



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

The Swedish Livestock Research Centre • Faculty of
Veterinary Medicine and Animal Science

Resources at

The Swedish Livestock Research Centre

• RESEARCH • EDUCATION • PRODUCTION



Welcome to The Swedish Livestock Research Centre

The Swedish Livestock Research Centre (SLU) is an important resource for research into and education on agricultural animals. On an average ten projects are running daily and the students at the faculty of veterinary medicine and animal science, VH, will be taught here at some point during their education.

The animals are central in the research and education, but are also part of the facility's basic food production. The goal for the Swedish Livestock Research Centre is to be at the forefront of animal production and agriculture and to offer an excellent environment for research and education in a modern farming facility.

This brochure gives a general presentation of the resources that represent the basis for research, education and food production at the Swedish Livestock Research Centre.

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Operations Manager
Swedish Livestock Research Centre

Resources at the Swedish Livestock Research Centre

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The Swedish Livestock Research Centre

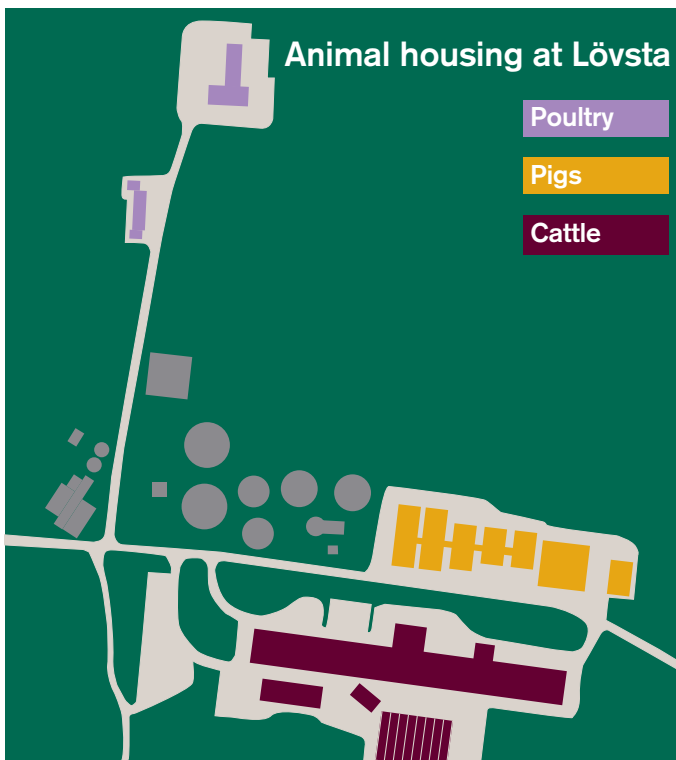
A research centre designed to provide you with results

The Swedish Livestock Research Centre has all the resources needed for different types of research into and education on farm animals. There are dairy cattle, pigs and poultry in housing solutions that are suitable for both research and education.

The Swedish Livestock Research Centre provides researchers with the right conditions to perform quality-assured research into:

- animal welfare, behaviour and health,
- animal environment and care and building function,
- sustainable and climate-smart food production.

The facilities for cattle, pigs and poultry represent technology at the forefront of development. The research centre has personnel with expertise in production, research and education. This gives you a resource, which shows you the possibilities and safeguards your trials.



The cattle facility have room for 300 dairy cattle plus recruitment animals. Milking is performed daily by a milking rotary parlour and an automatic milking system. Annual production:

2,725 tonnes of milk (2016).

Annual milk delivery:

2,574 tonnes of milk (2016).

Average yield per cow: 10,282 kg ECM (2016).



The pig herd comprises 110 sows in integrated production. The pig facility also have 960 slaughter pig places and 96 growth places. Approximately 2,500 pigs are fattened for slaughter each year.



The poultry facility allow for research with free-range laying hens, laying hens in cages and broiler chickens. Research with other poultry is also possible.

Customizations to the needs of the research project

The Swedish Livestock Research Centre has a great deal of experience in finding solutions that adapt animal housing and routines to the needs of the research project. This can cover anything from feeding to cow traffic.

Tips and requests

During the research you have access to a system for reporting requests, any defects and suggested improvements.

Share your results

At The Swedish Livestock Research Centre you have the opportunity to hire a conference room with space for 20 to 120 persons, including lecture rooms.

Research 24–7

Some research requires observation 24 hours a day. The Swedish Livestock Research Centre gives you access to overnight accommodation.

Resources

The Swedish Livestock Research Centre has many examples of adaptations that make the facility extra suitable for research and education. Much of this concerns gathering and registering data for the research, but there are also opportunities to shape the facility according to educational needs.

In the cattle facility there are plenty of extra cow alleys and separation possibilities. There are also many complementary resources:

- Teaching stalls
- Tie stalls with pipe line milking system
- Treatment room
- Insemination room
- Preparation room
- Sampling room
- Area for special needs

Education

Every year the Swedish Livestock Research Centre welcomes more than 4,000 students, most of them studying at the Faculty of Veterinary Medicine and Animal Science.

The facility's spacious conference and meeting rooms are valuable resources for both education and for researchers who wish to meet and discuss research projects or share research results.



Margareta Wallgren teaches veterinary students (year 4) about pregnancy controls of sows.

In safe hands

The Swedish Livestock Research Centre has around 30 employees with long and documented experience of animal care and trials. This, together with specially adapted facilities, gives you the right conditions for successful trials.

Here you find people who know what is needed to achieve good results in both research and production. You do this in an environment where adaptation, registration and quality assurance are part of everyday life – every day of the year.

Good results require teamwork to meet the needs of daily animal care and food production and of research and education.

Research coordinators

Planning and good communication are basic necessities for successful trials. The research coordinators at the Swedish Livestock Research Centre have themselves taken doctorates in relevant animal species and research areas. As coordinators they are with you from start to finish and maintain continuous contact with researchers, doctoral candidates, students with examination work and their supervisors.

1 The first step is to address the needs in a research enquiry to see what is possible to do, when and how the research project could be performed. On this basis, the research coordinator presents a preliminary cost estimate and a proposed starting time.

2 The next step is to sign an agreement with a more detailed costing proposal. The researcher will then supply a research plan, stating how the research is to be performed in practice, and ethical permits

3 The research coordinator also ensures that checklists and instructions are prepared, safety inspections are made and that there are routines for documentation and complementary registrations. Another important task is to provide help if the implementation of the research project needs to be changed.

Teamwork

At the Swedish Livestock Research Centre you will find collaborating expertise in:

- Animal care, including insemination, taking samples etcetera.
- Veterinary care.
- Work planning.
- Customization of animal housing systems.
- Coordination of research and education.
- IT support and registration.
- Administration.

Contact us!

How can we help you with your research? Contact us to discuss requirements and possibilities.

E-mail: forskning-lovsta@slu.se

Double ISO certificate

To ensure the quality of research, education and production, the Swedish Livestock Research Centre is certified in accordance with quality standard ISO 9 001:2008. The Swedish Livestock Research Centre is also certified according to the environmental management standard ISO 14 001:2004. The environmental management system is to ensure that environmental legislation and other requirements in respect of the environment are complied with and that the facility's environmental performance is continuously improved.

The ISO certification shows that The Swedish Livestock Research Centre maintains the highest level and is an important resource for both national and international trials.



The Swedish University of Agricultural Sciences. The Swedish Livestock Research Centre



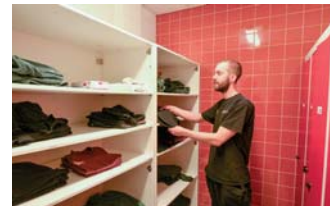
Biosecurity

The Swedish Livestock Research Centre maintains a very high infection protection level thanks to its well-planned and modern housing systems and thoroughly established infection protection routines. Both dairy and pig stocks are closed, which means that no animals are purchased. The pig herd also has SPF (Specific Pathogen Free) status, and samples are taken regularly to show freedom from a range of common pig infections.

The animal herds are included in relevant infection protection program for each animal type, such as *Smittsäkrad besättning* (Infection-Protected Herd) for the cattle.

Active work is performed at the Swedish Livestock Research Centre to maintain a high level of protection against infection, both from outside and internally, with good hygiene routines at every stage.

The observation room in the cattle facility allows visitors to view the various sections through a window without having to go in to the animals.



Visitor entrances with spacious changing rooms and washing and shower facilities make it possible to give a warm welcome to large groups of visitors. In this case, to the cattle sheds.

Collaboration at Funbo-Lövsta

The SLU has its practice centre for Ultuna in Funbo-Lövsta.

The Ultuna property consists of nine farms located around Uppsala and the total area today is 1,100 hectares of arable land, 350 hectares of natural pasture and 60 hectares of other land.

The facility offers research areas for field trials, commercial plant cultivation and property operation and contracting services.

Of the arable land, about 840 hectares are used for conventional cultivation, 200 hectares for organic cultivation and 60 hectares for plant cultivation trials. The main crops are cereals and roughage. The cultivation of cereals also provides straw for bedding and feed.

