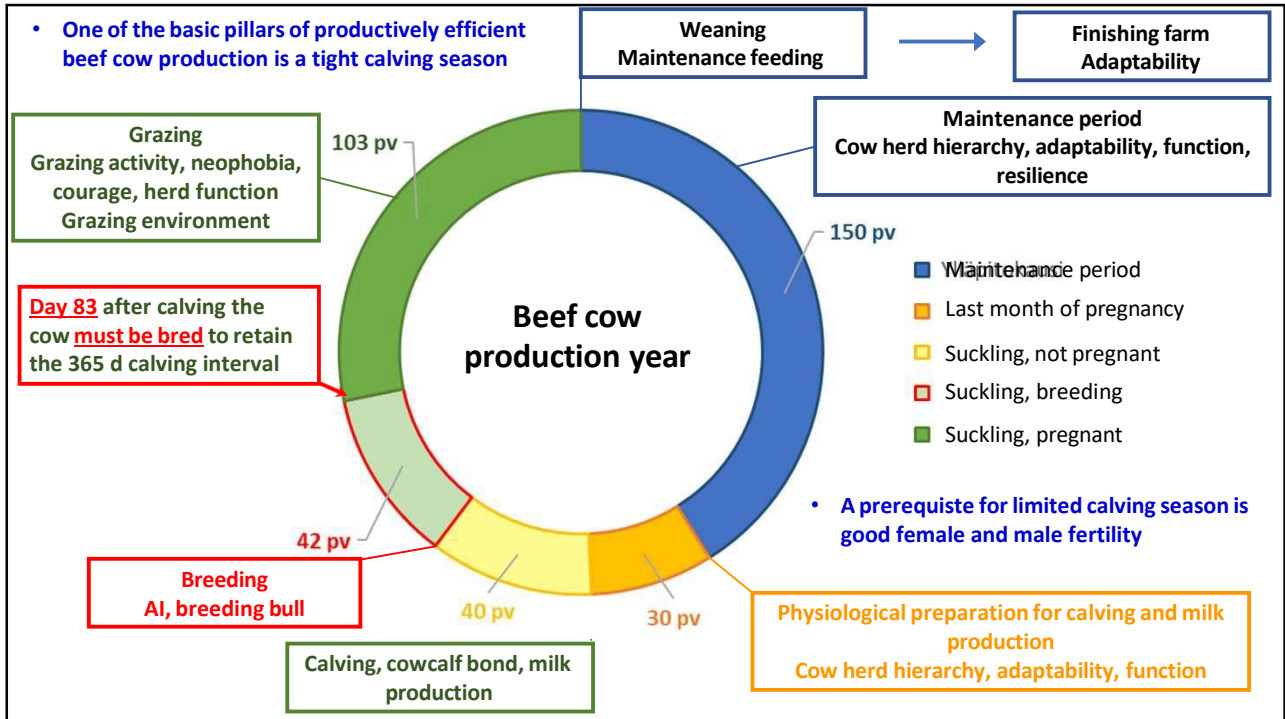




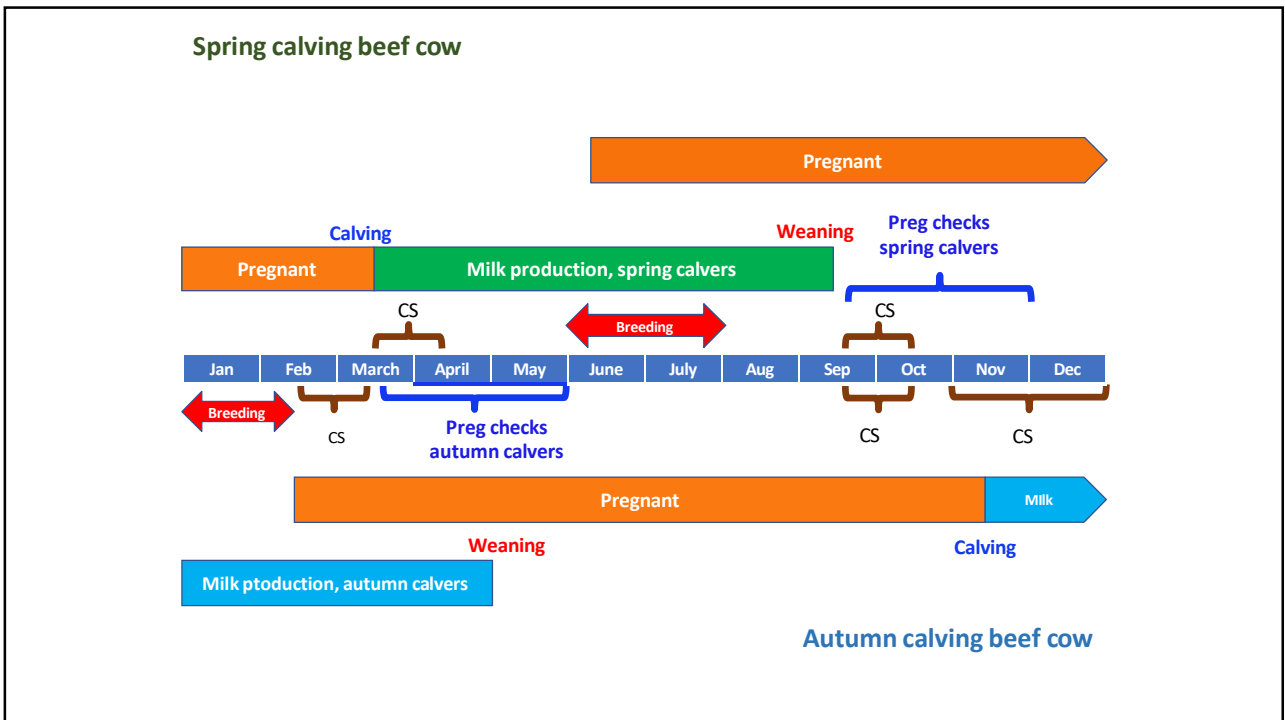
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Issues affecting productivity in beef production		
Trait	Positive effect	Negative effect
Low birth weight	Easier calving, less losses/mortality	Can lose growth potential, will decrease mature size
High fertility – female & male	Shorter calving season, more even weaning group, higher income from the calf group	The proportion of "teenage pregnancies" may increase
Moderate cow mature size, "a cow should look like a cow"	Improves input/output ratio	Can lose growth potential, muscle conformation
High growth	Target weights are reached in less time, over all feed amount is decreased, environmental impact is lower	Mature size can increase considerably
Good feed efficiency	Less consumed feeds, lower overall feed costs	Can lose fertility
Forage efficient animal type	Cost of feed expenses decrease as the amount of purchased feeds is lower	If the selection is done by choosing smaller mature size animals, growth potential can be lost
A) Thought targets		Maternal traits, carcass traits, own herd breeding goals
B) Preventive animal health care: Health certificates, pregnancy checks		Reduction of veterinary costs, lower mortality, less need for medication

2



3



4

Fertility, calving interval and lifetime productivity



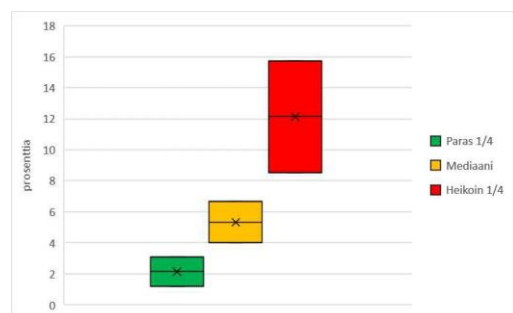
