Session 13_Manninen.pdf

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SUCKLER COW PRODUCTION IN NORDIC CONDITIONS: FEEDS, FEEDING AND HOUSING

EAAP 2010

Heraklion, Crete Island, Greece

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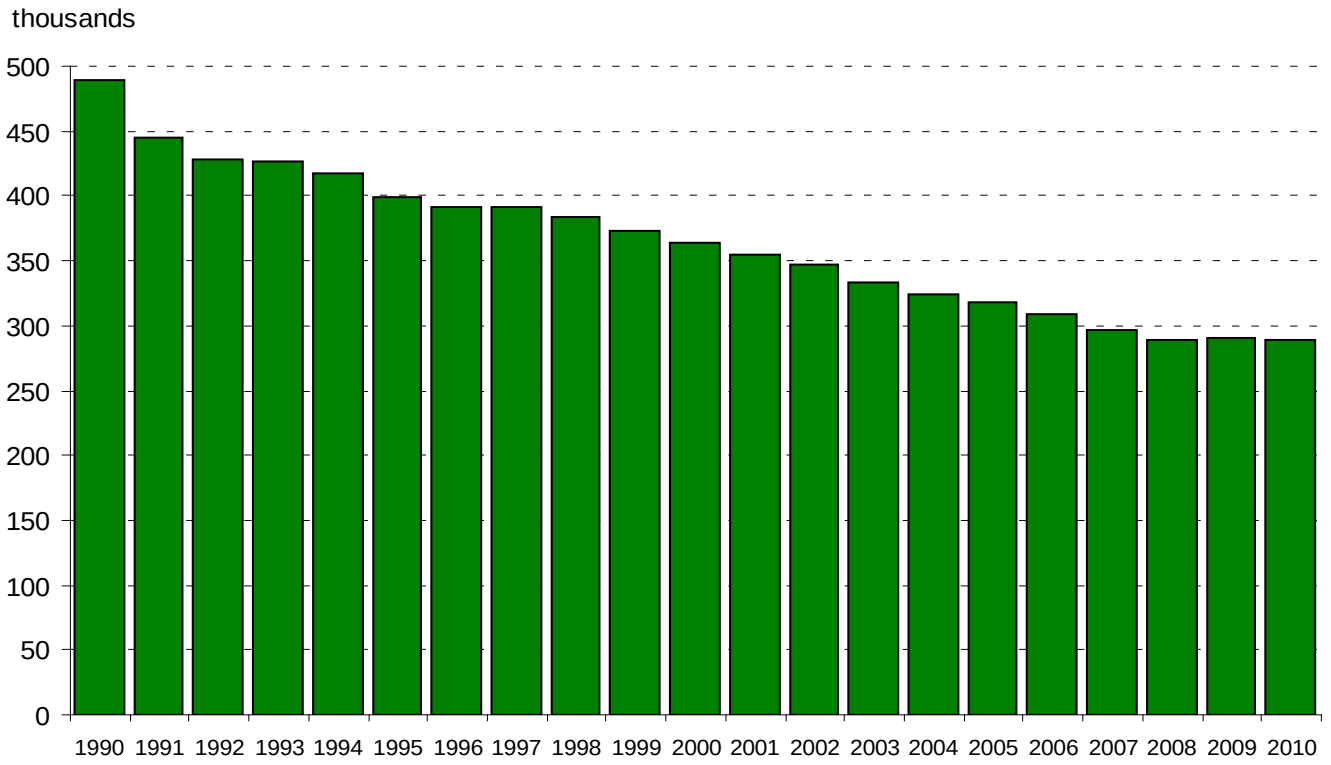
Photos: Merja Manninen if not mentioned.