The soil types in the Ultuna property include muddy clay, medium stiff to stiff clay and small areas of sandy soil, heathland and loamy soil. The staff consists of six full-time employees.

Lövsta Kött is a sister company of Andersson & Tillman and Faringe Kött & Slakt. Lövsta Kött leases SLU's newly-built slaughterhouse in Funbo-Lövsta where approximately 26,000 pigs, 6,000 cattle and 5,500 lambs are slaughtered each year. The lease agreement includes allocating space for teaching and for students doing practical work in the slaughterhouse.

The short distance from the slaughterhouse (about two kilometres) makes things easier for both the animals and for researchers at the Swedish Livestock Research Centre.

The slaughterhouse is part of SLU's focus on research into and education about farm animals.

The biogas plant at Funbo-Lövsta was completed in April 2012. Since then it has helped ensure that the Swedish Livestock Research Centre is self-sufficient in electricity and heat for most of the year. The output is 500 kW and each year the facility produces 4 GWh of electricity and a similar quantity of district heating. Most of the raw materials come from SLU's own activities or from farms in the Lövsta area and mainly consist of fertiliser and grass.





Laying hens

Housing system

Free-range system

- Space for 1,800 laying hens in 18 separate groups.
- Outdoor areas.

Equipped cages

- Space for 1,440 hens.
- T8 cages equipped with litter bed, perches and nests.

Smaller trials

- Large cages equipped with litter bed, perches and nests.
- Manual filling of automatic feeders.

Feeding

- 9 feed silos.
- Possibility of handling feed in sacks and manual feeding.
- Full flexibility to mix different feed compositions.
- Automatic feeders in free-range system and equipped cages call for feed automatically.
- Water in nipples/automats.

Registration

- Number of eggs.
- Weighing of eggs.
- Candling of eggs.
- Assessment of the birds' plumage and foot health.

Miscellaneous

- The units in Poultry 1 are mainly used for trials with laying hens, but other trials are also possible.
- Poultry 1 has small slaughterhouse, which enables the registration of slaughter weights.

Laying hens

Poultry facility 1

The Swedish Livestock Research Centre has three units that are mainly used for laying hens: one free-range system, one with cages and a special unit for small-scale trials. All birds are purchased before each trial. The choice of breed or hybrid is normally made by the researcher.



Free-range system for laying hens.



Preparations before trial.



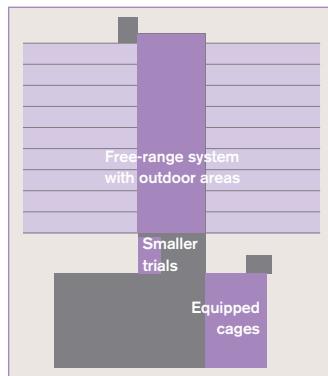
Equipped cages for laying hens.



Cages for small-scale trials.



Poultry facility 1 has three units.



Outdoor areas at Poultry facility 1.



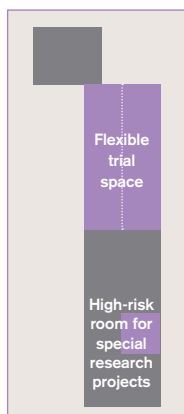
Chickens for slaughter and other poultry

Poultry facility 2

Poultry 2 at the Swedish Livestock Research Centre is mainly used for trials with broiler chickens. The flexible research area is also suitable for research with other poultry species, such as ducks, turkeys, geese and hens.



The main research area in Poultry 2 is about 200 square metres and can be divided lengthways.



Housing system

- 201 square metres of flexible trial space. The area can be used as one unit or can be divided lengthways using tarpaulin, with separate ventilation for each section.
- Enables trials with free-range birds or the use of cages.
- With cages, there is space for 320 chickens.

High-risk room

- 25 square metres with its own drainage and ventilation with HEPA filter.
- Equipped as needed.

Feeding

- 10 silos for feed. Automatic processing.
- The feed is blown to cyclones above each cage, 40 in total.
- Water dispensed automatically with nipples.

Other resources

- Separate room for taking samples from chickens.
- Egg hatching machine for 1,120 eggs.



Farrowing sows and gilts

Housing system

- 7 farrowing units.
- 12 unit pens per farrowing unit.
- Strewn with chopped straw via rail suspended robot.

Routines for farrowing

- The gilts/sows come to the farrowing unit about 1 week before farrowing is expected.
- For farrowing, the sows are weighed and fat thickness is measured.
- The sows stay with the piglets for about 5 weeks after farrowing.
- After weaning, the sows are weighed and fat thickness is measured as a basis for feeding at the dry sow stage.

Feeding

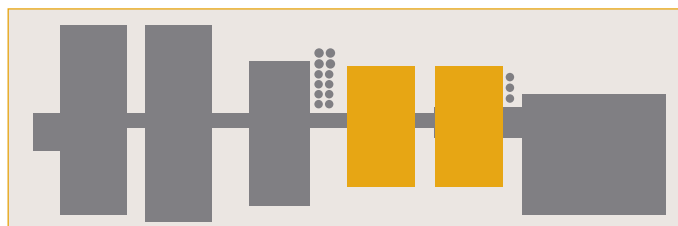
- The sows receive dry feed twice a day until 10 days after farrowing. Thereafter 3 times a day.
- Basic feed adapted for the sows.

Piglet data 2016

Number of litters	245
Number of piglets born	3,782
Number born per litter	15.44
Number of live births per litter	13.94
Average number weaned per litter	10.71
Average birth weight, kg	1.39
Average live birth weight, kg	1.42
Average weight weaned, kg	11.23
Average weight 9 weeks, kg	27.43
Percentage of first litters, %	22
Average litter number	3.45

Farrowing sows and gilts

The Swedish Livestock Research Centre has about 110 sows in integrated SPF (Specific Pathogen Free) production. The breeding sows are pure-bred Yorkshires. Pregnant sows and gilts arrive in the farrowing units about one week before farrowing is expected. Farrowing is done in shifts, with six to twelve new sows or gilts farrowing every other week.





Piglets

The piglets remain in the farrowing pen for about ten weeks in total, in other words for five weeks after the sow has been moved to the dry sow unit.



Litter awaiting treatment.



Weighing



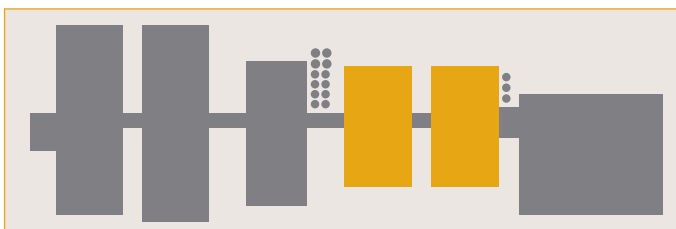
Preparation for ear marking.



Iron injection



Automatic feeding with dry feed.



Housing system

- The piglets remain in the farrowing pens for about 5 weeks after weaning. They are moved to the slaughter pig units at about 10 weeks old.
- Strewn with chopped straw via rail suspended robot.
- Supplementary specially equipped fattening unit with 12 boxes for special research projects after weaning (range 10–30 kg).

Routines

At birth

- Determining gender.
- Weighing.
- Marking in one ear with tattoo rod.

After 5 days

- Iron injection.
- Ear tags.

At 2 weeks

Second iron injection.

At about 4–5 weeks

Weighing.

At about 10 weeks

Moved to slaughter pig unit.

Feeding

- The piglets have access to feed from two to three weeks of age via an automatic feeder.
- Basic feed adapted for the piglets.



Pigs for slaughter

Housing system

- 7 slaughter pig units.
- 12 pens per slaughter pig unit.
- 10 places per pen, a total of 120 places per slaughter pig unit.
- Strewn with chopped straw via rail suspended robot.
- Supplementary, extra-flexible slaughter pig unit with 24 pens for special research projects.
- Loading area into which slaughter pigs are moved a maximum of one hour before transport.

Routines

- Vaccination against boar taint the first Monday after being moved into the slaughter pig unit; second vaccination 4 weeks later.
- When the pigs approach the desired slaughter weight, all pigs in the facility are weighed. Slaughter is planned from this basis.
- There is monitoring at individual level for all pigs.
- When it is time for slaughter, the pigs are delivered to the nearby Lövsta Kött slaughterhouse.
- The pigs are slaughtered at 5–6 months of age when they have a live weight of about 115 kg.

Feeding

- Dry feed and wet feed.
- Automatic feeding 3 times a day.

