BEEF CATTLE NUTRITION

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Growth

- Biochemical growth is regulated by hormones: the pituitary is the source of the anterior lobe, adrenal glands and testis growth regulator and the hormones that increase muscle formation.
- Growth is associated with a decrease in the amount of water.

- When BW is increased from 150 kg to 580 kg and gained 1000 g BWI per day
- - the amount of water falls from 70% to 55%.
- - the amount of fat increases from 7% to 23%.

  Despite this, the protein in the fresh body composition remains constant at 10% and the mineral content at 4.5%.

BASIC PRINCIPLES OF NUTRITION

- The ability to develop in the genetic structure of the animal is ensured by the provision of optimal nutrients, minerals and additives.
- Modern fattening should be carried out with young and livable animals.
- The composition of the meat should not be in the form of oily meat, but should be rich in protein.
- Early lubrication of animals prevents optimal growth.

Fresh muscle

- Total amount of water in muscles varies between 58-85% (~ 75%) in cattle and 76-83% in calves.
- Total amount of water in muscles; animal species, race, age, fattening status, nutrition and varies according to the way of cultivation.
- Intra and intercellular fat levels are 2.1- 5.6% in cattle and 0.5% in calves.
- CHO, especially glycogen (0.5-3%) and mineral substances (1.0-1.8%) play an important role in the nitrogen-free substances.

Protein, fat and energy level in fresh beef

Animal	BW, kg	Protein, %	Fat, %	Energy, MJ/kg
Calf	50	17	4	5,7
	100	17	5,5	6,3
Jung Bull	200	17	8,5	7,4
	300	17	10,5	8,2
	400	17	13	9,2
	500	16,5	19	11,6
Heifer	300	16	18	10,9
	400	15	25	13,4
Cow	550	15	30	15,5

To increase beef production:

- It can be summarized as increasing the success of calving,
- decreasing calf losses, decreasing early calf cuts (especially females),
- increasing the production of dairy cattle breeds, cutting the livestock after reaching the final weight,
- increasing the weights of the heifers and elderly cattle,
- improving feed preparation and feeding techniques.

- For fattening; by creating hybrids, daily live weight gain (GCAA) can be increased by 10-12% and carcass by 2-3%.
- A certain percentage of female cattle (such as 20%) can be paired with fattening bulls.
- Ration preparation and feeding technique has an important role in beef production.
- Feed costs account for 50-70% of all expenses.

- The economic weight of animals is dependent on race, age and sex.
- The rats of dairy cattle breed have a rapid development and reach high and economic live weight levels (500-550 kg) at 18 months of age.
- The male breeders of meat breeders give higher yields.
- Manned heifers and heifers reach certain live weights later, and their diet may include more roughage.

Short-term average 6 months of intensive beef cattle breeding

- The transfer of capital in a short time is required for earnings. For this reason, male cattle and heifers should be used rather than male cattle.
- Long-term fattening can be considered in the areas where the need for coarse feed can be obtained from the pastures (where the cost falls).
- The presence of roughage problem in our country is known. In order for the food to be more economical, at least roughage and cereals should be provided from the premises.

Fattening

- Fattening is a nutritional program applied to increase the meat yield and quality in animals.
- The purpose of fattening is to give animals a certain live weight gain every day. To the extent that the genetic structure permits, the animals are subjected to a special diet to produce the highest amount of quality meat.

There are two important terms in animal fattening

- The first one is the live weight gain (CAA), which is usually defined as the daily live weight gain (GCAA).
- To calculate this, it is simply divided into fattening time by removing live weight from the end of the fattening weight.

- The second is the rate of feed (YYO) and the amount of feed on the basis of the dry matter consumed per kg of live weight gain.
  - For this purpose, the dry matter of the feed consumed during the fattening is calculated and divided into the fattening period. The value is divided by the GCAA and the YYO is found to be low.
  In young animals, feed efficiency is better.

Fattening Performance

- In fattening, both the live weight gain and the feed utilization rate are called "fattening performance".

FACTORS AFFECTING FAT PERFORMANCE

- The conditions necessary for the breeding to be economically viable are also factors that affect the fattening performance. These factors are;
- The animal race
- Gender
- the origin
- Condition
- care and health
- nutrition

1-THE ANİMAL RACE

- The gain of live weight that can be obtained from a animal is limited mainly by the genetic structure of the animal. This is achieved by maintenance and feeding conditions.
- Cultural sriks and hybrids provide 1200-1600 g live weight gain (CAA) per day, while domestic races provide 800-1000 g.

- The culture breeds and hybrids which are more efficient in fattening studies constitute 65% of the cattle in our country.

- The most common of these races are Holstein (black and white pied), Mantafon (Swiss Brown) and Simental.

