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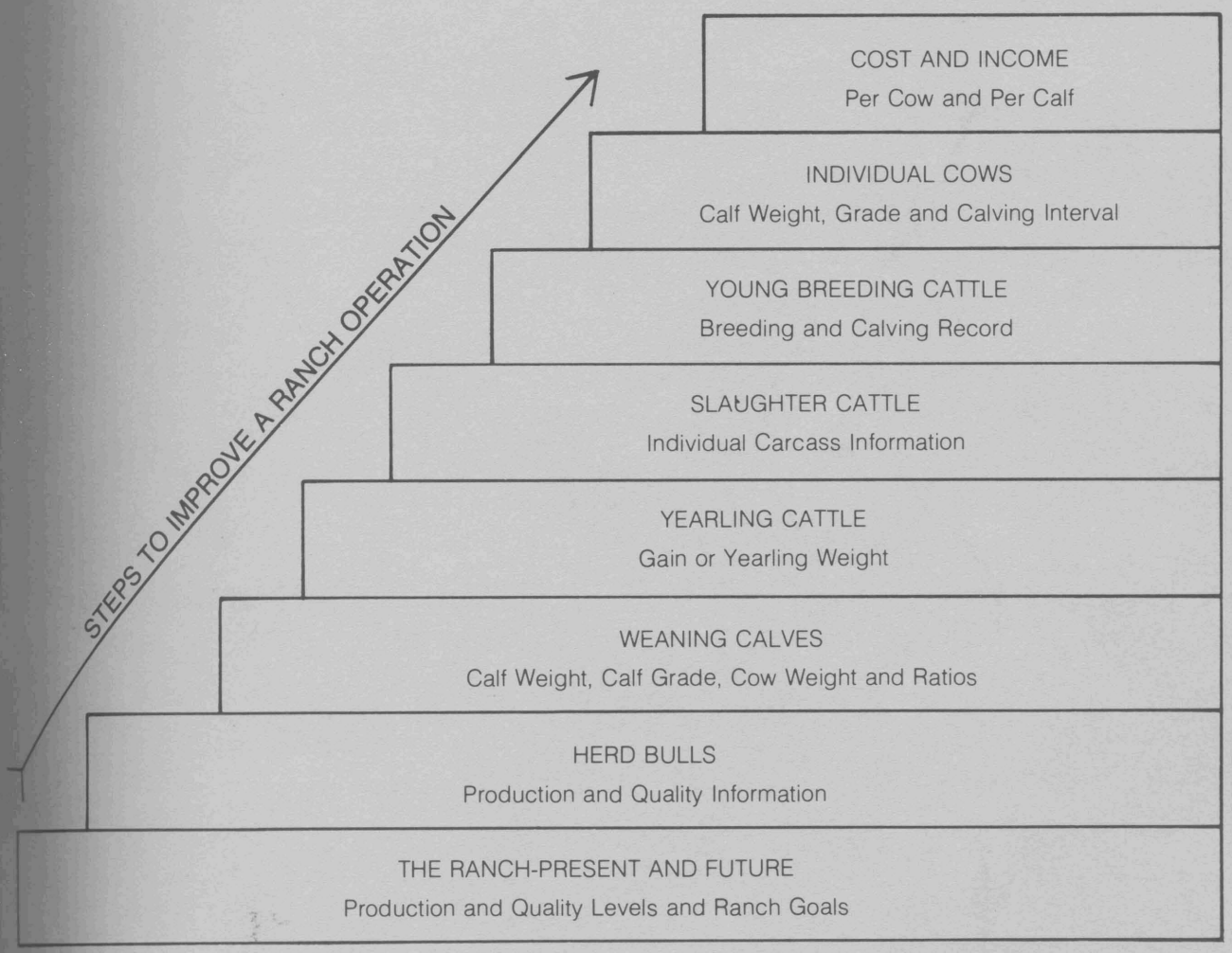
MANAGEMENT CONTROLS FOR RANCHES PRODUCING BREEDING CATTLE



Texas Agricultural Extension Service • The Texas A&M University System • John E. Hutchison, Director • College Station, Texas

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MANAGEMENT CONTROLS FOR RANCHES PRODUCING BREEDING CATTLE

L. A. Maddox, Jr.*

The production and marketing of breeding cattle continues to increase in sophistication whether the breeding cattle are registered, purebreds or crossbreds. It is usually advisable for registered breeders to use the record program developed by their own breed association. These breed associations often make the same or a similar program available to their purebred breeders for a small cost. There are organizations, designed especially for record keeping of crossbred herds, which should be used by some producers of large numbers of crossbred cattle.