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- The production of a beef cow is an annual calf from every bred cow
 - **Calf yield target at weaning time should be >98%** (Herring 2014)
 - In Finland the average calving rate is 85,7% (breed variation 73-96%) (Jämsä 2020)
- **Beef cow lifetime productivity target should be at least 9 good quality calves** (Greenwood 2017). In Finland the average beef cow produces 4,5 calves (Jämsä 2020)
 - Lifetime total production weaned calf kilogrammes > 2700 kg
- **Profitable beef cow calving interval is 365 days**
 - In Finland the beef cow calve on average in 388 days calving interval (364-400 d) (Jämsä 2020)
- **Calving period < 90 days**
 - First 21 days **65-75% calves** should be born
 - Next 21 days **at least 90-95 %**. In total 20-25 % of the whole calf crop
 - **Last 21 day period remaining 5-10 % calves**
- **Successful animal selection, breeding choices and feeding affects the fertility of the cows**
- **Breeding bull input is significant**
 - **Breeding bull in the cow herd = duration of calving season**
- Considering the **calving interval** as a production trait shortens the over all the **calving period = if used for selection will make the weaned calf group more uniform by age and result in a higher calf income**
- Improving fertility traits and shortening the calving interval makes production more efficient which improves profitability and reduces the environmentl impact of the production

