ORC Research Digest no. 5 - Mar 2021

AGROFORESTRY

Tree-crop interactions

Maximising productivity and public goods with tree-crop alleys

AUTHOR
Colin Tosh

CONTACT
Colin Tosh, Will Simonson

ORC ACKNOWLEDGEMENTS
Ambrogio Costanzo, Jo Smith, Sally Westaway, Martin Wolfe

YEAR
2011-2016

FUNDING - PROJECT
EU FP7
- AGFORWARD
- Co-Free
- SOLID

ORC has a long history of research with Wakelyns Agroforestry farm in Suffolk. This farm operates an innovative system of arable crop alleys lined with marketable timber and fruit trees (**Figure 1**) and willow used for domestic fuel. Tree-crop alleys are becoming popular in the UK as they combine high overall productivity per area land with delivery of public goods (biodiversity, carbon storage).

1) Maximising the benefits of agroforestry with strategic tree and crop selection - Trials at Wakelyns have shown that crops growing close to trees take a yield hit of around 25% relative to those growing at the centre of the alleys due to competition with trees (see point 3 for compensating mechanisms). Yield losses can be minimised through careful selection of tree and crop species, however. Sycamore is an excellent combination with winter wheat, but for oats, cherry is better. Spring wheat does best next to alder and alder, which fixes nitrogen, is a good general choice for arable systems.

Figure 1 The Wakelyns Agroforestry alley cropping system

2) Weeds, pests, and disease - Reviews of global agroforestry indicate that agroforestry suppresses crop weeds and reduces pests and disease in perennial crops but less so in annuals. ORC research at Wakelyns has shown that marketable trees also benefit from agroforestry. Apple trees grown around crop alleys show consistently less scab damage than those grown in a monocrop orchard. Trees are less densely packed and the scab fungus transmits less efficiently.

3) Maximising productivity per area land - Those prepared to harvest both tree and crop will get most from agroforestry. ORC researchers at Wakelyns, using a statistic called Land Equivalent Ratio, have shown that growers would have to use significantly more land growing tree and crop in monoculture to obtain the same yield obtained using agroforestry. Agroforestry can be an extremely efficient use of land.

FURTHER READING

1. Pumariño *et al.* (2015) doi.org/10.1016/j.baae.2015.08.006
2. Smith and Westaway (2020) tinyurl.com/ya53lyjp

ORGANIC RESEARCH CENTRE 40th anniversary

The Organic Research Centre
Trent Lodge, Stroud Road, Cirencester GL7 6JN - United Kingdom
Company Registration: 1513190 | Registered Charity: 281276
organicresearchcentre.com