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Bulletin 26 February, 1920

COOPERATIVE EXTENSION WORK IN
AGRICULTURE AND HOME ECONOMICS

UNIVERSITY OF FLORIDA DIVISION OF AGRICULTURAL
EXTENSION AND UNITED STATES DEPARTMENT
OF AGRICULTURE COOPERATING
P. H. ROLFS, Director

FEEDING BEEF CATTLE IN FLORIDA

By W. H. BLACK*

One of the most important problems in connection with the beef cattle industry in Florida is the feeding of the various

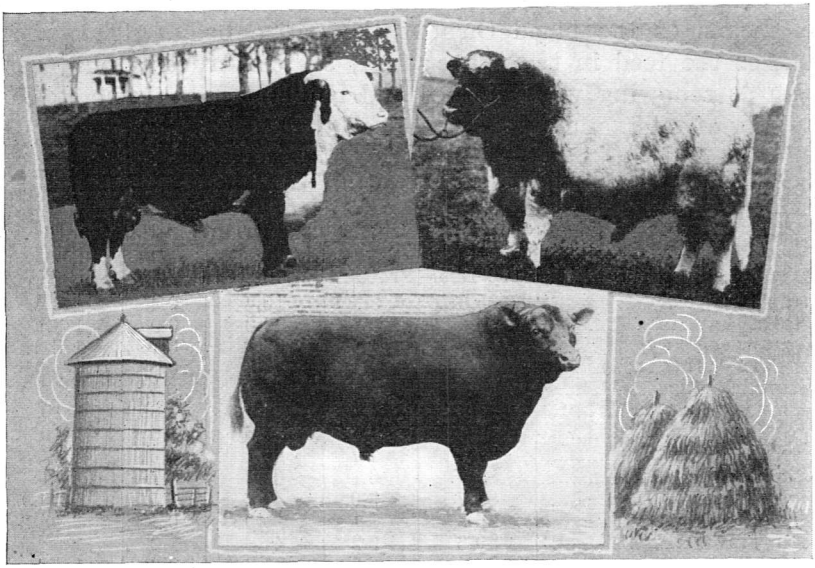

Fig. 1.—Representative types of Hereford, Shorthorn and Angus bulls, upon which depends the real improvement of the beef cattle of Florida

classes of cattle in the herd. More attention will have to be given to this in the future, because better cattle are being introduced, which means better care and management must be given

*Working cooperatively with the Bureau of Animal Industry, U. S. Department of Agriculture, in Beef Cattle Extension Work.

them. More intensified farming will be resorted to and to be successful the cattle must be of good quality, the larger percentage of feed must be grown on the farm, and the farmer himself must have a fair knowledge of the feeding of different classes of cattle.

The farmer hears and reads a great deal of protein, carbohydrates and fat and balanced rations, but very few know how to combine various feeds to get the proper proportion to make a desirable ration. A knowledge of the uses and functions of different foods to the animal body will be of much assistance in determining the proper feed for different animals.

Feed, as every one knows, satisfies the cravings of a hungry animal, but is of no use to the animal until it has become digested in the different organs of the alimentary canal, absorbed by the absorbent vessels in the stomach and intestines and distributed by means of the blood thruout the entire body. The body utilizes the feed in two ways; first, for constructive purposes, such as renewing worn tissues and building new tissue or the making of milk, and second, for heat and energy.

TABLE 1.—DRY MATTER AND DIGESTIBLE NUTRIENTS IN 100 POUNDS OF FEED

Feeding Stuff	Total Dry Matter in 100 Lbs.	Digestible Nutrients in 100 Lbs. Feed*			
		Protein†	Carbo-hydrates	Fat	Nutritive Ratio
Alfalfa (green)	25.3	3.3	10.4	0.4	1:3.4
Alfalfa hay	91.4	10.6	39.0	0.9	1:3.9
Beggarweed hay	91.0	11.6	36.2	0.7	1:3.3
Beggarweed (green)	27.1	3.1	11.6	0.2	1:3.9
Bermuda grass	33.2	1.4	17.0	0.5	1:12.9
Bermuda hay	90.3	3.7	37.9	0.8	1:10.7
Corn (dent)	89.5	7.5	67.8	4.6	1:10.4
Corn (flint)	87.8	7.7	66.1	4.6	1:9.9
Corn and cob meal	89.6	6.1	63.7	3.7	1:11.8
Corn fodder	81.7	3.0	47.3	1.5	1:16.9
Corn silage	26.3	1.1	15.0	0.7	1:15.1
Corn stover	90.6	2.2	47.8	1.0	1:22.7
Cottonseed meal	92.5	37.0	21.8	8.6	1:1.1
Cottonseed hulls	90.3	47.6	23.7	8.0	1:0.9
Cowpeas (grain)	88.4	19.4	54.5	1.1	1:2.9
Cowpea hay	90.3	13.1	33.7	1.0	1:2.7
Cowpeas (green)	16.3	2.3	8.0	0.3	1:3.8
Cowpeas and corn (green)	20.0	1.3	11.4	0.3	1:9.3
Cowpeas and sorghum (green)	18.7	0.7	10.0	0.3	1:15.3
Cowpeas and sorghum silage	32.3	0.9	16 6	0.6	1:20
Cowpea silage	22.0	1.8	10.1	0.6	1:6.4
Crab grass	30.9	1.3	14.2	0.5	1:11.8