5

Herd vitality – targeted production, clarify losses

- Every single animal lost or prematurely removed increases the losses on the farm
- In beef cow production the aim should be that **at least 95 % of farm's cattle will reach the planned target** (Herring 2014)
- **The annual calf yield** = the amount of weaned calf should always be **compared to all beef cows which are in the herd and are over 24 months of age**
 - Good target is that calf crop is at least 98 % of the preg checked females (Phillips 2019)
- **In Finland the average calf mortality of under 6 month age calves is 6,2 %** (Jämsä 2020)
 - In first calvings 8,9 % of the calves are lost
 - In older cows the calf mortality is in average 5,5 %
- **Production environment, management, feeding and animal selection affect the level of production losses** (Herring 2014, Muliniks & Beard 2019)
- **Losses increase the workload, decreases profitability and increases environmental load**
- **Try to prevent calf mortality = Monitor calvinings, animal selection**
 - **The goal is to produce long-lived, easy-calving, resilient beef cows**



Beef calf mortality in the Finnish production study 1999-2019 (Jämsä 2020)

Production effect in 100 beef cow herd/year

	Best 25%	Median	Worst 25 %
Mortality	3,4	5,33	12,14
Losses in calf income, e/year	2210	3464,5	7891

6

Calf morbidity increases if (Phillips 2010, Stokka 2010):			
<p>1) Delay in colostrum intake. Failure of passive immunity</p> <ul style="list-style-type: none"> • Dam's low CS • Weak udder quality/structure • High production potential dams in challenging production environment • Calving difficulty • Poor maternal traits • Stress on the dam in late pregnancy 	<p>2) Mixing cowcalf pair groups with in the herd</p> <ul style="list-style-type: none"> • Long calving season produces calves of different ages • Calf group age deviation should not exceed over 60 days 	<p>3) Extreme environmental temperatures and humidity</p> <ul style="list-style-type: none"> • Heat • Cold • Snow • Freezing rain 	<p>4) Feeding failure, feeding changes</p> <ul style="list-style-type: none"> • Lack of energy or protein • Unanalyzed feeds • Supplementary feeding • Lush pasture • Drought • Spoiled feed • Feed containing harmful plants
<p>5) Mineral & vitamin deficiencies</p> <ul style="list-style-type: none"> • Copper • Zink • Selenium • ADE-vitamins 	<p>6) Infectious diseases</p> <ul style="list-style-type: none"> • Viruses • Bacteria • Mycoplasma bovis 	<p>7) Other problems</p> <ul style="list-style-type: none"> • Handling stress • Pain • Insufficient workforce • Lack of bedding • Failure of bedding • Hereditary diseases 	<p>✓ The risk factors of calves getting sick in different stages of growth can be reduced by foresight and good production conditions</p>

Luke ©LUONNONVARAKESKUS

7



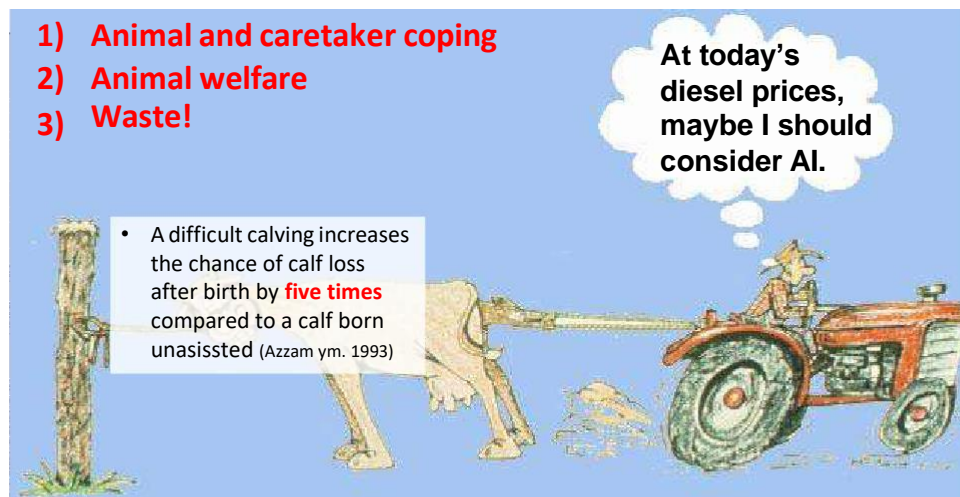
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One calf – from every cow – every year – at the same time

