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Laura Poppy, John Kort, Bill Schroeder, Tricia Pollock and Raju Soolanayakanahally, Editors

AGROFORESTRY IN GERMANY – FROM TRADITIONAL TO MODERN APPLICATIONS

Norbert P. Lamersdorf

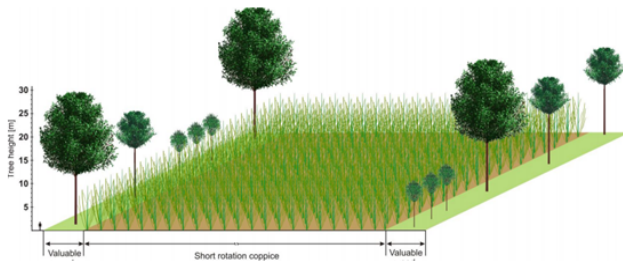
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ABSTRACT

Agroforestry (AF) has a long history also in temperate climatic zones (e.g. grassland fruit orchards / "Streuobstwiesen" in southern Germany or wind brakes in northern Germany). However, due to the immense industrialization of the agricultural sector during the last decades those traditional land use systems were pushed to the fringes and were often not further promoted. On the other hand, modern agriculture also in most parts of Germany is progressively facing major ecological problems: i) loss of biodiversity, ii) soil erosion, and iii) eutrophication, including nitrate leaching. Furthermore, as all European member states should strive to a 20% share of renewable energy by 2020 (i.e., an equivalent of ca. 17.5 million ha of land dedicated to only produce energy crops), an additional pressure on farmland biodiversity as well as on soil and water resources can be expected.

Within this context, information on most important and actual running AF activities in Germany, including contact addresses for further details are presented. All German's AF activities were recently gathered in a newly formed AF working group (www.agroforst.org) to further promote AF on a national but also within the European AF association EURAF on the EU member state level (www.agroforestry.eu).

Keywords: German agroforestry working group, high quality timber, short rotation coppice, alley cropping, bioenergy production, biodiversity, grassland, silvopasture, riparian buffer



1. What is new in AgroCop ?

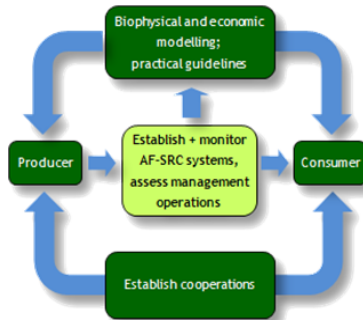
AgroCop utilizes two innovative strategies for wood production on agricultural land. Both have generated increasing interest as potential solutions for timber and feedstock production in Europe.

- 1) Agroforestry Systems (AFS), and
- 2) Short Rotation Coppice (SRC)

2. The approach of AgroCop

AgroCop will examine how these two systems can be combined, by researching the use of SRC as an intercrop between rows of high value timber trees. We will assess the potential of such Agroforestry-SRC (AF-SRC) systems in two ways:

- a) by establishing and monitoring experimental AF-SRC systems **across a gradient of environmental conditions throughout Europe,**
- b) by modelling the biophysical and economic behaviour of such systems.



3. The expected outcome of AgroCop

By identifying relevant key parameters, we will provide practical knowledge that will help to **optimise the production of high quality timber and feedstock wood for energy** use in AF-SRC systems, for a variety of different environmental conditions in Europe.

Our research team consists of partners in **five European countries.**

For more information: Chair of Forest Growth, University of Freiburg, Germany
www.iww.uni-freiburg.de & www.agroforestry.de

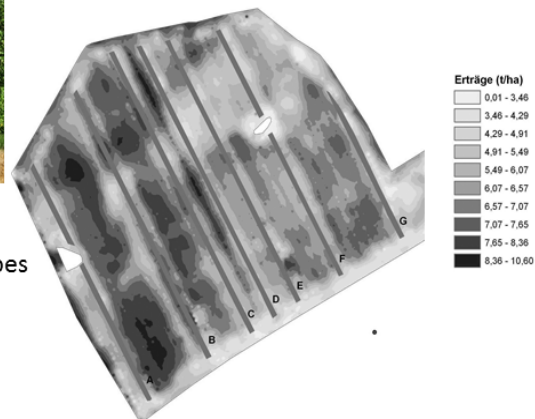
Studies on an alley cropping agroforestry system with stripes of short rotation coppices in Thuringia, Germany



*Jung, Bärwolf, Vetter, 2013, Renewable Resources Department,
Thuringian State Research Centre for Agriculture
Contact: linda.jung@ll.thueringen.de*



Yield of Barley 2011



Key study aspects

- Influence of Short-rotation-coppice-stripes on field crop yield, quality, diseases
- Economical evaluation
- Microclimate
- Soil nutrients
- Biodiversity