Dairy cows in Finland 1990 - 2010



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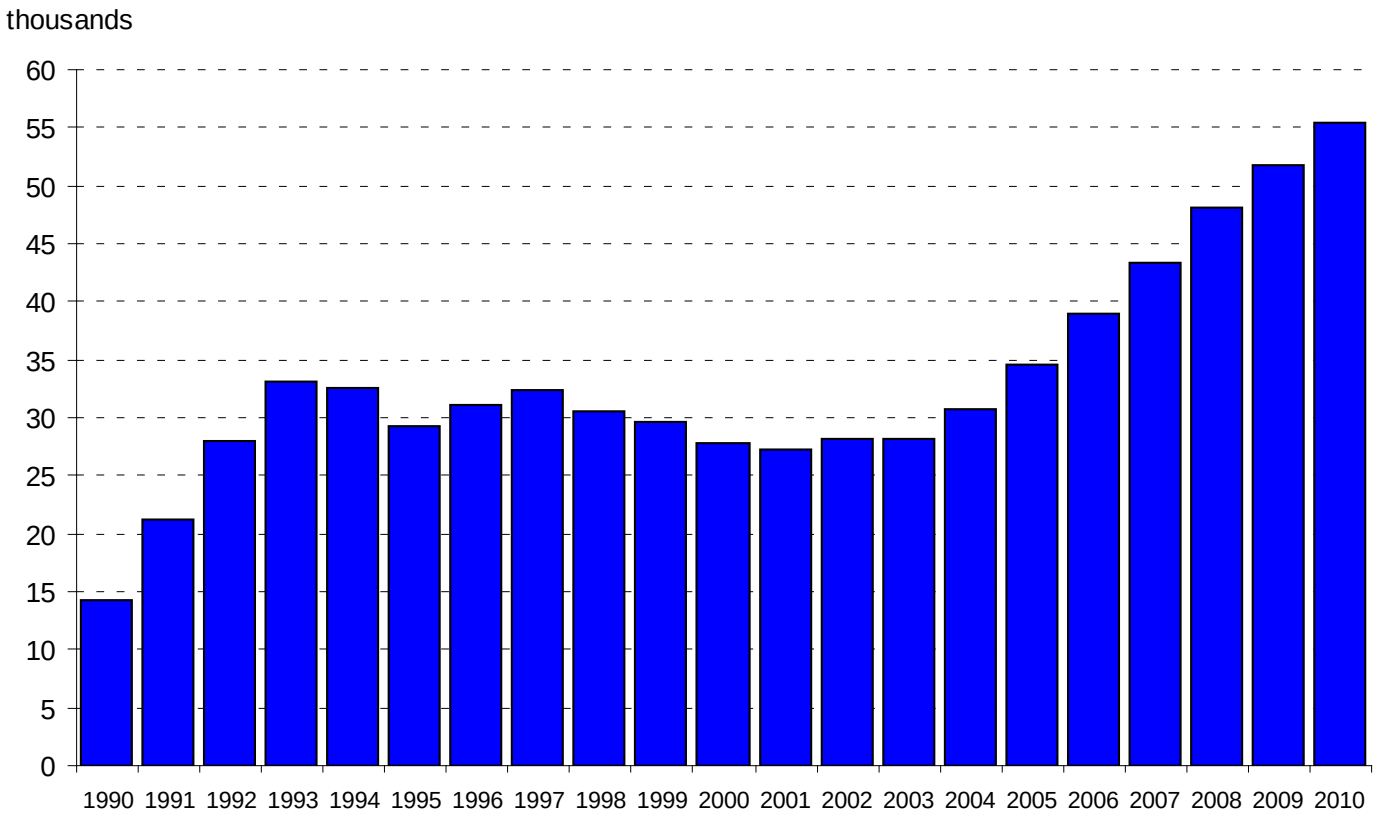
TIETOPALVELUKESKUS