Feeding Stuff	Total Dry Matter in 100 Lbs.	Digestible Nutrients in 100 Lbs. Feed*			
		Protein†	Carbo-hydrates	Fat	Nutritive Ratio
Crab grass hay	90.5	3.5	40.0	1.0	1:12
Japanese cane silage	22.4	0.6	11.2	0.3	1:19.8
Japanese cane fodder	93.2	0.5	55.0	1.2	1:115
Johnson grass	29.1	1.2	14.7	0.5	1:13.2
Johnson grass hay	89.9	2.9	45.0	1.0	1:16.3
Kafir fodder	91.0	4.1	45.0	1.7	1:11.9
Kudzu vine (green)	30.6	4.2	13.9	0.5	1:3.6
Lespedeza (green)	36.6	4.5	17.1	0.6	1:4.1
Lespedeza hay	88.2	8.6	41.1	1.1	1:5.1
Linseed meal	90.4	31.7	37.9	2.8	1:4
Millet hay	86.5	5.1	40.5	0.8	1:8.3
Milo fodder (dry)	88.9	1.9	36.3	2.8	1:22.4
Milo fodder (green)	22.7	0.8	12.7	0.3	1:16.8
Molasses (blackstrap)	74.2	1.0	58.2	.....	1:58.2
Natal grass hay	90.2	3.7	37.9	0.8	1:10.7
Natal and cowpea hay	90.2	8.4	35.8	0.9	1:4.5
Oats (grain)	90.8	9.7	52.1	3.8	1:6.3
Oats (hay)	88.0	4.5	38.1	1.7	1:9.3
Para grass	27.2	0.8	14.0	0.3	1:18.4
Para hay	90.2	2.3	38.7	0.4	1:17.2
Peanut with hull	93.5	18.4	15.3	32.6	1:4.8
Peanut meal with hull	93.5	28.4	27.0	5.0	1:1.48
Peanut meal without hull	89.3	47.6	23.7	8.0	1:0.9
Peanut hay without nuts	78.5	6.6	37.0	3.0	1:6.6
Peanut hay with nuts	92.2	9.6	39.6	8.3	1:6.1
Rape (green)	16.7	2.6	10.0	0.3	1:4.1
Rhodes grass hay	89.0	6.1	42.5	2.3	1:13
Rye (grain)	90.6	9.9	68.4	1.2	1:7.2
Rye (green)	21.3	2.1	12.2	0.5	1:6.3
Sorghum (green)	87.3	7.5	66.2	2.6	1:9.6
Sorghum fodder	90.3	2.8	44.8	2.0	1:17.6
Sorghum silage	22.8	0.6	11.6	0.5	1:21.2
Soudan hay	90.0	2.7	45.4	0.7	1:17.4
Soy bean (grain)	90.1	30.7	22.8	14.4	1:1.8
Soy bean meal	88.2	38.1	33.9	5.0	1:2
Soy bean hay	91.4	11.7	39.2	1.2	1:3.6
Soy bean (green)	23.6	3.2	10.2	0.5	1:3.5
Soy bean silage	27.1	2.6	11.0	0.7	1:4.8
Soy bean and corn silage	24.7	1.6	13.8	0.8	1:9.8
Teosinte (green)	21.3	1.0	11.9	0.3	1:12.6
Teosinte hay	89.4	5.6	40.2	0.9	1:7.5
Velvet beans green	88.3	18.1	50.8	5.3	1:3.5
Velvet beans and pod	87.7	14.9	51.7	3.8	1:4
Velvet bean hay	92.8	12.0	40.3	1.4	1:3.6
Vetch, hairy (green)	18.1	3.5	8.1	0.4	1:2.6
Vetch, hairy, hay	87.7	15.7	37.1	1.9	1:2.6
Wheat grain	89.8	9.2	67.5	1.5	1:7.7
Wheat bran	89.9	12.5	41.6	3.0	1:3.9
Wheat middlings	89.3	15.7	52.8	4.3	1:4

*The above analyses were taken in a large part from Henry and Morrison's "Feeds and Feeding."

