Pasture pork production: a journey to sustainability

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About me ...

UNIQUELY
BARN RAISED
LIMITED EDITION
Pathway toward a more sustainable pasture pork production system

• Issues to be addressed in our journey to sustainability
• The pasture pork production systems we are looking for
• Experiences that have proven successful
• Summary of CEFS research- Environmental impact reduction in pasture pork production systems
Pasture pork production system

Environmental impact
- Water and soil pollution
- Eutrophication
- Acidification
- Greenhouses gases
- Ground cover deterioration
- Soil erosion
- Desertification
- Lost of biodiversity
- Water and land scarcity
- Carbon footprint
- Non-renewable energy use

Animal wellbeing and welfare
- Parasites
- Predators

Climate change

Food safety and public health
- Responsible use of veterinary medicines

Animal wellbeing and welfare

Farmers profitability

Issues to be addressed in our path toward more sustainable systems
- Regulations
- Consumers demand and expect
  - Safe, Healthy, Nutritious, Affordable meat
  - Fair trade
  - Ethically sourced

Improving and maintaining communities.
- Safeguarding the health, well-being, and social rights of workers, farm managers, and their families.

Consumers demand and expect
- Safe, Healthy, Nutritious, Affordable meat
- Fair trade
- Ethically sourced
What kind of pasture pork production systems are we looking for?

- Flexible
- Resilient
- Innovative approaches
- Commitment to continuous improvement
- Improve resource efficiency
- Diversification of resources
- Make better use of local resources
- Reduce dependence of external inputs
- Adopt best management practices
- Improve the management of forages
- Improve feeding and breeding practices
- Foster the use of renewable energies
- Develop a record keeping culture
- Explore emerging markets
- Benefit from environmental services payments
Our goal:

Design pasture pork production systems
More productive
more efficient
more resilient
more sustainable

There is no “one-size-fits-all” solution

Need to develop production systems adapted to each farm unique circumstances
Path toward a more sustainable pasture pork production system

- Better use of local resources (alternative feedstuffs, heritage breeds, traditional systems)
- Traditional and new technologies (genetics, breeding)
- Increase resources efficiency (animals, feed supply chains)
- Implement best management practices
Make a better use of local resources
Improve breeding programs

“Genetic Biodiversity”
Rydhmer, Gourdine, de Greef and Bonneau, 2014

“Breeding innovations are necessary to obtain animals that are both productive and adapted to a broad range of local contexts and diversity of systems.”
- Pure vs crossed.
- Specialty niche markets
  - Pure breed
  - Control inbreeding.

Phocas et al., 2016
Increase survival rate on pre and post weaning periods

Breeding – Maternal abilities.
Baxter et al., 2011a

Optimize farrowing hut and creep design
Baxter et al., 2011b

Piglet protection features:
Slopped wall, rails, raised bars
Provision of substrate (10-15 cm) and nesting material
Improve Feed efficiency, Zero feed wastage, Feeding strategies

- Single diet, blend feeding or three-phase feeding
- Sex-split

Lower nutrient excretion
Lower costs

Niemi et al., 2010; Schulz and Hadrich, 2014; Moore, Mullan and Kim, 2016
Alternative feed resources and by-products, food waste recycling

Be aware of potential impact on performance, carcass and pork quality
Make a better use of local resources, multispecies pastures (Grasses, legumes and herbs)

Barley and Austrian winter pea

“Seeds are cheaper than supplemental feed”.
Options to consider: grasses, legumes, brassicas, chicory, plantain, amaranth, Jerusalem artichoke, millets, and other forages.

Ryegrass, chicory and clover

To encourage pasture consumption:
Provide new grazing areas (Andresen and Redbo, 1999)

Supplemental feed restriction [FR] (Kanga et al. 2012; Kongsted et al. 2015)

To avoid impact on performance
FR ≤ 20 to 30% for growing pigs
FR ≤ 30% for replacement gilts
FR ≤ 25% Lactating sow
FR ≤ 50 to 70% Gestating sow (Bauza, 2005; 2007; Bochicchio et al., 2012)
Improve pasture management, establish adequate stocking rates

Referential Stocking Rates to Maintain Vegetation Cover

Annual species
* 10 to 20 weaned to finishing head/acre
* 2 to 4 sows + litter/acre

Perennial species
* 15 to 30 weaned to finishing head/acre
* 6 to 8 sows + litter/acre

Natural vegetation
* 4 to 10 weaned to finishing head/acre
* 0.5 to 1 sows + litter/acre

Stocking rates must be adjusted according to forage species, climate, soil, drainage and managers’ skills.
Improve pasture management, implement rotational stocking systems

Rotational Stocking

Weeks 1 to 8

Weeks 9 to 12

Same paddock, changes are consequence of internal fences removal
Rotationally managed bermudagrass pasture

0.37 acre bermudagrass pasture divided in 9 sections: 1 HUA and 8 grazing paddocks
Period of occupation per section: 1 week
Stocking rate: 4 sows per paddock, equivalent to 11 sows/acre
Rotating hogs between paddocks provides rest periods for forages to recover and helps to avoid the build-up of parasites and diseases.