Some small registered breeders and many small commercial breeders like to keep their own records in order to have information immediately available for decision making. The record program suggested in this publication is organized to furnish records that will help make decisions concerning animal breeding and point out problems in animal nutrition and health.

This management control system is designed so that parts of it can be used to furnish useful management control information. For example, the records from the first three steps shown on the front cover would furnish much information about the kinds of cattle being produced and changes in production characteristics through the weaning calf. A management control record such as Form D-917i will furnish helpful information in making more accurate management decisions in all areas of production. Of course, a partial record program would not be as effective as one which included at least a random sample with a gain test or yearling weights and carcass information on half sibs. The goals for each rancher producing breeding cattle are different; therefore, each breeder should select those parts of the management system that will best fit his particular needs. Some ranchers will want to develop additional information beyond that suggested in this publication.

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The Ranch-Present and Future

The first step in planning a management system should be to determine the present status and then decide where you would like to be in five years. After you have established these goals, plan the changes necessary to reach your five-year goals. A rancher producing breeding cattle for sale should first establish the production and quality levels of the cattle he is producing. This information should not be based on weaning weights of calves with unknown ages or a visual, quality grade by the owner. There are more objective measures available, which would be effective tools to herd improvement. Form D-917a, ***Production and Quality Levels and Ranch Goals,*** furnishes an easy way to record production characteristics, including numbers of (percentages where applicable) cows bred, calves born and weaned and average weaning weights.

The quality of product at the cow/calf level would be the kind of feeder calf that has been produced. Measurement of quality of the feeder calf can be determined by rate and efficiency of gain

during the feeding period combined with the yield and quality of grade when the cattle are slaughtered. For this information to be useful, one should also know the age and weight into the feedlot and the number of days on feed.

Herd Bulls

The single most important purchase made by ranchers producing and marketing breeding cattle is the bull (or bulls) introduced into the breeding herd. The bull introduces half the genetic material of all the calves he sires. Problems confronting beef cattle breeders include: (1) knowing the qualities of a good bull and how to recognize these and (2) finding a bull that excels in traits needing the most improvement in the breeding herd. Sophisticated record programs developed by breed associations have made it possible to buy a bull with performance and production records that will reliably predict his breeding value on many production and quality characteristics. If artificial insemination is being considered, bulls in AI studs will have performance and progeny information to aid in the selection of the sire(s) for your next calf crop.

Form D-917b, ***Production and Quality Information,*** suggests production information such as birth weight, 205-day weight and weight ratio, 140-day gain and gain ratio, yearling weight and weight ratio. The birth weight information is the only new data suggested and has become increasingly important with the development of a few extremely large mature animals within domestic breeds and the importation of large exotic breeds.

In the selection of a herd bull, the best quality control information is the performance of steer half sibs (half brothers) through feedlot and normal marketing channels. Information needed would be the number of half sibs, days on feed, feedlot gain, feed required per hundred pounds gained, slaughter weight, quality and yield grade.

Weaning Calves

Measurement of weaning weight (205 days). Weaning weights are measured to evaluate differences in mothering ability of cows and growth potential of calves. For best estimates of genetic worth of weaning weight, it is necessary to adjust individual calf records to a standard basis. Most organizations that record weaning weights use weights taken between 160 to 250 days and adjust this weight to a uniform age of 205 days.

It is recommended that 205-day weights be computed on the basis of birth weight and average daily gains from birth to weaning. To accomplish this: (1) subtract an estimated 70 pounds (or actual birth weight, if available) birth weight from actual weight at weaning, (2) divide by age in days at weaning to obtain average daily gain, (3) multiply the average daily gain by 205 and (4) add the 70 pounds (or actual birth weight) that was subtracted initially for birth weight.

This provides an estimated 205-day weight, unadjusted for age of dam or sex of calf. This procedure is summarized by the following formula:

$$\text{205-day wt. (lb)} = \frac{\text{actual wt.} - 70}{\text{age in days}} \times 205 + 70$$

The above formula or Figure 1 on page nineteen can be used to estimate 205-day weights from actual calf weight and age in days. Age in days can be readily calculated by using the charts on the back cover.

Table 1 should be used to establish a uniform procedure for computing age of dam.

Table 1. Establishing uniform age of dam

Age range	Age of dam
1 yr. - 9 mos. to 2 yrs. - 9 mos.	2-year olds
2 yrs. - 9 mos. to 3 yrs. - 9 mos.	3-year olds
3 yrs. - 9 mos. to 4 yrs. - 9 mos.	4-year olds

The correction factor shown in Table 2 can be used to adjust 205-day weights to a mature dam equivalent.

