



Poultry Extension Collaborative newsletter

A collaboration between Purdue University, University of Maryland,
University of Georgia, and Virginia Tech



Source: Steadfast Farm

Chickens in a citrus and peach tree orchard

**Extension
collaborative
for the poultry
industry**

**Silvopasture for
free-range and
pasture-based
poultry
production**

Silvopasture-based poultry production

This newsletter provides an overview of silvopasture-based poultry production, and potential benefits and challenges of adopting this system as a large-scale or small-scale producer.

Silvopasture is an agroforestry practice in which trees, forages, shrubs, and animals are intentionally integrated into a single land unit. These systems are managed in ways that take advantage of the beneficial interactions among the plant and animal components.

This system largely has been designed for cattle and small ruminants. However, silvopasture can also provide a suitable environment for raising chickens, with potential benefits in terms of bird welfare, productivity, environmental outcomes, and ultimately product quality.

Silvopasture could fit well within a USDA organic certification scheme, as the certification requires access to an outdoor range. Furthermore, animal welfare certification schemes require some degree of outdoor access too, such as:

- [Global Animal Partnership](#) step 3 and up
- [Certified Humane](#) free-range and (seasonal) pasture-raised
- [American Humane certified](#) free-range and pasture-raised

Outdoor ranges for poultry with pasture access

Current outdoor ranges, especially for larger-scale commercial poultry production, often provide very limited overhead cover for chickens. Chickens prefer trees and thicket cover, just like their ancestors, the Red Junglefowl from Southeast Asia. This preference for overhead cover can result in limited grass pasture use, i.e. birds do not roam as far or as often from their house. Chickens will avoid direct sunlight, and prefer to range at dawn and dusk.

Planting large bunchgrasses and woody shrubs in the range can improve habitat structure, and increase birds' range use. For example, slow-growing broilers with access to short rotation coppice (willows) had increased free-range use; more chickens were recorded outside and they utilized a larger part of their free-range area compared to chickens that only had access to artificial shelters in their range (Stadig et al., 2017).



Broiler chickens may not roam far from their house or shelter because of the lack of overhead cover in the range

Establishing a silvopasture plot

Silvopasture can be developed on almost any type of land. Establishing silvopasture in an existing forest is a different process than planting trees in open pasture.

Simultaneous production of trees, forage, and poultry helps to increase both short-term and long-term productivity of the farm. Trees could be managed for high-value sawlogs, nuts or fruits, and, at the same time, provide shade and shelter for poultry, reducing fearfulness, and providing a moderate microclimate. The birds will also defecate throughout the range, distributing nutrients, improving soil fertility more widely than when they stay near their coop or house, resulting in a symbiotic relationship between poultry and plants.



Black locust timber can be used as fence posts and make \$1,500/acre when the plot is partially harvested. Sheep and goats are grazing in the background.



A newly planted silvopasture plot at a large-scale commercial chicken farm in Virginia. Vegetation includes mulberry, serviceberry, hazelnut, black locust, and switchgrass.

Establishing a silvopasture plot (cont.)

Wooded plots: Producers with unutilized forest or woodlots might convert these areas into productive silvopastures. Consider thinning out some of the pre-existing trees to support growth of more forages, such as grasses and legumes suitable for chickens. Fruit- and nut-bearing trees could provide a secondary source of income (or food and feed source) for the farmer. Tree cover should be between 25 and 45% when warm-season forages are grown in the understory; 40 to 60% tree cover is acceptable for maintaining cool season forage growth (USDA National Agroforestry Center). Less than 25% tree cover can lead to birds flocking around a few trees, which could negatively impact soil health and forage growth near those trees. Tree cover over 60% reduces forage growth.

Open grasslands: The goal in open pasture would be to add trees without greatly reducing sunlight, as this would impact forage growth. Again, the target should be to achieve tree cover between 25-60%. Trees can be planted in many different configurations but spatial arrangement should consider infrastructure needs in the context of long-term tree growth.

