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AGRICULTURAL EXTENSION DIVISION
UNIVERSITY OF MINNESOTA

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MINNESOTA FARM BUSINESS NOTES

No. 117 August 20, 1932

Prepared by the Division of Agricultural Economics
University Farm, St. Paul, Minnesota

SOME CAUSES OF VARIATIONS IN SHRINKAGE ON LIVESTOCK

Prepared by J. B. McNulty and D. C. Dvoracek

In general livestock weighs less when it reaches market than when received at the local shipping point. This is true even though the animals are fed after arriving at the terminal market. Shippers commonly describe this loss of weight in transit as "shrinkage". The following paragraphs present an analysis of shrinkage of livestock shipped by rail.

The livestock studied was received from livestock shipping associations at Minnesota points located from 30 to 350 miles from the South St. Paul market. On only a few consignments did the distance exceed 300 miles and the livestock was not unloaded for feeding enroute. In order to make observations on the effect of distance, shipments were classified into three zones as follows: under 100 miles, 100-199 miles, and 200-299 miles. Shrinkage was determined by subtracting the weight when sold at the terminal market from the weight when delivered at the local shipping point. Because there is some loss of weight in moving livestock from the farm to the local shipping point, the data obtained in this study are certain to show a somewhat lower shrinkage than if home weights were taken before the livestock left the farm. As few farms are equipped with a scale for weighing livestock, the usual practice of shippers is to use weights at the local shipping point as home weights in determining shrinkage. Because the procedure for determining shrinkage followed in this work is the same as that used by shippers generally, the observations made may be useful to shippers interested in making comparisons, or in obtaining further information on this problem. Readers should not conclude that the same general effects of distance from market herein reported will be observed when livestock is shipped a longer distance than 300 miles. At longer distances and especially under unfavorable climatic conditions, shrinkage is likely to include some actual loss in weight from the carcass, whereas, for the distances studied in this investigation, the shrinkage may be due entirely to losses from the digestive system. Under these latter conditions, feeding after arrival at the market can be an important factor in reducing shrinkage.

With the exception of a short period of recent date when hogs were at the lowest level since 1898, the difference between the sale price of livestock and the cost of feed at the terminal market has been sufficient to make it profitable for producers, in their efforts to reduce shrinkage, to feed liberally after the livestock arrived on the market. Though feeding and handling, both before and after delivery to the local shipper are very important, they are not the only factors affecting shrinkage. Observations based on the home and market weights of 18,385 cattle, 27,933 calves, 100,706 hogs, and 24,252 sheep indicate the distance from market and seasonal or climatic conditions also influence shrinkage on livestock. The analysis of the influence of these two factors is given in the following paragraphs.

Published in furtherance of Agricultural Extension Act of May 8, 1914, F. W. Peck, Director, Agricultural Extension Division, Department of Agriculture, University of Minnesota, cooperating with U. S. Department of Agriculture.

Table 1

A Comparison of the Shrinkage of the Different Kinds of Livestock, For A Period of 3 Years, 1929-1931
(Shrinkage Expressed on a Percentage of Home Weight)

Kind	No. of Head	Per cent of Shrinkage
Cattle	18,385	1.97
Calves	27,933	4.31
Hogs	100.706	1.38
Sheep	24,252	3.89

Shrinkage on calves and sheep was about two times and that on cattle three times as much as that on hogs when, as in Table 1, the calculations included all shipments under 300 miles for all seasons. Inasmuch as cattle, calves, hogs and sheep were received from nearly all of the 56 consignors studied, the question as to whether the marked differences observed in the shrink of these four species might be due in part to differences in distances from market need not be considered.

Table 2

Relation of Distance to the Shrinkage of Livestock, 1929-1931

Kind	Average All Distances	Under 100 miles	100 to 199 miles	200 to 299 miles
	Per cent	Per cent	Per cent	Per cent
Cattle	1.97	2.38	2.27	1.52
Calves	4.31	3.87	4.60	4.03
Hogs	1.38	1.23	1.13	1.70
Sheep	3.89	4.08	3.91	3.81

The data of Table 2 gives evidence of a striking contrast of the effect of distance on shrinkage on hogs and cattle. For example, the shrinkage on a 20,000 pound shipment of cattle would, according to the data of Table 2, be 476 pounds when shipped less than 100 miles and 304 pounds when shipped 200-299 miles. This is a 36 per cent decrease on the longer shipments of cattle. On a 20,000 pound shipment of hogs, shrinkage would be 246 pounds when shipped less than 100 miles and 340 pounds when shipped 200-299 miles. This is an increase of 38 per cent on the longer shipments of hogs.

