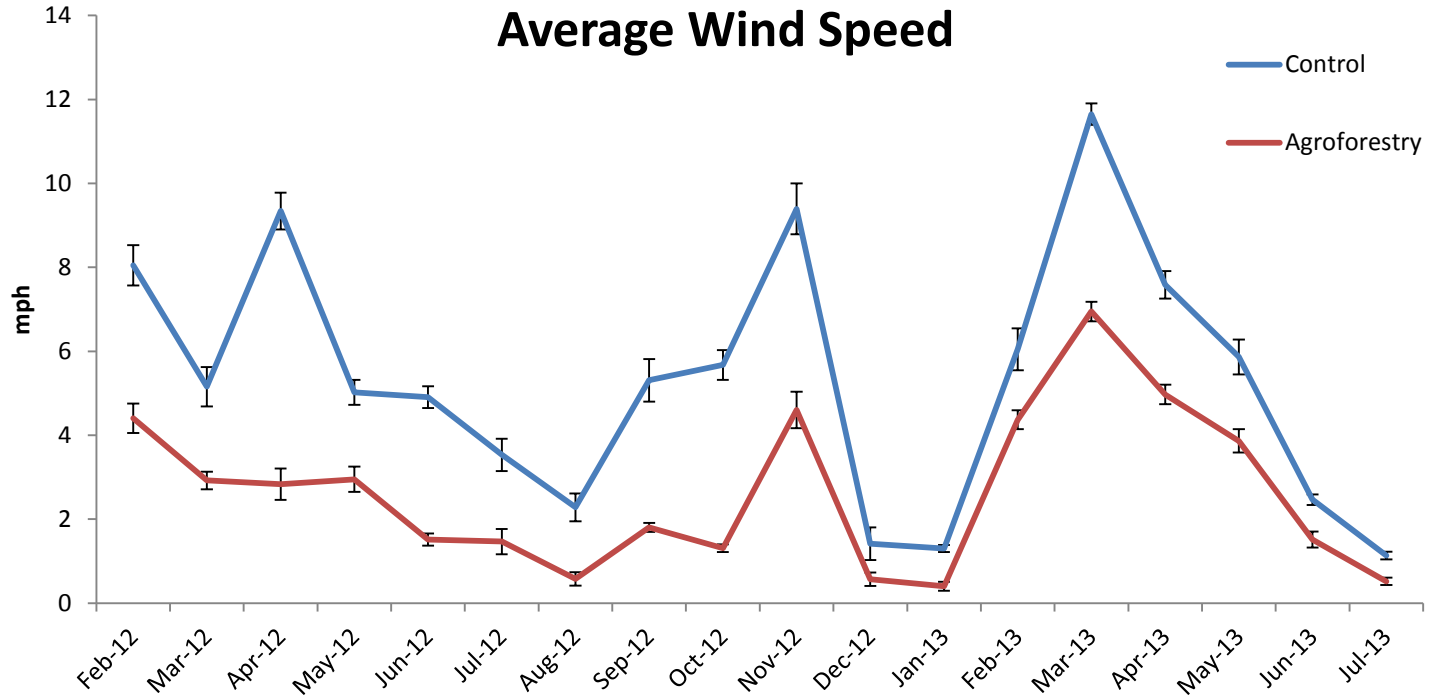
- **increased growth rate and quality**
- **protection from windblown soil**
- **moisture management**
- **soil protection**
- **extended growing season**
- **increased flowering periods and bee activity, leading to increased fruit set and earlier maturity**

Microclimate regulation

AGROFORESTRY



CONTROL



Pest and Disease Regulation

- **Lower abundances of certain pest species**
- **Higher abundances of natural predators**
- **Change in relative importance of pest groups**
- **Weed pressure**





Scab in agroforestry apples compared with orchards

- **Greater distance between tree rows**
- **Better air circulation**
- **Regular cultivations**