Table 2. Correction of 205-day weight for age of dam

Age of Dam	British and small dairy breeds	Other breeds
2	+ 15	+ 8
3	+ 10	+ 5
4	+ 5	+ 2
5-10	0	0
11 and Older	+ 5	0

Weaning weight ratio. Records on 205-day weight and 205-day weight ratio, adjusted for age of dam on individual animals, should be recorded and

available on the basis of each sex. Weaning weight ratios within sex groups are calculated by dividing each individual animal's 205-day weaning weight, adjusted for age of dam by the average of its sex group, and expressing it as a percent of its sex group average. Thus, weaning weight ratios provide a record of each individual animal's deviation from the average of its contemporaries in terms of percent. It is calculated by using the following formula:

$$\text{Weaning weight ratio} = \frac{\text{Individual record}}{\text{Average of animals in the group}} \times 100$$

These ratios are useful in ranking individual animals of each sex for making selections.

Conformation Grade. There are many grading systems in use today. The simplest and apparently most useful grading system is to grade the cattle based on your estimate of what grade they would fit into after an appropriate feeding period. All except good and choice grades should be eliminated. The good and choice grades can be subdivided into sections such as high choice, average choice, low choice, high good, average good and low good. In a herd raised to be marketed as breeding cattle, probably the last two grades would be cull cattle.

Dam Weight. The weight of the dam should be taken at the same time the weaning weight of the calf is taken. Dam weight is affected by both genetic factors and nutrition levels just as is the calf's weight. Relating dam's weight at weaning time to the weaning weight of her calf should produce indication of relative efficiency of the cow. Since calves' weights have been adjusted to a mature dam's equivalence, the weight of young cows must be adjusted to a mature equivalent. Table 3 suggests the percentage factor to adjust 2-, 3-, 4- and 5-year old cows to an estimated mature weight.

Table 3. Correcting dam weight for dam's age

Age of dam, years	Percent of correction
2	+ 20
3	+ 15
4	+ 10
5	+ 5

Production Ratio. Measures of production efficiency of weaned calves have been questioned for many years. The best farm or ranch type measurement is the relationship of cow weight to calf weight. With the introduction of many exotic breeds, questions continue to arise concerning total efficiency as it relates to these two measurements. Some people like to measure efficiency by comparing maintenance of cows based on metabolic cow size to weaned calf weight. This means that maintenance requirements will not increase in direct proportion to cow weight but in a smaller increment where metabolic cow size is calculated by multiplying cow weight by the .75 power. Table 4 reduces this to a percentage figure using 1000 pounds as 100 percent and calculating the weaning weights necessary to offset different feed requirement for different size cows.

All of these records can be recorded on Form D-917c, ***Weaning Calves.***

Table 4. Relative feed requirements for maintenance and weaning weights necessary to offset additional feeds for different size cows

Cow wt., lbs.	Compared to a 1000-lb. cow: feed for Maintenance	Weaning wt.	Feed required for the following differences in calf gain not accounted for*
800	85%	425 lbs.	— 75 lbs.
1000	100%	500 lbs.	0 lbs.
1200	115%	575 lbs.	+ 75 lbs.
1400	129%	645 lbs.	145 lbs.
1600	143%	715 lbs.	215 lbs.
1800	156%	780 lbs.	280 lbs.

*This kind of comparison has a built in error in that it makes no correction for the amount of feed saved in producing lighter weight calves and the amount expended producing heavier weight calves.

A simple and more accurate method for hand record keeping is to develop a production ratio using cow weight and calf weight. Use a simple percentage figure and make direct comparisons between animals producing calves of the same sex or adjust all calf weights to steer weights.

The following formula is recommended:

$$\text{Production ratio} = \frac{\text{205-day calf weight (mature dam equivalent)}}{\text{Weight of dam (mature equivalent)}}$$

Variation in these percentages may vary from cows that produce 28 percent of their weight in weaned calf at 205-days of age to those that produce more than 60 percent.

Adjustment for sex for sire, dam and group summaries. In the case of sire, dam and group summaries for 205-day adjusted weaning weight

where it is necessary to adjust to a single sex, the adjustment should be to a bull or steer basis. Allow a 10 percent difference between bulls and heifers. Thus, adjust heifer weights to a bull basis by multiplying by 1.10 and steer weights to a bull basis by multiplying by 1.05. In commercial herds, where the majority of male calves are steers, records of heifer calves should be adjusted upward to a steer basis by multiplying by 1.05 and records of any bull calves should be adjusted to a steer basis by subtracting 5 percent or multiplying by .95.