The decrease in shrinkage on hogs and cattle shipped 100-199 miles, when compared with shipments of less than 100 miles, Table 2, are so slight that they might easily be due to errors in weighing. This should be kept in mind when comparing shrinkage on shipments under 100 miles with shrinkage on shipments of 100-199 miles on both hogs and cattle. It is significant, however, that the shrinkage on hogs, though approximately the same in the first two zones, increased decisively on shipments from the third zone. Apparently, hogs are in a better condition to take on a fill when shipped 100-199 miles than when shipped 200-299 miles. Very probably this is due to the tendency for hogs shipped this longer distance to be worn out and as a result they fail to eat enough to make up for the losses from the digestive system during transit. More time for rest before feeding and weighing should, on the basis of this explanation, result in a reduced shrinkage.

Sheep and calves had fairly uniform shrinkages of approximately 4 per cent regardless of the distance shipped.

Table 3

A Comparison of the Seasonal Shrinkage of Livestock

Kind	Yearly Average	Winter	Spring	Summer	Fall
	Per cent	Per cent	Per cent	Per cent	Per cent
Cattle	1.97	2.39	2.26	1.40	1.80
Calves	4.31	5.01	4.30	3.46	4.16
Hogs	1.38	.86	1.33	1.72	1.72
Sheep	3.89	1.81	3.45	4.74	4.36

Table 3 indicates that cattle and calves had their highest shrinkage in winter, while hogs and sheep had their highest shrinkage in summer. Apparently, cattle and calves suffer more from exposure to cold than from exposure to heat, whereas the reverse is true of hogs and sheep. It is not true, however, that sheep and hogs are immune to cold, because hogs shipped in extreme cold may arrive with frosted hams, if not bedded heavily. This suggests the need of special care in preparing the car for shipping livestock, and especially for cattle and calves in extremely cold weather. For hogs, frequent sprinkling in extreme heat or even icing the car are good practices to keep shrinkage at a minimum. Fall shipments of hogs shrank nearly as much as summer shipments. This may be due to a tendency to overload cars in the fall when the heaviest movement of hogs takes place.

Table 4

A Comparison of the Seasonal Shrinkage on Livestock when Shipped Varying Distances

	Winter	Spring	Summer	Fall	Average all seasons, 1929-1931
	Per cent	Per cent	Per cent	Per cent	
		Cattle			
Under 100 miles	2.34	2.81	1.38	2.44	2.38
100 - 199 miles	2.75	2.28	2.08	2.05	2.27
200 - 299 miles	1.99	2.05	.78	1.34	1.52
		Calves			
Under 100 miles	4.10	4.06	3.58	3.18	3.87
100 - 199 miles	5.36	4.32	3.85	4.73	4.60
200 - 299 miles	4.83	4.41	2.93	4.16	4.03
		Hogs			
Under 100 miles	.73	1.42	1.84	1.99	1.23
100 - 199 miles	.60	1.17	1.24	1.41	1.13
200 - 299 miles	1.17	1.48	2.24	1.93	1.70
		Sheep			
Under 100 miles	1.83	4.45	5.82	4.11	4.08
100 - 199 miles	1.96	3.06	5.29	4.42	3.91
200 - 299 miles	1.20	3.56	3.43	4.32	3.81

Observations on the effect of both distance and seasons may be made from Table 4.

Cattle, when shipped 100-199 miles, tended to maintain a high shrinkage in summer, while those shipped less than 100 or 200-299 miles, had shrinkages that were decidedly lowest in summer. A possible explanation of this may lie in the fact that cattle shipped over 200 miles arrived more hungry and thirsty and therefore

tended to consume more feed and water at the market than those shipped 100-199 miles. With reference to the shrink of 1.38 per cent on cattle shipped less than 100 miles in summer, it appears that at this shorter distance the cattle had lost less, particularly of the solids in the digestive system, than those shipped longer distances. Consequently, this loss was more nearly balanced by a heavy water consumption than in the case of those shipped 200 miles.

As with cattle, the minimum shrinkage on calves resulted when shipments were made in the summer months and from points 200-299 miles from market. Since veal calves are not likely to consume much dry feed, regardless of the distance shipped, it appears that this marked reduction in shrinkage may be due to a heavy water consumption after arrival or to more favorable climatic conditions enroute to the market, or to both. No doubt the high shrinkage observed on calves in the winter seasons, for all distances, were due very largely to exposure to wintry weather. Cold and exposure would tend to cause a loss of weight without stimulating an appetite for water.

