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# **Core Testing Grease Wool**

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#### Summary

### Some weaknesses in wool pool operations, as shown by this study, are:

- 1. Pools sell grease wool for a bid price with the addition of subjective deductions for defects not correlated with yield deductions that are assessed by the wool company representative holding the bid contract.
- 2. The average price paid for grease wool to each pool was 1.65 cents per pound less than the contract bid.
- 3. Half of the financial settlements -5 of the 10 were for less than the lowest bid received.
- Some pools received as many as 5 bids with practically unlimited restrictions on discounts. This made it impossible for the high bid to be accepted.
- 5. From this research, it was apparent that when wool was visually appraised, the higher yielding wool was discounted more than the lower yielding wool.

#### Some possible solutions suggested by this research are:

- 1. Small clips can be core tested to determine pounds of clean wool fiber present.
- 2. Pounds of clean wool fiber determined by objective tests on each individual clip reflect true value more accurately than visual appraisal.
- 3. Individual clips with a high yield should receive a relatively higher return than low yielding clips in the pool.
- 4. Collectively, the pounds of clean wool fiber from each individual clip, determined by objective tests, will more nearly represent the true value of the entire wool pool than do subjective estimates.
- 5. A revision to clarify conditions and terms of bid contracts in marketing pool wool is necessary to insure growers of fair financial settlements.



## **Core Testing Grease Wool**

Lowell O. Wilson and Edward P. Duren

An estimated 2 million pounds of grease wool are marketed annually by 23 wool pool organizations in Idaho. This wool is produced mostly in farm flocks of 500 head or less which are managed under pasture conditions. By improving quality, packaging and marketing of grease wool, wool pools have increased returns to farm flock operators. However, when members of wool pools do not know the yield of grease wool sold, they are unable to determine a fair market value for the individual clips within the pool. Generally, the inferior quality wool within a pool sells because the pool also contains superior quality wool. A producer of superior quality wool often receives less than the true market value of his clip, due to visual appraisal.

Core test results have been used more frequently in marketing range wool over the past few years. The wool is not sold through local wool pools in most cases. Research results are available on the accuracy of core testing small clips of wool. Nevertheless, this information is not being put to use in marketing pool wool.

This research was initiated to study the feasibility of core testing individual clips within a wool pool to determine two things:

- 1. clean fiber present in each clip, and
- 2. the amount of clean wool fiber in the entire pool.

With this information individual clips could be appraised on their own merit and the value of the entire pool could be determined objectively.

#### **Core Testing Review**

Previous research shows that shrinkage and clean fiber in a clip of grease wool can be accurately determined by using the core test (Wollner and Tanner, 1941; Johnson and Davis, 1949; USDA, 1956; Keller, 1957a, 1957b, 1959). The core test has proven to be the most accurate method of determining clean fiber in a clip of grease wool. This method provides sampling schedules applicable to clips of various size. The schedules reflect a precision of  $\pm 1\%$  clean wool content at a probability level of 95%.

Accuracy of the core test is reduced by lowering the number of bags cored per test (ASTM, 1971). When testing small clips of wool, only a limited number of bags will be cored. However, when the number of cores taken per bag is increased, the accuracy of testing small clips still exceeds the subjective estimates of the most efficient appraisers. Correlations between the calculated price determined from the core test and grease price estimated from visual judgment indicate that wool sold on a core test alone more nearly approximates the price it should have brought than does wool sold on a visual estimate (Holland, 1961). The quantity of clean wool present in a clip is the main factor determining the true value of the clip.

Staple length is a trait highly correlated (r = .54) with clean fiber. Strictly combing wools yield 2% more clean fiber than average length wool. French combing and clothing wools yield 2.3 and 7.4% less respectively, than average length wools (Davis, 1955). In yearling (12 to 14 months) fine wool, 1 cm in staple length represents approximately 1.13 pounds of grease wool weight. In 58's quality wool, this relationship is 1 cm to 0.98 pounds of grease wool.

Staple length is a trait easy to recognize and to measure. It is highly heritable  $(h^2 = .47)$  and therefore, responds admirably to breeding and selection (SID, 1970). Unfortunately, staple length cannot be determined from the core sample. Samples for length can easily be drawn from bagged wool with the wool hook (Johnson et al., 1951; Johnson et al., 1957; Pohle et al., 1958). Average length can quickly and accurately be determined from these samples. Length of staple can also be measured on the sheep. Length can be determined accurately by using the dye-stripe method (Wilson et al., 1970) for delineating growth length for specific time periods. Measuring length of staple will be less necessary with continued improvements in breeding and selection.



This study demonstrated that when wool was visually appraised, the higher-yielding wool was discounted more from its true value than the lower-yielding wool. High-yielding clips determined by the objective core test should receive higher financial returns than the lower-yielding clips in a pool.

#### Wool Pool

The number of small specialized wool processing facilities has declined sharply in favor of larger plants capable of processing all grades, lengths or qualities of domestic or foreign wools and man-made fibers. These plants purchase all grades and lengths of grease wool on a volume basis at a competitive price and can produce a variety of fabrics — from sheer crepe to saddle blankets.