- These animals have a genetic structure suitable for 1400-1600 g live weight gain daily.

2- Gender:

- It was determined that male cattle gave better fattening performance than both cattle and cattle.
- This is due to the effect of sex (sexual) hormones on fattening performance and meat quality.

•Testosterone and androgen hormones produced from testes in men who have reached sexual maturity have anabolic effect and promote muscle development.

- These hormones affect growth by increasing protein accumulation in the body and accelerating metabolism.
- Male animal flesh is darker and less fat.
- In cured animals, the carcass has more oil.
- The only benefit of castrating is that animals are docile. The fattening performance of cows, heifers and caste animals is lower than that of males.

3-Age

- Age is an important factor affecting the fattening performance of cattle.
- Animals should be young. These animals have higher fattening performance.
- Young animals use the nutrients they consume in muscle, organ, tissue, bone development. Nutrient requirements are low. In animals less than one year these events are more prominent.

- Growth in culture races and hybrids lasts until the age of maturity. This is 18 months. In domestic races it is 2.5-3 years old.
- At this age, the feed should be terminated. Because this turn, real growth, that is, muscle, organs, tissues and bones in the organs increases.

- The live weight gain of young animals creates a large amount of water and protein.
- As they get older, the water is replaced by oil.
- For instance, the daily live weight gain of 250 kg live weight is 1000 g and 13.5% of it is oil.
- When this tosun reaches 450 kg body weight, 25.5% of the daily live weight increase is fat.
- As the daily live weight gain increases, the amount of oil synthesized increases. For example, when GCAA is 800 g, 200 g (25%) of this is GCAA 1200 g, of which 420 g (35%) is fat.

- The amount of nutrients consumed for fat synthesis is higher than the nutrient consumed for the same unit muscle synthesis.
- As the animal gets older, the amount of feed KM consumed for 1 kg of CAA is increasing.
- In a study to determine the relationship between age and YYO,
- 5.08 for 0-1, 1-2, 2-3 and 3-4 years, respectively; 11:26; 17.02 and 23.45 kg.
- As the animal ages, the need for energy increases and the protein needs decreases.

- In young animals, fat is dispersed in the muscles and provides a good marble, while the quality of the meat increases.
- During growth, protein and mineral accumulation occurs in the body. Protein accumulation decreases with age.
- While the amount of protein accumulated in the body at the beginning of fattening is 160-180 g, this value decreases to 120 grams towards the end of the feed.

- Young people need more protein than the elderly.
- In order to maintain protein levels in young people, protein supplements (such as oilseed pulp) are required, whereas the elderly can meet this level of 10% mostly with cereals.

- Young people in the valuable part of the meat and waist muscles increase.
- Because the BW is rich in water and protein and poor in fat, the energy value of meat is low.
- In elderly animals, the amount of internal fat, which has low economic value, increases and abdominal muscles develop.

- Growth in cattle is highest up to 1 year of age and decreases at later ages.
- If we consider the growth in the first year as 100%, the growth in the second year is 70% and in the third year 50%.

- Young cattle eat a small portion of the oath they live for a large portion of the living for the growth, the rate of feed use is high.
- Elderly people use a large portion of the oath they consume for life.
- The energy level that the animal has to spend for one kg of fat accumulation is twice as much as the energy required for a kilogram of meat-bone accumulation.
- For this reason, older animals provide less live weight gain (CAA) than energy consumption.

- Young animals may be fed longer.
- If the market conditions are not suitable, the cutting work can be extended to the end of the mature age.
- However, if an adult animal is kept, it is not economical.
- On the other hand, young people adapt more quickly to open food.

4. **Origin**

- It is more convenient to use the offspring obtained from bulls with high breeding value.
- A closer understanding of the care, feeding conditions, diseases, and other growing problems of animals from a known source.
- With the knowledge of the mother and father of the fattening calf, a high fattening performance can be achieved because the CAA that the offspring can take is better determined.it can be better determined by the offspring.

5. **Kondition**

- When the condition is said, the development and fattening of the animal is understood.
- In the period of calving, good care was given, skeletal framework was established, but later, due to non-disease reasons (hunger, carelessness, stress, etc.).

- Low condition animals provide the necessary conditions (fattening, vaccination, good feed formulation) prior to fattening.
- They are also cheap and low-cost. They spend a small portion of the oath they have consumed, the more they live for CAA.

6, nutrition and health

- The animals to be fed must be fed to the internal and external parasites and fed as necessary vaccinations.
- Animals should be preferred when buying animals, their hairs are bright and smooth, their nape and shoulders are developed, and the bones and buttocks which are suitable for filling the buttocks should be preferred.

7. **Nutrition**

- A good feed formulation is required. As it is known, almost 70% of the expenses constitute feed.