Suckler cows in Finland 1990 – 2010



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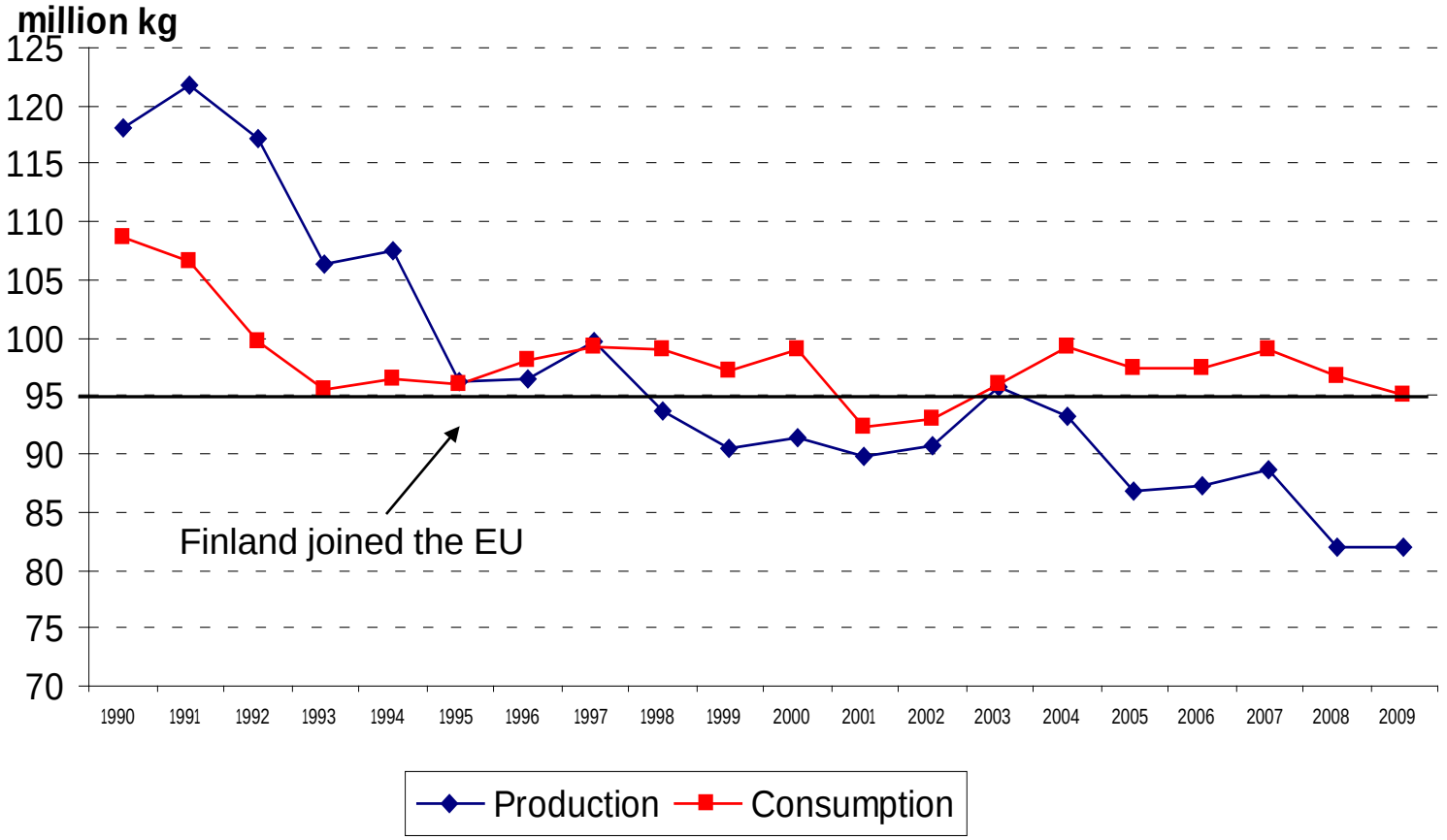
Beef meat production and consumption in Finland 1990-2009



- Degree of domestic origin **84%**
- Import **14 million kg**

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Meat production in Finland 2009

	Million kg
Pork	206
Poultry meat	95
Beef	82
Mutton and lamb	1
TOTAL	**384**

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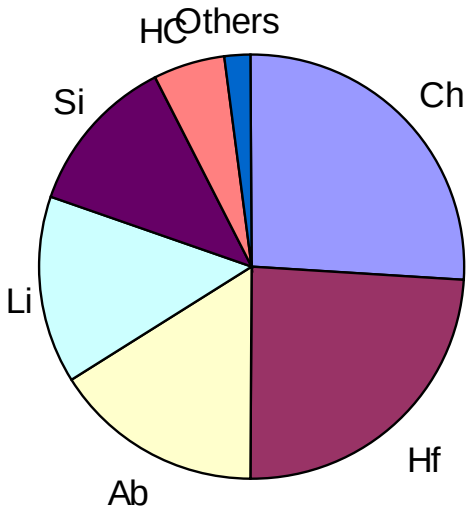
* Approximately 13% of Finnish beef meat originates from beef breeds.

