



Description of Kappel farm

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Kappel herd description

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Introduction

PigIT is a project to improve welfare and productivity in finisher pigs by using advanced ICT method. Data collection in the project is done in several herds and this is a description of the herd Kappel.

The object is to provide an overview of the herd and description of the sensors and cameras installed to record observations used in the PigIT project. The description will only include information about the finisher unit (Roejkaer), but in this introduction a short summary of the whole production will be described.

The Kappel production consists of four different production units. All four units are located in Hurup Thy, in the northwestern part of Jutland. The production includes a sow unit, a weaner unit (Refsgaard), a finisher unit (Roejkaer) and a unit with both weaners and finisher pigs. It is the finisher unit, Roejkaer, there will be described in this report. The sow unit consists of approximately 1,800 sows per year which produces around 45,500 weaners yearly. Approximately half of the weaners are sold and the other half are fed up to slaughter and sent to Danish Crown. The sow unit receives around 220 gilts every second month where the two latest deliveries have been from Volsgaard Multiplication herd. Previously they had their own nucleus breeding program but this is not practised anymore.

The Kappel herd is owned by the father Ole Kappel and his two sons, Kristian and Anders. Anders is responsible for the sow unit, whereas Kristian is responsible for the weaner unit and the fields. There are furthermore three employees who are responsible for the weaner unit and the finisher unit.

Kappel health status included previously both *Mycoplasma hyopneumoniae*, serotype 6 pleuropneumonia, Vaccine PRRS (American PRRS virus) and Danish PRRS (European PRRS virus) but the status is unknown for all four units at this current time.

Chapter 1

Buildings

1.1 Pen design

Roejkaer consists of 5 sections with 28 pens in each section and each pen consists of approximately 18 pigs. PigIT uses four pens in each section apart from Section 4. Figure 1.1 shows the 5 sections where the yellow pens are monitored and registered for the project. The 28 pens in a section can be classified as 14 double pens. Each double pen is referred by the herd by a ventil number, so each section has 14 ventil numbers. The PigIT project uses the another system like illustrated in Figure 1.1. Every section has one double pen which is used as sick pen.

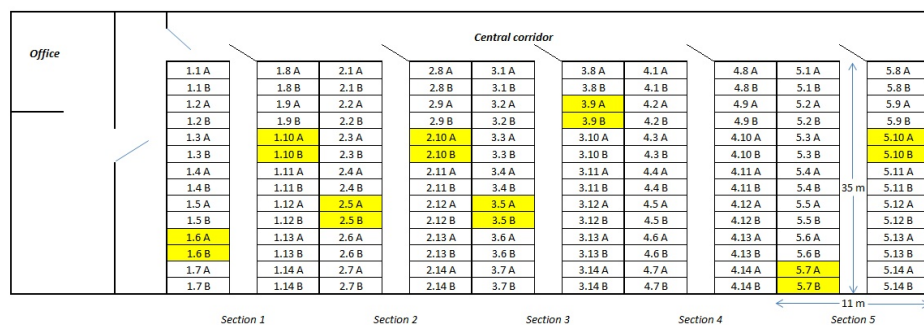


Figure 1.1: Overview of the five sections.

Figure 1.2 shows an example of one double pen. Each pen measures $2.4\text{ m} \times 5.0\text{ m}$. The water supply consists of a water nipple in each pen but the water pipe is shared between two pens (one double pen). This also applies for the feeding trough. The feeding trough is a 5 m long trough and 20 cm width which is also illustrated in Figure 1.2 together with the shared water pipe. The floor is composed of $1/3$ drained and $2/3$ slatted, see Figure 1.3.