†Very often with commercial feeds the percentage of ammonia is given in place of protein. In this case the protein can be determined by multiplying the ammonia by 5.15. A feed having 7 per cent ammonia would have 7 × 5.15 or 36.05 per cent protein.

PROTEIN

It is important for the feeder to know that he must supply a good amount of protein to his animals. The muscles, tendons, ligaments, skin, hair and the digestive organs, in fact all cellular tissues are made up largely of proteids. The importance then of supplying the necessary amounts of protein for the development of the above organs can not be over emphasized. The younger the animals the more protein will be required, because of the large amount needed for the development of muscle organs and other tissue, as compared with older animals nearing maturity.

CARBOHYDRATES

The function of carbohydrates is that of supplying heat and energy to the animal. Every movement the animal makes, such as walking, eating, digesting, breathing, etc., requires energy. This energy comes from the oxidation of the carbohydrates. The carbohydrates are also used in fat formation.

FATS

Fats are similar to carbohydrates in use to the body. They are used as fuel for heat and energy and assist in fat formation. The amount of fat in the feed is much less than carbohydrates, but the fuel value is much higher. Carbohydrates have to undergo a change before they are of use as a fat former, whereas fats taken in by the animal may be deposited without change.

RATIONS AND NUTRITIVE RATIOS

A "ration" is the amount of feed given to an animal in 24 hours. A "standard ration" is understood to be for a 1,000-pound animal, or for 1,000 pounds weight as in case of sheep and hogs. A "balanced ration" is a ration that will give the best results in work, meat or milk production, for a specific animal under conditions then prevailing. It will vary according to age, species and condition of the animal. A balanced ration is not necessarily the most economical.

By "nutritive ratio" is meant the ratio of the protein to the combined carbohydrates and fats present in a given ration. It

has been determined that one pound of fat is equal in heat production to 2.25 pounds of carbohydrates. The fat is brought to a carbohydrate basis by multiplying by 2.25. It is then added to the carbohydrates and the ratio of the protein to the total determined.

DRY MATTER AND DIGESTIBLE NUTRIENTS

As rations should vary according to age of animal, the species and condition of animal and upon the production sought after, it is necessary to have some idea of what is approximately the correct number of pounds to feed daily. It has been determined by experiments that the 1,000-pound beef animal requires from 15 to 30 pounds of dry matter, from 2 to 3½ pounds of protein, from 12½ to 15 pounds carbohydrates and from a half to 1½ pounds of fat daily, depending upon the object of the feeding. Generally speaking, the younger the animal the more protein is needed in proportion to the carbohydrates and fat. In other words the younger the animal the narrower the ration should be.

FIGURING A RATION

Just how can the farmer figure out a ration that will be approximately correct? He can do this only by knowing the percentage of the digestible nutrients in his feeds. Table 1 gives the total amount of dry matter and digestible nutrients in 100 pounds of various feeds used in beef cattle feeding in Florida. A daily ration that gave very good results in Florida for 84 days of feeding during the winter of 1918 and 1919 was as follows:

Thirty-five pounds of corn silage, 5.6 pounds of Natal and cowpea hay (mixed half and half), and 2.4 pounds of cottonseed meal. These steers averaged about 600 pounds at the beginning of the feeding period, when photograph shown in Fig. 2 was made. In determining the total dry matter and digestible nutrients in this ration reference must be made to Table 1.

Table 2 shows pounds of dry matter and nutrients in 100 pounds of feed as taken from Table 1.

TABLE 2.—POUNDS OF DRY MATTER AND DIGESTIBLE NUTRIENTS IN 100 POUNDS OF FEED

Feed	Dry Matter	Digestible Nutrients		
		Protein	Carbo-hydrates	Fat
Corn silage	26.3	1.1	15.0	0.7
Natal and cowpea hay	90.2	8.4	35.8	0.9
Cottonseed meal	92.5	37.0	21.8	8.6

To get the pounds of dry matter and digestible nutrients in the ration given above: By looking at Table 1 it is seen that there are 26.3 pounds of dry matter in 100 pounds of corn silage. Then there will be 9.2 pounds of dry matter in 35 pounds of corn silage. ($26.3 \times 35 \div 100 = 9.2$). Likewise there are 37 pounds of digestible protein in 100 pounds of cottonseed meal. Then in 2.4 pounds of cottonseed meal there will be .88 pounds of protein. ($37 \times 2.4 \div 100 = .88$ pounds.)