Beef breeds and beef cattle recording in Finland

- **11 beef breeds:**
  - Charolais, Hereford, Limousin, Aberdeen Angus, Simmental, Highland Cattle
  - Blonde d'Aquitaine, Galloway, Dexter, Piemontese, Texas Longhorn
- **2009:** 10 446 recorded suckler cows



Typical for suckler cow production in Finland

- No permanent pastures
  - 2009: totally 640 400 ha for grass production of which 78 700 for grazing
- Short grazing period, maximum 4 months
- Long indoor/winter feeding period
  - Need to preserve feeds (grass/whole-crop silages, straw, hay)
  - Need for winter housing facilities (insulated or uninsulated)
- Small herds (average 1.5.2010: 24 cows/herd)
  - Number of cows per herd increasing
- Suckler cow production increasing: Dairy cows → Suckler cows

Animal health in Finland

- Officially free (EU 64/432)
  - Bovine tuberculosis (*Mycobacterium tuberculosis complex*, last observed 1982)
  - Enzootic bovine leucosis EBL (virus)
  - Bovine brucellosis (last observed 1960)

- BVD (Bovine Viral Diarrhoea) eradicated 2008 ??
- Target prevalence under 1% in official Salmonella control programme (pigs and cattle) in slaughterhouses
- For cattle no routine vaccination
- **Animal health in Finnish beef herds is good**

Feeds, feeding and housing

Winter feeding strategies for suckler cows

in cold climatic conditions (2007)

- **6 articles** (8 experiments)
- **418 spring-calving cows**:
  - Hf*Ay, Li*Ay, Ch*Ay, Ab*Ay, Hf, Hf-cross
    - 64 1st calving
    - 127 2nd calving
    - 227 mature