Wakelyns Agroforestry

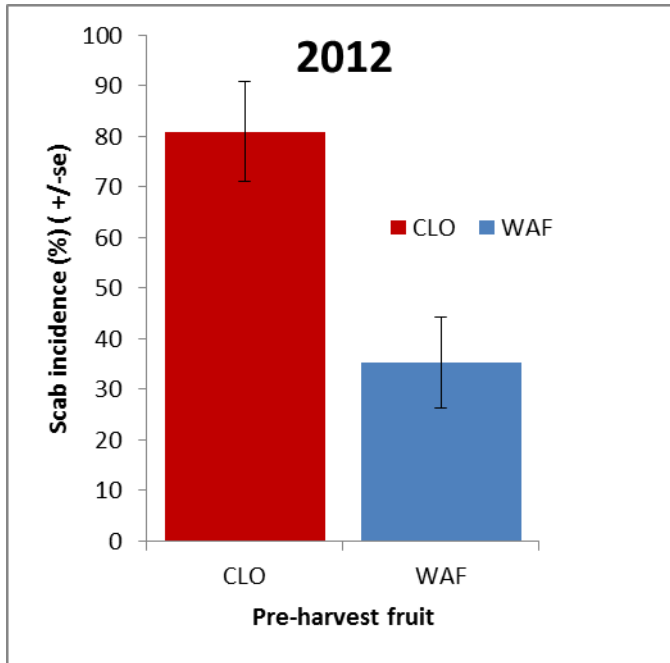
- ~ 2ha system
- 21 varieties of apple; 38 trees
- 7 timber species
- 12m crop alleys
- Planted 1994
- Unsprayed

Clarkes Lane Orchard

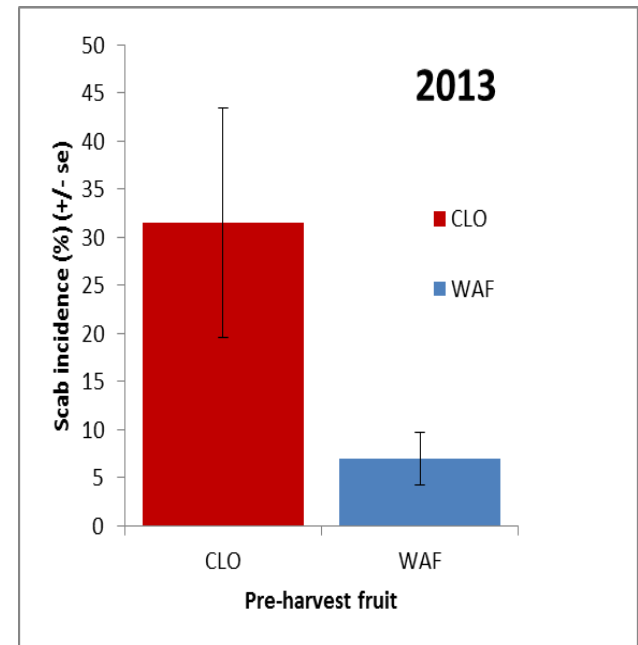
- 0.2 ha organic orchard
- Planted 2004
- 19 varieties of apples
- M9 rootstock (dwarfing)
- 3m between rows, 1.5m between trees within row
- Unsprayed



Apple scab



Mean scab incidence per plot in the agroforestry (WAF) and orchard (CLO)