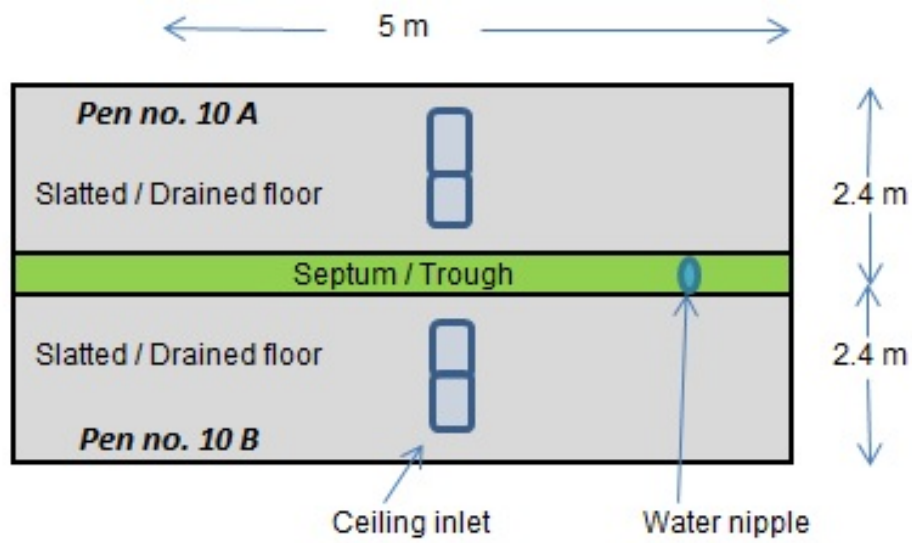


Figure 1.2: Schematic diagram of one double pen.



Figure 1.3: Floor composition.

1.2 Climate

The ventilation system is a combi-diffuse ventilation from the company SKOV A/S, see Figure 1.4a. The temperature can further be regulated by the sprinklers that are installed above all pens and by the climate computer, which is shown in Figure 1.4b. Furthermore there is installed heating pipes on the rear walls above the pens.



(a) Diffuse ventilation.



(b) Climate computer.

Figure 1.4: Climate at Roejkaer

Chapter 2

Cameras and sensors

For the PigIT project sensors and cameras are placed in 16 pens (8 double pens) distributed on Section 1, 2, 3 and 5, see the yellow pens in Figure 1.1, these 16 pens are referred to as the experimental pens.

2.1 Sensors

There are installed sensors to measure both on pen and section level. The sensors collect the following data:

- Pen level
 - Temperature (at two positions)
 - Water consumption
 - Feed consumption
- Section level
 - Temperature
 - Humidity

The temperature is recorded with a thermometer, Figure 2.1a. In every experimental pen two thermometers are installed and both are placed above the feeding trough to collect the temperature at pen level, Figure 2.1b. The temperature is also registered at section level, but these data are collected from the climate computer, Figure 1.4b together with the humidity. Besides the temperature a flow meter is placed in the double pens above the water nipple, to measure the water consumption at pen level for each double pen. No sensors are placed to record the feed consumption, this information is generated from the feeding system, see Figure 2.1c, which is from the company Big Dutchman. The measurements that are collected are the feed consumption per day at pen level. The feed consumption, as well as the water consumption, is registered for each double pen / for each dispenser.



(a) Thermometer.



(b) Two thermometers in one pen.



(c) Feeding system.

Figure 2.1: Sensors and feed at Roejkaer.

2.2 Cameras

Additionally to the sensors there are placed two cameras in each experimental pen, Figure 2.2. The video recordings from these cameras, Figure 2.2a, are intended for weight assessment and to measure the activity in each pen which is done in Foulum. For each experimental pen one camera is placed in front of the pen (Figure 2.2b) and one camera is placed in the back of the pen (Figure 2.2c). Four cameras are installed for each double pen, which in total give 8 cameras per section.



(a) Video recordings.



(b) Camera in front of the pen.



(c) Camera in the back of the pen.

Figure 2.2: Cameras in experimental pens.

Chapter 3

Animals

Pigs are inserted in the finisher unit on Wednesday at a weight of approximately 30 kg. 480 animals are inserted per section and the animals are sorted by gender and size. When the pigs are inserted in a section they are inserted in 27 pens, which give an average of 18 pigs per pen and 36 pigs for each double pen. Over the next 3-4 weeks, from the inserting time, the remaining pen is used for runt animals from the other pens.

All animals should have permanent access to sufficient amount of straw or other manipulable materials which meet the animals need for rooting and enrichment materials (Order No. 323 of 06/05/2003, §20). The animals in the finisher unit are provided with two wooden blocks in chains for every pen, which can be seen in the empty pen in Figure 1.3 as well as in Figure 3.1. In Denmark the wooden blocks, when available on the floor, are characterized as both rooting and enrichment materials.



Figure 3.1: Wooden blocks.

Chapter 4

Feed

4.1 On-farm mixing

The herd mixes their own feed on-farm and the animals are fed liquid feed. The mixing equipment can be seen in Figure 4.1 and Figure 4.2 and includes two mixing vessels, a grain cleaner and a roller mill with a slide gate of 2 mm.



Figure 4.1: Two mixing vessels at Kappel.



Figure 4.2: Grain cleaner and roller mill.

4.2 Diets

The two mixing vessels are mixing two different mixtures for the animals in the finisher unit. The first mixture is given to animals in the weight-class of 30-55 kg and the content of the diet is shown in Table 4.1. The second mixture is given to

animals in the weight-class of 55-110 kg and the content of the diet is shown in Table 4.2. The herd has only one silo, so the diets contain only one type of grain. Therefore it is not always the same type of grain stated in the feed optimization that are used in the mixtures. At this moment (August 2014) the herd only uses barley, whereas they earlier only used wheat but this led to bad results.