Main subjects of interest in Experiments I - VI

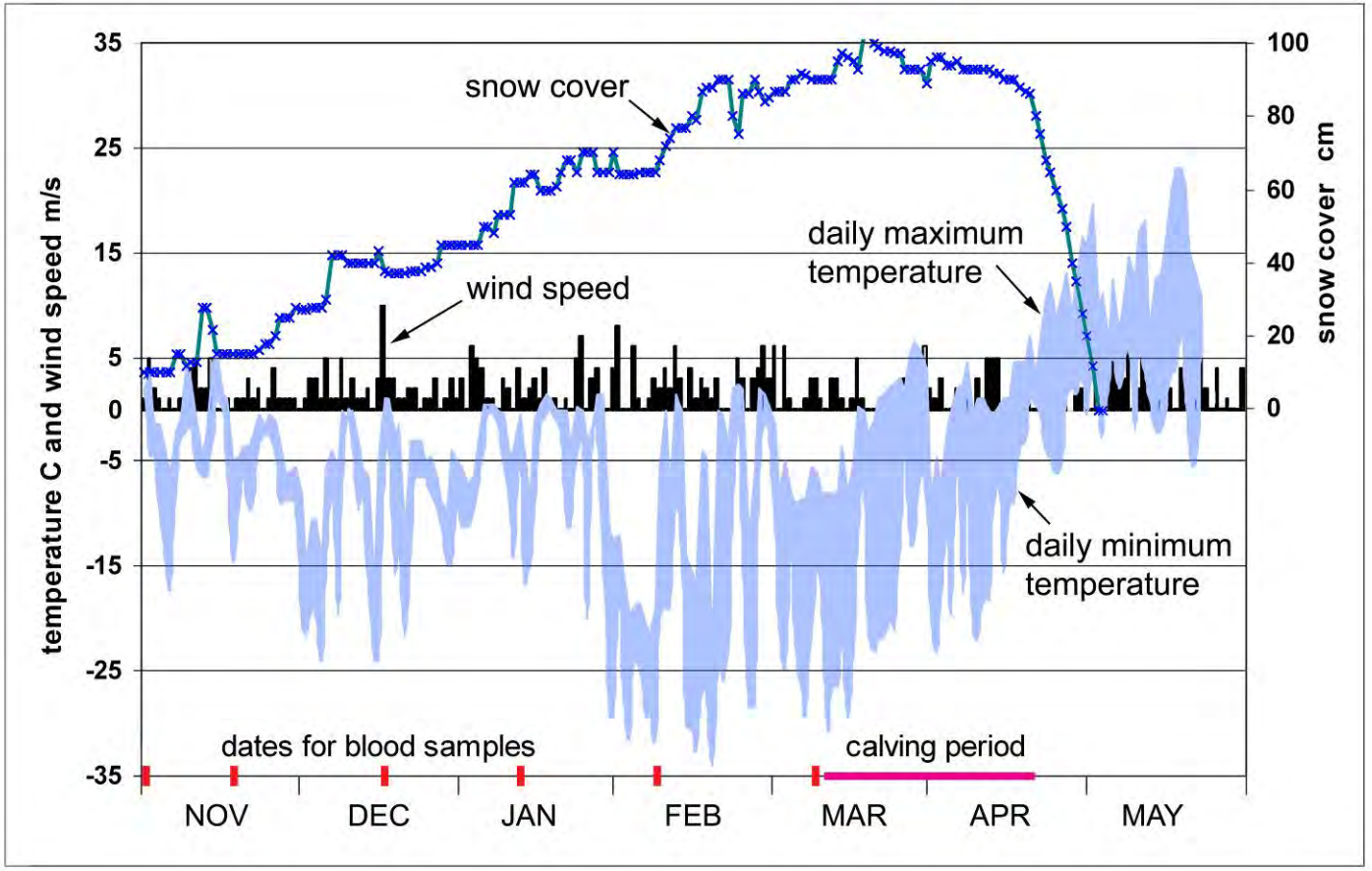
I	**Feeding level** (Moderate vs. Low) and **Diet** (Urea-treted straw vs. hay)
II	**Feeding strategy** (Accuracy; Daily/14 days variation of ±40%) and **Breed** (AbAy vs. ChAy)
III	**Feeding strategy** (Step-up vs. flat-rate) and **Diet** (Alternative feeds)
IV	**Diet** (Whole-crop silages)
V	**Feeding strategy** (Daily vs. every third day feeding)
VI	**Feeding level** and **Winter housing**

MTT Agrifood Research Finland
Suckler Cow Research Station
Tohmajärvi, North Karelia

Temperatures (°C, Average; Average minimum and maximum; Ground minimum) during the experimental years 1989-2004 in the Tohmajärvi zone.

Month	Average	Min.	Average Max.	Ground min. at 10 cm Min.
January	**-8.5**	-16.1	-3.8	**-42.9**
February	**-7.9**	-16.9	-0.2	**-42.6**
March	**-3.5**	-9.2	0.5	**-33.6**
April	**2.1**	-1.1	5.5	**-27.1**
May	**8.4**	5.4	11.1	**-16.6**
June	**13.9**	10.7	18.3	**-5.1**
July	**16.4**	13.8	19.5	**-2.0**
August	**13.9**	12.5	15.2	**-3.7**
September	**8.7**	4.2	11.3	**-11.4**
October	**3.1**	-2.0	6.2	**-20.8**
November	**-3.6**	-7.8	1.6	**-33.6**
December	**-6.8**	-14.3	-1.7	**-38.5**

Minimum and maximum temperatures, snow depth and wind speed during the winter 1997 – 1998



Manninen et al. 2008. *Livestock Science* 115: 179-194.