TABLE 3.—DRY MATTER AND DIGESTIBLE NUTRIENTS FOR EACH FEED IN RATION MENTIONED ABOVE

	Total Lbs. Dry Matter	Digestible Nutrients, Pounds		
		Protein	Carbo-hydrates	Fat
Corn silage 35	9.20	.385	5.25	.245
Hay 5.6	5.05	.470	2.00	.050
C. S. meal 2.4	2.22	.888	.52	.206
Total	16.47	1.743	7.77	.501

To find the nutritive ratio, as previously stated, multiply the total fat by 2.25, then add to combined carbohydrates and divide by the total protein.

By referring to the totals in Table 3 the total fat sums up to .50 pound. Multiply this by 2.25 and add to the total carbohydrates (7.77 pounds), which gives 8.89 pounds of combined carbohydrates. Divide this by the total amount of protein (1.74 pounds) and we get the ratio of one pound of protein to 5 pounds of combined carbohydrates and fat, or the "nutritive ratio" of 1.5.

FEEDING STANDARDS

Many feeding standards have been devised, but in a definite way, no standard will apply to all animals. Practically all

standards have been based on 1,000-pound weight. This means that the 1,000-pound animal should consume twice as much feed as the 500-pound animal. The necessary amounts of nutrients can not be fixed for each class, as there is a big variation in digestibility of nutrients, depending upon their source. The individuality of the animal often makes it necessary to modify the ration. Young growing animals require a frequent change of rations. It is best not to follow any fixed standard in feeding.

FACTORS TO CONSIDER IN THE SELECTION AND COMPOUNDING OF RATIONS

Make the ration as nearly balanced as possible, being practical and consistent as to price of feeds.

Even tho a ration of 1:6 might be termed a balanced ration for a 1,000-pound steer, the feeds on hand might make the proposition more business-like and practical to feed a ration of 1:8. The ration making the greatest gain does not always net the greatest profit; it might be scientifically or theoretically right but practically wrong. The feeding business is in reality a commercial proposition, the feed is the raw material and the animal is the finished product. The price of feeds therefore is a very important factor.

MAKE THE RATION PALATABLE

The ration must be composed of feeds that are relished by the animal. If an animal does not like its feed it will not eat enough for maintenance and good gains in addition. A ration composed of good corn silage, cottonseed meal, a little black strap molasses to sweeten up the feeds and bright baggarweed hay would be far more palatable than a ration of over-ripe corn stover, cottonseed hulls and velvet bean meal. Variety of feeds usually adds to palatability.

SELECT FEEDS ADAPTABLE TO THE NEEDS OF ANIMALS

Young growing animals require more highly concentrated rations than do matured animals. The young animals should be supplied with feeds rich in protein, such as milk, cottonseed meal, peanut meal, velvet beans, soy beans or wheat bran and leguminous hays, such as cowpea, peanut or beggarweed.

Matured animals will thrive and fatten well on rations which are largely carbohydrates, such as corn and corn silage, or chops and grass hay.

The eye of the feeder and the merits of the animal should play a very important part in the selection of feeds and the compounding of rations.

USE HOME GROWN FEEDS

Economy must never be overlooked in making up rations. Home grown feeds are usually the more economical. Leguminous hays should be grown and utilized on the farm. Conditions might warrant the selling of corn and buying cottonseed meal or peanut meal. Velvet beans should be grown at home by all means. If enough corn or sorghum can be grown to furnish sufficient silage for the bulk of feed, and velvet beans and leguminous hays grown to furnish the protein, as a supplement, the buying of high priced concentrated and commercial feeds can be overlooked.

BE ECONOMICAL IN PREPARATION OF FEEDS

Expensive machinery for grinding feed for cattle for beef is not good economy. It has been proved quite conclusively that grinding feed for fattening cattle is not profitable. With aged breeding animals and the dairy cow the grinding of real hard grain is sometimes advisable.

Experiments of the last ten years have shown that it does not pay to grind velvet beans for fattening steers, as whole beans have made greater gains and also more economical gains. The soaking of beans for cattle has proved profitable but with any other feed the profitableness from such a practice is questionable. Shredding or cutting up coarse fodders such as corn, sorghum, Japanese cane, Napier or Merker grass is good practice when these crops are not put into a silo.

FEEDING IN THE DRY LOT FOR MARKET

This phase of the beef cattle industry has been but little practiced in Florida for the following reasons: Sufficient feeds for dry lot feeding have not been produced; the cattle man has

made a nice profit by utilizing the free range and marketing his surplus off of grass; the cattle have not possessed the quality and conformation to warrant dry lot feeding and the cattle man has not felt justified in undertaking the finishing of steers in the dry lot, on high priced feeds.