Slaughter pig data 2016

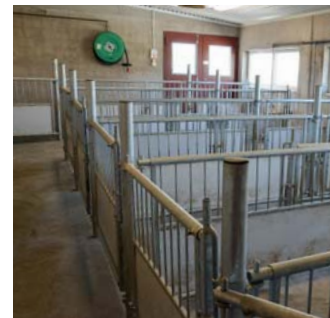
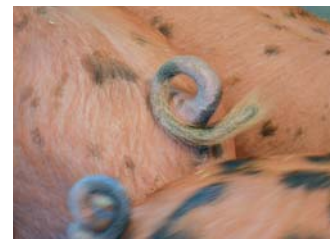
Age at slaughter, days	151.9
Slaughter weight, kg	82.8
Meat %	59.3
Growth birth – slaughter, grams per day	736
Growth 9 weeks – slaughter, grams per day	949

Pigs for slaughter

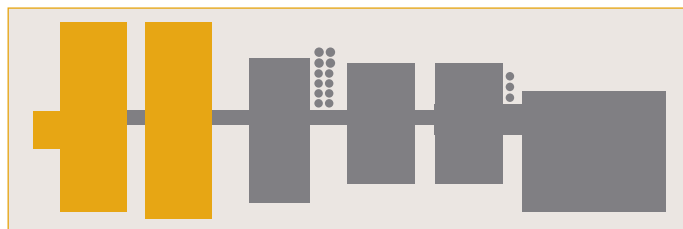
The piglets arrive in the slaughter pig units at the age of ten weeks. There are seven slaughter pig units in total, each with 120 places, plus a supplementary unit for special research projects. The Swedish Livestock Research Centre fattens about 2,500 slaughter pigs a year.



Weighing slaughter pigs.



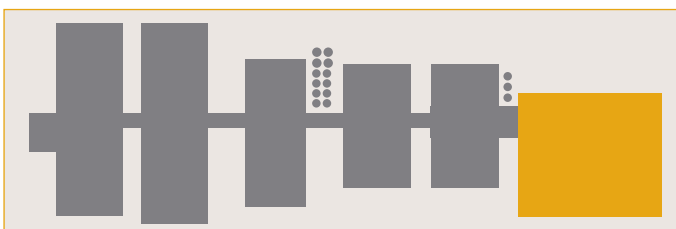
Loading area.





Dry sows and gilts for breeding

The sows are moved to the dry sow unit after weaning, normally five weeks after farrowing. The dry sow unit also has four pens for gilts being recruited for breeding.



Housing system

- Loose housing on a deep litter of straw (bedded pack).
- 9 large boxes on a deep litter of straw and feeding pens for dry sows, of which 3 are in the insemination section.
- 11 large boxes for gilts, of which 4 are in the insemination section.
- Strewn with long straw.

Routines for gilts

- Gilts are checked if in heat from 5 months.
- Insemination of gilts at 6–8 months age.
- Insemination 2 consecutive days.
- All insemination is from known boars.
- Pregnancy test 30 days after insemination, then pregnant gilts are moved to pens for pregnant sows.
- 1 week before expected farrowing the gilts are moved into farrowing units.

Routines for sows

- Measurement of fat thickness after weaning. The result determines feeding until the next farrowing.
- Weighed after weaning.
- Inseminated 5–7 days after weaning.
- Insemination 2 consecutive days.
- All insemination is from known boars.
- Pregnancy test 30 days after insemination, then pregnant sows are moved to pens for pregnant sows.
- New measurement of fat thickness in the event of miscarriage.
- 1 week before expected farrowing the sows are moved into farrowing units.

Feeding

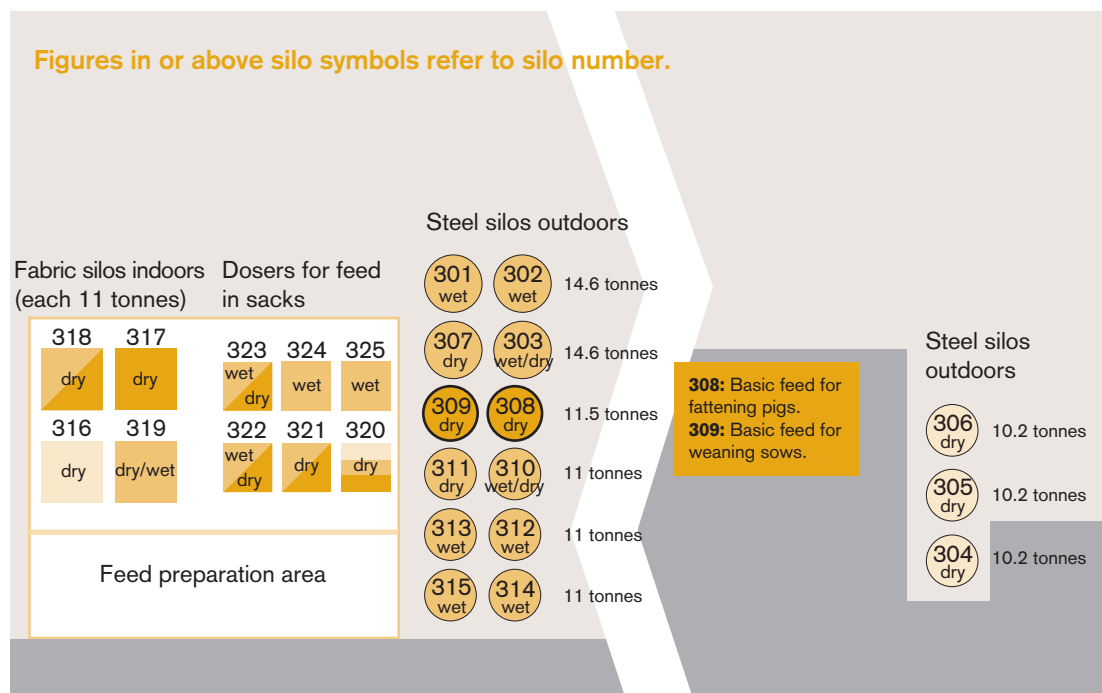
- Individual feeding with dry feed twice a day.
- Normally 3–4 feeds available.
- Normally 3–4 feeds available.



Feed and feeding

The advanced feeding system in the pig units gives great flexibility. For dry sows and gilts for breeding, the dry feed is portioned using an automatic feed trolley suspended from rails.

In the other units the dry feed is delivered via pipes from the computer controlled feed preparation system. The feed preparation area also has a computer controlled system for wet feed for slaughter pigs.



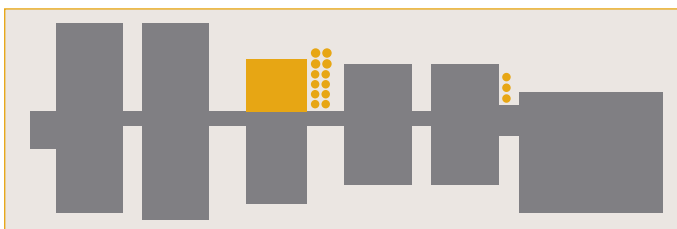
Weaning sows and piglets

Pigs for slaughter

Dry sows and gilts for breeding

Diagram showing possibilities for combining feeds to different units. For example, up to six different dry feed mixes can be fed simultaneously in the same unit. Each portion is weighed and delivered to the right pen without being mixed with other feed mixes. Sows, piglets, dry sows and gilts for breeding can be fed with dry feed. Slaughter pigs can be fed with both wet and dry feed.

Note that two silos are normally loaded with dry feed for piglets and weaning sows.





Equipment for wet feeding.



Automatic feeder for piglets.



Rail suspended feed trolley for dry sows and gilts for breeding.

Bedding

The pig units have bedding of cut straw and long straw.



All units, apart from loose housing for dry sows and gilts, are strewn with cut straw via a robot suspended from rails. The bedding robot is filled automatically.



Dry sows and gilts are housed on a deep litter of long straw.



Dairy cows | Housing system

Housing system

- Heated cubicle system (free-stall).
- 4 groups, each of 60–64 animals.
- Milking by VMS™ and AMR™.

Floor, bedding and manure removal

- Cubicles with mattresses.
- Three scraper paths per group.
- Rubber covered scraper paths at feeding tables, otherwise grooved concrete scraper paths.
- Slatted concrete floor in VMS™ waiting area.
- Transition and collecting areas grooved concrete.
- Manure removal by wire-driven scrapers.
- Cubicles normally strewn with wood shavings. Bedding robot.

Cow traffic

- Passage gates can steer cows towards milking, feeding tables or resting areas (applies to two groups).
- Registration of all gate passages.

Miscellaneous

- Activity measurement.
- Hoof bath and hydraulic hoof trimming frame.
- Scales for automatic weighing.

Possible customizations

- Other bedding, such as cut straw.
- Intervals for spreading of bedding material.
- More frequent weighing.
- Hoof bath interval.
- Other floor coverings.
- Tethered places for special research projects.

Dairy cows

The stock at Lövsta is made up of about 280 SRB (Swedish Red) and Holstein cows, about 250 of which are lactating. The dairy cattle are housed in heated cubicle systems (free-stalls). Recruitment is done with our own animals.

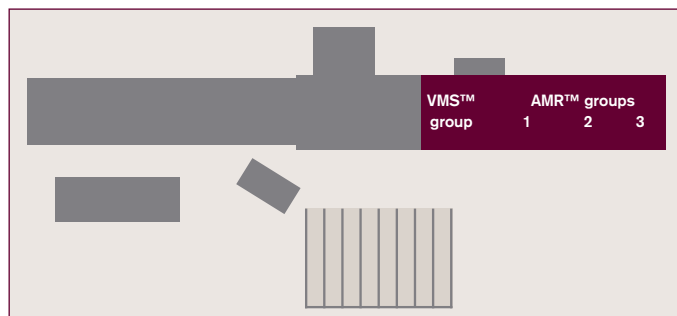
Three out of normally four groups are milked in a milking rotary parlour (DeLaval AMR™). The fourth group is milked in an automatic milking system (DeLaval VMS™).