- On of the most important factors in the succes of beef cow farm is a vigorous calf
 - Every bred female should have a calf, every year
- **Goals for calving for each beef cow and the herd:**
 - 1) **A 365 day calving interval**
 - 2) **Limeted < 90 day calving season**
 - The calf group can be reared as same age group eg. Feeding (replacement heifers, slaughter cattle)
 - Beef cow feeding is more precise
 - Morbidity is less
 - 3) **Bred beef cows and heifers >95 % pregnant (limited breeding season)**
 - If there are < 85% pregnant from the bred females the reasons should investigated immediately
- Reproductive efficiency traits include **conception rate, age at first calving, calving ease, calving interval** and **production age = stayability**
- Reproductive efficiency is paramount for profitable beef cow production and environmentally acceptable production
- Indirectly female reproductive efficiency can be maintained by selecting replacement heifers from most fertile dams of the herd (the dams which calve regularly first in the calving season) and breeding bulls with large testicular circumference

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Calving ease is one of the essential factors



- The most expensive animal in the herd is the heifer that failed in first calving or did not get pregnant after the first calf – and had to be culled
- Difficult calving reduces the ability to get pregmat by 20-35 % for the subsequent breeding opportunity (Glaze ym. 2011)

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General about udder- and teat conformation



- **Udder conformation is one of the most important structural traits of a beef cow**
- Udder and teat conformation affect the profitability and productivity of beef cows (Kersey DeNise ym. 1987, Herring 2014)
 - The calf's ability to suck, especially the first days
 - Colostrum intake
 - Milk flow and the amount of milk in the later lactation period
 - Beef cow's longevity and appearance
 - The labour intensity of the production
- **Weak udder and teat conformation increases the beef cow's risk to mastitis, increases the susceptibility to injury, increases cullings and reduces lifetime productivity** (Riley ym. 2001, Herring 2014)
- The size of the udder is not directly related to the amount of milk the cow can produce
- However in breeding selection it might be good to avoid selecting very small udder and teats
 - Selecting extremes can bring unpleasant surprises to functionality and milk production (Frisch 1982, Riley ym. 2001, Herring 2014)

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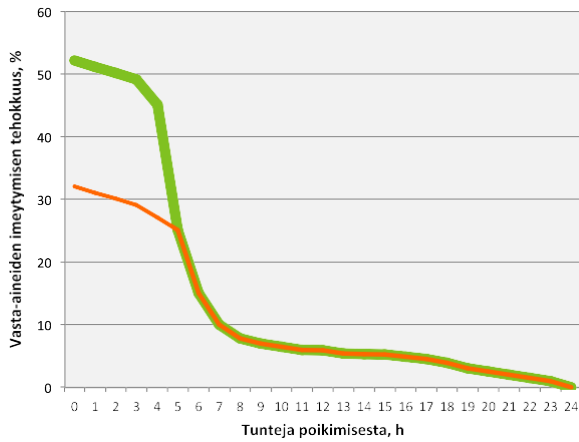


- Colostrum contains all the nutrients a newborn calf needs in a concentrated package
 - **The goal should be that the calf receives colostrum from a clean udder as soon as possible after the birth**
- Dam's body forms antibodies to the environment which the cow's own production environment
 - The best colostrum for a calf is its own mother's colostrum
 - Colostrum from another cow on your own farm
- Be prepared: have colostrum in the freezer
- Colostrum from another farm can be a source for unwanted diseases
- Antibodies are transferred to colostrum about **2-3 weeks** before calving
 - The antibody levels can vary (dam's health, age, feeding, CS, breed)
- Six layers in the placenta
 - The antibodies are not transferred to the calf during the pregnancy
- **The calf must get the antibodies from the colostrum**
 - **Absorption of antibodies from the calf's intestine decreases significantly 6 h after birth**

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Timely, enough and good quality colostrum



- ✓ Even in the best case, only part of the antibodies are absorbed
- ✓ Absorption decreases significantly after 6 h = not enough antibodies, the immunity decreases, morbidity increases

French recommendation (Mille 2017):

- 1,5-2 l colostrum with in two hours from calving
- Another 2 l should be drunk with in 6-8 h after calving
- The aim is to get the calf to suck the colostrum by itself

- The amount of antibodies varies (young dam, feeding etc.)
- **CS!**
- **Udder conformation & teat size!**
- Adequate observation = calf should be seen sucking
- Clarifying repeated problem cases (the same cow having "a bad calf")
- Refractometer

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Good quality colostrum BRIX > 22 %

Brix-lukema	IgG mg/ml	Ternimaidon laatu	Kuiva-aine pitoisuus %
10	0	Keltainen	9,5
11	0		10,6
12	0		11,7
13	0		12,8
14	0		13,9
15	0		15
16	0		16
17	0		17
18	0		18
19	12		19
20	24	Keltainen	20,1
21	35		21,2
22	47		22,3
23	58		23,4
24	70		24,5
25	82		25,6
26	93		26,7
27	105		27,8
28	116		28,9
29	128		30
30	139	Vihreä	31
Brix-lukema	IgG mg/ml		Ternimaidon laatu