The cattle industry is now changing in many respects. Better cattle are taking the place of the scrubs, more feed is being produced, the large ranges are rapidly disappearing and more intensive farming methods are inevitable. With these conditions progressing as they are the practice of marketing crops in the form of beef is certain to become popular a few years hence.

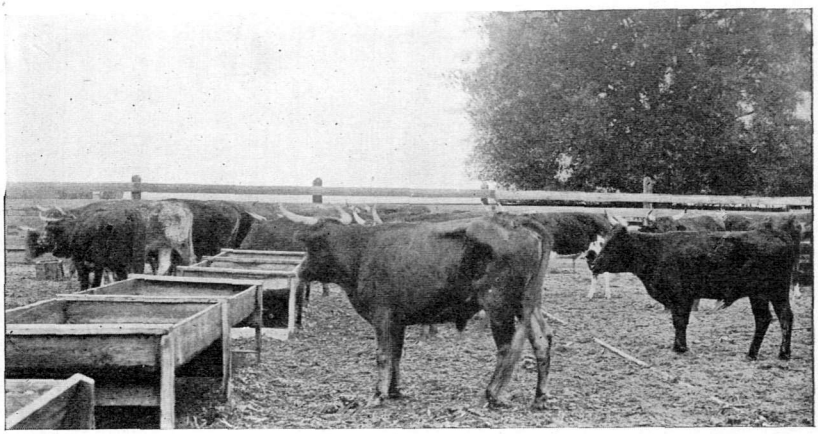

Fig. 2.—Common Florida steers that made a daily gain of 2.16 pounds for a period of 84 days, under dry lot feeding

PROFIT—THE CONTROLLING FACTOR IN FEEDING CATTLE FOR MARKET

This will depend upon the economy of gain, the rate of gain and upon the buying and selling price.

The rate and economy of gain will depend upon the age of the animal. The younger the animal the greater and cheaper the gains. The younger animal makes better use of his feed. Records kept on rate of gains from birth, bear out the fact that younger animals make cheaper and more rapid gains.

The mature steer tho, will make a more rapid gain in the feed lot for a short feeding period.

Economy and rate of gain depend a great deal on the individuality of the animal. The animal must be capable of eating large quantities of feed and at the same time make use of that feed in the way of laying on flesh in the valuable parts. He must show signs of early maturity and have good constitution and conformation.

GENERAL SUGGESTIONS CONCERNING RATIONS

Table 4 shows rations that should produce good results in feeding for market.

Silage should be used in rations wherever possible, especially with cattle two years of age or over. Older cattle will utilize coarser and rougher, and necessarily cheaper feeds.

TABLE 4.—SUGGESTED RATIONS FOR STEER FEEDING

Weight and class of cattle	Length of feeding period (days)	Average daily ration per period in pounds	Total dry matter pounds	Digestible nutrients in ration (pounds)			
				Protein	Carbo-hydrates	Fat	Nutritive ratio
(1) 900-1,150 lbs. Fattening steers..	90	Silage, 40; whole velvet beans, 10; crab grass hay, 5	23.82	2.1	13.17	.71	1:7
(2) 700-1,000 lbs. Fattening steers..	120	Silage, 35; whole velvet beans, 8; crab grass hay, 3	19.00	1.68	10.58	.58	1:7
(3) 600-900 lbs. Fattening steers..	150	Ear corn, 10; velvet beans, 6; cowpea hay, 4	17.82	2.03	10.80	.65	1:6
(4) 600-1,000 lbs. Baby beeves.....	180	Ear corn, 12; C. S. meal, 3; cowpea hay, 5; molasses, 2....	19.50	2.5	11.00	.75	1:5

Younger cattle require rations of a narrower ratio, hence more concentrated food will have to be supplied in proportion to their weight. The amount of velvet beans in a ration could be substituted by one-half that amount of cottonseed meal, and vice-versa. That is, 10 pounds of velvet beans in pods could be substituted for 5 pounds of cottonseed meal, and 3 pounds of cottonseed meal could be replaced by 6 pounds of velvet beans.

Peanut meal of good quality is nearly equal to cottonseed meal, pound for pound. The choice between peanut meal, cottonseed meal and velvet beans should be determined largely by price and availability.

The weights of cattle given in Table 4 are for initial and final weights. For instance in ration No. 1 the cattle are considered to weigh 900 pounds at the beginning and 1,150 pounds at the end of the 90 days feeding period. The length of feeding period should vary with the age and condition of the animal.

Mature feeders should be fed three to four months; two-year-olds, five to seven months; yearlings, eight to ten months, and calves ten to twelve months.