The number of farm flocks of 500 head or less in the western states has increased while range operations have declined. Movement of smaller clips from the farm to market has gradually becomed the responsibility of local producers. As a result, growers have organized county, area and statewide wool pools to facilitate marketing farm flock clips of grease wool.

#### Price for Pool Wool

Average grease price per pound for clean wool from 21 wool pools in Idaho was 27.11 cents in 1971, 42.20 cents in 1970 and 44.72 cents in 1969. These prices were well in agreement with the domestic wool quotations compiled by the USDA Consumer and Marketing Service (Table 1).

Bid price is determined by the buyer estimate of the percentage of the various grades, lengths and yields of wool in any one pool. These estimates vary among buyers.

#### **Pool and Grower Expense**

- Wool is loaded for shipment at a cost of from \$20 to \$150 per pool.
- 2. A fraction of a cent per pound is assessed each grower for marketing and operating costs of the pool.

#### **Objectives and Advantages of Wool Pools**

- 1. To increase the quantity of high quality wool produced.
- 2. To prepare the grease wool in a more attractive and desirable condition.
- 3. To accumulate a volume of wool large enough to be attractive to the industry.
- 4. To benefit from competitive marketing at a lower sales commission.

#### Disadvantages

- 1. Pools sell grease wool for a bid price with the exception of subjective deductions (for defects not correlated with yield of wool) assessed by the wool company representatives holding the bid contract.
- 2. Discounts vary at the discretion of the wool company representative.

- 3. A rising market decreases the number and amount of discounts.
- 4. A declining market increases discounts.
- 5. Pools receiving high bids also accept higher discounts.
- 6. With loose wording in the bid contract and with undefined sale conditions, there is no assurance of the amount of financial settlement between the wool processing company holding the bid contract and the wool pool (Table 2).

Table	1.	Estimated distribution of grades of Idaho pooled
		grease wool and value per pound based on USDA
		market news quotations.

Wool		Clean price (April)			Price equivalent		
grade	Percent	1971	1970	1969	1971	1970	1969
-	19 19 19	\$	\$	\$	\$	\$	\$
64-70's St.	5	.68	1.05	1.20	.0340	.0525	.0600
60-62's St.	20	.65	.96	1.08	.1300	.1920	.2160
60-62's Fr.	5	.60	.88	1.00	.0300	.0440	.0500
56-58's St.	30	.63	.88	.94	.1890	.2640	.2820
56-58's Fr.	5	.60	.80	.90	.0300	.0400	.0450
50-54's St.	25	.63	.85	.88	.1575	.2125	.2200
50-54's Fr.	5	.60	.80	.85	.0300	.0400	.0425
48-over	5	.62	.77	.80	.0310	.0385	.0400
Total					.6315	.8835	.9555
Less freig	.0850	.0825	.0800				
Estimated	d clean p	rice F.	.O.B. Ic	laho	.5465	.8010	.8755

Table 2. Comparison of the bid price per pound with the price received and estimated price from the core test.

Wool pool*	Year**	Wool represen- tative***	Bid price	Price received	Estimated price core test	Percent clean yield
10.000	C TRAN		\$	\$	\$	%
3	9	А	.4670	.4495	.4587	.5239
3	0	A	.4443	.4222	.3893	.4860
3	1	A	.2896	.2721	.2765	.5060
4	9	С	.4950	.4822	.4658	.5320
4	0	Α	.4419	.4303	.4130	.5156
4	1	В	.2825	.2710	.2881	.5273
5	9	В	.4487	.4372	.4691	.5358
5	0	А	.4297	.4060	.4140	.5168
6	9	А	.4344	.4225	.4160	.4754
6	0	Α	.3750	.3499	.3441	.4296
	Average		.4108	.3943	.3934	

\*Number of pools tested

\*\*Year of test

\*\*\*Buyer holding bid contract

#### **Core Test Results**

#### **Preliminary Analysis**

Cores were drawn from 9 individual clips. Clean fiber content was determined in a preliminary yield and price analysis (Table 3) conducted by the U.S. Sheep Experiment Station in cooperation with the Idaho Cooperative Extension Service, wool pool members and a representative from the wool processing company holding the bid contract. This test showed a definite need to core test individual clips within a wool pool as a basis for financial adjustments – additions for high yielding clips and deductions for low yielding wools. (See Table 3).

This preliminary test was made on clips varying in size from 4 to 20 bags, selected visually to have a wide spread in clean fiber content. All 9 clips were from farm flocks raised under similar environmental conditions by members of the same Idaho wool pool. Results showed a spread in clean yield percentage from 41.38 to 60.82, a difference of 19.44 percentage points. One of the higher yielding clips was visually discounted 5 cents per pound for low yield. The core test result revealed the low yielding clip was much above the average in yield, but no financial consideration was given.

