



# Silvopoultry: establishing a sward under the trees

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## Why do chickens need a sward under trees?

Trees in the outdoor run are beneficial to the welfare of chickens. The ancestors of domestic chickens roost in trees, and hens are happier and use more of the range when it is enriched with trees. However, one problem with including trees in the range is the lack of ground vegetation under the trees, due to reduced light levels and increased competition. Further, where the tree canopy opens unpalatable weeds, rather than grasses, may grow.

European regulations for organic and free-range chickens state that the outdoor area should be mainly covered with vegetation. Establishing and maintaining a healthy sward under the trees has multiple benefits; it protects the soil, provides alternative food sources for the chickens and enhances biodiversity.



Preparing the ground for sward sowing using a pedestrian power harrow. Ref: Organic Research Centre



Chickens under the trees in the silvopoultry system? Ref: Organic Research Centre

## Establishing a sward in the understorey

The development of a sward mixture that can establish and survive under trees has been identified as a priority by a focus group of UK farmers producing woodland eggs. To address this issue, sward establishment trials were set up within an existing silvopoultry system at a commercial organic laying hen unit in southern England. Mixed broadleaved tree blocks of 144 trees were originally planted within the chicken enclosures in 2002 at 2 m x 2 m spacing. These blocks were selectively thinned to approximately 50% of planted density in February 2016 prior to sward establishment.

Three sward mixes were tested against a natural regeneration control to identify a mixture that performs well under trees. The trial mixes were: (1) a standard commercially available chicken sward mix; (2) a customised mix with shade tolerant grasses and (3) a diverse mix with grasses, legumes and forage herbs. The mixes were sown in four tree blocks in spring 2016 after a shallow cultivation using a pedestrian power harrow. Mixtures were sown by hand at a rate of 52 kg/ha, rolled and watered in. Chickens were excluded for the first three months to allow sward establishment and then introduced to two of the blocks for a ten week period from August to October 2016.

Growth and establishment of the mixtures was monitored weekly for the first six weeks, and environmental factors including soil moisture, canopy cover and temperature were also measured. Biomass cuts were taken after six weeks to measure sward productivity. After the chickens were introduced, biomass cuts and surveys of plant diversity were repeated every six weeks to identify the impact of the chickens on the different mixtures.



a



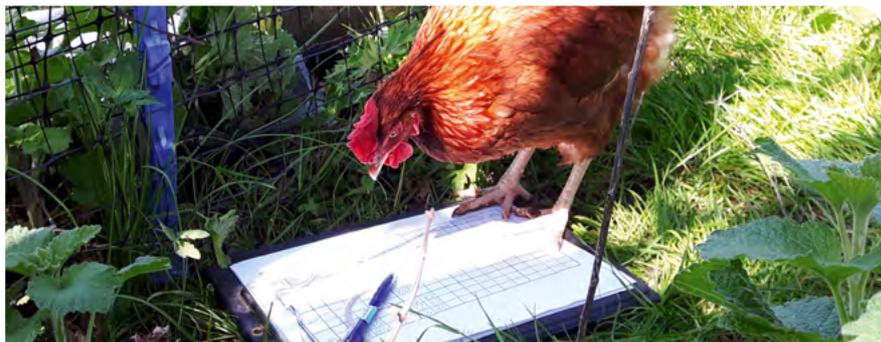
b

The sward six weeks after sowing (a) Mix 3 (b) The control. Ref: Organic Research Centre

## Advantages

The combination of trees, chickens and the presence of a healthy diverse sward throughout the range has multiple benefits.

- In addition to the animal welfare benefits associated with trees, a good quality sward has potential nutritional benefits for the hens, both directly from the plants and indirectly by increasing the number of insects.
- The presence of a diverse sward beneath the trees will enhance biodiversity, and weed suppression throughout the growing season, as well as protecting the soil by reducing soil erosion and building soil organic matter.
- There is also the potential for additional income from tree products. For example, material from tree thinning can be used as woodfuel for a farm biomass boiler.



The chickens checking up on the sward monitoring. Ref : Kevin Waldie

## Sward establishment

All three mixtures established well under the trees. The commercially available standard sward mixture performed in a similar way as the other two customised mixtures. This has economic implications for poultry keepers, as the more specialised mixtures are likely to have higher seed prices as the seed is more expensive to source. Sward establishment rates increased one month after sowing for all mixtures, indicating higher weed suppression potential after four weeks and minimum growth time required for establishment.

## Weed control

There was a clear trend of higher cover and biomass of weeds in the control than the mixtures. At the end of the growing season, in the absence of chickens, the cover of sown plants was still increasing and the cover of weeds had started to decline in all mixtures except the control; this suggests that the sowing of any mixture will help suppress weeds.

## Introducing the chickens...

Once the chickens were introduced, the cover of all sown mixtures dropped significantly in the six week period they had access to the sward. This was especially evident where the house was close to the trees; here the sown sward species disappeared almost completely. Where the house was situated 25 m further away from the tree block, the sown sward appeared better able to withstand the presence of chickens.

This study highlights the need to exclude the chickens for as long as possible to aid sward establishment. The trial demonstrates that establishing a sward under the trees is possible, but that the challenge is to maintain the sward in the presence of chickens. Careful planning of the agroforestry system to optimise chicken pressure across the range appears to be the key, with rotation of flocks to allow swards to establish and recover.

## Further information

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### Sally WESTAWAY

sally.w@organicresearchcentre.com  
Organic Research Centre, Elm Farm,  
Hamstead Marshall, West Berkshire,  
RG20 0HR, UK  
[www.agforward.eu](http://www.agforward.eu)

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