GETTING STEERS ON FULL FEED

The daily ration given in Table 3 does not mean that the cattle were fed the amount stated, every day alike, but means the average for the feeding period. One pound of meal was fed per day for the first week and gradually increased until 3 pounds were reached, the average being 2.4 pounds for the entire period of 84 days.

The steers shown in Fig. 2 were fed for 84 days as follows:

	Pounds Corn Silage	Pounds Hay	Pounds Cottonseed Meal
First 28 days	30	5.8	1.2
Second 28 days	38	6.7	3.0
Last 28 days	38	4 5	3.0
Average daily ration	35	5 6	2.4

Getting steers on full feed requires careful observation on the part of the cattle feeder. The rate by which the feed should be increased is dependent upon the age of cattle, the length of the feeding period and upon the composition of the feeds used.

Keep the cattle a little hungry so that they will be looking for their feed at feeding time. Feed should not be found in the troughs two hours after feeding. When an oversupply of feed is left before the cattle, they become tired of it and less feed will be eaten than where the cattle clean up their ration quickly and still remain a trifle hungry.

Increasing the concentrates deserves more attention than the bulk of the ration. Too much hay, or any roughage will not hurt an animal. On the other hand, an overfeeding of some nitrogenous concentrate such as cottonseed meal will sometimes

Fig. 3.—Three best fat Angus steers, including grand champion Florida fat steer (shown at right) at the 1919 Florida State Fair

cause such a severe case of scours that the animal will never again get back in good feeding condition.

The more mature the animal, the quicker it can be put on full feed. The amount of time to be taken in getting steers up to full eating capacity should be determined largely by the length of time they are to be fed.

Mature steers, three years or over, if going to be fed for 90 to 120 days, should be on full feed in 30 days from the beginning. With younger stuff such as yearlings, 45 days should be taken.

Table 5 shows the ration and just how the feeds were increased during the last 84 days of the feeding of the fat Aberdeen-Angus yearlings that won grand championship in carload fat cattle, grand championship first three steers, and grand champion Florida fat steer, at the 1919 Florida State Fair. These yearlings are shown in Figs. 3 and 4.

TABLE 5.—FEEDS GIVEN FLORIDA PRIZE WINNING YEARLINGS

	Pounds of feed daily per animal											
	First Month				Second Month				Third Month			
	1st week	2nd week	3rd week	4th week	1st week	2nd week	3rd week	4th week	1st week	2nd week	3rd week	4th week
Ear corn with husks, ground	6	8	9	10	10	11	12	12	10	10	10	10
Cottonseed meal	½	1	1½	2	2	2½	2½	3	3	3½	4	4
Cowpea hay	3	3	3½	4	4	4½	5	5	5	4	3	3
Blackstrap molasses	½	¾	1	1	1	1½	1½	2	2	2	3	3
Oats	.....	.....	.....	.....	.....	.....	.....	.....	3	4	5	5

Water and salt before cattle at all times.

THE PRODUCTION OF BABY BEEF

Just what are "baby beeves"? Baby beeves are young cattle of good quality that have been crowded or well fed from birth until marketed, which is usually when they are from 12 to 20 months of age. To be baby beeves they must have the quality, breeding and condition that will make them grade as prime. They might weigh from 600 to 1,200 pounds and still be baby beeves.

This quality of beef can not be made on the range. As calves they should have plenty of milk, and before weaning should be eating a grain ration such as corn and peanut meal and some legume hay. Starting on grain before weaning is quite essential, in order to prevent any shrinkage or loss of milk fat during the process.

To produce calves that will make this class of beef requires good pure bred bulls of the beef breeds and pure bred or grade cows. As they must grade as prime on the market when finished, it would be impossible to produce calves of such conformation, quality and condition, that would come up to this standard, without having behind them good blood of the beef breeds in both parents.

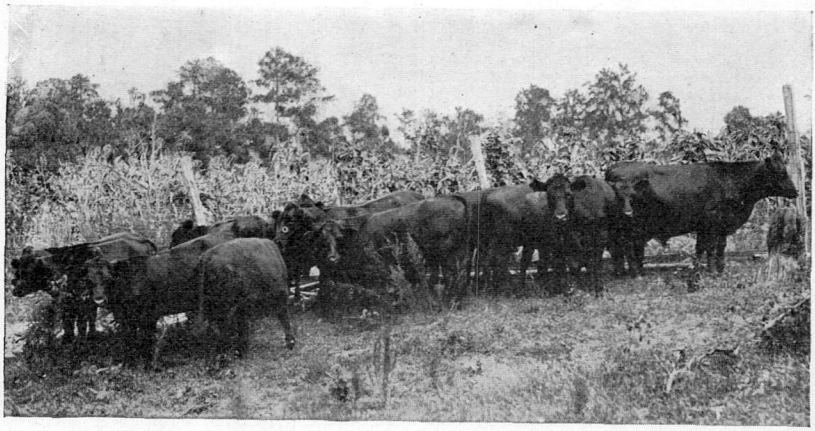

Fig. 4.—Angus yearling steers that won highest honors at the 1919 Florida State Fair and Exposition. This photograph was made at the beginning of the feeding period.