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Photos:

Perttu Virkajärvi


Kuva: Henrik Sarin


Kuva: Henrik Sarin

Feeds in Experiments I - VI

Exp.	Hay	Grass silage	Whole-crop barley / oat silage	Straw	Urea-treated straw	Barley / Oats	Rape-seed meal	Flour-mill by-product
I	x			x	x	x	x	
II	x	x		x		x		
III		x	x	x		x		x
IV		x	x					
V	x	x						
VI			x			x		

Additionally: Mineral and vitamin mixtures

Feeds in Experiments I - VI

	Hay *	Grass silage *	Whole-crop barley silage	Whole-crop oat silage
DM, g/kg	857 – 867	214 – 322	299 – 353	311
ME, MJ/kg DM	9.0 - 9.8	9.9 – 11.5	10.0 - 10.7	9.5
CP, g/kg DM	82 - 115	116 – 192	101 - 119	92

* Hay and grass silage: meadow fescue-timothy grasses

Results

- Whole-crop silages, treated straw and flour-mill by-product can partly replace hay and grass silage in the winter diet.
- Roughages with **high or moderate digestibility**, if offered *ad libitum* to suckler cows, may be uneconomical and environmentally undesirable since
  - The cows consume excessive quantities leading to unnecessarily high body condition and waste of energy.
- Feeds with **low DM content** may freeze in cold winter housing conditions if offered *ad libitum* to the cows.
  - This may be a minor problem in suckler cow feeding with a restricted feeding scheme.

Feeding strategies

Level, accuracy, frequency, flat-rate feeding

Photos: Mika Peltonen

Dystocial cases

- Only a few severe calving difficulties were observed, mainly related to
  - Age of the cow
  - Sex, birth weight or disposition of the calf
- Not to the experimental treatments.

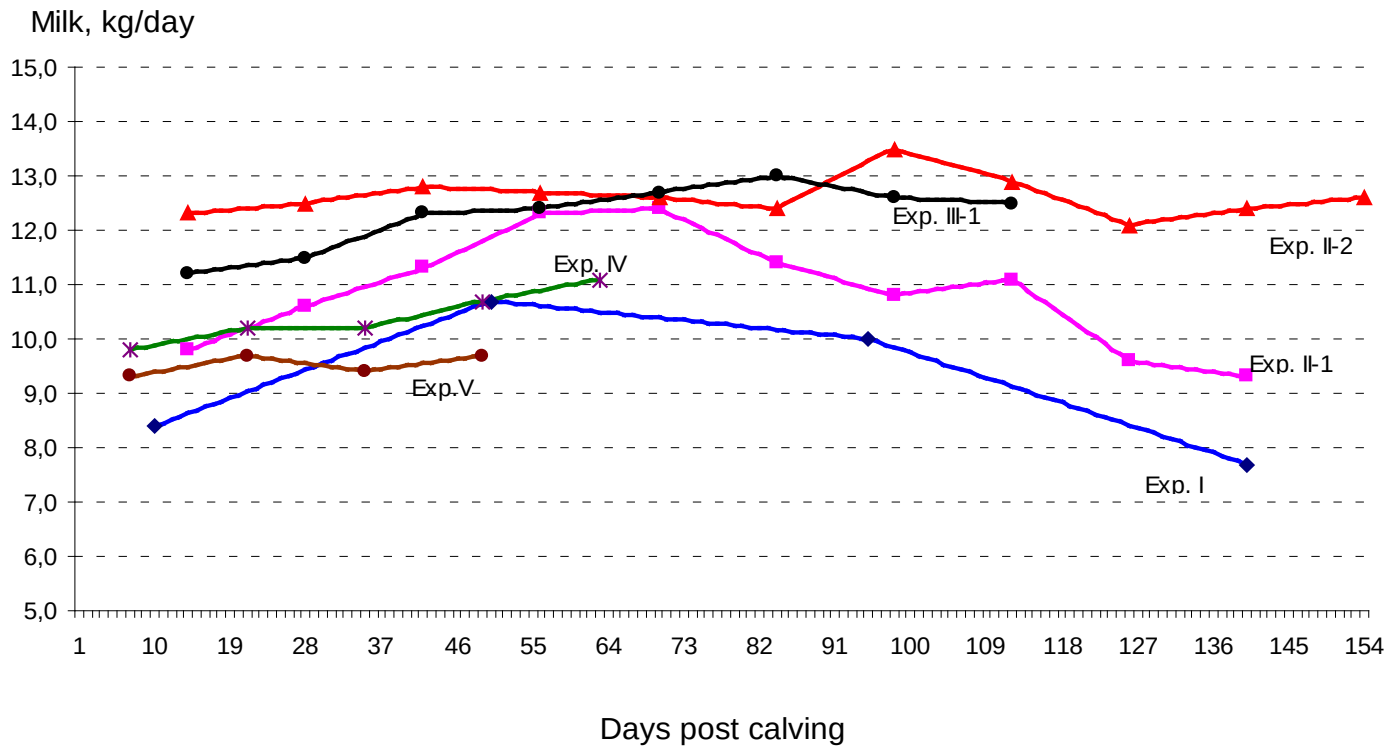
The winter feeding strategies did not increase the incidence of dystocial cases.

