I might first say that I am sorry I did not have time to concoct some slides but I do have some more information on lambs. Earlier this spring, Jim Kemp wrote to me and asked what studies we are carrying on in Illinois in lamb carcass studies. At that time I indicated these things which you see on this afternoon's program. However, this is not the case in the information that we have available, and so I have changed the title of my paper to correspond to the work that is in progress. The work that we have in part is covered by the title, "The Effects of High Corn Oil on Lamb Characteristics and the Use of Specific Gravity as an Index to Degree of Finish."

Briefly, in this procedure the lamb carcasses were placed in a cooler at $34^\circ \text{F.}$ after slaughtering and dressing. Then after 48 hours, the chilled carcasses were graded to the nearest one-third grade according to the U.S.D.A. specifications. The carcasses were weighed to the nearest one-half pound on a track scale. Then in getting specific gravity the carcasses were submerged in water and allowed to lay in a horizontal position. The water was maintained at a temperature of $34$ to $36^\circ \text{F.}$ and the weight of the carcass was read to the nearest $1/19$th gram. However, it is presumed that the accuracy of the weight was no greater than to the nearest 5 grams, since the carcass did not completely stop moving before the weight was read.

Care was taken to prevent the entrapment of air inside the carcass during this process of determining specific gravity and specific gravity was determined by the usual equation; that is, specific gravity is equal to the carcass weight in air divided by the carcass weight in air minus the carcass weight in water.

In the case of lambs on which ether extract was determined, the right side was boned out, and the composite mass of boneless meat, including the kidney fat but excluding the kidney, was ground through a grinder, using a plate $1/8$th of an inch in diameter, and thorough mixing was accomplished by these several grindings.

The samples were frozen and stored in airtight container at minus $5^\circ \text{F.}$ for subsequent determination of ether extract by the AOAC method of continuous extraction. In the carcass characteristics which follow here you will notice the U.S.D.A. grade specific gravity ether extraction.

In addition we determined on these lambs the iodine number. Sample of external fat was removed from over the loin on the left side of the carcass for the iodine number determination. We had boned out completely the right side and ground it up to get a composite sample for the
ether extraction. These samples for iodine number then were frozen and stored in airtight container at minus 5° F. for approximately two months. That was for our convenience until we could find time to run them.

Samples were then ground, placed in a constant temperature oven which was maintained at 60 to 65° C. and these samples were rendered for 90 minutes and then filtered through four thicknesses of cheese cloth. Duplicate samples of the rendered fat were weighed by difference and iodine number was determined according to the AOAC method.

The trait test was used to determine whether or not significant differences in carcasses could be attributed to the feedlot treatment. The coefficient was calculated and correlated with the various measurements of carcass characteristics.

In dealing with this high oil corn -- and that is primarily the carcass studies that we have been conducting at Illinois recently -- there has been considerable interest in the practicality of increasing the energy value of animal rations by using animal fats or high oil corn. Several hybrid varieties of corn have been developed which contain comparatively high levels of protein and fat, and we notice quite frequently that as they get a high level of protein they also get a high level of fat.

Terrill and others in 1951 reported that two groups of hogs receiving corn containing 4.7 and 6.4 per cent fat respectively did not give significant differences in carcass traits.

Several workers, including Ross and others, in 1954, conducted experiments to study the effect of corn containing different amounts of proteins on lambs.

The lamb carcass studies which are the subject of this report were carried out recently at Illinois in order to compare the effect of high oil corn with regular corn. The high oil corn that they were using at Illinois had an average of 8.3 per cent fat as compared to the regular corn which had 4.1. I might also point out that the crude protein content of the high oil corn was 11.7 per cent and the regular corn 7.9 per cent.

There were 32 lambs on each of the two studies of this corn. However, only 16 of the lambs were used in this study. In other words, for the studies that we have made of these various traits we used only 16 lambs rather than the total of 64.

The results of the feeding experiments have not been analyzed statistically, although they indicate a slightly higher average daily gain and also a slightly greater feed efficiency for the lambs receiving the high oil corn.

In comparing the mean value of these carcass characteristics in this study I might point out that comparing high oil corn with the regular corn in the 16 lambs that we have studied, the specific gravity for the high oil corn was 1.0420 as compared with 1.0353 for the regular corn.