While the yearlings shown in Fig. 4 would not class as baby beef on the Chicago market, they approach very closely what is desired in the baby beef animal.

Florida is not yet ready for baby beef production. The feeder lacks experience, and desirable cattle are not yet in sufficient numbers to warrant this class of feeding to any extent.

FEEDING THE BREEDING HERD OF BEEF CATTLE

In all feeding the object sought is to produce the greatest results with the least cost. The use of cheap raw materials is the key to successful feeding.

For summer there is nothing that will take the place of good pasture. If this can be supplied by Carpet, Bermuda or Para grass the summer feeding is solved. The making of a good pasture of one of these grasses is not an impossibility for any section of Florida. If wire grasses are depended upon for pasture, additional roughage, such as silage, hay or stover or soiling crops such as cane, sorghum, Napier or Merker grasses should be supplied. Wire grass is good for only a short period in the spring, and additional feed is absolutely necessary for a breeding herd after the wire grass becomes dry and woody. There are certain places in the state where Broom sedge and Maiden cane furnish sufficient pasture for the greater part of the year.

By all means have a good pasture, even if it does take money and labor to get it. Once a good permanent pasture is established it will be good for years, and at the same time furnish the most economical feed that can be produced. Good pasture furnishes a ration which is nearly balanced for breeding cattle.

FEEDING HERD BULLS

Plenty of good pasture should make up the bulk of roughage during the summer. If best results are expected, bulls should receive some feed in addition to the pasture, no matter how good it may be. This is of course an impossibility on the large ranges during the summer months. But where conditions do make it possible, bulls should receive during the breeding season a grain ration and some legume hay such as peanut, cowpea or beggarweed. The grain ration should be fairly high in protein and ash.

The following grain mixtures should give good results:

(1) Corn, bran and oats, equal parts by measure.
(2) Corn, 3 parts; oats, 2 parts; peanut meal, 1 part.
(3) Corn, 3 parts; oats, 2 parts; velvet beans, 2 parts.
(4) Corn, 3 parts; oats, 2 parts; cottonseed meal, 1 part.

Hay should be limited in amount. One to one and a quarter pounds for each 100 pounds live weight is a liberal allowance. (A 1,000-pound bull then should have 10 to 12½ pounds daily.) From 1 to 1½ pounds of the above grain mixtures should be a reasonable amount. Some of the best breeders allow all the grain mixture the bull will clean up in three feeds per day.

When the breeding season is over in the summer a third to a half of the grain ration is sufficient. Easy keeping bulls while not in service will do well on good pasture alone. During winter use some grain ration, but increase the legume hay.

FEEDING PREGNANT COWS AND HEIFERS

It should be borne in mind that pregnant cows require food for the production of the foetus, in addition to food for their maintenance and for extra energy involved in carrying and developing the foetus.

Good pasture will usually be sufficient for summer, but in the fall and winter grain and roughage should be supplied.

Corn or sorghum silage is a very good roughage for breeding cattle. Well cured fodders are very good but not so valuable as the legume hays. Twenty-five to thirty pounds of good silage and one pound of cottonseed or peanut meal, or two pounds of velvet beans and five pounds of cowpea hay should be a good daily winter ration for a 1,000-pound cow.

Corn, bran and oats, equal parts by measure, make a very good grain mixture for any breeding animal. Usually five or six pounds of a grain mixture per 1,000 pounds weight is sufficient.

Heifers should receive a more liberal ration of both grain and roughage. Their ration should be narrower than that of the mature cow, because they are growing, which necessitates more protein for flesh building.

FEEDING YOUNG STOCK IN THE BREEDING HERD

Young stock to be developed as breeders should be crowded by liberal feeding from birth, so that such qualities as early maturing, thick fleshing and feeding can be brought out at an early age and the inferior animals discarded as a market class.

As superior breeding animals bring very high prices, it is advisable and profitable to give them more expensive feed and care.

For the first two weeks, unless weather conditions are very favorable, calves should not run out with their mother, but should be allowed to nurse three or four times a day. After two or three weeks, allow the calf to go out in a small pasture with the cows. Do not start the calf to eating grains until four weeks old. Ground corn, oats and bran, equal parts by weight, make an ideal feed for young calves. Some of this feed should be placed in a feed box in a lot where calves can get access, but where the cows cannot go. The young calves will soon begin to eat of this, and more quickly if some older calves already accustomed to eating grain are put with them. Calves should be allowed all of the mixture that they will clean up three times a day.