Exp.	Cow breed	Sire breed	Calvings	Easy	Slight assistance	Difficult / Very difficult
I	HfAy, LiAy	Ch	63	**82.5**	15.9	1.6
II-1	AbAy, ChAy	Ab	63	**33.3**	**50.8**	15.9
II-2	AbAy, ChAy	Hf	64	**84.4**	12.5	3.1
III-1	AbAy, ChAy	Li	56	**82.1**	14.3	3.6
III-2	Hf	Hf	56	**94.6**	3.6	
IV	Hf	Hf	48	**95.8**	2.1	2.1
V	Hf	Hf	32	**100.0**		
VI	Hf	Hf	35	**94.2**	2.9	2.9

Milk production

- Calf suckling / machine-milking techniques.
- The cows received at least moderate amounts of energy and were in good body condition at parturition with no need to use their own body reserves for milk production.

Winter feeding strategies had minor effects on milk production and milk composition



Calf performance

- Calf LWG was good
  - the cow milk production was sufficient
  - the pastures were good
- The calf LWG was mostly affected by calf sex.
- The opportunities to affect the calf LWG prior to the grazing period via the winter feeding strategy are rather marginal
  - if the energy requirements of the cows are satisfied.

Winter feeding strategies had minor effects on calf performance

Exp.	Cow breed	Calving	Sire breed	Birth weight, kg	Live weight gain, Birth → weaning, g/day
I	HfAy, LiAy	2nd	Ch	41.9	1282-1368
II-1	AbAy, ChAy	1st	Ab	39.2	1184-1418
II-2	AbAy, ChAy	2nd	Hf	46.2	1262-1528
III-1	AbAy, ChAy	Mature	Li	46.9	1301
III-2	Hf	Mature	Hf	44.4	1138-1472
IV	Hf	Mature	Hf	44.2	1357
V	Hf	Mature	Hf	40.2	1255
VI	Hf	Mature	Hf	43.3	1251

Pregnancy

- Unaffected by the winter feeding strategies.
  - The good body condition of the cows at the onset of the mating period.
  - The good pastures available for the cows to increase body condition simultaneously with rather high milk production
  - The use of fertile bulls.

Pregnancy rate was unaffected by the winter feeding strategies

Exp.	Cows entering mating	Pregnancy rate,%	Mating period	BCS at the onset of grazing	Calving to conception, days
I	63	**69**	32	Nm*	Na*
II-1	63	**100**	97	2.5	61-68
II-2	62	**98**	85	2.5	89
III-1	54	**98**	81	2.3	75
III-2	50	**98**	96	3.2	76
IV	42	**100**	90	2.9-3.4	89
V	31	**100**	97	3.1	78
VI	33	**91**	82	2.7-3.2	101

* Nm, not measured; Na, not available

Mean daily intake of dry matter (DM), metabolizable energy (ME) and diet crude protein content (DPC) in Experiments I-VI.

Exp.	Breed	Calving	DM, kg	ME, MJ	DPC CP g/kg DM
I	HfAy, LiAy	2	6.7-9.1	**54-77**	Na
II-1	AbAy, ChAy	1	6.7-7.6	**73-82**	127-128
II-2	AbAy, ChAy	2	8.4-9.4	**87-95**	98-103
III-1	AbAy, ChAy	M	9.2-9.6	**77-97**	90-97
III-2	Hf	M	8.9	**87-99**	116-145
IV	Hf	M	9.2-10.5	**97-109**	91-189
V	Hf	M	9.5	**93-94**	115
VI	Hf	M	9.2-12.6	**101-134**	99-107

M, Mature.
Na, Not available.