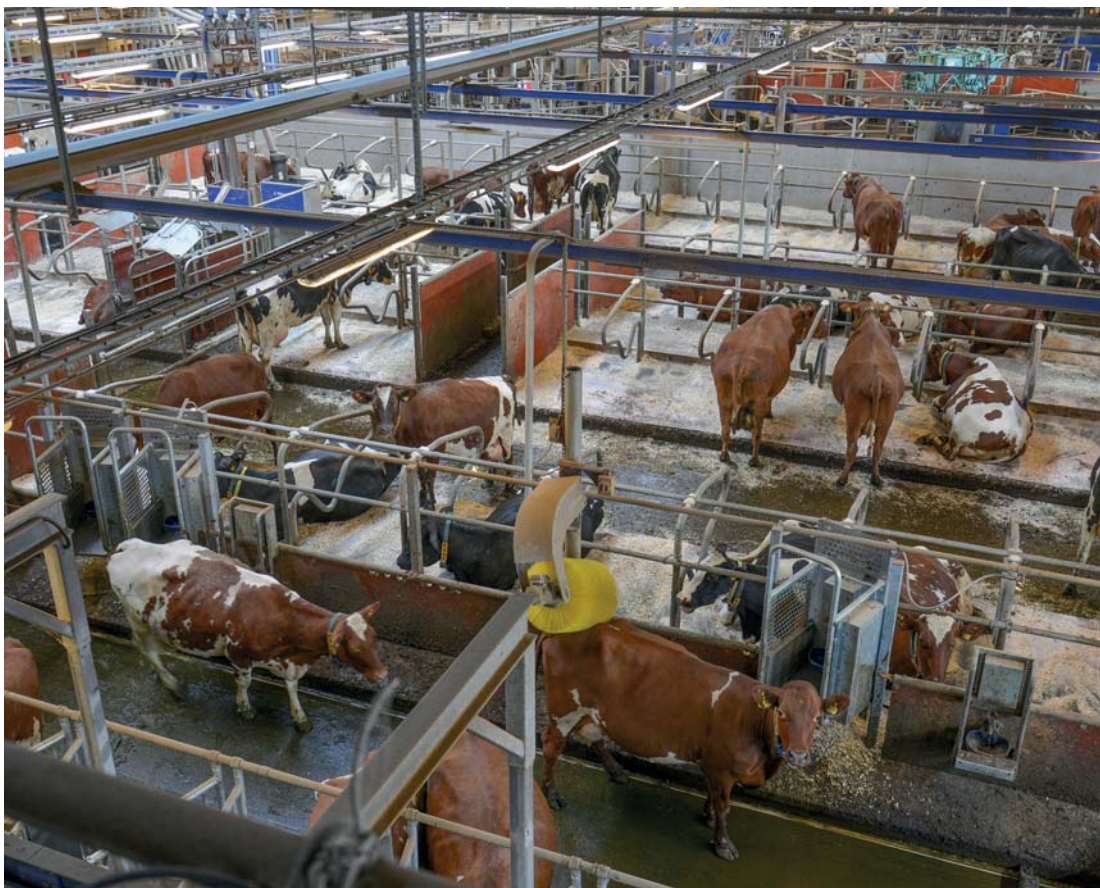


The dairy cows are divided into four groups.



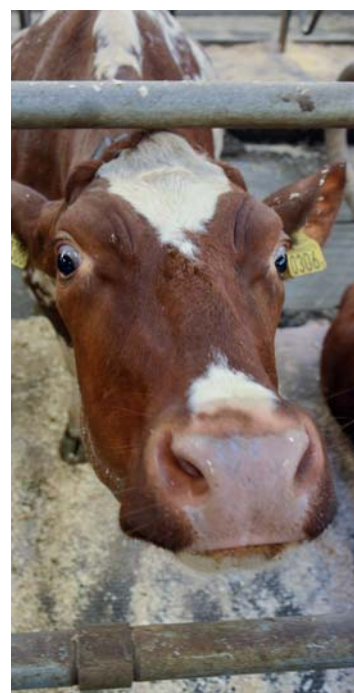
Bedding material is distributed by a robot. Wood shavings are normally used, but it is also possible to use chopped straw.





Key figures for milk production 2016

	All	SRB	Holstein
Average number of cows	265	160	105
Yield kg ECM	10 282	9 780	10 789
Fat, %	4,2	4,3	4,1
Protein, %	3,4	3,5	3,4
Dry period, days	67	71	72
Number of calvings	280	169	111
Calving interval, months	13,0	12,8	13,4
Number of ins (inseminations)	2,2	2,3	2,1
Calving to first ins days	75	72	78
Calving to last ins days	119	116	125
Recruitment percentage	44		
Somatic cell count	175		
First calving age, months	26,2		





Dairy cows | Feeding

Feeding

Roughage

- Roughage via mixer from three different buffer tables.
- Salt and minerals added to the silage once a day.
- Roughage trough on weight cells for registration of feed intake in VMS™ group and AMR™ group 1.

Concentrates

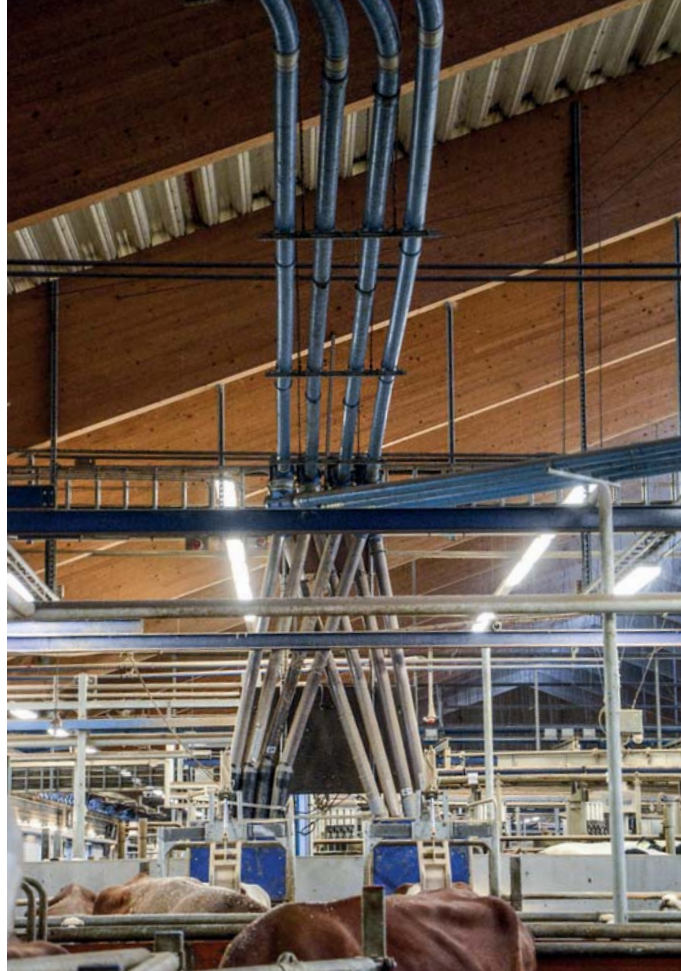
- Automatic concentrate feeders, four per group.
- AMR™ group 1: Six different concentrate feeds, up to four simultaneously.
- AMR™ group 2 and 3: Maximum two concentrate feeds simultaneously.
- VMS™ group: Four different concentrate feeds simultaneously, up to two of them by robot.

Distribution

- Conveyor belt for roughage distribution (AMR™ group 2 and 3).
- Feed wagon and feed trough equipped with scales (AMR™ group 1 and VMS™ group). Possible to control each animal's access to the feed trough. Each group is fed three times per day.
- Screw feed from concentrates silo to VMS™, buffer silo and automatic concentrate feeders.

Possible customizations

- Supplementary roughage.
- Number of feeds.
- Possible to include a concentrate direct from the buffer silo into the roughage mix, plus manual addition.
- Supplementary use of feed truck and manual feed cart.
- Withdrawal of small quantities from any silo.



Feeding with concentrates in concentrate stations and in VMS™. These pipes run from silos to the concentrate stations.



The VMS group and AMR group 1 have feeding troughs equipped with scales that give individual registration of the cows' feed consumption.

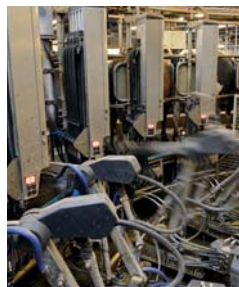


At the Swedish Livestock Research Centre, milking is mainly performed in a DeLaval AMR™ (A Milking Rotary Parlour) with 24 milking places and a DeLaval VMS™ (an automatic Milking System). There is also equipment for semi-automatic milking, bucket milking and manual milking.