Yearling Record

Yearling weight at 365-days or long yearling weights at 550 days are particularly important because of their high heritability and high genetic association with efficiency of gain and pounds of retail trimmed boneless beef produced.

Yearling weights should be computed and reported separately for each sex. In on-the-farm or ranch tests, the yearling weight program should start on the date weaning weights are obtained and actual weaning weight is used as initial weight on test. It is desirable to add yearling gains in a 160 day yearling period to 205 day weaning weight, adjusted for age of dam, to arrive at an adjusted 365-day weight. The following formula is recommended:

$$\text{Adjusted 365 day wt.} = \frac{\text{actual final weight-actual weaning weight}}{\text{Number of days between weights}}$$

x160 + weaning weight (205 days) adjusted for age of dam

The period between weaning weight and final weight should be at least 160 days, final weight should not be taken at less than 330 days of age for any individual animal and the average age for each sex group should be at least 365 days. It is recommended that the number of days between weaning and final weight be the same for all animals of the same sex in a herd. By use of this procedure, it is necessary to obtain only weaning weight and yearling weight on each animal.

The procedure of using adjusted 365-day weights as a measure of yearling weight will apply primarily to herds that develop bulls on a rather high level of concentrated feeding starting at weaning time. For herds that prefer to develop bulls more slowly, and with lower level of feeding for growing out potential replacement heifers, a long yearling weight may be used as an alternative to adjusted 365-day weights. This is accomplished by measuring growth rate in the period of approximately 345 days after weaning, with weaning weight and weaning date being the initial weight and starting date of the yearling period.

Adjusted long yearling weight (550 days) for each sex should be computed in the same manner as adjusted 365-day weight.

$$\text{Adjusted 550-day wt.} = \frac{\text{actual final weight-actual weaning weight}}{\text{Number of days between weights}}$$

x345 + weaning weight (205 days) adjusted for age of dam

Final weight should not be taken at less than 500 days of age when estimating 550-day weight.

Weight ratios. Weight ratios for either adjusted 365-day weight (yearling), or adjusted 550-day weight (long yearling) should be computed and reported separately for each sex.

Form D-917d, ***Yearling Cattle***, is a convenient form for recording yearling information.

140-Day Gain Test. Form D-917e, ***Gain Record***, is a convenient way to keep records on cattle on a gain test. This form suggests that two initial weights are taken on consecutive days and an average of that weight used for the beginning weight. Generally, cattle are not shrunk for either initial or final weight in a gain test. The form is designed for weighing the cattle every 28 days, a common practice on gain tests. These 28-day weights are primarily for the feeder because average rate of gain will indicate the success or failure of the nutrition and health program. Final weights are also suggested to be the average of two weights taken on consecutive days. Grades should be based on the grading system used for weaning calves.

Gain tests have been justly criticized in the past because of wide differences in age and nutritional background of the cattle placed on feed. On-the-farm tests are generally more reliable if the cattle being tested are limited to groups placed on feed at 7 to 9 months of age.

In looking at 140-day gain test results, particularly from central gain test, always look at weaning weights and weight per day of age as well as gain on tests. A low weight for day of age and a high gain per day on test indicates an extremely low weaning weight or a long period of little or no gain before the cattle are placed on test. This may mean much of the superiority in rate of gain on test is compensatory gain instead of genetic ability to grow rapidly.

Slaughter Cattle

Farmers and ranchers who produce breeding cattle should attempt to gather slaughter information on representative samples of cattle from time to time to determine the kind of carcasses their cattle will reproduce. This information does not necessarily have to come from the ranch itself but can come from cattle you produced but which were fed by someone else. An eartag, furnished by the United States Department of Agriculture through the Texas Agricultural Extension Service, placed in the ear of slaughter cattle sired by your bull would furnish information needed for Form D-917f, ***Slaughter Cattle***. These tags cost $.50 each, payable upon order of the tags, plus $.75 for an attachment tool. At the time the steer is slaughtered, six to fifteen months after weaning, the carcass data is returned to the Texas Agricultural Extension Service. When this data is received by the Texas Agricultural Extension Service, you will be billed $1.50 a head for each completed data report. This makes it possible for a breeder to be able to document the carcass characteristics of the cattle he has been reproducing.