Table 4.1: Content of diet for 30-55 kg pigs, mixture 1

Ingredients	Percentage, %
Water	66.5
Grounded Barley	21.8
Rolled Barley	4.0
Soybean	6.2
Vitamins and minerals mixture	1.2
Fat	0.15
Added acid	0.2

Table 4.2: Content of diet for 55-105 kg pigs, mixture 2

Ingredients	Percentage, %
Water	66.5
Grounded Barley	24.6
Rolled Barley	4.0
Soybean	3.6
Vitamins and minerals mixture	1.1
Added acid	0.2

4.3 Feed curves

Besides that the animals are fed according to their weight they are fed according to gender. The animals are, as mentioned, sorted by gender when they are inserted in the herd. Female pigs are afterwards fed according to the feeding curve shown in Figure 4.3 and male pigs are fed according to the feeding curve shown in Figure 4.4. The male and female pigs are fed the same amount of feed per day the first 5 weeks (day 35) and hereafter the male pigs are fed 2.95 FU per day per animal whereas the female pigs are 2.80 FU per day per animal.

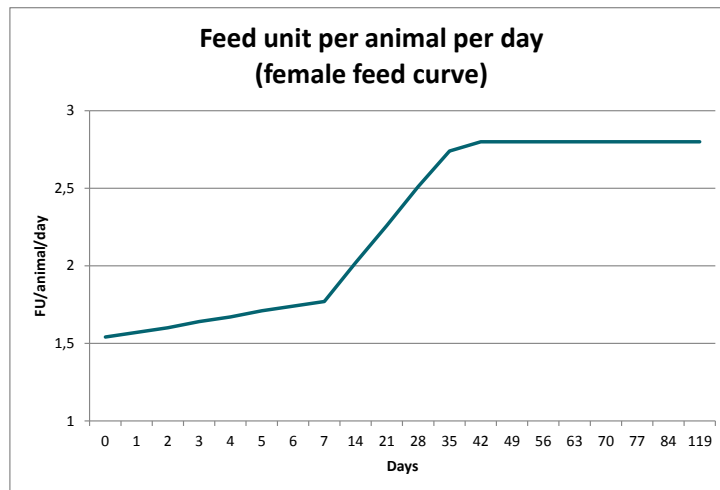


Figure 4.3: Feed curve for female pigs.

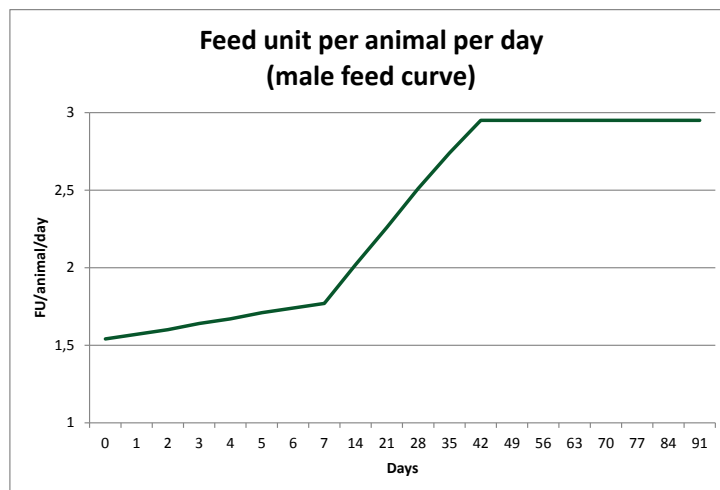


Figure 4.4: Feed curve for male pigs.

Chapter 5

Labor and management

Every day the responsible employees at Roejkaer register with a PDA, Figure 5.1, the following in each of the experimental pens:

- Diarrhea
- Pen fouling
- Tail biting
- Removal and insertion of pigs



Figure 5.1: PDA for registrations.

Besides the registrations that are automatic send to the PigIT database and the registration from the PDAs, all animals in the experimental pens in alle sections are weighted when inserted. The animals in the experimental pens in Section 2 are hereafter weighted once very week. The scale used in the herd is shown in Figure 5.2.



Figure 5.2: Scale in the finisher unit.

The weekly weight registration should be compared with the findings from the weight analysis done in Foulum. These weekly weighings are on individual animal level, but the herd has recently started to weigh animals in Section 1, 3 and 5 to have weight data at section level. The animals in these sections will then be weighed first when inserted and again in the truck when the animals are send to slaughter.



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