In the VMS™ and AMR™ milking is done at quarter level, as is registration of milk data.



Milking by VMS™.



The milking rotary parlour, AMR™, has 24 milking places. Milking is done with three types of robot systems: cleaning and prestimulation of teats, location of teat cups and final spraying of teats. Every milking is monitored by personnel.

Milking by VMS™.

- One group, 60–65 cows.
- Continuous milking.
- Cow traffic is normally on the DeLaval feed first™ principle.
- DeLaval online cell counter, OCC™.

Adaptations possible in VMS™

- Different types of cow traffic.
- Separate groups.
- Size of tease feed in VMS™.
- Automatic separation of milk.
- Registration of waiting time for milking.
- Manual milking.
- Size of and number of cows in waiting area.
- Milking conditions.
- Teat cleaning times.
- Times for pre-treatment.

Milking by AMR

Three groups, each of 60–65 cows.

Milking times: Start at 05.00 and 16.00.

Cow traffic: Collection via passageway. After milking is completed, the selection gate leads the cows back to the right rest area (or pasture), or individuals can be divided from the group.

Adaptations possible in AMR™

- Feeding in manger during milking.
- Grouping as desired, for example by stage of lactation.
- More milkings.
- Adjusted milking times.
- Use of push gate.
- Manual milk sampling at whole udder level (Tru-Test).
- Marking of cows for special treatment, such as manual milking.
- Treatment time for teat cleaning.
- Take-off levels.
- Pretreatment times.



Dairy cows | **Registration**

Registration

Basreg, example

(see also pages 30–31)

- The animal's weight.
- Water consumption (in VMS™ and one of the AMR™ groups).
- Camera for body condition scoring.

Milking

- Teat cleaning times.
- Milk yield on udder and quarter.
- Milk flow.
- Milking times.
- Milking interval.
- Incomplete milkings.

Management system

DeLaval DelPro™

(VMS™ and AMR™)

Milk yield measurement

Twice a month, milk is sent for analysis of fat, protein and somatic cell count. The herd is part of a national monitoring programme for dairy herds in Sweden.

The VMS™ uses the software AMS-link™. In research projects a system is used that further safeguards the connection between sample and cow. Example of registration:

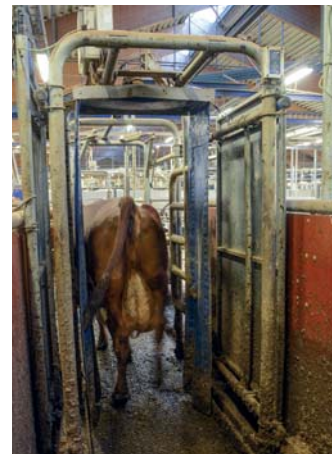
- Milk yield.
- Fat.
- Protein.
- Cell count.
- Lactose.
- Urea.
- Progesterone (option).



The automated milking, here in VMS™, gives comprehensive registration by both udder and quarter.



Camera for flesh assessment.



Automatic weighing of dairy cows.

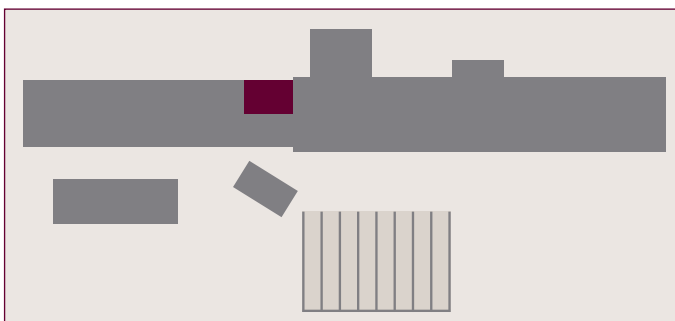


Equipment for milk yield measurement by udder in AMR™.



Calving heifers and cows

Cows and heifers are moved to the calving section's loose housing about two weeks before expected calving. Before calving they are moved into individual calving pens in which they also remain during the colostrum period.



Housing system

- 13 places in loose housing with rubber mats.
- 5 individual calving pens.
- Controlled ventilation.
- Each pen allows restraining of one animal.
- Floor with rubber mats.
- Manual spreading of bedding material.
- Manual manure removal.
- Vacuum connection for milking in bucket.

Feeding

Common feeding table with feed wagon.

Routine for calving

- Cow licks the baby calf dry.
- Milking in bucket as quickly as possible.
- Colostrum checked with colostrometer. Value is recorded.
- Calves are weighed. Weight is recorded.
- The calves receive their ear tags and are registered.
- The newborn calf is given colostrum by bottle and is moved to a calf hutch or an individual pen.
- The calf is given its mother's colostrum for 3 days.
- There is good quality frozen colostrum as a backup.
- Cleaning and disinfection of the calving pen between calvings.

Monitoring

Continuous monitoring between 05.00 and 20.30, supplemented with video monitoring.



Calves

Housing system

39 covered calf hutches. Supplementary single boxes in the cattle facility.

Feeding

- Each calf receives its mother's colostrum for 3 days, then full cream milk from the group of cows that gives the best quality milk.
- The milk is fed from rubber teated buckets twice a day. Distribution is by milk trolley.
- Free access to water, hay, silage and concentrates.
- The calves are weaned at eight weeks.

Other routines

- Spreading of straw.
- Dehorning.
- Vaccination against ringworm.
- All male calves and beef cattle breed crosses are sold.

Possible customizations

- Weighing with mobile scales.
- Video monitoring.
- Calves kept in pairs or groups.
- Feeding routines.
- There is room for a further 20 calf hutches close to the existing calf hutches.

Calves

Young calves are housed singly or in pairs in calf hutches under a roof. At six to eight weeks old, the calves are moved into the calf section of the cattle facility. As a supplement it is possible to house young calves in single boxes in the cattle facility.



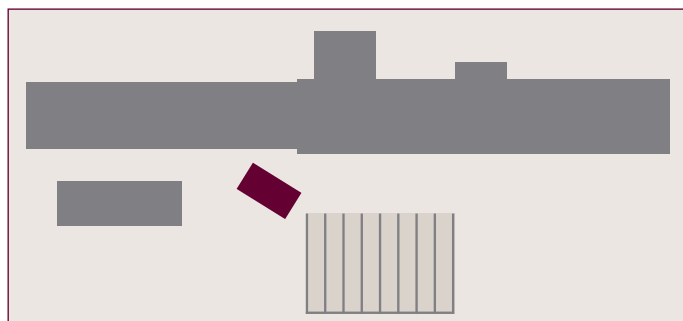
Weighing with mobile scales.



Feeding with milk trolley.



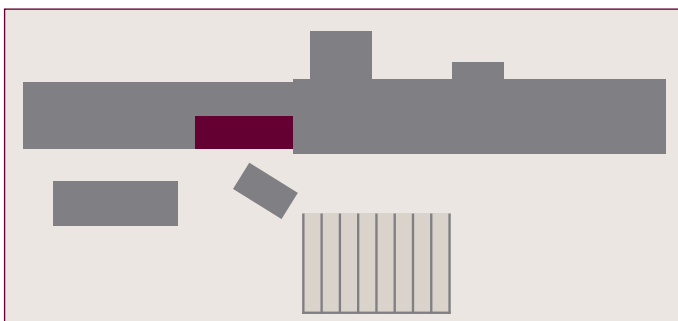
Registration in calf health records.





Weaned calves

At about eight weeks old, the calves are moved into the calf section of the cattle facility. The calves are housed here for about four months, up to an age of about 5.5 months. This section's four rooms are flexible and can be easily adapted to the particular needs of the research.



Housing system

- Four rooms, two of which are equipped with automatic milk feeders.
- Controlled ventilation and heating, separate for each room.

Feeding

- Free access to water, hay and silage.
- Also feeding with concentrates.

Bedding routines

- Spreading of straw or wood shavings.

Possible customizations

- Weighing with mobile scales.
- Video monitoring.
- Feeding routines.



Young animals

Housing system

- 10 groups of cubicles (freestalls), eight for young animals and 2 with cubicles (freestalls) for dry cows. Total of 261 lying places for young animals.
- 3 boxes for separation of individual animals.
- Headlocks to make sampling and treatment easier.
- Walkway around the whole unit for driving and inspection.
- Scraper paths with automatic manure removal. Grooved concrete in scraper paths and crossings.
- Wood shavings strewn by rail suspended robot.
- Rubber mats in cubicles (freestalls).
- Supplementary heating.
- Frost-free environment.
- Access to animal scales.

Feeding

- Common feeding table with feed wagon on rail for roughage or mixed feed.
- Can be fed with mix from 2 feed mixers. Also feeding from silage bales and with feed truck.
- Groups for inseminated and pregnant heifers have concentrate stations for individual feeding of concentrates.