Young Breeding Cattle

With crossbreeding, which provides opportunities to breed extremely small cows artificially to bulls with high growth rate, there may develop a problem with ability to calve unassisted. With the increased milk production bred into some of the new crosses, there may be problems with rebreeding after the first calf and with the cow's ability to calve again as a 3-year-old. Form D-917g, ***Young Breeding Cattle,*** is designed to record evaluative information concerning a breeding program. It could convince a buyer that your particular cross will begin cycling and conceive in time to calve at or before 24-months of age, give birth to calves unassisted and, under your nutrition program, rebreed within 90 days. This kind of record from those who have purchased replacement heifers from you would be useful. Table 5 is used in many research projects and is easily understood.

Table 5. Calving difficulty scores

Score	Description
1. No difficulty	Calves unassisted; however it may be necessary to straighten head and/or front legs.
2. Calf pulled	Assistance given with jack or calf puller; some difficulty was encountered even with the pullers being used.
3. Caesarean birth	Performed after it was determined calf could not be delivered with a calf-puller.
4. Genetic abnormality	Snorter dwarf, cleft palate, bent pastum, double muscling, etc.

Individual Cow Record

Individual cow records are the most interesting record on any breeding herd. Breeders learn to watch cattle with outstanding records, hoping for the best calf ever produced by their herd. A negative kind of anxiety will build with cows with low production records. It becomes necessary for the breeder to make decisions concerning replacement of particular cows if their production does not increase. Use of the term "Most Probable Producing Ability (MPPA)" is new in the Individual Cow Record, D-917h. This is a way of combining the total genetic effect of average weaning weight ratio and average yearling weight ratio with the number of offspring to predict each cow's probable future production.

Probably the greatest usefulness of MPPA is in comparing cows that have produced only one calf with those that have been in the breeding herd for long periods of time. This method is not as effective as estimated breeding value but estimated breeding value must be calculated with a computer.

It is recommended that MPPA be included first on the ***Individual Cow Record***. Then a dam summary can be developed to rank all of the dams based on their MPPA for 205-day weaning weight ratio or a yearling rate ratio. This allows comparison of dams that do not have the same number of calf records. For example, suppose six cows have the following levels of production:

Cow	Number of calves	Average weaning weight ratic	MPPA
A	1	85	94.0
B	2	88	93.2
C	4	90	92.7
D	3	110	106.7
E	4	112	108.8
F	1	115	106.0

MPPA is helpful in identifying the lowest producing cows to be culled. In the example, cow A has the lowest lifetime average. However, this is for only a single calf for which environmental conditions or the calf's genetic potential for growth might have been below the average of what the cow would normally produce. One or more calves from cows B or C could also have had a record of 85 or less. All three cows are probably low producers but MPPA enables more accurate culling and in this example indicates that cows B and C are slightly lower producing cows than A.

MPPA for weaning weight ratio is computed by the following formula:

$$MPPA = H + \frac{NR}{1+(N-1)R} (C - H)$$

where H = 100, the herd average weaning weight ratio,

N=the number of calves included in the cow's average,

R=.4, the repeatibility factor for weaning weight ratio,

and C= average for weaning weight ratio for all calves the cow has produced.

Cost and Income

Cost and income records for this kind of ranch operation would be on a per cow and a per calf basis. Since most people do not sell breeding cattle on a per pound basis, this will vary some from the usual commercial operation.

There is always the problem of how to handle land costs when keeping cost records. Generally, the most accepted way to establish land cost is to estimate a rent or lease value of the particular piece of property. This leaves part of the land cost as an investment in land that you expect to appreciate in value two or more percent per year. In some areas of the state, land values include mineral rights which means the possibility of a oil lease or oil and gas production that may affect the total land value.

In breeding herds, there is an extremely high per animal cost. If these animals are purchased this is not hard to establish. If you raise them yourself there is the question of a fair market value. It is suggested that you estimate the sale value of the animal at the time it is placed in the breeding herd. These two figures plus above average nutrition contribute to high cow cost. In form D-917h there is a column for cow cost at weaning plus cost after weaning since most young breeding cattle are sold at 12 to 15 months of age.

The rancher will be faced with decisions concerning individual cows. For example, in a purebred herd, a rancher could have a cow that would not rebreed while nursing a calf, thereby calving only every 18 to 20 months. An economic analysis of her record shows that, as a financial investment, she returns 100 percent or more on the total investment. The question would be whether the cow should be retained or culled if she produces lines of cattle with low reproductive rates even though her offspring may be considerably above average in other traits.