Finnlacto Oy www.finnlacto.fi info@finnlacto.fi

- Kelvontaa ternimaitoa
- Käytä tilapäisesti
- Kohtuullista ternimaitoa
- Hyvää ternimaitoa
- Erinomaista ternimaitoa

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Colostrum 10-15 % from bodyweight

- **40 kg calf 4-6 l**
 - First 2 h = 2 l
 - Next 4 h = + 2 l
 - 24 h = total at least 6 l



Kuva: Johanna Jahkola

Goal = 200 g/l IgG < 6h

- Good quality colostrum contains >50 g/l IgG = needed **4 l colostrum**
- Average colostrum contains 40-49 g/l IgG = needed **4,5 l ternimaitoa**
- If the colostrum contains <40 g/l IgG = needed **5-6 l colostrum**

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Cleanliness prevents many possible future health challenges



- The calf can look for the teat in very wrong places to the point of frustration
- At this point, anything can get into calf's mouth



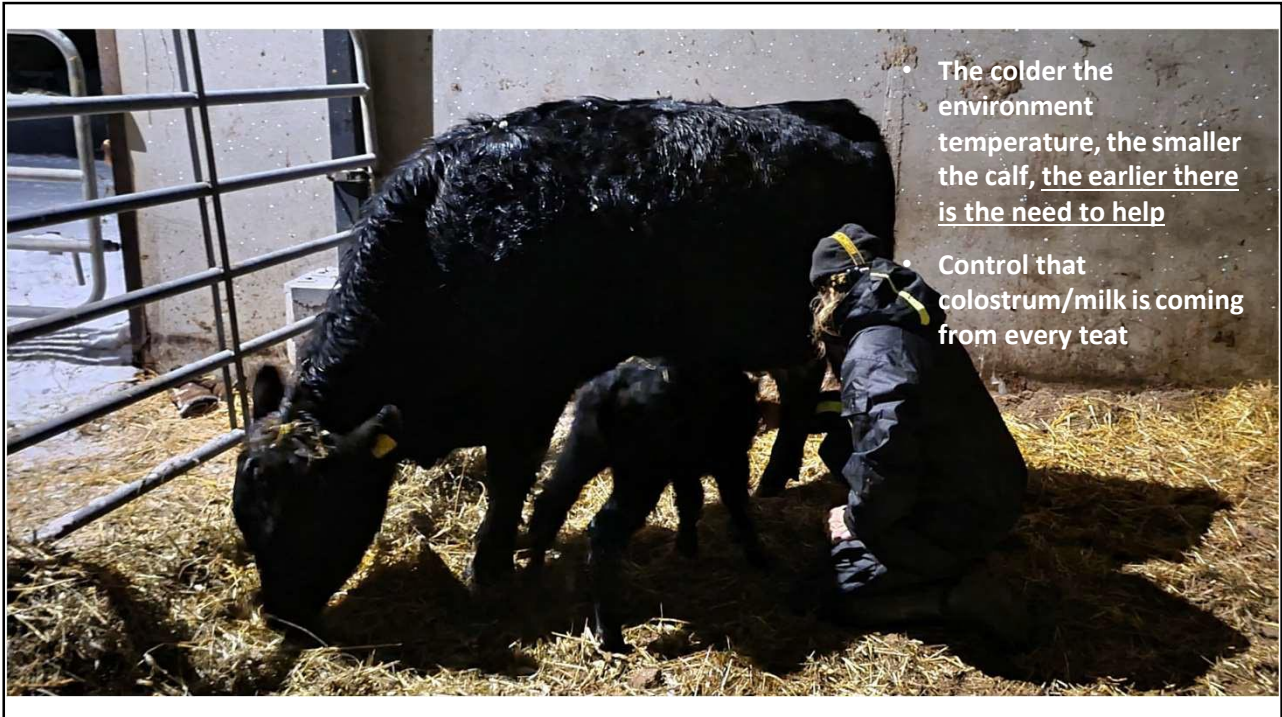
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2-4 h

