LowInputBreeds

Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production

# SP3: Pigs

## Aims of the Breeding Research in LIB and the Methods to be Used.

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**Wageningen, March 15 2011.**

IPG

## SP3: Problems dealt with:

- Pig survival and associated traits, e.g. piglet losses 20% on organic and 12% on conventional farms.
- Abiotic stress factors in particular heat stress, e.g. pigs raised in outdoor production systems are often exposed to greater challenges by both abiotic and biotic stress factors, that adversely affect production.
- Nutritional and sensory quality of pig meat affected by (a) breed/genotype and (b) dietary regimes.
- Lack of appropriate breeding infrastructure for the 'low input' sector In conventional pig production, cross-breeding has been widely used since the 70's. Such cross-breeding systems are not available for organic or low input production

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## SP3: GOALS

- **WP3.1 Development of a flower breeding system to improve pig survival and robustness related traits in small populations**
- **WP3.2 Development of management innovations (gilt rearing and lactation systems) on mothering ability of sows and losses of piglets**
- **WP3.3 Effect of traditional, improved and standard hybrid pig genotypes and feeding regimes on carcass, meat and fat quality**

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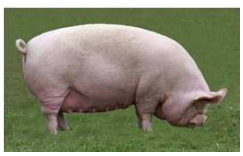
## WP 3.1.1. Selecting suitable genotypes

Goal WP 3.1.1.

- **Identify the most suitable breeds for organic/low input pig production**


1. **Literature meta-analysis (Month 1-18)**
2. **Survey of organic and low input farms in different macroclimatic regions (Month 1-30)**


3. **Stakeholder workshop**



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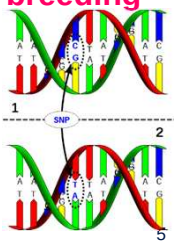
## WP 3.1.2. Development and implementation of a “flower” breeding systems (FBS)

Goal WP 3.1.2.

- **Develop and implement a suitable breeding structure for organic/low input systems**
- **Develop and implement a genetic fingerprinting approach to select for improved piglet & finisher survival**

1. **Developing and implement the most viable breeding structure/breed combination (M 12-60)**
2. **Developing and implement selection for piglet and finisher survival using a genetic fingerprinting approach (M 6-60)**

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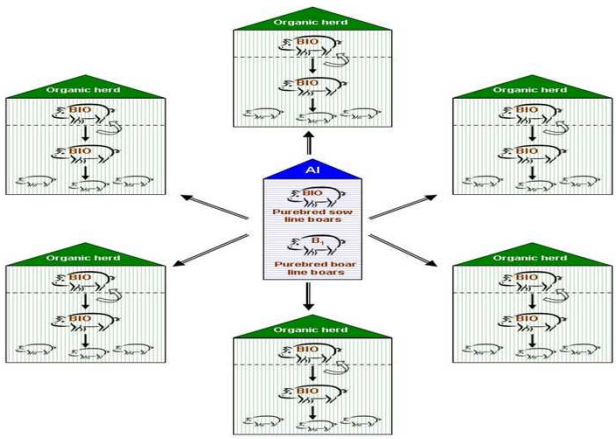
## New breeding structure along collaboration

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## WP 3.1.2. Approach (1)

Survey results organic/low input farms

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**Economic model analysis**

--> Most profitable combination of breeding structure and breeds

**Genetic model analysis**

--> Predicted genetic progress using different breeding programmes/breeding strategies

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Most suitable combination of breeds and breeding structure

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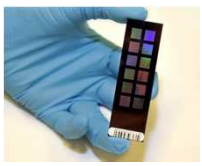
## WP 3.1.2. Approach (2)



- Methodology development
  - **- 124 high quality SNP's were selected from a total of 450 SNP's**
  - **- Quality testing of these SNP's on various sample types (blood, hairs, swabs)**
  - **- Development of automatized parental identification in a suitable software environment**
- Implementation
  - **- On Low Input farms in Spain, Brazil and ??**

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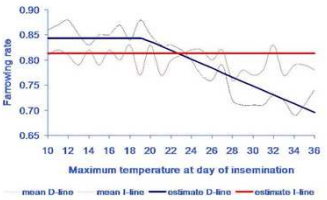
## WP3.1.3. Parameters to reduce heat stress

Goal WP 3.1.3.

- **Quantify genetic variation for parameters that determine temperature neutral zone and effects on pig health and welfare**
- **Design breeding programs that increase temperature neutral zone/robustness**

1. **Data ANALYSIS from several breeds that have performances under climatal conditions with a wide temperature variation**

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## WP3.2. Development of management innovations on mothering ability of sows

Two critical moments in the life of piglets

- **Last days before and during birth + first days of live**
- **Lactation period: birth - weaning**

Goal WP 3.2.

- **Effect of rearing gilt system on maternal behaviour (litter 1 + 2) and subsequent liveability and health of piglets (0-6 wk)**
- **Effect of genotype piglet and rearing environment on survival of piglets on liveability before and after weaning (1-6 + 6-10wk)**

1. **Experiments at Raalte organic farm**

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## WP3.3. Effect of PIG GENOTYPES and FEEDING REGIMES on carcass, meat and fat quality

Goal WP 3.3.

- **WP 3.3.1. Effects of, and interactions between, (a) pig genotype and (b) dietary regimes on carcass, meat and processing quality characteristics – EXPERIMENTAL APPROACH**
- **WP 3.3.2 Effect of genetic, management and dietary factors on carcass and meat quality parameters in European `low input production systems – SURVEY APPROACH**

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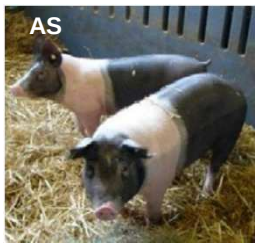
## SP 3.3.1. Meat quality: `experimental approach

… three different genotypes:

- AS (Angler Sattelschwein): Old, rare, indigenous breed
- Pi*AS: Semi-intensive crossbreed of Piétrain as sire line with a AS-sow
- Pi*(DE*DL): Modern hybrid of Piétrain, German Large White and German Landrace






… and two different feeding strategies:

- Concentrates (straw as roughage source acc. to EC Reg.
- Concentrates and roughage (grass-clover-silage)

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## SP 3.3.2 Meat quality: survey approach

**Quality of fresh pork:**
**Nutritional quality – n-3 PUFA, antioxidants and/or Sensory quality – skatole**

**Organic and low input systems in D, ES, UK**

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## SP3.3.2 Meat quality: survey approach

**324 fat samples**

| | |
|---|---|
| **Country** | **3** |
| **Season** | **3** |
| **System** | **2** |
| **Farm** | **4** |
| **Gender** | **2** |
| **Repl** | **3** |

**Background information**

- **Season (May, Aug, Jan)**
- **System (pasture/indoor)**
- **Gender (F/ M-C)**
- **Breed (? SP1)**
- **Feed**
- **Sl wt, P2**

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