At this stage, a producer must make a decision as to whether his primary goal is to improve the cattle in all important economic traits or to make money. Form D-917i, ***Cost and Income***, which suggests a convenient method of establishing a life time cost and income record on individual cows, can help the rancher to make decisions.

Date _____ Present Production Goals for _____

PRODUCTION	Number	Percentage	NUMBER	Percentage
Cows bred				
Calves born				
Calves Weaned				
Average weaning weights				

QUALITY

Age and weight into feedlot		
Number of days before official test begins		
Age and weight at beginning of official test		
Age and weight 140-days later		
Rate and efficiency of gain during test period		
Estimated quality grade at end of test period		
Estimated yield grade at end of test period		

D-917b

HERD BULLS
Production and Quality Information

						Remarks
Year						
Number of bulls purchased						
Percent of total bulls used						
Individual Information						
Birth weight, lb.						
205-day weight, lb.						
205-day wt., ratio						
140-day gain test, lb.						
140-day gain test, ratio						
Yearling weight, lb.						
Yearling weight, ratio						
Steer half sibs - Production & Product						
No. of half sibs						
Day on feed						
Feedlot gain, lb./day						
Feed per lb. of gain						
Slaughter weight						
Quality grade						
Yield grade						

D-917c

WEANING CALVES

Calf Weights, Cow Weights and Ratios

Date ____________________ Sex ____________________

Herd no.	Dam	Sire	Date of birth	Age in days	Actual weight	Adj. wt. 205 days	Adj. wt. dam's age	Weight ratio	Grade	Dam weight	Prod. ratio	Remarks

D-917d

YEARLING CATTLE

Yearling Weights and Grades

Date ______________________________ Sex ____________________

				Weaning Data			Yearling Data (365 or 550)					
Herd no.	Dam	Sire	Date of birth	Actual weight	Adj. wt. dam's age	Weight ratio	Actual weight	Gain	Adjusted weight	Weight ratio	Grade	Remarks

D-917e

YEARLING CATTLE
140-Day Gain Tests

Date ______________________ Sex ______________________

Dates														
Herd no.	Initial weights			1st wt. & gain	2nd wt. & gain	3rd wt. & gain	4th wt. & gain	Final weights			Total gain	Av. daily	140-day gain	Grade
	1st	2nd	Ave.					1st	2nd	Av.				

SLAUGHTER CATTLE

Individual Carcass Information

D-917f

Calf Crop ____________________

Herd no.	Sire	Eartag number	Conformation (thirds of a grade)	Maturity (thirds of a group)	Marbling (thirds of a degree)	Quality grade (thirds of a grade)	Packer's warm carcass weight (lbs.)	Adjusted fat thickness (inches)	Ribeye area (sq. inches)	Kidney pelvic, & heart fat (percent)	Yield grade (tenths)	Evaluation date

YOUNG BREEDING CATTLE
Breeding and Calving Records

Calf Crop _____

Herd No.	First Pregnancy						Second Pregnancy					
	1st Breeding Season			Calving Information			2nd Breeding Season			Calving Information		
	Date	Age of heifer*	Conceived**	Date	Sex	Calving score	Date	Weeks after calving	Conceived**	Date	Sex	Calving score

* Months at beginning of breeding season

**Weeks into the breeding season

D-917h

INDIVIDUAL COWS

Calf Records and MPPA

Date of Birth _____ Herd or Chain No. _____

Sire _____ / _____ / _____ / _____ / _____
Name / Number / Wn. Wt. Ratio / Yr. Wt. Ratio / Yr. Wt. lbs.

Cow _____ / _____ / _____ / _____ / _____
Name / Number / Wn. Wt. Ratio / Yr. Wt. Ratio / Yr. Wt. lbs.

Dam _____ / _____ / _____ / _____ / _____
Name / Number / Wn. Wt. Ratio / Yr. Wt. Ratio / Yr. Wt. lbs.