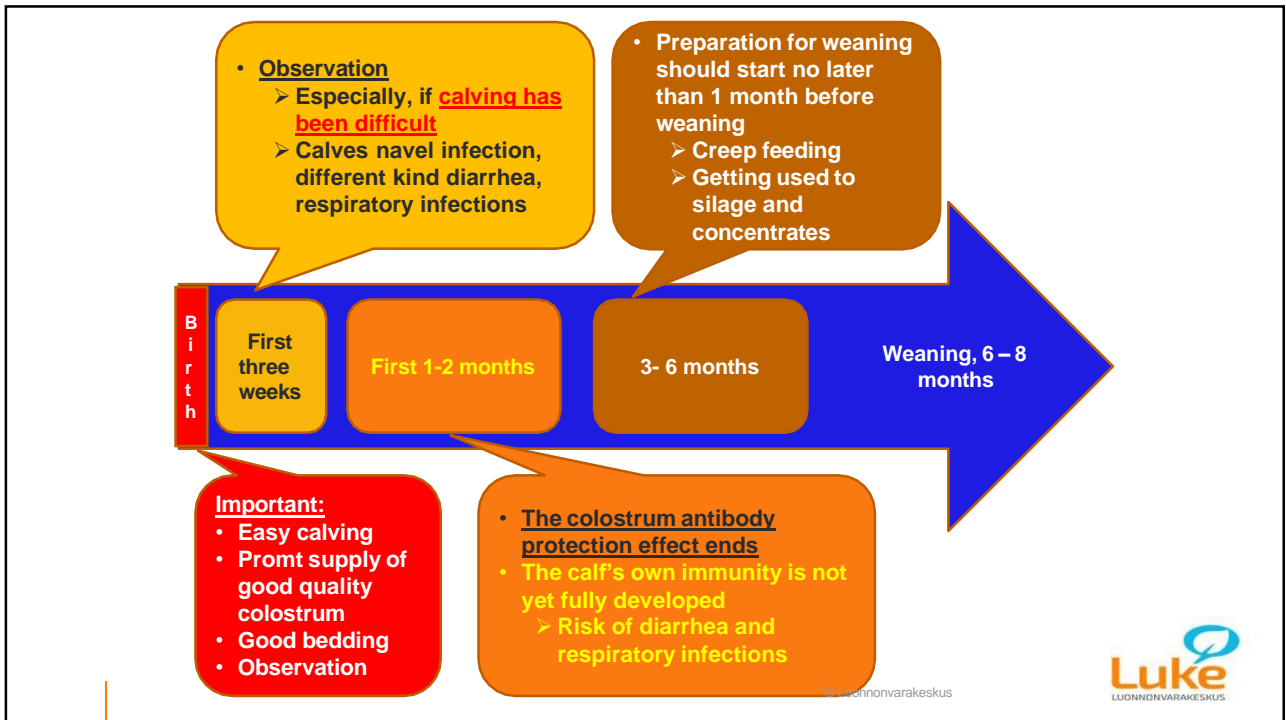


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- The colder the environment temperature, the smaller the calf, the earlier there is the need to help
- Control that colostrum/milk is coming from every teat

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Cow calf – select carefully

- The basis of beef cow herd female selection should be based on systematic thought idea for uniform and functional cow type
- The first step is to try to select the right/best cow calves that will become next generation beef cows
- **Identify the cows in your herd that are best suited to your production environment:**
 - Those that calve first and regularly = calving interval 365 d
 - Those whose calf is vigorous and grow well
 - Those that keep their CS year after year + have slick hair first in the spring
 - Those with impeccable udder structure
 - Those whose production age is higher than the herd average
 - **When selecting future dams replacement heifers focus on above cows on your herd**
 - **Breed these cows with a bull which you want to be your future dam sire**
- Choose cow calves from the beginning of the calving season
- The cow calf's live weight should be **in the highest 20 %** of the herd at weaning (avoid choosing cow calves with low weaning weight as replacement heifers) – the cow calf's live weight should **be 40 % that of mature weight at weaning**
- **Pay attention to feeding, growth, health and handling of the replacement cow calf during the first indoor feeding season**
 1. **Feeding** – based on good quality forage, the heifer should reach the growth target with roughage-based feeding
 2. **Growth** - based on the weaning weight, set a growth goal for the breeding age and follow the growth with weighing
 3. **Health** – take care of the health of the animals, good bedding, consult a veterinarian whenever necessary and always with health certificates for purchased animals
 4. **Docility** – already at the weaning pay attention to animals which are easy to handle, it will be easier to work with them in the future

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Replacement heifer – pay special attention to