Young animals

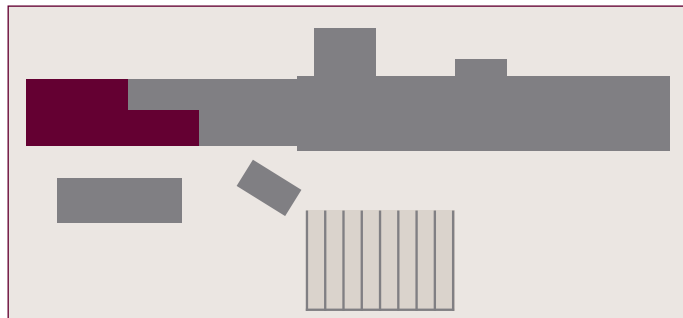
The calves come into the housing for young animal when they are five to six months. Heifers are normally inseminated at 14–15 months.



The housing system for young animals consists of 261 cubicles.



Weighing of young animals.

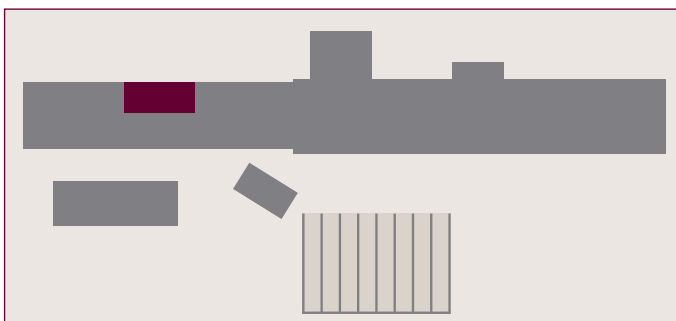


Dry cows



Dry cows

The dry cows share this section of the cattle facility with young animals. The dry cows are in two groups with cubicles (free-stalls). In the first group the cows spend approximately a week after becoming dry, in the second about two months. About two weeks before calving the animals are moved to individual calving pens.



Housing system

- 2 group boxes with cubicles (free-stalls). Total of 42 lying places for dry cows.
- Access to boxes for separation of individual animals.
- Headlocks to make sampling and treatment easier.
- Passageway for moving of cows and for inspection around the whole unit.
- Scraper paths with automatic manure removal.
- Grooved concrete in scraper paths and crossings.
- Wood shavings strewn by rail suspended robot.
- Rubber mats in cubicles.
- Supplementary heating.
- Frost-free environment.
- Access to animal scales.

Feeding

- Common feeding table with trolley on rail for roughage or mixed feed.
- Basically receive the same feed as young animals, but with adapted mineral feed content.
- The quantity of roughage is controlled and registered at group level.
- Concentrate stations for individual feeding of concentrates.

Dry cow routines

- Dry period is normally 2 months.
- During the dry period, the dry cows are milked in the AMR™ on Monday, Wednesday and Friday.



Tie stalls

Tie stall facility

- 32 tethered places (2x16).
- Automatic feeding with concentrates with a rail suspended Skold Mullerup Smart Feeder trolley.
- The feeding table allows individual feeding of roughage. Concentrates are given in separate mangers.
- 10 places with water meters.
- Milking by DeLaval Milk Master™.
- Controlled ventilation.

Miscellaneous

- Can be equipped with camera for monitoring.
- There is space close by for researchers to store and use their laboratory equipment.

Tie stalls

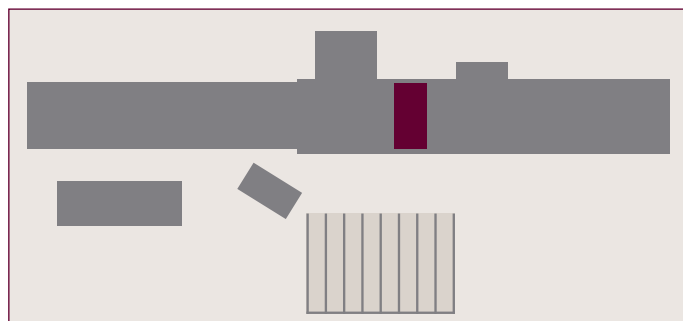
The tie stalls are a flexible complement to other resources in the cattle facility and are particularly suitable for intensive research projects.



The feeding table for the tie stalls allows individual feeding of roughage. Concentrates are given in separate mangers.



The cows in the tie stalls are milked by DeLaval Milk Master™.





Teaching area

The teaching area is used for teaching and research. It is possible to pick out animals from their group and temporarily place them in the teaching area, which makes research and education at the Swedish Live-stock Research Centre easier.



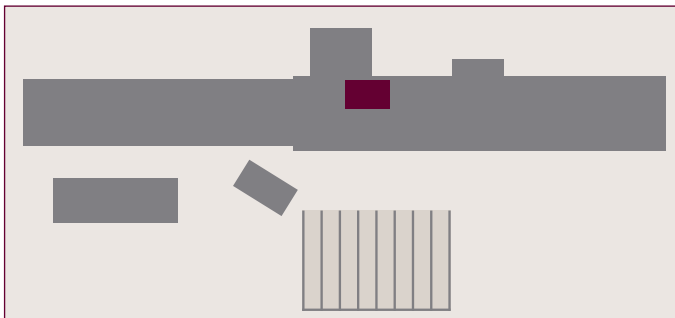
The teaching area have ten tethered places with enclosure gates.



Treatment rail for up to 15 animals.



The three boxes of the teaching area have vacuum and milk connections.



Teaching area facility

- 10 tethered places with water cups and enclosure gates.
- 3 boxes.
- Treatment rail for up to 15 animals.
- Manual feeding.
- Milking vacuum connection to boxes.

Miscellaneous

The teaching area is in frequent use for teaching, but can also be used for intensive research projects with a lighting programme requirement, for example, since the room has no natural light.



Treatment box-stalls

Treatment facility

- Boxes with enclosure gates.
- Controlled ventilation.
- Manual spreading of bedding material.
- Floor with rubber mats.

Feeding

Common feeding table with trolley on rail.

Manure removal

Automatic scraper in culvert below the box floor. Cleaning hatch connected to the culvert. Cleaning and disinfection between cows.

Milking

Vacuum and milk connection for pipe line milking system. Access to Tru-Test milk quantity measurement.

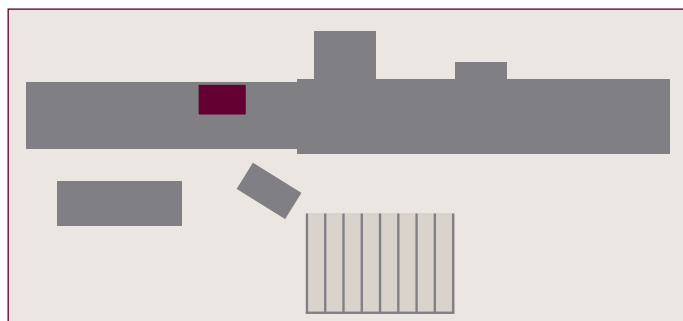
Monitoring

Continuous monitoring during working hours, supplemented with video monitoring.

Treatment box-stalls

Animals that require treatment or special monitoring are placed in the treatment box-stalls. The treatment facility has twelve boxes and gives great flexibility for both milking and feeding.

Cows that are subject to treatment with a milk withdrawal period remain in the treatment box-stalls during the milk withdrawal period.





Feed and feeding

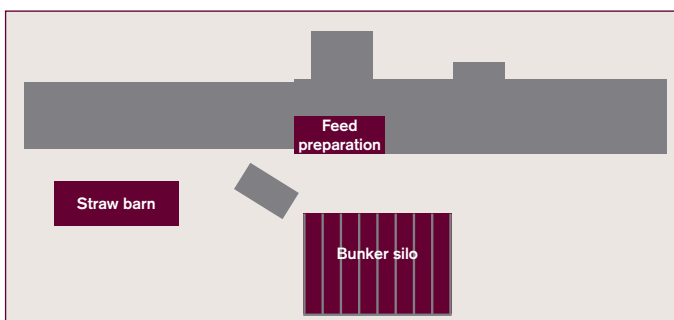
Feed stores and feeding at the Swedish Livestock Research Centre are characterized by flexibility and good control over the volumes fed. In the sections for dairy cows, it is AMR™ group 1 and the VMS™ group that offer the best conditions for feed trials. It is also possible here to use several different kinds of concentrates in each section.



Belt feed distribution for dairy cows.



In the VMS™ group and AMR™ group 1, roughage is given in troughs that are equipped with scales, which gives individual registration of consumption.



Feed stores

- 8 bunker silo compartments, 8x42 metres.
- Space for silage bales and storage in plastic silage bags.
- Total of 13 concentrates silos ranging from 4 to 22 tonnes.
- Straw barn.
- All concentrates silos are equipped with level sensors.

Preparation area

- 3 buffer tables.
- Stationary mixer with vertical screw, 2 tonnes. Feed to belt feed distributors or to trolleys, feed carts, feed truck or similar.
- Buffer silo for concentrates.
- 2 holders for salt and minerals.

Additional preparation area

- Stationary mixer with horizontal screw, 2 tonnes. Filled by loader.
- Refrigerated and deep-freeze rooms for feed, milk and blood samples, for example.