Studies on short rotation agroforestry system consisting of crops and fast-growing trees for bioenergy production in Brandenburg, Germany

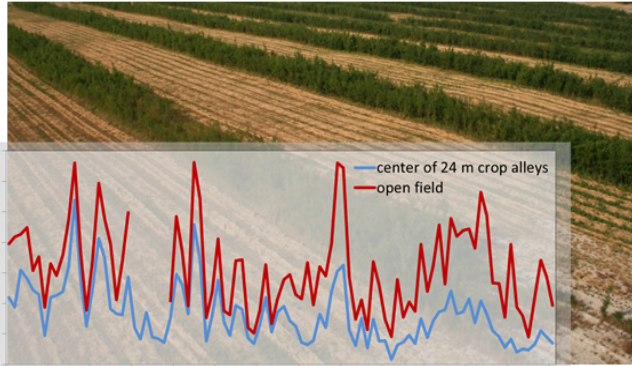
Christian Böhm, Dirk Freese

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Konrad-Wachsmann-Allee 6, D-03046 Cottbus, Germany

Contact : boehmc@tu-cottbus.de; <http://www.tu-cottbus.de/projekte/de/multiland/>

Research focuses

- Carbon sequestration
- Nutrient cycle
- Seepage quality
- **Microclimate**
- Biodiversity
- Yields from trees/crops
- Ecosystem services
- Reclamation options



center crop alleys: $\bar{\varnothing} 0.8 \text{ m s}^{-1}$ (53 %); open field: $\bar{\varnothing} 1.6 \text{ m s}^{-1}$ (100 %)

b.tu Brandenburg
University of Technology
Cottbus



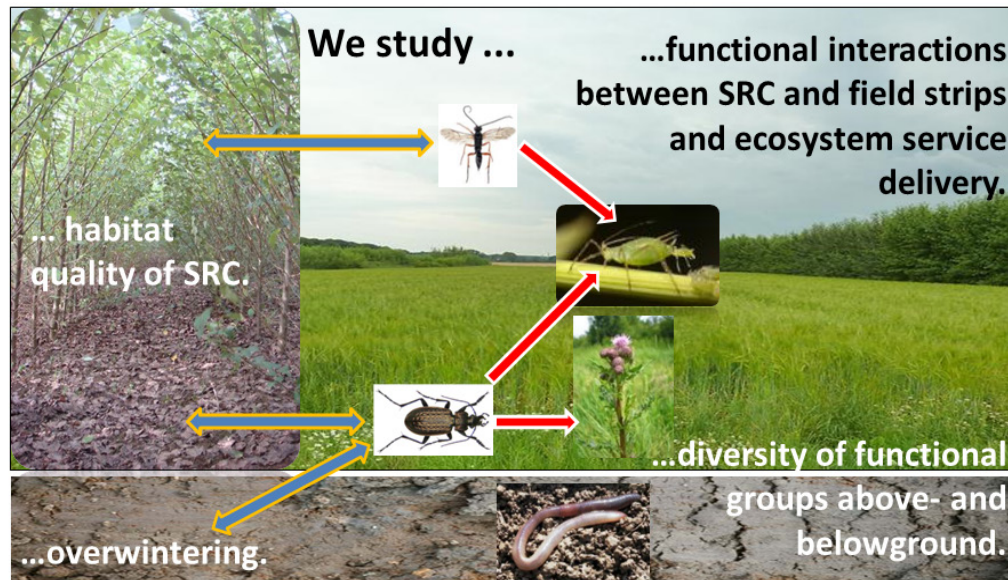
AgroForstEnergie

Functional biodiversity in alley cropping with poplar short rotation coppice (SRC) in Lower Saxony, Germany

THÜNEN

Institute of Biodiversity

Masur, Dauber 2013; Contact: daniel.masur@ti.bund.de



AgroForstEnergie II

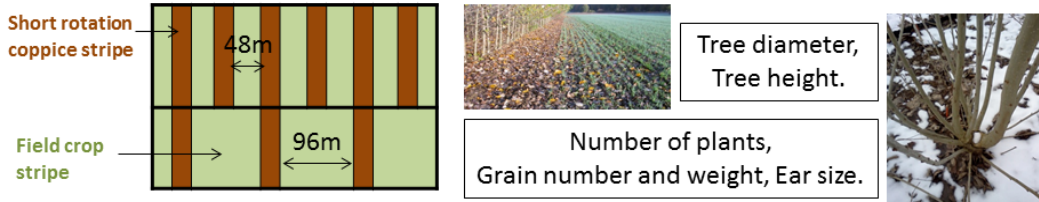
Federal Ministry
of Food, Agriculture
and Consumer Protection