- **Remember the replacement heifer must grow in sufficient rate to reach sexual maturity (puberty: weight and age related)**
 - Usually this means at least 700 g/d growth
 - Weigh, monitor growth
 - Make any fixes to the feeding ect. in time
- **At 365 day age the heifer should weigh 50-55 % of its mature weight and 15 month age 65 % of its mature weight**
- **Early onset and regularity of oestrus cycles is an important characteristic for the first breeding season to be successful**
 - A heifer that conceives on the first opportunity is most likely to retain the trait in the future as well
 - Before breeding the heifer should have had at least three regular estrus cycles
- **Animals selected as replacement heifers should be critically evaluated before breeding**
 - Do not select underdeveloped heifers for breeding – increases calving difficulties
 - Do not select the nervous ones - decreases possibility to conception, increases the risk of injury
 - Do not select structurally odd ones – reduces durability, stayability
- **Breed the selected heifer in 15 months of age with a calving ease bull**
 - First calving 24 months of age
 - The success of the first calving effortless is very important for the productive age of the animal
- **Pay attention to good forage, mineral feeding and pasture conditions**
 - The heifer must get enough nutrients for further growth
- Remember to condition score at the end of grazing season
- Plan the feeding and nutritional goals based on the live weight and CS
- **Remember that at the end of this rearing/production phase the heifer must calve, take care of her calf, produce milk**

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First calving – do not forget

- **The heifer should calve at 24 months of age**
- **Prevention of calving difficulties is one of the most essential factors in terms of the calf's success and the dam's next pregnancy**
- **When you know when a heifer is bred, you can estimate when the heifer will calve.**
 - **Easier to observe**
- **Valvonta:**
 1. Intervene with possible calving difficulties by assisting in a timely manner or call the veterinarian to clarify the problem
 2. After calving: See that the heifer knows how to take care of the calf
 3. Check that the heifer produces colostrum
 4. Make sure the calf finds the teat and knows how to suck from the right place
- Heifers produce less colostrum and the antibody concentration may be lower than in older cows
 - Pay special attention to calves that have a first-time dam
- **It would be a good practice to have the first-calving heifers in their own feeding group with no other age animals**
 - The heifer must be given enough feed and undisturbed feeding table space so that she is able to eat enough
- Take care of necessary mineral feeding
- **The CS of the first-time-calving heifer should not decrease**
 - The next conception can be significantly delayed if the heifer loses a lot of weight

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Beef cow - maintain

- **Multiparous cow should calve every year, a viable calf at 365 day interval**
- The measure of beef cow fertility, is how well the dam is able to convert the dry matter offered and available into the calf's weaning weight
- **The beef cow's success in production = calf crop is affected by:**
 1. **Balanced intake of nutrients = appropriate feeding**
 - No overfeeding or underfeeding of any nutrient
 - Feed analysis
 - Monitoring and calculating feed consumption
 2. **Regular condition scoring**
 - Beef cows should maintain a fairly even CS
 - High CS, excessive fatness strains the animal
 - Poor, low CS has a negative effect on fertility, conception, calf and milk production
 3. **Good working relationship with the veterinarian**
 - Pregnancy checks!
 - Prevention of all health problems
 4. **Maintenance of calving ease**
 - Thoughtful animal selection
 - Knowing the calving characteristics of your own herd
 5. **Moderate milk production**
 - Beef cows' abundant milk production increases the maintenance energy need and the feed inputs
 6. **The right breed type cow to a right production environment**
 - A breed type that is well suited to the chosen production environment can facilitate the production and lower the costs

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Breeding bull – observe!

- The breeding bull's activity and willing to breed affects the age distribution, evenness of the calf group, and in extreme cases the total calf yield in the next year
- **The breeding bull must be able to effectively breed the females of the breeding group to their first heat**
 - By the first heat (21 d) at least 65 % of the breeding group should be pregnant
- **The size of the breeding group should be sized according to the breeding bull's age and breeding willingness**
 - For young bulls (first breeding season) the size of the breeding group must not be larger than the bull's age in months
 - An older bull can effectively breed a group of 35-40 females
 - As the group size increases, the calving season becomes longer (not desirable)
- **The bull may have reduced fertility or the bull may be infertile**
 - A young bull's semen production may be less or the semen production is delayed (the bull is physiologically too young)
 - An older bull may have lost the ability to produce semen during the maintenance period
 - The bull can be injured during the breeding season (feet, back, penis)
- **Observe the activity of the breeding bull**
 - Record the cows bred during the first 21 days
 - The next 21 day round should not have more than 2% of the cows which were bred in the first 21 day period
 - If more cows repeat estrus, the reason is, most likely, the bull
 - If a single cow repeats estrus, repeatedly, the reason is the cow's failure = not the bull
- **The losses in calf yield due to a breeding bull must be observed and reported during the breeding season!**
 - At pregnancy checks it is too late and the financial loss is considerable