Hazel system 2012: western alley – blighted rows removed



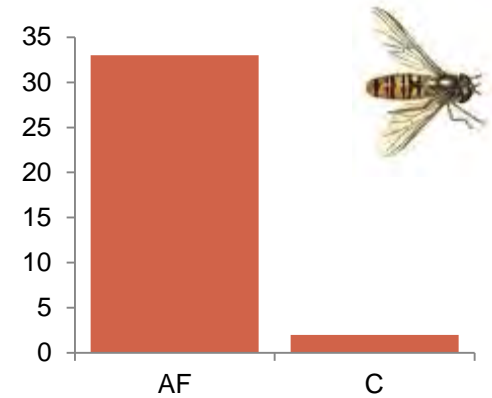
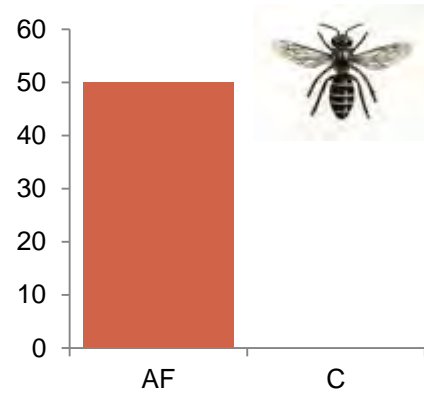
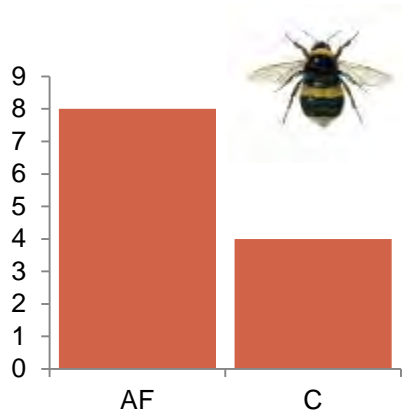
Hazel system 2012: eastern alley – no plants removed



Biodiversity in agroforestry e.g. pollinator abundance

Alexa Varah, PhD

University of Reading/ORC



Ground beetle distribution

Jenny Sharman
MSc Nottingham Trent
University



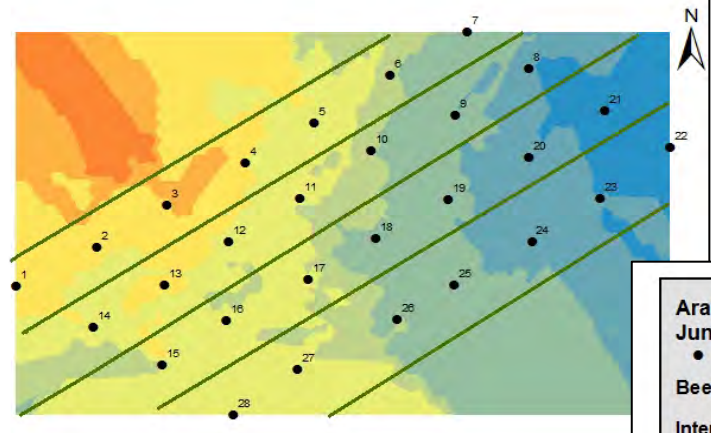
**Silvoarable System
June 15, 2015**

- Tree Alley
- Traps

Beetle numbers

Interpolation

- 2 - 4.1
- 4.1 - 6.2
- 6.2 - 8.3
- 8.3 - 10.4
- 10.4 - 12.5
- 12.5 - 14.6
- 14.6 - 16.7
- 16.7 - 18.8
- 18.8 - 20.9
- 20.9 - 23