			Weaning Data				Yearling Data (365 or 530)					
Herd No.	Sire	Date of birth	Actual weight	Adjusted weight	Weight ratio	MPPA	Actual weight	Gain	Adjusted weight	Weight ratio	MPPA	Remarks

COST AND INCOME
Per Cow and Per Calf

Date of Birth _____ Herd No. _____

Sire _____

Cow _____

Dam _____

Values or cost when entering the breeding herd $ _____ Annual depreciation rate $ _____

Herd no.	Sire	Date of birth	Cow's * cost at weaning	Costs** after weaning	Total costs	Selling price	Profit	Remarks

* Depreciation plus cow costs since last calf weaned

**If any

CHART FOR CALCULATING DAYS OF AGE

	1 Jan.	2 Feb.	3 March	4 April	5 May	6 June	7 July	8 Aug.	9 Sept.	10 Oct.	11 Nov.	12 Dec.	
1	0 365	31 334	59 306	90 275	120 245	151 214	181 184	212 153	243 122	273 92	304 61	334 31	1
2	1 364	32 333	60 305	91 274	121 244	152 213	182 183	213 152	244 121	274 91	305 60	335 30	2
3	2 363	33 332	61 304	92 273	122 243	153 212	183 182	214 151	245 120	275 90	306 59	336 29	3
4	3 362	34 331	62 303	93 272	123 242	154 211	184 181	215 150	246 119	276 89	307 58	337 28	4
5	4 361	35 330	63 302	94 271	124 241	155 210	185 180	216 149	247 118	277 88	308 57	338 27	5
6	5 360	36 329	64 301	95 270	125 240	156 209	186 179	217 148	248 117	278 87	309 56	339 26	6
7	6 359	37 328	65 300	96 269	126 239	157 208	187 178	218 147	249 116	279 86	310 55	340 25	7
8	7 358	38 327	66 299	97 268	127 238	158 207	188 177	219 146	250 115	280 85	311 54	341 24	8
9	8 357	39 326	67 298	98 267	128 237	159 206	189 176	220 145	251 114	281 84	312 53	342 23	9
10	9 356	40 325	68 297	99 266	129 236	160 205	190 175	221 144	252 113	282 83	313 52	343 22	10
11	10 355	41 324	69 296	100 265	130 235	161 204	191 174	222 143	253 112	283 82	314 51	344 21	11
12	11 354	42 323	70 295	101 264	131 234	162 203	192 173	223 142	254 111	284 81	315 50	345 20	12
13	12 353	43 322	71 294	102 263	132 233	163 202	193 172	224 141	255 110	285 80	316 49	346 19	13
14	13 352	44 321	72 293	103 262	133 232	164 201	194 171	225 140	256 109	286 79	317 48	347 18	14
15	14 351	45 320	73 292	104 261	134 231	165 200	195 170	226 139	257 108	287 78	318 47	348 17	15
16	15 350	46 319	74 291	105 260	135 230	166 199	196 169	227 138	258 107	288 77	319 46	349 16	16
17	16 349	47 318	75 290	106 259	136 229	167 198	197 168	228 137	259 106	289 76	320 45	350 15	17
18	17 348	48 317	76 289	107 258	137 228	168 197	198 167	229 136	260 105	290 75	321 44	351 14	18
19	18 347	49 316	77 288	108 257	138 227	169 196	199 166	230 135	261 104	291 74	322 43	352 13	19
20	19 346	50 315	78 287	109 256	139 226	170 195	200 165	231 134	262 103	292 73	323 42	353 12	20
21	20 345	51 314	79 286	110 255	140 225	171 194	201 164	232 133	263 102	293 72	324 41	354 11	21
22	21 344	52 313	80 285	111 254	141 224	172 193	202 163	233 132	264 101	294 71	325 40	355 10	22
23	22 343	53 312	81 284	112 253	142 223	173 192	203 162	234 131	265 100	295 70	326 39	356 9	23
24	23 342	54 311	82 283	113 252	143 222	174 191	204 161	235 130	266 99	296 69	327 38	357 8	24
25	24 341	55 310	83 282	114 251	144 221	175 190	205 160	236 129	267 98	297 68	328 37	358 7	25
26	25 340	56 309	84 281	115 250	145 220	176 189	206 159	237 128	268 97	298 67	329 36	359 6	26
27	26 339	57 308	85 280	116 249	146 219	177 188	207 158	238 127	269 96	299 66	330 35	360 5	27
28	27 338	58 307	86 279	117 248	147 218	178 187	208 157	239 126	270 95	300 65	331 34	361 4	28
29	28 337	— —	87 278	118 247	148 217	179 186	209 156	240 125	271 94	301 64	332 33	362 3	29
30	29 336	— —	88 277	119 246	149 216	180 185	210 155	241 124	272 93	302 63	333 32	363 2	30
31	30 335	— —	89 276	— —	150 215	— —	211 154	242 123	— —	303 62	— —	364 1	31
	Jan. 1	Feb. 2	March 3	April 4	May 5	June 6	July 7	Aug. 8	Sept. 9	Oct. 10	Nov. 11	Dec. 12	

EXAMPLE: A calf born November 10, 1964 and weighed May 31, 1965. Looking across from 10 under November, the bottom number shows that it was 52 days before January 1. Looking across from 31 and May, the top number shows that it was 150 days since January 1. By adding both numbers we find the calf is 202 days of age on May 31, 1965.