Young male cattle feed::

- Young male beef fattening and beef production is carried out intensively. As a result of intense fattening, animals are sent to slaughter with a weight of 400-500 kg.
- A beef cattle at 300 kg BW and 1000 g of GCAA binds 150 to 200 g protein and 150-200 g fat in the body.

- The ration of free-circulating animals is required to add 10% energy. The need for energy varies depending on the CAA.
- In general, DM consumption for 100 kg CA for fattening cattle is 20-30% lower than dairy cattle.

- 250 kg BW, GCAA 1000 g level of beef cattle need approximately 500 g dCP (sHP). In this case, the level of bacterial protein synthesized in the rumen is 350 g. Due to this difference, animals need by-pass proteins.

- Depending on the body weight, the body needs mineral. for example
- For 150 kg BW, a fattening cattle needs 15g Ca and 9g P per kg CAA
- For CAA, the Ca requirement for each kg CAA is 10 and the P requirement is 5 g at 450 kg CA.
- Daily mineral substance requirement level increases up to 400 kg BW. The absorption of various minerals is also decreasing.

- While crude cellulose plays a primary role in providing the required acetic acid for milk production, the production of propionic acid due to concentrated feed in beef cattle breeding is important and economically provides feed energy.

- ndustrial waste, cereal straws and beet cattle products should be supplemented with P-rich mineral mixes (163 g P / kg).
- Fattening cattle synthesize B group vitamins with microorganisms in rumen.

- Fattening beef cattle should be supplemented with vitamin in intensive concentrate feed (1-1.5 kg / 100 kg BW). Vitamins A, D and E should be supplied in the meadow.
- Corn silage, sugar p. In the case of the consumption of leaf silage, these silages should be supplemented in terms of the vitamins A and D in which they are poor.
- The need for vitamin D in cattle that have been kept in the stables for the whole year and fed by the intensive method should not be forgotten.

- When vitamin D2 is low, 1.5 g irradiated yeast / 100 kg BW per week is recommended.
  In some enterprises, parenteral vit D3 applications are performed every 2-3 weeks especially in the end of the fattening.
  In the case of the addition of large amounts of dry grass (2-3 kg / animal and day) to the usual feedstuffs, the vitamin D requirement is usually closed.

Fattening Cattle Ratio (% KM)

	Besi I,	Besi II	Besi III	Besi IV
Besin maddeleri	150 kg CA	250 kg CA	350 kg CA	450 kg CA
ME, kcal/kg en az	2900	2600	2500	2600
HP, % en az	14	12	11	10
HS, % en az	15	15	15	15
HK, % en çok	14	14	14	14
Ca, % min-max.	0,5-2	0,5-2	0,5-2	0,5-2
P, % min-max.	0,3-1	0,3-1	0,3-1	0,3-1
Mg, % min-max.	0,1-0,4	0,1-0,4	0,1-0,4	0,1-0,4
K, % min-max.	0,65-3	0,65-3	0,65-3	0,65-3
Na, % min-max.	0,08-0,18	0,08-0,18	0,08-0,18	0,08-0,18
S, % min-max.	0,1-0,4	0,1-0,4	0,1-0,4	0,1-0,4
Fe, mg/kg min-max.	50-1000	50-1000	50-1000	50-1000
Co, mg/kg min-max.	0,1-5	0,1-5	0,1-5	0,1-5
Cu, mg/kg min-max.	10-115	10-115	10-115	10-115
Mn, mg/kg min-max.	40-1000	40-1000	40-1000	40-1000
Zn, mg/kg min-max.	30-500	30-500	30-500	30-500
I, mg/kg min-max.	0,5-50	0,5-50	0,5-50	0,5-50
Se, mg/kg min-max.	0,2-2	0,2-2	0,2-2	0,2-2
Vit A, IU/kg "	2200	2200	2200	2200
Vit D, IU/kg "	250	250	250	250
Vit E, mg/kg "	15	15	15	15

Mechanization and Expenditures in Fattening Cattle Breeding

- Lowering labor costs in fattening enterprises reduces costs. Mechanization is the biggest factor in reducing labor costs.

Machines and equipments used in the operation of Beside:

- 1. Feed preparation (crushing, grinding, mixing):
- Particularly in businesses that prepare their own feed, the machinery that breaks, grinds and mixes raw materials should be involved. These machines are usually prepared with the help of a worker between 0.5-1 tonnes per hour. On larger capacities, more than 15 tonnes of feed per day is being prepared.

- 2. Feed distribution: Feeders prepared in mixers reach the feeders with pipes, spiral carriers or other carriers. Today, concentrate and coarse feeds are mixed together and placed in front of the animals moistened.