Upon analyzing the data it was found that there is considerable
correlation of specific gravity with the USDA grade of a negative .585, and on the same 16 lambs a correlation coefficient of specific gravity with ether extract of a negative .622. In analyzing further there was a significant difference at the .05 level of the specific gravity between the two treatments. However, the differences in the other measurements were not found to be significant.

I might further point out that a total of 150 lambs, ranging from average good to average prime, were used to indicate the value of specific gravity as a measurement of finish. In other words, we tried to get a range of as big a spread as we could from the lambs we had available to get a true measure of the specific gravity, so we were only able to get from average good to average prime, but we were still able to get a correlation, as indicated of the specific gravity with the USDA grade of .585 and with the ether extract of .662.

This report is not a complete resume of the carcass studies but rather is a report of the portions of the studies which have been completed to date. The work on arsenic acid and added animal fats indicated on your program is being conducted, but we are not far enough along to present data at this time.

High Oil Corn

References - J. R. Stouffer


MR. ANDERSON: Much interest has been shown in late years with regard to the use of antibiotics and hormones of various kinds and in applying them particularly to the subject in which we are interested at the present moment as far as lamb carcasses and grades are concerned. My observation has been that the responses in many instances have been gratifying as far as gains are concerned, and in some instances the quality of the grade has been very meritorious. In other cases the grade has been on the low side from the standpoint of what we really call quality in lamb carcasses.

Some difference has been noted particularly in the size and quality of lambs at the beginning or the starting of the trial. In the fall the carcass performance has been gratifying, but later on, the second assortment of the lambs, on repeat trial, have been somewhat on the disappointing side. That was our experience at Minnesota during the past winter.

No doubt some of the effects of the hormones and the antibiotics are useful. However, it has been our experience that when the result in quality of carcass had begun to reach a level that was acceptable, the lambs were much too weighty for good market sale and were criticized by the men in the lamb coolers because of weight. So that we had some encouraging results as far as the carcass grades were concerned -- quality -- and others were disappointing.

One point that was mentioned by Professor Soule was with regard to the amount of hormone fed which I think is still in the experimental stage, so that we do not get some of the side effects that were noted on the screen here a short time ago. I think that further research will help us a great deal on that particular part.

There are some important conditions as far as quality is concerned in lamb carcasses that have not been noted by these two papers, unusual cases, and I should like to receive comments from the floor if anyone has had experience with them, and that is where we get off color lamb carcasses. They are not white. They are not icterus, being exceedingly yellow. However, the color is not acceptable. It is a sort of rusty or it might be called a sort of tannish color that is not desirable in lamb carcasses, the color that we find in some of the older sheep. Of course, it is a serious sales proposition as far as the industry is concerned. Maybe some of our members here have had some experience with that.

With those remarks I will call for discussion on the papers or anything that anyone might have to add as to some of the things that we do desire in quality lambs.

MR. BRAY: I do not have much to add but I would like to find out something from Jim Stouffer regarding the use of specific gravity for lamb carcasses. We have made a similar study using specific gravity to try to measure the fat, if any, of the lamb carcass. We have used both the whole carcass and the half carcass, and, although we have not as yet analyzed the data, it surely did not look to me as we went along that we were going to get a very high association between specific
gravity and ether extract of these carcasses. In fact, we had some carcasses that would float in water. We could not get them to sink. It may not be right but we came to the conclusion that we were trapping air underneath the fell, perhaps during the slaughtering operation, and also that there seemed to be considerable air in the membranes in the flank region.

I am just wondering if Jim had any trouble along that line, and if so how he eliminated it. In fact, we tried to push the air out, to puncture the fell, etc., to try to get rid of it, but it did not seem to help us too much.

MR. STOUFFER: Actually, I don't recall that we encountered the difficulty of their floating. Actually, Birdette has done this work and maybe he could answer Bob Bray's question.

MR. BREIDENSTEIN: We had no difficulty with any floating carcasses. However, our sheep division did have difficulty when they tried to do it on the warm carcasses. They could never get them to submerge. We took every precaution we could in submerging the carcasses to prevent entrapment of air, and we did not get anything like air in the fell or in the flank region. I don't have any idea what could happen in the slaughter process to cause that.