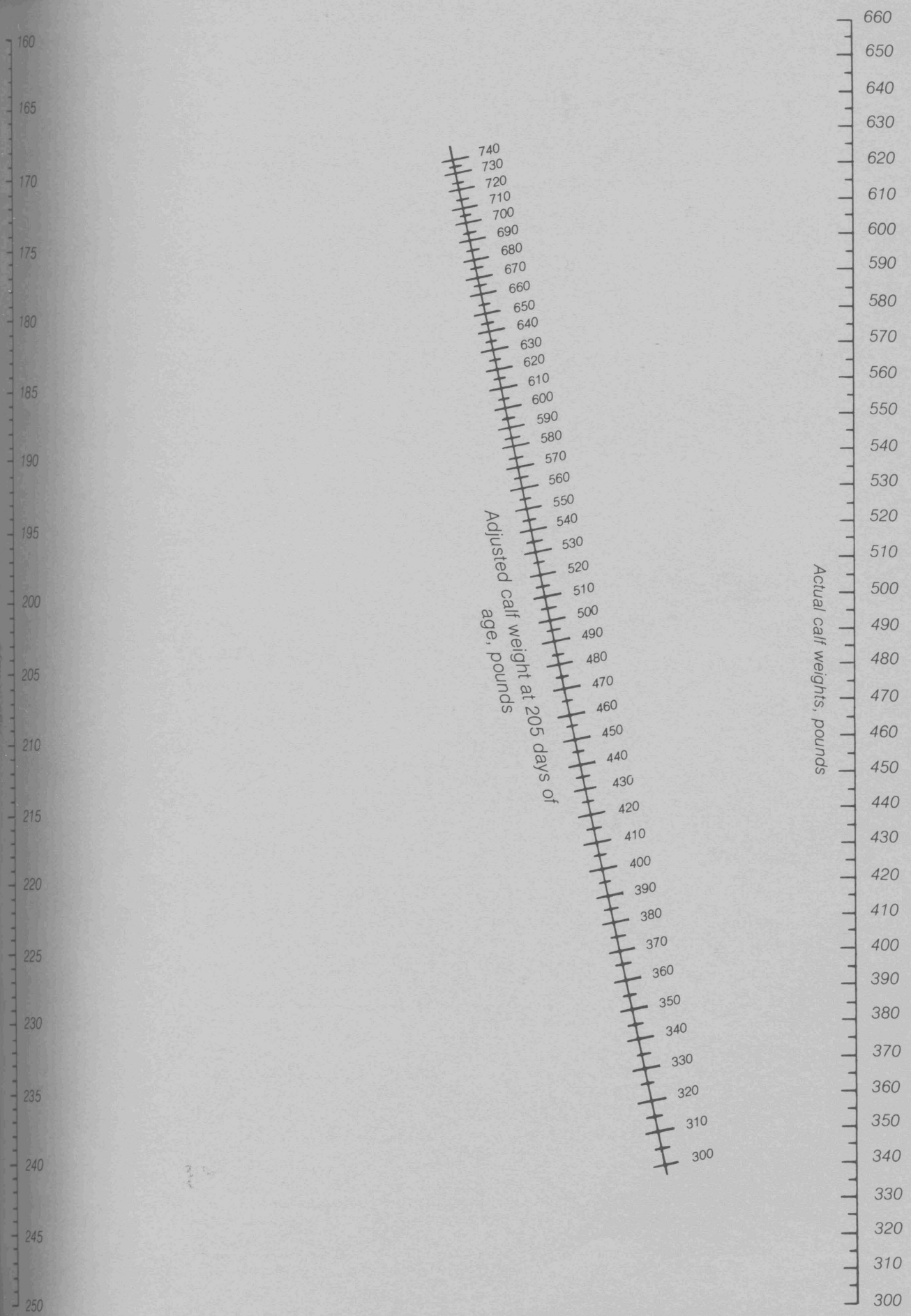

Fig. 1. A means of adjusting the weight of calves to 205 days of age. Use a straight edge to connect age in days with actual weight and read the adjusted weith at 205 days of age on the center scale. This chart was developed by subtracting an average birth weight of 70 pounds, calculating gain per day of age, multiplying this gain by 205, and adding the 70 pounds birth weight.

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