Hogs showed a shrinkage that varied from a minimum of .6 per cent for a distance of 100-199 miles in winter to a maximum of 2.24 per cent for a distance of 200-299 miles in summer. For all seasons, hogs shipped from 100-199 miles shrink less than for the other distances.

According to the data of Table 4, shrinkage on sheep was highest, 5.8 per cent, on summer shipments of less than 100 miles, and lowest, 1.2 per cent, on winter shipments. Shrinkage on winter shipments of 200-299 was approximately one-third as much as on spring, summer and fall shipments. These observations emphasize the extent to which shrinkage on sheep may vary as a result of seasonal conditions.

With the exception of fall, when there was little variation, shrinkage in all seasons, and for the three-year period, was less on shipments of 200-299 miles, than on shipments of less than 100 miles. In the summer season, shrinkage declined from the maximum of 5.82 per cent, on shipments of less than 100 miles, to 3.43 per cent on shipments of 200-299 miles.

This decrease in shrinkage noted on longer shipments, may have been due to a tendency for sheep to become "more settled" as the period in transit increased and, therefore, to arrive at the market in a better condition for taking on a fill. If this be the explanation, it seems probable that the higher shrinkages observed on shipments under 100 miles, might have been reduced if longer periods had been taken for rest before feeding and weighing.

The reader is cautioned against drawing the conclusion that distance from market or seasonal conditions will account for all variations in shrinkage. Some shippers who follow the practice of marking all animals at the time of delivery, report little or no shrinkage. A few even report gains. When livestock is branded and weighed at the time of delivery, each consignor takes his own shrinkage and this practice tends to discourage heavy feeding by producers just before shipment. Such livestock reaches the terminal market with keen appetites. Much feed is consumed and shrinkage is greatly reduced or, as some state, "eliminated entirely".

Obviously feed consumed a few hours before slaughter can not add much to the carcass or dressed weight of livestock and, therefore, heavy filling before slaughter may be uneconomical. On those terminal markets where livestock is received from points varying widely in distance, however, the opportunity for livestock to consume feed before being sold is held to be a practice necessary for obtaining fair sale weights.

MINNESOTA FARM PRICES FOR JULY 1932

Prepared by Adena E. Erickson

The index number of Minnesota farm prices for the month of July 1932 was 43.7. When the average of farm prices of the three Julys of 1924-25-26 is represented by 100, the indexes for July of each year from 1924 to date are as follows:

July	1924 -	84.8
"	1925 -	107.3
"	1926 -	107.4
"	1927 -	97.8
"	1928 -	110.3
"	1929 -	109.5
"	1930 -	82.5*
"	1931 -	58.1*
"	1932 -	43.7*

*Preliminary

The price index of 43.7 for the past month is the net result of increases and decreases in the prices of farm products in July 1932 over the average of July 1924-25-26 weighted according to their relative importance.

Average Farm Prices Used in Computing the Minnesota Farm Price Index, July 15, 1932 with Comparisons*

	July 15, 1932	June 15, 1932	July 15, 1931	Av. July 1924-25-26	% July 15, 1932 is of June 15, 1932	% July 15, 1932 is of July 15, 1931	% July 15, 1932 is of July 15, 1924-25-26
Wheat	$.38	$.43	$.48	$1.39	88	79	27
Corn	.28	.26	.43	.80	108	65	35
Oats	.15	.17	.20	.39	88	75	38
Barley	.22	.26	.26	.64	85	85	34
Rye	.20	.21	.23	.72	95	87	28
Flax	.83	.88	1.38	2.21	94	60	38
Potatoes	.34	.32	.95	.97	106	36	35
Hogs	4.30	2.70	5.80	9.99	159	74	43
Cattle	4.90	3.70	4.90	6.17	132	100	79
Calves	5.00	4.50	6.40	9.10	111	78	55
Lambs-sheep	4.66	4.53	5.85	11.33	103	80	41
Chickens	.090	.083	.137	.181	108	66	50
Eggs	.10	.09	.13	.24	111	77	42
Butterfat	.16	.16	.23	.41	100	70	39
Hay	7.20	7.72	8.86	11.70	93	81	61
Milk	1.05	1.04	1.56	2.01	101	67	52

*Except for milk, these are the average prices for Minnesota as reported by the United States Department of Agriculture.