Cow live weight (LW), body condition score (BCS) and ME intake (MJ ME/kg$^{0.75}$) in Experiments I-VI.

Exp.	Breed	Calving	LW, kg			BCS			
			Initial	Pre grazing	Post grazing	Initial	Pre grazing	Post grazing	ME MJ/ kg$^{0.75}$
I	HfAy, LiAy	2	493	440-505	543	.	.	.	**0.53-0.73**
II-1	AbAy, ChAy	1	423-451	456-516	512-562	**2.8-3.1**	**2.5**	**2.7**	**0.75-0.80**
II-2	AbAy, ChAy	2	504-552	480-560	532-594	**3.0**	**2.5**	**2.6**	**0.80-0.86**
III-1	AbAy, ChAy	M	567	552	608	**2.6**	**2.3**	**2.5**	**0.67-0.84**
III-2	Hf	M	692	682	760	**3.3**	**3.2**	**3.3**	**0.65-0.74**
IV	Hf	M	741	714	811	**3.2**	**2.9-3.4**	**3.8**	**0.70-0.77**
V	Hf	M	787	724	788	**3.3**	**3.1**	**3.6**	**0.65**
VI	Hf	M	670	688	733	**2.9**	**2.7-3.2**	**2.9-3.2**	**0.76-1.00**

M, Mature.

Winter feeding strategies (1)

- The amount of energy offered to the cows during winter can be decreased, thus allowing the cows to lose LW and body condition
  - if the losses can be replenished at pasture.
- Accurate feeding daily is not needed providing
  - that the total amount of energy offered, over a period of a few weeks, is adequate to fulfil the energy requirements of suckler cows.

Winter feeding strategies (2)

- Feeding every third day is acceptable for mature suckler cows.
  - However, the cows must receive enough energy determined per day for maintenance, pregnancy and milk production.
- The flat-rate feeding strategy can be practised as a simple way of managing the nutrition of mature suckler cows.
  - The precise date of calving is often unknown and the duration of calving period may vary largely.

Grazing at Tohmajärvi Research Station

Photo: Reetta Palva

Grazing at Tohmajärvi Research Station

- Mainly 120 days.
- Sown peatland pastures
  - Continuously (I) and rotationally (II-VI) grazed
  - Timothy and meadow fescue with a small proportion of red clover
- N fertilization 160-190 kg/ha/year divided into 2-3 applications.
- The grass growth was rapid during the first two to three weeks of the grazing season.
  - The surplus pasture areas were cut for silage in mid-June.
- Stocking rate: 2.0 and 1.7 livestock units/ha in the early and in the late season.
- The post-grazing sward heights were 11-12 cm.

Housing at Tohmajärvi Research Station

Housing

- All facilities offered adequate shelter for the cows and calves.
- The feeding strategies introduced to the cows are well suited to conditions similar to those in the present study.
- Production in cold conditions requires
  - shelter against rain and wind
  - a dry resting place
  - adequate amounts of feed suitable for cold conditions
  - water
- All winter housing facilities should
  - prevent the animals from becoming wet and dirty
  - ensure a safe feeding place for each cow.

Animal health in Experiments I - VI

Photo: Perttu Virkajärvi

- The health of the cows and calves was good
  - No clinical symptoms were observed, suggesting no negative effects of the feeding strategies or cold conditions.
- The calf losses were not related to the treatments or cold conditions.

Old winter housing facilities

New winter housing facilities

In the future:
Challenges in suckler cow production

- Profitability – subsidies
- Increasing farm / herd size
  - need for new management practices
- Animal welfare (generally good in beef cow herds)
- Ecological sustainability (carbon footprint)
- Advice services for new producers
  - no earlier experience with beef cattle or experience with dairy cattle

Thank you for your attention !