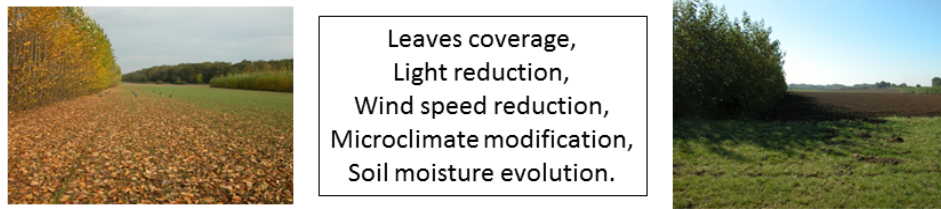
Structural diversity of an alley cropping agroforestry system with short rotation coppice stripes in Lower Saxony, Germany

Lamerre Justine, Schwarz Kai-Uwe, Langhof Maren, Grief Jörg-Michael
 Julius Kühn-Institute, Institute for Crop and Soil Science, Braunschweig, Germany
 Contact: justine.lamerre@jki.bund.de

Study of: - Yield structure modification of trees and crops, especially in the transition area



- modification of abiotic conditions next to the trees



Studies on a young agroforestry system consisting of grassland vegetation and willows for sustainable bioenergy production in Lower Saxony, Germany



Part of the **BEST** - Project
 Bioenergie-Regionen stärken



Dep. of **Grassland Science and Renewable Plant Resources**
 University of Kassel

Dep. **Soil Science of Temperate Ecosystems**
 University of Göttingen

From SRC to Heat



+

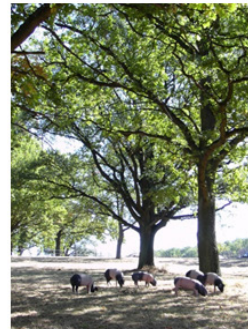
From Grassland to Biogas + Briquettes/Pellets



www.BEST-Forschung.de

Oak hard mast for Swabian-Hall swine: Rediscovering a traditional silvopastoral system

- **Institution:** Institute of Silviculture, Technische Universität München
Dr. Bernd Stimm (stimm@forst.wzw.tum.de), Hans-H. Huss
- **Partner:** Eichelschwein GmbH www.eichelschwein.de
- **Approach:**
 - Pig herding in coppice and coppice-with-standards (CWS) forests in northern Bavaria
 - Conservation of an endangered race and CWS forests
 - Marketing of premium meat products
 - Monitoring of acorn production
 - Evaluation of foraging effects on composition of ground vegetation, tree regeneration and soil fauna
- **Funding:** Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) via the Federal Agency for Agriculture and Food (BLE) (until 2010)



Pictures taken by B. Stimm and Hans-H. Huss

Livestock Farming & SRC

hein@hs-rottenburg.de

Hühner und Energieholz als Agroforst-System

Göran Spangenberg, Sebastian Hein und Joachim Schneider



Abb. 1: Baumstreifen und Mobilställe schaffen die Voraussetzungen für eine optimale tierartgerechte und bodenschonende Hühnerhaltung.

3 Fotos: Göran Spangenberg

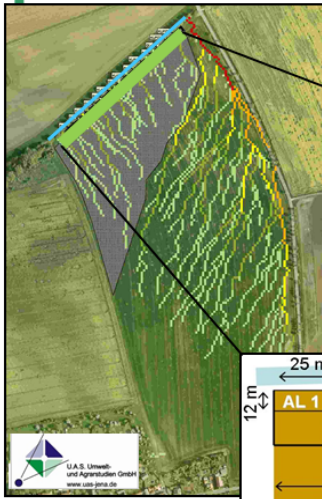


Spangenberg, G.; Hein, S. (2012): Hühner und Energieholz als Agroforstsystem.
Allgemeine Forstzeitschrift / Der Wald 21/2012: 31-33.

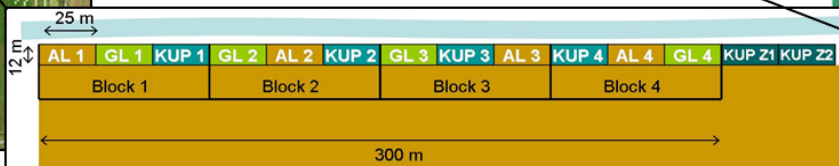
Short rotation coppices along watercourses – water protection by erosion control and nutrient runoff reduction

Dr. Cornelia Fürstenau et al. 2013, (cornelia.fuerstenau@tll.thueringen.de)

Thuringia Regional Institute for Agriculture, Dep. of Renewable Resources, Dornburg



- study site set up in spring 2011 in the north of Thuringia
- three management options: cropland (AL), grassland (GL), and SRC (willow, Tordis) (KUP)
- two additional sites to test other tree species
 - KUP Z1 poplar (Max), KUP Z2 alder
- key aspects:
 - erosion modeling
 - soil analysis
 - water and suspended solids analysis
 - yield measurements of crops, grassland and trees



Prof. Dr. S. Heimwald