When all pool prices are averaged, the agreement is good between the price received and the estimated price using the core test (see Table 2). However, inequities are evident for individual lots. The 5 highest yielding clips were underpaid from 1.0 to 9.8 cents a pound, while the 4 lowest yielding clips were overpaid from 1.9 to 4.0 cents per pound (Table 3).

#### **Coring Results of 10 Wool Pools**

As a result of the preliminary test, 762 individual farm flock clips containing 874,000 pounds of grease wool and representing 10 wool pools were studied over a 3-year period to determine the value of individual clips within a wool pool. Core tests were made on 43% of these clips representing 82% of the total grease wool weight. The percentage of clips and the total weight core tested from each pool could be increased considerably by proper packaging and availability at time of coring.

The wool from these 10 wool pools was sold by sealed bid. Buyer interest was active with up to 5 bids for each pool (Table 4). Conditions of the sale included a bid price for clear wool less 0 to 10 cents per pound discount for excess dirt (mud balls, sand, dust), moisture and vegetable material (all of which are accounted for when using the core test). Also included were a set price for tags and dead wool and one-third dockage for black wool.

This research has demonstrated that coring small clips of grease wool for clean yield may be used to determine pounds of clean fiber present. From this information, a more accurate appraisal of the value of individual clips is possible. From the subjective evaluation previously made on these same clips of grease wool, 194 discounts were assessed individual clips ranging from a low of 0.3 to a high of 10.0 cents per pound — with an average of 3.24 cents per pound. A discount of 3.24 cents on 40-cent grease wool is approximately 8% discount (Table 5).

Table 3.	Preliminary yield and price analysis on 9 clips from a
	typical Idaho wool pool.

Yield	Grease	Grease price calculated from	Underpaid () or overpaid (+)		
	received	core test yield	Per Ib.	Per lot	
%	\$/lb.	\$/Ib.	\$/lb.	\$/lot	
60.8	0.40	0.498	-0.098	- 91.63	
57.1	0.40	0.468	-0.068	-137.77	
55.3*	0.35	0.453	-0.103	-107.74	
54.0	0.40	0.442	-0.042	- 50.23	
47.5*	0.38	0.390	-0.010	- 24.84	
46.5	0.40	0.381	+ 0.019	+ 118.08	
46.3	0.40	0.380	+ 0.020	+ 120.68	
45.1	0.40	0.370	+ 0.030	+ 74.43	
41.4*	0.38	0.340	+ 0.040	+ 96.60	

\*Clips receiving discount

Table 4. Grease wool bids and actual price received.

Wool pool*	Year*	Wool represen- tative*	Accepted bid	Price rec'd. after discount
			\$	\$
3	9	A	.4670	.4495
3	0	А	.4443	.4222
3	1	А	.2897	.2721
4	9	С	.4950	.4822
4	0	A	.4419	.4303
4	1	В	.2825	.2710
5	9	В	.4487	.4372
5	0	A	.4297	.4060
6	9	А	.4344	.4225
6	0	А	.3750	.3499
	Average		.4108	.3943

\*See footnotes, Table 2.

Table 5.	Weight and number of individual clips within a wool
	pool and number of clips receiving a discount.

Grease weight	Individu	ual clips	Clips discounted		
per clip (Ib.)	Number	Percent	Number	Percent	
0 - 500	359	47	39	11	
500 - 1000	159	21	44	28	
1000 - 2000	132	17	53	40	
2000 - 3000	51	7	23	45	
3000 - 4000	16	2	8	50	
4000 - 5000	16	2	9	56	
5000 - over	29	4	18	62	
Total	762	1000	194		

Discounts clearly were influenced by clip size. In this study, 47% of the farm flock clips were under 500 pounds. Only 4% were above 5,000 pounds. Price discounts were applied to 11% of the clips under 500 pounds and to 62% of the clips over 5,000 pounds. In every case, as the size of the clips increased the percentage of the clips discounted also increased.

The number and amount of discounts assessed subjectively were also influenced by fluctuations in the existing market and the immediate price quotations. Many discounts and no financial premiums were issued on high yielding clips. Overall, 82% of the visual yield assessments on individual clips exceeded the calculated value determined from the core test. Correlations were nonsignificant between the visual estimated value of a clip of grease wool and the true value determined from the core test (Table 6).

The production of higher yielding wool in any clip should be advantageous to the producer, manufacturer and wool industry by improving the competitive position of domestic wool. Yet, discounts assessed to individual clips by subjective visual yield appraisal discourage promotion of higher yielding wool.

able	6.	Correlation	between	estimated	grease	value	and
		grease value	determine	ed from the	e core t	est.	

Wool pool*	Year*	Wool representative*	df	r**
3	9	А	47	.278
3	0	A	38	.152
3	1	А	41	.288
4	9	С	31	.142
4	0	А	27	.216
4	1	В	23	.263
5	9	В	56	.167
5	0	A	44	.058
6	9	А	9	.063
6	0	А	14	.247

\*See footnotes, Table 2.

\*\* All correlations nonsignificant at 5%.

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