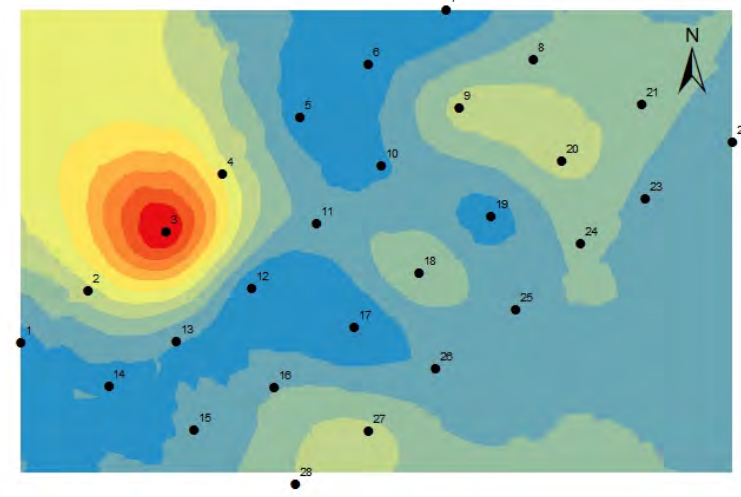
**Arable System
June 15, 2015**

- Trap

Beetle numbers

Interpolation

- 1 - 4.6
- 4.6 - 8.2
- 8.2 - 11.8
- 11.8 - 15.4
- 15.4 - 19
- 19 - 22.6
- 22.6 - 26.2
- 26.2 - 29.8
- 29.8 - 33.4
- 33.4 - 37





2010 VOLUNTEER & FARMER ALLIANCE



Associated biodiversity

Species List: Wakelyns

This list includes all birds seen during the RSPB Volunteer & Farmer Alliance Surveys carried out during the 2010 breeding season. Note some birds may have been missed, and winter visitors are unlikely to be represented.

Species	Status
Barn owl	Amber
Blackbird	
Blackcap	
Black-headed gull	Amber
Blue tit	
Bullfinch	Amber
Carriion crow	
Chaffinch	
Chiffchaff	
Collared dove	
Coot	
Dunnock	Amber
Feral pigeon	
Garden warbler	
Great spotted woodpecker	
Great tit	
Green woodpecker	Amber
* Greenfinch	
Herring gull	Red
House martin	Amber
House sparrow	Red
Jay	
* Kestrel	Amber
Lesser black-backed gull	Amber
Little owl	

Species	Status
Long-tailed tit	
Magpie	
Mallard	Amber
Mistle thrush	Amber
Moorhen	
Pheasant	
Red-legged partridge	
Robin	
* Rook	
Song thrush	Red
* Starling	Red
* Stock dove	Amber
Swallow	Amber
* Turtle dove	Red
* Whitethroat	Amber
Willow warbler	Amber
* Woodpigeon	
Wren	

Total Species: 43



* Farmland Bird Indicator Species

Red Status: Birds of high conservation concern. These Species have either undergone ≥50% decline in UK breeding population or range over the last 25 years, a historical decline from 1800 – 1995, or are species of global conservation concern.

Amber Status: Birds of medium conservation concern. These species have undergone a 25 – 49% decline in breeding population or range in the UK during the last 25 years or have unfavourable conservation status in Europe.

All other species hold **green status** and are of lower conservation concern.

For more information see Eaton et al. (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp 296–341.



Management challenges

Costs of establishment

Managing the competition

**between trees and crops for
resources: water, nutrients,
light, space**

Mechanical limitations

Management complexity

Multiple markets

**Access to and availability of
information and advice**

Policy and support mechanisms



Farm Woodland Forum

www.agroforestry.ac.uk



- **Aims to facilitate the generation and exchange of information that supports best practice in and improves opportunities for farming with trees**
- **Formed in 1986 to agree general structure of the Silvopastoral National Network Experiment and later, Silvoarable National Network**
- **Active JISCmail internet group**
- **Annual meetings**
- **2016 in Northern Ireland**



European Agroforestry Federation (EURAF):

www.agroforestry.eu



- **Aims to promote the use of trees on farms as well as any kind of silvopastoralism throughout the different environmental regions of Europe.**
- **Formed Dec 2011 in Paris**
- **280 members from 20 different European countries (membership via national bodies)**
- **Lobbying EC officers and EP for agroforestry in CAP reform**
- ***2016 EURAF Conference, Montpellier 23-25 May 2016***



AGFORWARD
Agroforestry for Europe



Develops and test combinations of diversified farming systems integrating trees, crops and livestock production to:

- a) better understand how AF systems function;**
- b) demonstrate their benefits and viability;**
- c) promote their adoption in Europe.**

Working with stakeholder groups to identify, develop and test innovations to improve benefits and viability of agroforestry

January 2014-December 2017

27 partners from 23 countries

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