The calves may be allowed to run with the mother at all times or kept in a separate pasture and allowed to nurse night and morning. If the latter method is followed more attention will be given the herd and the calves will be more likely to get their grain mixture. A little legume hay should be accessible to the young stuff at all times.

FEEDING BULL CALVES

Bull calves should be separated from the heifers when four or five months of age, and given a separate pasture and allowed to nurse night and morning. They should be allowed all the grain mixture (corn, bran and oats) they will eat twice a day, and all the cowpea, beggarweed or peanut hay they will eat in addition to this pasture. Young bulls should be taught to steal milk from cows not their mothers, as it is necessary to dry up the mothers when they have nursed six to eight months. The

young bulls should then be placed on nurse cows, and if taught before this to steal milk, there will be no difficulty when taken from their mothers. Young bulls should nurse cows until they are 12 to 14 months old, and if to be fitted for show purposes, should be allowed milk until 18 to 20 months old. There is no feed that will make as rapid and satisfactory gains as whole milk.

The grain ration, up to 10 months, should be of the same mixture as previously mentioned. It is not necessary to grind the feed after they begin to eat it well. Allow them all the legume hay they will eat.

FEEDING HEIFER CALVES

Heifer calves may be allowed to run with their dams until weaned, which should be when they are seven to eight months old. They should receive a light grain ration of the same mixture as that used by the young bulls, but should not be crowded as rapidly as bulls. If pushed too rapidly there is danger of impairing their breeding value. From the time heifers begin eating grain and until they are weaned, a half pound of grain for 100 pounds weight is sufficient. After weaning and during the fall the same rate of feeding is sufficient if they are on good pasture. It might be necessary to increase the grain ration to three-fourths of a pound per 100 pounds weight as winter comes on.

The grain ration and good roughage will bring the heifers out nice in the spring. Silage is valuable as roughage for this class of stock during the winter. In the spring reduce roughage and grain ration as pasture comes in, but continue feeding a fourth pound of grain ration for 100 pounds weight during summer and fall. Handle thru the second winter as before.

FEEDING YOUNG STOCK IN THE MARKET HERD

While the young animals in the market herd are not so valuable as those of pure bred herds, their handling is a more important problem in Florida today. At least 90 per cent or practically all the herds of cattle in this state at this time, are kept to furnish beef for the market and not as breeding stock.

In the grade or market herd, the males are castrated and sold

as steers, the inferior heifers are fattened and sold on the market and the choicest retained for breeding purposes.

In beef herds cows should be bred so as to drop calves in early spring. By the time pastures are good the calves will be old enough to eat grass.

The calves should be weaned when from six to eight months old. A little grain and legume hay, in addition to good pasture, will make better calves, but under the present conditions with a great scarcity of grain, it would seem more advisable to keep the grain and hay until winter. Winter is the trying time on cattle in Florida, and young stock should not be stunted by starvation, but should receive enough feed to keep in a good growing condition.

The silo furnishes the cheapest and most practical way to winter cattle. If silage is available, 10 to 15 pounds, with 1 pound of cottonseed meal or 2 pounds of whole beans and 2½ to 3 pounds of legume hay, would be a good winter ration for young calves 10 months old.

During the second winter when the young stock are around 20 months of age, 20 to 30 pounds of silage, 1 pound of cottonseed meal or 2 pounds of beans and 5 pounds of good hay will bring them thru the winter in good shape.

Where feed is cheap and pastures good and plentiful, the steers or other surplus should be kept until two or three years of age. Where lands and feeds are high in price the quicker the cattle are gotten in marketable condition the more profitable will be the industry.

The cattle may be marketed off of grass in the fall or finished on higher priced feeds during the winter.

With average steers in Florida more profit will result in marketing off of grass. Steers of good quality and breeding should pay for their feed in the dry lot, providing the bulk of feed is raised at home.

If silage and velvet beans can be raised on the farm, there should be no hesitancy in finishing good quality steers in the dry lot.

Any of the rations given in Table 4 should give good results in winter feeding.

Steers may be finished economically on grass by supplementing the pasture with some concentrate in a cake form. Cottonseed cake fed on the grass is being used very extensively in many sections of the United States with very good results and should be a good practice in Florida.

Finishing steers by pasturing corn and bean fields is more or less of an experiment. It is a well known fact that cattle will often eat more than is good for them, and for this reason it is very questionable whether the self-feeder and the hogging down system of feeding will ever be as popular with cattle as it is with hogs.