Distribution

- Concentrate stations in the AMR™ groups, VMS™ group and some of the calves.
- Concentrates attractant in VMS™.
- Belt feed distributors.
- Automatic, rail suspended trolleys, with optional manual operation.
- Rail suspended, manual trolleys.
- KL feed truck.
- Avant mini loader.
- Feed carts.



Cattle feed and feeding

Feeding with roughage/mix

- Roughage is given unmixed or mixed.
- Roughage from three different buffer tables plus salt and minerals is prepared in the mixer.
- The mixer can also include concentrates.

AMR™ groups and VMS™ group

- In the feeding system it is possible to divide both the VMS™ group and AMR™ group 1 into two groups and give different types of roughage within the group.
- The feeding troughs register feed intake at individual level and can be set so that only certain animals have access to each trough.
- The feeding troughs can also be controlled during a 24-hour period, individually or at group level, and give access to feed during certain periods or at all times.
- Normally seven servings are given per day at times between 05.00 and 20.30. It is also possible to give feed during the night.
- For feeding roughage to AMR™ group 1 and the VMS™ group, conveyor belt feed distributors are used to fill a rail suspended trolley, which in turn distributes the mix to the troughs of both groups.
- Distribution to AMR™ groups 2 and 3 is done with belt feed distributors.

Tie stalls

- Feed truck and manual, rail suspended trolley, plus mobile scales.

Young animals

- Fed by rail suspended feed trolley, which is filled from the vertical or horizontal mixer.
- Normally fed 8 times a day.



The preparation area has three buffer tables.



The stationary mixer feeds the conveyor belt feed distributor, but can also be used to load trolleys, feed carts, feed trucks or similar.



There is also a stationary mixer with horizontal screws in the additional area for special needs.



The feed truck can reach practically all parts of the facility and is thus a useful complement. The machine feeds in both directions and is also equipped with a sweeping roller and scissor lift.



The rear gates of the concentrate stations mean that the cows can consume their concentrates in peace and quiet.



The VMS™ group and AMR™ group 1 have water stations that register consumption individually.

Feeding with concentrates

- Concentrate stations are calibrated once a month.
- Concentrate stations have sensors that give a warning if no feed is coming through.

AMR™ groups and VMS™ group

- VMS™ group: 4 concentrate stations, maximum 4 different concentrate feeds in stations, 2 of which are used as teaser feed in the robot.
- AMR™ group 1: 4 concentrate stations, maximum 4 different concentrate feeds simultaneously. There are a total of 6 silos connected to AMR™ group 1.
- AMR™ group 2 and 3: Maximum 2 concentrate feeds in 4 stations simultaneously.

Tie stalls

Access to 4 different concentrate feeds, for example via concentrate trolley.

The young animal housing

2 concentrates.

Teaching area

Concentrates are given manually.

Feeding with water

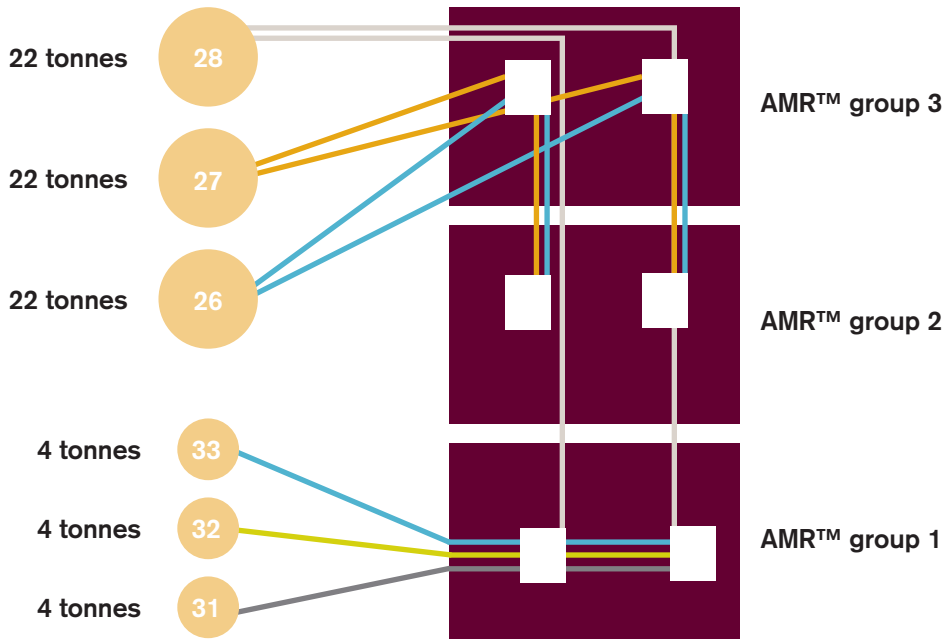
- The same water to all animals.
- Water stations with automatic registration of consumption at individual level in the VMS™ group and AMR™ group 1.
- Water cups in AMR™ group 2 and 3.



Cattle feed and feeding

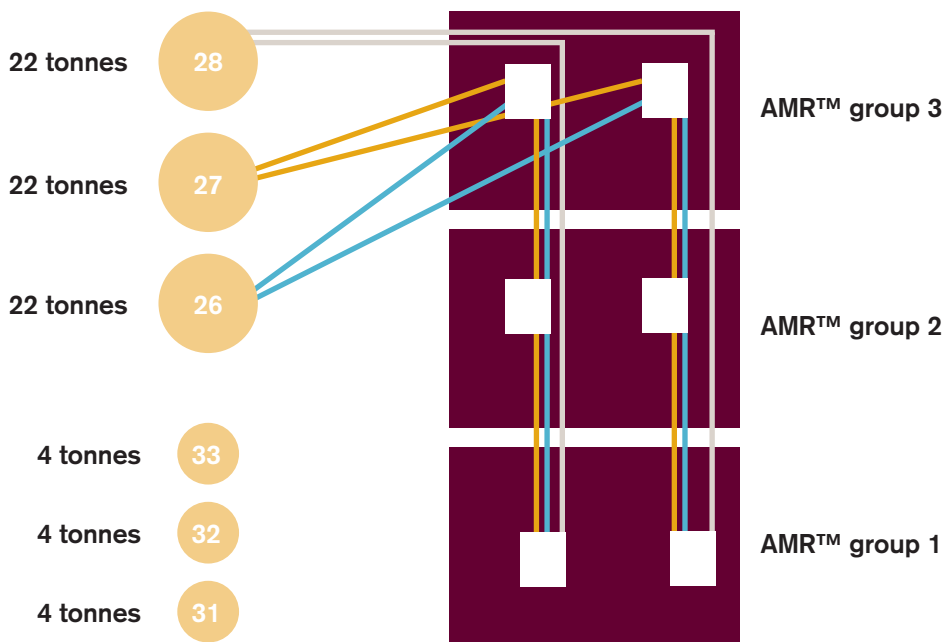
Concentrates from steel silos to the AMR™- groups.

Alternative 1



Two concentrate feeds to AMR™ group 2 and 3. Four concentrate feeds to AMR™ group 1..

Alternative 2

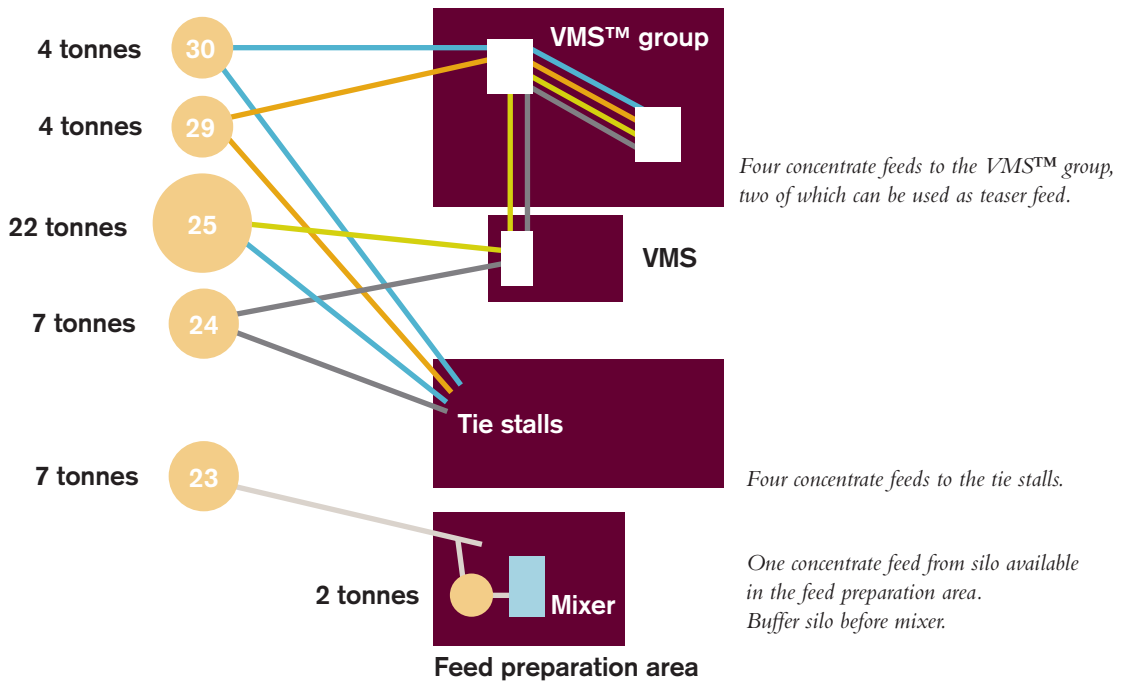


Two concentrate feeds to AMR™ group 2 and 3. Three concentrate feeds to AMR™ group 1.