Tree species to consider

Native tree species that would thrive in the local climate are preferred. Some characteristics for vegetation in a poultry production system could include:

- Fast-growing
- Highly productive
- Palatable products for poultry to feed on
- Canopy that provides shade
- Fruit or nut-bearing species

Some examples are:

1. Serviceberry (*Amelanchier laevis*)
2. Hazelnut (*Corylus americana*)
3. Red Mulberry (*Morus rubra*)
4. Black locust (*Robinia pseudoacacia*)



Vegetation to avoid

Some vegetation can be toxic to poultry, although the level of toxicity can differ by species:

- Common vetch
- Rattlepods (*Crotalaria*)
- Cassia
- Riverhemp (*Sesbania*)
- Jimsonweed (*Datura stramonium*)

Read more on toxic plants for poultry here: [Florida Cooperative Extension](#)

Benefits of a silvopasture production system

Poultry welfare



- Increased activity, range use, and reduced exposure to (indoor) litter, resulting in improved leg health
- Facilitates birds to perform natural behavior such as foraging (scratching and ground pecking), sunbathing, and dustbathing
- Provides diversified feed (forages and insects)
- Shade from trees protects birds from extreme weather conditions

Environment



- Facilitates soil conservation and supports better nutrient distribution
- Improves microclimate
- Supports biodiversity conservation (flora and fauna)
- Reduces fine dust and odor emission

Farmer/producer economics



- "Doubles" land productivity
 - Has the potential to increase per-bird production outcomes
 - Provides (secondary) income from trees/vegetation
- Enhances visual appearance of the farm

Some challenges

- Medium to long-term investment required. Income from vegetation could take a long time, especially if timber will be harvested
- Vegetation management adds labor (thus costs)
- Poultry may experience ground predation if the fencing is not managed appropriately. Electric fences would be sufficient to deter ground predators. Chickens do need to be kept indoors at night.
- There's little known about how vegetation impacts the chances of disease transmission between wild birds and poultry. Trees and shrubs will deter some wild birds like water fowl, which are potential carriers of Avian Influenza and Newcastle Disease (Sanchez et al 2016).

Summary: silvopasture for poultry production



Silvopasture has largely been utilized with ruminants, but these systems could also work well for poultry production.

- Silvopasture supports chickens to express their natural behaviors such as foraging, sunbathing, and dustbathing.
- Trees provide shade and help to minimize thermal stress.
- Chickens can feed on forages, insects, and fallen tree fruits.
- Due to increased activity in the pasture, chickens may experience fewer leg and foot health issues.
- Silvopasture can be developed on most land types. Planting trees in a row in the existing pasture is one way of developing silvopasture. In the case of existing forests, it can be developed by thinning and pruning some older trees.
- Producers need to be mindful of selecting suitable tree species for long-term harvest and leguminous forages that could be beneficial for both birds and people.

Sources and additional resources

Chedzoy, B. (2015). Creating quality silvopasture from wooded area. [On Pasture](#).

Collias, N. E., & Collias, E. C. (1967). A field study of the red jungle fowl in north-central India. *The Condor*, 69(4), 360-386.

Fike, J. et al. (2017). Creating Silvopastures: Some Considerations When Planting Trees in Pastures. [Virginia Cooperative Extension](#).

Fike, J. et al. (2016). Defining Silvopastures: Integrating Tree Production With Forage-Livestock Systems for Economic, Environmental, and Aesthetic Outcomes. [Virginia Cooperative Extension](#).

Fike, J., et al. (2016). Creating Silvopastures: Some Considerations When Thinning Existing Timber Stands. [Virginia Cooperative Extension](#).

Gabriel, S. (2018). Six key principles for a successful silvopasture. [Cornell University](#).

Gantz, A. (2016). Pasture poultry producers can benefit from silvopasture. [Wattagnet](#).

Hegelund, L. et al., (2005). Use of the range area in organic egg production systems: effect of climatic factors, flock size, age, and artificial cover. *British poultry science*, 46(1), 1-8.

Sanchez, S., et al. (2016). Microbiological hazards of wild birds and free-range chickens. In *Food Safety Risks from Wildlife* (pp. 89-130).

Shrestha et al., (2004). Exploring the potential for silvopasture adoption in south-central Florida: an application of SWOT–AHP method. *Agricultural Systems*, 81(3), 185-199.

Stadig, L. et al., (2017). Effect of free-range access, shelter type, and weather conditions on free-range use and welfare of slow-growing broiler chickens. *Applied Animal Behaviour Science*, 192, 15-23.