- 3.
  For this purpose, especially the bucket tractors, silage pits in the silage pit by cutting them into the feeder block cutting machines, silage transporters to the feeders that take the carriage, band carriers are the tools to increase the profitability of reducing workmanship.

- 4. Weighing instruments (weighbridge):

  In order to follow the development of animals, live weights should be determined at the beginning of fattening and monthly weighing. Those who do not have enough live weight gain are not disposed of unnecessarily and are disposed of.

At the same time, the amount of live weight and economic calculations can be made thanks to the beginning and end of live weight differences..

Animal manipulators (animal compression chamber):

- Manipulations to the animals are facilitated by animal compression units and treatment, medicine and control procedures are facilitated.

- In practice, calcium (Ca) requirement is 34 g in animals with 150 kg live weight and 1000 g daily weight gain. Increased live weight Ca demand rises and increases by 2-3 g in every 100 kg CA increase. Phosphorus is calculated as half of Ca.
- Vitamin B vitamins are usually sufficient to synthesize the rumen.
- However, niacin and thiamine supplementation is recommended.
- As a feed additive, probiotics improve the fermentation of nutrients by contacting with the microorganisms in their trace.
- They do not leave any residue, they are environmentally friendly.

- Cattle housed in semi-open and free stables become more efficient, healthy and alive. In semi-open and open-breeding, the issue that growers fear most is the coldness of animals. However, animals live at an optimal level of 10 and minus 10 ° C.
  Animals begin to cool at minus 18 ° C.
  In general, in our country the harsh and cold winter winds must be open to the south facing the north and north to the north.

- The critical temperature for animals is minus 30 ° C. In semi-open and open barns, when the feed is needed, the effect of wet and wind and cold is not observed.
- In fattening applications, feed energy is generally increased by about 10%. In free-flowing animals, nail, joint and foot diseases are more rare.

- The quality of the food may vary depending on the quality of the roughage, the concentration of the concentrate and the energy density of the total ration.
- With the addition of dry matter rich corn silage and concentrated feed, a good daily live weight gain is obtained. Various grain varieties can provide energy support.
- Along with coarse feed energy, chopped fruit and various industrial products may limit the grain level.
- We can add lumps, grass grasses, grain yields and straw that has the lowest value.

- Sugar beet products can be used alongside grains by regulating the mineral (especially P), cellulose and protein levels.
- Sugar beet and sugar beet pulp has a high digestibility. The higher the sugar content in the ration components, the more consuming the animals.
- In practice, daily feed dry matter consumption is an average of 2.5% of live weight.
- (This amount varies between 3.5% and 1.8% of the age of the animal).

- Per animal
- Between 6 and 18 months, approximately 3125 kg of concentrated feed (about 3550 kg in natural form) and 780 kg of coarse feed (naturally 2800 kg of corn silage) are used as dry matter (Table 1).
- These amounts
- Between 6-12 months, there are 1300 kg concentrate feed (about 1550 kg in the natural state) and 325 kg of roughage (in the natural state it is 1150 kg corn silage) (Table 2).
- For 12-18 months, 2075 kg of concentrated feed (about 2350 kg in the natural state) and 520 kg of forage (in the natural state, eg 1850 kg corn silage) (Table 3).

Amount of feed consumption in beef cattle between 6 months and 18 months

GCAA= Daily live weight gain= 1,36 kg		%80 concentrated feed + %20roughage	Total feed, month, KM	
	CA	Total feed, kg/day	concentrated feed	roughage
6. month	160	4,8	115,2	28,8
18. month	661	14,542	349,0	87,3
1 Animal:	TOTAL		3123, 3	780,8

Ration for Holstein breeding cattle (10 months old, 343 kg, Target 660 kg, GCAA: 1,750 kg / day)

FOOD TO BE GIVEN	QUANTITY , kg		Roughage	concentrated feed
CORN SILAGE, %25	10		10	1,6
VETCH	1,8		1,8	0,15
OAT DRY GRASS	2,8		2,8	0,2
BARLEY , AĞIR	1,6			0,3
TAIL OIL	0,15			0,04
SUNFLOWER SEAT, %28 HP	0,2			0,01
WHEAT BRAN	0,3	toplam	14,6	2,3
CALCIUM CARBONATE	0,04			
BICARBONATE	0,01			

Ration sample for Holstein breeding cattle (14 months old, CA 523 kg, Target 660 kg, GCAA: 1,400 kg / day)

FOOD TO BE GIVEN	QUANTITY ,kg	MİKTAR,kg	Fiyat
CORN SILAGE, %25	14	14	2100
YULAF KURU OTU	1,5	1,5	300
ARPA, AĞIR	6,2	1,4	2480
KALSİYUMKARBONAT	0,09		18
SIĞIR BESİ YEMİ	-	5	