MR. KASTELIC: I should like to ask about the experiences that anyone may have had in planting lambs with synovex, because colleagues have told me that their experience with this preparation is that breakjoint closure often takes place and there is difficulty in pelting the carcass. In fact, Dr. Hale's work at Iowa State College would indicate that a rather large percentage of the lambs as compared to the controls treated with synovex had breakjoints that caused the grader to grade them as yearlings.

I wonder if Mr. Kline would care to comment on that. Have you seen those carcasses?

CHAIRMAN KLINE: No, I haven't seen them. Where is Ralph? He has worked with synovex.

MR. SOULE, JR: The Food and Drug Administration said, "We are going to make a pellet using estradiol, which is the natural hormone, along with progesterone, which will counteract the effect of the estradiol in producing these conditions." So they came out with synovex which, as I said before, is 10 milligrams of estradiol and 250 milligrams of progesterone, and it was passed by the Food and Drug Administration. They used those this past year at Garden City.

Davy can tell you about the synovex lambs that were pelleted. In the first place, I happened to be splitting some breast bones and the controls split pretty easily. Davy came along and he was going to split the breast bones of the synovex ones and there was a lot of cussing around there.

Some of those synovex lambs went to the G.I. camp, and the
others were like dish rags, a far greater response to the synovex pellet than there was in those lambs that were given two 15-milligram pellets of diethylstilbestrol three years ago.

As far as the thickness of the fell is concerned, I think the man who has the data on it is Duane Acker who reported on it at Oklahoma Feeders Day.

MR. ACKER: I was just about ready to raise my hand. After that introduction I am sorry that I don't have my briefcase full of facts and figures, but if any of you are interested we would be glad to give you a copy of our Feeders Day report that came out this spring.

We used synovex implantation on one lot of lambs, stilbestrol feeding, and we used a half milligram per pound of feed.

Since we have been on this synovex, if I remember the figures correctly the controls gained about .35 pounds per day in about an 82-day feeding period and the synovex lambs right around a half pound per day, a tremendous response in gain. Maybe it was more than a half pound per day. Of course, with corresponding improvement in feed efficiency.

As far as carcass quality is concerned, I did not get to see the lambs when they were in the cooler because I was at the Southern Agricultural workers meeting. But 34 of the lambs went into the cooler in Oklahoma City. The government grader classed 56 per cent or 20 of the 34 as yearlings, and as the report came back to me he classed them as yearlings not because they were heavier but rather because they were old looking. They had coarse, dark colored meat and appeared to be aged animals. The synovex lambs which were not classed as yearlings which remained as lambs were no lighter than those which were called yearlings, so apparently it was not a function of weight.

Secondly, we had the workers on the kill floor score the difficulty in pelting the lambs -- 1 as easy; 2 as normal; 3 as hard, and 4 as very hard. I am fairly sure of these figures. It seems to me that the controls were about 1.56, half way between easy and normal. Stilbestrol, normal, perhaps 2.2, a little more difficult than normal. The synovex lambs were 3.5. In other words, very difficult to pelt. We took five to Stillwater and slaughtered and pelted them there, and we had to get about three people to sit on them and then pull like mad and I am not very heavy. I cannot do that. We really tore them up getting those pelts off of them.

After the pelt was removed (the carcass was still warm) there was a fibrous mass apparently of connective tissue over the outside of the carcass. You could pull it out and it snapped back like a pair of rubber gloves. When the carcass had chilled, however, and you looked at those lambs in the cooler it appeared as though it was a layer of fat. So I don't think those lambs were knocked in grade as they should have been by the government grader.

Another point on this is that we had an experienced lamb
buyer go through the lambs in the lot. He thought that lot was fatter than the rest. I think he was deceived by the fact that they did have an extra layer of connective tissue in that dermal area. We measured the thickness of the skins, and they were thicker. The lambs yielded less wool upon clipping the pelts.