Recovery of bermudagrass managed with a stocking rate of 11 sows/acre after 3 weeks of rest. Note the difference in color with the section at left that has not been grazed yet.
Stocking Systems

Continuous stocking

Weeks 1-12

Rotational stocking

Weeks 1-8

Weeks 9-12

Rotational strip

Weeks 1-8

Weeks 9-12

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Area in use</th>
<th>Ft²/pig</th>
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</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>100 %</td>
<td>2274</td>
</tr>
<tr>
<td>Rotational</td>
<td>22.2 %</td>
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<td>Strip grazing</td>
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<tr>
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<tr>
<td>Rotational</td>
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<tr>
<td>Strip grazing</td>
<td>25.0 %</td>
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Stocking rate equivalent to 20 hogs/ac (2600 lb/ac)
Paddock size 18192 ft²
In the Rotational Stocking system pigs have permanent access to the central area
Tall fescue under three stocking systems

20 pigs/ac.

Soil $\text{NO}_3$ (22.5%), P (18.6%), K (19.5%), Mn (8.1%), Zn (14.3%), and Cu (8.3%) higher in the continuous system.

Same pig growth (1.61 lb/d), feed intake (4.32 lb DM/pig/d) and gain to feed (0.37 lb gain/lb feed).

Changes in sward botanical composition: tall fescue (65%), other grasses, (30.3%) and broadleaf species (4.7%)
Sylvopastoral systems

“Preliminary analysis suggests that the financial performance of this agroforestry enterprise could be superior to that of a pasture-based enterprise”.

Brownlow, Dorward, and Carruthers, 2005
Sylvopastoral systems, AGFORWARD project

Pigs integrated with energy crops, poplar (*Populus* spp) and willows (*Salix* spp)

Evaluation of trees as fodder source, mulberry (*Morus* spp)

Images courtesy AGFORWARD project
Waste recycling, business diversification

Composting

Vermicomposting

Anaerobic digestor
Explore emerging niche markets, charcuterie
Explore new marketing strategies: on farm sales, INTERNET, Social Media

Farmer markets, restaurants, wholesaler/distributor, processing plants, small retailers, CSA, farm stand, online, aggregators
“... livestock sustainability assessments tend to focus primarily on environmental and economic dimensions; therefore, these valuations might be limited because they do not consider the complete set of associated goods and services (soil fertility, farmland biodiversity, food security, rural vitality and culture).

Hence, a need exists to recognize the multiple contributions provided by livestock to human well-being and society. “

Ryschawy, Disenhaus, Bertrand and Allaire, 2017
Take home ideas

Sustainability is not a finish line, rather is a journey enriched by our commitment to continuous improvement.

This continuous transformation implies a change in the way we conceive our rapport with the environment, with the territory and with the surrounding community.

Farmers should shape their production system in a way to find a balance among the three aspect of sustainability: environmental impact, animal welfare and economy/profitability. Sometimes, this would imply accepting some trade offs.

To guaranty system and farm survival over time, profitability goals need to be achieved.
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For a Sustainable Pasture Pork Operation:

Design a flexible production system adapted to the unique circumstances of your farm.

Select an animal breed suitable for outdoor production.

Select a site that minimizes potential runoff to waterways.

Use appropriate vegetation.

Build vegetation buffer filters to limit runoff to waterways or drainage ditches.

Include locally-available feedstuffs in your feeding program.

Implement management practices to reduce environmental impact and adapt them to the season

- Adjust stocking rate and length of animals stay according to climate, soil, drainage and managers’ skills.
- Allow your paddock a resting period
- Protect areas sensitive to soil compaction
- Reduce feed wastage
- Plan periodic movements of structures and equipment
- Utilize crops to remove soil nutrients
- Conduct periodic soil tests
References


References


References


Van Huis, A. 2013. Potential of insects as food and feed in assuring food security. Annu Rev Entomol, 58, 563-583