Figures in silo symbols refer to silo number.



Concentrates from steel silos to the VMS™ group, tie stalls and feed preparation area.



Concentrates from steel silos to the young animal housing



Figures in silo symbols refer to silo number.



Cattle grazing

27 grazing pens

The grazing pasture is divided into 27 grazing pens, which can be further divided if needed. Two raised gravel walkways lead out from the milking facility to the different grazing pens.

Selection gates

With the aid of selection gates, the cows can be given the opportunity to move freely between housing and pasture. Otherwise the dairy cows graze at least half the day (day or night grazing) and are then brought in for milking in the late afternoon or early morning.

Between milkings, during the part of the day or night when the cows are in the cattle facility, they have access to silage and concentrates.

Miscellaneous

- All young animals that have reached the age of six months go out to graze 24 hours a day.
- A deworming agent is used on all first-time grazers.
- The youngest group also receives concentrates as a supplement to grazing. Heifers that are to be inseminated are taken back to the young animal facility and kept in loose housing until pregnancy is confirmed.
- Every grazing pen has a water trough and mineral bucket.

Cattle grazing

During the summer, the cattle graze in the pastures around Lövsta. There is a total of around 70 hectares of cultivated pasture and 100 hectares of natural pasture.

The cows are normally let out at the beginning of May into the cultivated pasture, which is directly adjacent to the cattle facility. In recent years the general public has been invited to watch the cows going out to pasture.

The young animals are normally let out in to the natural pasture land in the middle of April and stay there until the end of September/early October. These pastures are divided into about ten pens.



Gravel walkways lead out to the cows' different grazing pens.



The biological diversity of natural pasture land relies on grazing animals. Many classic Swedish grazing land plants, insects and birds are now threatened.



Water troughs are standing on concrete surface.

Collected data on the Swedish Livestock Research Centre

The basic registration database system at the Swedish Livestock Research Centre stores automatically and manually registered data from the facility's equipment, from stable technicians, researchers, research coordinators, project administration, slaughterhouses, laboratories etcetera.

The system is normally referred to as Basreg. It is used to both register and obtain data. The quality assured information gathered represents a vital foundation for the trial work and education that is conducted at the Swedish Livestock Research Centre.

Basreg is continuously developed on the basis of the researchers' and departments' wishes, the research centre's own evaluation and what is technically possible to register. There are examples of registrations in Basreg on the following pages.

During 2017, all the data that has been collected will be transferred to a new database. Until then, the information is kept centrally in the existing Basreg database or locally at the Swedish Livestock Research Centre.

Something you can't find? Don't hesitate to ask!

Basreg Poultry

Poultry facility 1 (laying hens in cages and on floor)

Description	Where data is found	Frequency
Dead animals	Basreg	Daily
Eggs, number and weight	Basreg	Number: daily, weight: weekly
Access to feed	Basreg	Daily
Remaining feed	Basreg	Every 4 weeks
Temperature	CSV file	Daily
Animal weight	Manual	Random selection
Animal weight and assessment	Manual	Once per trial
Candling	Basreg	Every 8 weeks

Poultry facility 2 (chickens)

Description	Where data is found	Frequency
Animal weight	Manual	Weekly
Dead animals	Basreg	Daily
Access to feed	Basreg	Daily
Remaining feed	Basreg	Every 4 weeks
Temperature	CSV file	Daily

Basreg Pigs

Gilts and boars

Description	Where data is found	Frequency
Weight (100kg)	Excel document	Once per animal
Echo sounding (100kg)	Excel document	Once per animal
Food distribution (when individual feeding starts)	Basreg	Daily
Weight (when individual feeding starts)	Excel document	Once per animal
Exclusion, reason	Excel document	Once per animal
Exclusion, date	Excel document	Once per animal

Dry sows

Description	Where data is found	Frequency
Insemination, date	Excel document	Each occasion
Insemination, failed	Excel document	Each occasion
Miscarriage, date	Excel document	Each occasion
Miscarriage, insemination, date	Excel document	Each occasion
Miscarriage, insemination, failed	Excel document	Each occasion
Feed distribution, pregnancy period	Basreg	Daily

Farrowing sows

Description	Where data is found	Frequency
Farrowing, actual date	Text file	Each occasion
Farrowing, size of live litter	Text file	Each occasion
Farrowing, size of dead litter	Text file	Each occasion
Farrowing, weight after	Text file	Each occasion
Farrowing, echo sounding	Text file	Each occasion
Weaning date	Text file	Each occasion
Weaning, weight	Text file	Each occasion
Weaning, echo sounding	Text file	Each occasion
Feed distribution, weaning period	Basreg	Daily
Feed mixes Skiold	DAT file	Daily
Exclusion, date	Excel document	Once per animal
Exclusion, reason	Excel document	Once per animal

Basreg Pigs

Piglets

Description	Where data is found	Frequency
Identity of individual	Text file	Once per animal
Birth date	Text file	Once per animal
Birth weight	Text file	Once per animal
Gender	Text file	Once per animal
Breed	Text file	Once per animal
Deformity	Text file	Once per animal
Individual weight, Weaning (5 w)	Text file	Once per animal
Individual weight, 9 w	Text file	Once per animal
Feed distribution by box, fattening section	Basreg	Daily
Feed distribution by litter (3–9 w)	Basreg	Daily
Feed mixes Skiold	DAT file	Daily
Castration	Text file	Once per animal
Origin	Excel document	Once per animal
Litter number	Excel document	Once per animal

Slaughter pigs

Description	Where data is found	Frequency
Identity	Excel document	Once per animal
Entry, date	Excel document	Once per animal
Slaughter, date	Excel document	Once per animal
Feed distribution, box level	Basreg	Daily
Feed mixes Skiold	DAT file	Daily
Slaughter data, slaughter weight	Excel document	Once per animal
Slaughter data, meat percentage	Excel document	Once per animal
Slaughter data, comments	Excel document	Once per animal

All pigs

Description	Where data is found	Frequency
Illness, date	Text file	Each occasion
Illness, diagnosis	Text file	Each occasion
Illness, treatment	Text file	Each occasion
Death, date (age)	Text file	Once per animal
Death, cause (poss. post mortem)	Text file	Once per animal
Death, weight	Text file	Once per animal
Lab results, feed tests	Basreg	Each occasion

Basreg Cattle

Milk production

Description	Where data is found	Frequency
Milk yield	Basreg	Each milking
Milk analysis, fat	Basreg	Every other week
Milk analysis, protein	Basreg	Every other week
Milk analysis, lactose	Basreg	Every 4 weeks
Milk analysis, cell count	Basreg	Every other week
Milk analysis, urea	Basreg	Every other week

Exterior

Description	Where data is found	Frequency
Weighing lactating cows	Basreg	Every month
Weighing other animals	Basreg	Every month during bar period

Illnesses

Description	Where data is found	Frequency
Illnesses	Delpro™/DV data	Each occasion
Bact tests (milk)	Manual	Each occasion
Illness, treatment	Text file	Each occasion

Calvings

Description	Where data is found	Frequency
Calvings	Basreg	Each occasion
Birth weight	Basreg	Once per animal

Fertility

Description	Where data is found	Frequency
Insemination	Basreg	Each occasion
Pregnancy	Basreg	Each occasion
Dry cow process	Basreg	Once per lactation

Basic data

Description	Where data is found	Frequency
Origin	Basreg	Once per animal
Bulls (not physically in Lövsta)	Basreg	Once per animal
Slaughter, slaughter weight	Manual	Once per animal
Slaughter data	Manual	Once per animal
Outgoing animals	Basreg	Once per animal

Basreg Cattle

Stock events

Description	Where data is found	Frequency
Trial, trial affiliation	Basreg	Per trial
Trial, trial treatment	Basreg	Per trial
Trial, date	Basreg	Per trial

Feed: grass, grain and maize silage

Description	Where data is found	Frequency
Insertion	Basreg	1 test per silo
Extraction	Basreg	1 test per silo
Dry matter	Basreg	Weekly
Weekly	Basreg	VMS™ & AMR™1: daily

Feed: concentrates

Description	Where data is found	Frequency
Concentrates, analysis	Basreg	Once per month
Concentrates, quantity fed	Basreg	Daily

Basreg

– provides basic data

A world class university



The Swedish University of Agricultural Sciences has activities all over Sweden. The main locations are Alnarp, Skara, Umeå and Uppsala. Tel: +46-(0)18-67 10 00 • Fax: +46-(0)18-67 20 00 • VAT Number: SE202100281701