Then we had a fellow do some staining of a cross-section of the skin area, staining the connective tissue and trying to measure the thickness of the connective tissue, and it was definitely whiter and thicker. So we are very much concerned about this connective tissue, if there is an increase in the production of it. We were convinced with our very rough techniques of measuring -- and they were very rough -- we just stumbled on to it and then we began to take measurements -- we were convinced that there was an abnormal amount of connective tissue there. If it is there how about in the eye muscle?

I wish we could measure it. One thing I hoped to pick up here is how we can measure it accurately. I understand that these collagen and other measurements are very difficult in time and labor consumed.

Since we got that tremendous response with synovex, looking back at the stilbestrol lambs, 9 of the 34, 25 per cent, were classed as yearlings. They were a little more difficult to pelt. Our measurements indicated a very slightly greater thickness of skin. Perhaps we had a slight but the same difference in those, but we didn't have great enough differences to make any conclusions, and our measurement techniques certainly are not accurate enough to say that we had a difference.

I think we do need to develop a lot of measurement techniques in order really to evaluate these things. That is why I agree with Mr. Sulzbacher that one of the functions of this organization should be really to bat these things back and forth and dig into my technique and tell me why I am not getting the answers I should and vice versa.

MR. BRATZLER: Not defending synovex, it was approved by the Pure Food and Drug Administration on the basis of work done at Michigan State. I think it brings up one point in working with these hormones as Ralph has stressed. In addition to the original trial we had a trial this last winter that was not quite as good as the first trial. But I think in working with these hormones we have just about scratched the surface. Maybe our feed in Michigan does not have the estrogenic qualities you gentlemen are acquainted with out in the western area. But whatever it is we did not get any of the severe conditions that we heard about this afternoon. The results of the work that Dr. Aunan has done, and Bob Rust and Bob Deans -- O.D., I don't know whether you helped when you were up there -- but the results that we got and on which approval was given were not nearly as bad as what occurred this afternoon.

I am not defending it. I think this is just pointing it up as something that needs considerable more work. It was approved too soon.
MR. SOULE: Just one more comment. One week after we slaughtered the synovex lambs the man who owned the place sold out. He just completely sold out to somebody else.

MR. EBBING: I might mention that we fed a set of Arizona lambs (they were old for age) in our feeding operation at Waterloo. Two hundred and fifty in each lot. We had a check lot. One was synovex and aureomycin, and one was synovex, and another was stilbestrol and stilbestrol and aureomycin on the fourth or fifth lot. We found a considerable increase on these lambs. They went on experiment in February, 250 in a lot. These synovex lambs did the fastest job of anything we had ever had in our operation, but we experienced some of the same things that were experienced at Oklahoma and Kansas when we slaughtered. It took two boys to pelt each lamb. We broke, I would say, close to 50 per cent of the fells on these synovex lambs. Also about 40 per cent of them had the yearling breakjoints. About 5 per cent of the stilbestrols had the yearling breakjoints. About 1 per cent in the check lot.

We have just completed a review of this thing on a set of Callielambs from California that were young for age. They were killed Saturday morning. I saw them going into the cooler. We still had the problem of pelting them, but we did not have the yearling breakjoints on them that we had on the old lambs that came out of Arizona. The graders are working on them today, so I cannot tell you exactly how they grade. But from observation Saturday morning they looked like they were a little better, holding a little closer together than the first batch of lambs that we did.

I think probably one factor here is the quality of the lambs on some of these experiments and the various treatments have a terrific bearing on it. At least that is just an offhand conclusion of mine. I thought I might throw it in here for what it is worth.

MR. ANDERSON: We thought the same way up in Minnesota that the last bunch of late lambs were not the quality of lambs we like to have. We had to take them if we were going to carry on, but they did not show up as well.

Oliver, have you anything from the West on this?

MR. OLIVER: No, I have no comments. I don't think we have been treating very many.

MR. ANDERSON: Does anyone else wish to be recognized at this time? All right, Mr. Kline, I will turn it back to you.

CHAIRMAN KLINE: Thank you.

Well, we are keeping right on schedule, according to the program.

The next gentleman, of course, needs very little introduction to some of us. To some of you newtimers, of course, we want to
introduce him. He is a former meats worker and is still following very closely our meats work, and he is the gentleman who has been selected to edit our meat judging manual. So we are calling on Dr. Hillier to tell us about the progress of the meat judging manual.

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