



Silvopastoral experimental site at ILVO, Belgium

The mission of ILVO (www.ilvo.vlaanderen.be) consists in performing and coordinating policy-supporting scientific research and associated public service in view of sustainable agriculture, fishery, and food in an economic, ecological and social perspective. The institute has four research units: Plant Sciences, Animal Sciences, Social Sciences, and Technology and Food Sciences. ILVO is coordinator of the Consortium Agroforestry Flanders and has a long term experience with on-farm monitoring of agroforestry impacts. Since 2014, ILVO has installed a silvopastoral experimental site on its own research fields in Merelbeke, Belgium. Researchers of the Animal and Plant Sciences Unit work together to investigate how a single parcel of agricultural land can be used more efficiently and sustainably through the thoughtful combination of crops and animals.

General info on location

The silvopastoral experimental field is located on the poultry site of ILVO's Animal Science Unit in Merelbeke, Belgium. It is an organic free-range area of about 0.77 ha where trials with chickens (broilers and laying hens) are held. The range is enriched with two vegetation types: short rotation willows and hazel trees. The soil texture is sandy loam.

Research goals

The aim of the long-term silvopastoral research plot is threefold:

1. Assessment of animal welfare and behaviour in relation to free-range use and preferred vegetation type for shelter.
2. Conducting plant-related research on (different varieties of) hazel trees and short rotation coppice (SRC) in Flanders, in an agroforestry context.
3. Studying the interaction between crop production of food, wood and/or biomass with free-range (organic) poultry.

Context

As chickens are naturally forest animals that like to scratch and take dust baths, a free-range with a rich environment with sufficient vegetation to provide shelter for sun and birds of prey could meet the increasing demand for products from natural production systems. This vegetation could not only serve as a sheltering element, but also provide wood, biomass, nut or fruit production, or a combination thereof, and thus maximize land use efficiency.

There is a worldwide rising demand of fresh nuts as well. Nuts, including hazelnuts, are a popular and healthy substitute for animal based proteins, the production of which is known to put pressure on ecosystems around the world. Besides, there is an increasing interest in local food production to reduce food kilometres. Nowadays hazelnuts in Flanders and other West European regions are mainly imported from Turkey, producing almost 65% of the total world production (FAO). Local production of

hazelnuts is limited, and research and knowledge on productive cultivars in a more temperate climate compared to Mediterranean regions is scarce.

Design of the agroforestry system

In half of the free-range area, willows (*Salix* sp.) were planted in 2014 in a SRC system, implying that they are being coppiced every three years. The other half included grassland with artificial shade structures.

In 2017, the artificial shade structures were replaced by 168 hazel trees (*Corylus avellana* cvs.) of eight different varieties, planted in a randomised design. The eight cultivars selected were 'Emoa 1', 'Hall's Giant', 'Corabel', 'Gunslebert', 'Kentish cob', 'Gustav's Zeller', 'Cosford' and 'Tonda di Giffoni'. They were planted in such a way that each cultivar was represented equally. The distance in the row (3 m) ensures an optimal light and water supply; the distance between the rows (7.5 m) allows machine mowing. This results in a planting density of 476 trees/hectare.



Figure 1. Chicken seeking shelter under the willows (left) and hazel trees (right).

A schematic overview of the site is given in Figure 2. During each trial period, there are four separated groups of chickens (1-4) divided over two mobile stables. During most trials, the chickens can choose whether they range between the willows or between the hazels. In each zone, fenced control areas (where no chicken can enter) are included. As the chicken often range nearby the stable and their presence is inversely proportional to the distance to the stable, this distance is used as proxy to assess impact of chicken on crop production.

Monitoring

Several trials have been organised at the site since 2014. The measurements that took place include the monitoring of chicken presence (with tracking systems), chicken welfare (e.g. feather pecking, leg health, breastbone fractures,...), weather conditions (wind, temperature, rain), production of SRC (willow) and hazelnuts in relation to chicken pressure, monitoring of carbon, nitrogen (mineral and organic), phosphorus, potassium in the soil, properties of the different hazelnut varieties (production, size, flavour, cracking yield, susceptibility to the hazelnut weevil,...).

More info?

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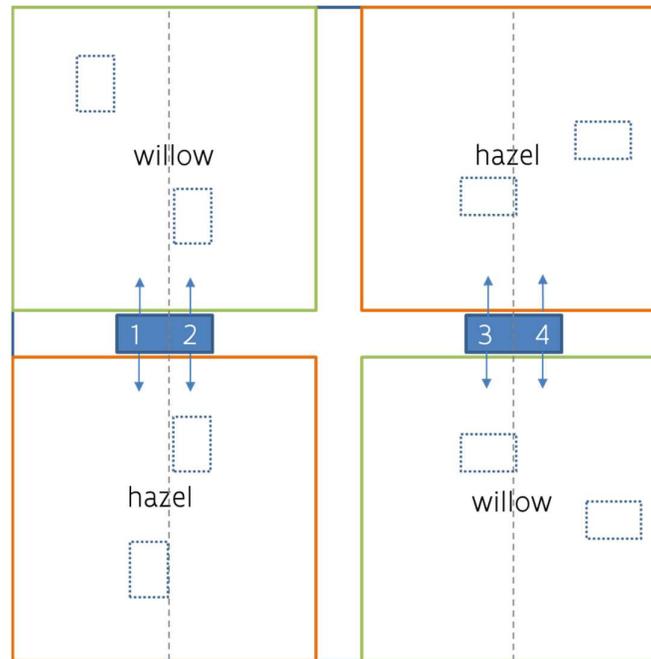


Figure 2. Schematic overview of the silvopastoral experimental site at ILVO.

Related literature

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