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Fertility traits – breeding bull and it's dam

1) Group Size

Young bull, age > 15 kk

- **Breeding group size**

max 15 female

- [Limousin- ja blonde-bulls 8-10 beef cows or heifers](#)

- **A bull starting second breeding season or an older**

- **max 35-40** beef cows or heifers

2) Testicular circumference:

- ✓ 15 mn > 30 cm
- ✓ 24 mn > 34 cm

Bulls with larger than average testicles

- Sons have larger testicles
- Daughters reach puberty earlier



3) Bull's dam:

Poikimähistoria

Krt	Poikiminen		Poik.vaik.	Tila	Sp
	Poikimapv	Tapa			
1	26.03.2012	P	ilman apua	elävä vasikka	le
2	07.04.2013	P	ilman apua	elävä vasikka	so
3	15.04.2014	P	ilman apua	elävä vasikka	so
4	04.04.2015	P	ilman apua	elävä vasikka	so
5	06.02.2016	P	ilman apua	elävä vasikka	le
6	12.02.2017	P	ilman apua	elävä vasikka	le
7	14.02.2018	P	ilman apua	elävä vasikka	so
8	16.02.2019	P	ilman apua	elävä vasikka	le
9	25.02.2020	P	ilman apua	elävä vasikka	so
10	10.02.2021	P	ilman apua	elävä vasikka	so
11	25.02.2022	P	ilman apua	elävä vasikka	le

* puhdasrotuinen

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Points to consider


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- **Monitoring – the herdmand’s own eyes**
 - Monitor the behavior – both breeding bull and the cows
 - **Never leave the young bull unattended – you should know how he operates**
 - The first 21 days of the breeding season are the most important (>65 % cows and >80% heifers should be pregnant by the first possible chance of conception)
 - **Take notes!**
 - Attention to the rebreeders! How many, what cow, are there common factors (what factors separate the pregnant from the nonbred? Same breed group? Same agegroup? Same duration and then rebreeding? Same damsire? CS? Breed type? etc.)
- **Genetics** – Favor fertility in the selection of replacement cattle & older cows
 - **As replacement heifers** choose the offspring of dams that calve regularly
 - **As breeding bulls** favor bulls that are sons of cows that have calved over six time at the same time every single year – these are valuable genetics
 - Aim for a herd with a cow set of **uniform** traits and looks
 - **Think, find out, analyses, discuss, what genetics have preformed the best in your production environment**
- **Feeding** – Use the produced feeds in the herd thoughtfully and as intended
 - **Plan the feeding of the replacement heifers to support their future career as a longlasting beef cow**
 - **Note the 10-15% higher nutrient requirement of second calvers**
 - Take into account the milk production increases the energy requirement by at least +30%
 - **Remember mineral feeding**
 - Do the CS and use feeding groups
- **Production environment** – Give thought how things work in your farm
 - **Keep the breeding groups in a reasonable size** (max. 15 dams for young bulls, max. 30 dams for older bulls) – use AI to lessen the load of breeding bulls)
 - Consider the potential challenges in the grazing conditions or winter breeding environment (slippery or uneven ground, too little space, too much area to cover, cold/hot, totally different environment that the bull is used to etc.)
 - **Take the bull out of the cow herd after the planned breeding season** = the calving season is as long as the breeding season
 - Do the **preg checks ALWAYS** after the breeding season. Cull the females that are not pregnant!

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Key numbers that should be monitored from the herd – aim higher calf corp

- Target condition score 3
 - If over 10 % of the herd are under 2,5 or over 4, the feeding should be checked
- Heifer calving age 24 months
- Preg check pregnant cows >95%
- Calving interval 365 days
- Calving period less <90 days
- The first cycle (21 days) 65-70 % of the calves
- The second cycle (42 days) 20-25 % of the calves
- The third cycle (63 days) 5-10 % of the calves
- Calving difficulties (assissted calvings) <10%
- Calf mortality <5%
- Cow mortality <1%
- Calf yield target at weaning time should be >98%
- Calf weaning weigth 300 kg, herd average
- Beef cow lifetime productivity target should be at least 9 good quality calves
- Lifetime total production weaned calf kilogrammes > 2700 kg
- Replacement heifer and beef cow weights
- Used hectares (silage and grazing)

- 
- Excel sheet
 - Whole herd
 - Different animal categories
 - Used hectares for production
 - Baseline
 - Breeding goals
 - Targets
 - Annual follow up
 - Analysis

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