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Signed: Luann Stovall

Date: 7-11-2019
Scottish Highland Cattle:
History and the Effect of Blending and Spinning their Fiber

Luann Stovall
Submitted to Olds College
July 31, 2017
Abstract

The purpose of this in-depth study is to study the spinning characteristics of the Scottish Highland fiber using the downy and guard hair from cows we raised. In addition, this study will explore the history of the breed and the reasons for spinning their fibers or blending their fibers with other animal fibers. This study will include combing the Highland hair and washing and separating the hair from the down fibers. This study will explore the preparations of other raw fibers either by combing or carding alone, as well as setting the yarn. The study will present samples of woven and knitted swatches and of the yarn and fiber. Highland Cattle were the first domesticated cow and hopefully this study will spark someone with a hobby farm to invest in the Scottish Highland and serve as a knowledge base for working with the fiber.
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Introduction

This study will show that when blended with other fibers, Scottish Highland fiber yields many benefits: it is fun to spin, the feel and texture varies when spun, the end results of the blends vary, and blending ten percent Highland fiber produces positive results. This study is rooted in the history and stories of the Scottish Highland cows. Characteristics of the fiber and the micron count of Highland fiber, including information on preparing and spinning the fiber into yarn and how it is used, will be explored. Scottish Highland fiber is mostly coarse and not thought of as a fiber to be spun. The Highland’s hair easily mats. The undercoat, which is the down, is a small percentage compared to the Bison or Yak. This study indicates that Highland fiber is a blending fiber. Finding Highland fiber for sale is difficult because it has to be brushed, and unless the cow is tamed, people do not brush or comb Highland cattle. For this reason, it is best to raise one’s own Highlands. The Highland’s horns grow several feet long and can be dangerous if they are not trained to be combed. This is one of the reasons the fiber is so rare. Along with the beauty of these massive animals that have been around for 1,000 years, the farmer will have meat, milk, and fiber to spin and weave.
History of Breed

According to Cochrane (2008), Scottish Highland were the only cattle in Scotland for many centuries. Before the Highlands were a wild forest breed called Urus or Auroch. These ancient cattle are now extinct. In the Gaelic speaking Hebrides the Scottish Highland were the only breed of cattle in 1834. Today after many years of dedicated farmers the Scottish Highland is no longer an endangered species. Highlands are now in many other countries including the United States and Canada.

"The breed today remains essentially the original type, having escaped the fervor of the breed-changing improving schemes so prolific in the early days of agricultural science. The distinctive long haired and horned appearance attracts attention now, as it did in the Edwardian heyday of picture postcards" (Cochrane, 2008, page 3).

The Registration book of the Highland Cattle was established in 1885 and is the oldest registry book. The Highlands are the oldest registered cattle in the world (Cochrane, 1996).
Characteristics of Highland Cattle and Fiber

The Scottish Highland cattle are athletic and graceful. One of the pleasures of raising Highland cattle is that they leap gracefully over fences with their gorgeous coat and hide flowing up and down. Highlands are highly intelligent and live to around 18 years. They graze on rough land and eat most everything on pasture, no matter how rough or harsh. The Highlands are docile with humans unless they are protecting their calves. Many postcards can be found on the internet with children laying with them or riding their Highland in a parade.

A herd of Scottish Highland cattle is called a fold. The farmers would bring them near or in their homes at night to protect them from thieves. In Scotland, raising Scottish Highland was a sign of wealth, and increased the risk of being robbed. Of course this was in the day before fences and bushes that would keep the cattle in a protected area (Cochrane, 2008). The farmers in Scotland also kept the Highlands in their homes for milk and meat. They also spun their fibers and made outerwear and twisted their long hair into ropes.

According to Cochrane (2008), The Queen of England has a fold of Scottish Highland cattle. Queen Elizabeth’s favorite meat is Highland cattle. The meat is low in cholesterol because the cows don’t have as much fat to keep them warm. The Highland’s hair and down keep them warm. In colder climates they have more down and hair. Much of their hair is lost in the spring either by rubbing against trees or fences or by being groomed by their owner.
Scottish Highland

The hair and the down of the Scottish Highland is the reason they have survived. They have survived temperatures of -30 in Scotland. The downy undercoat protected them from the cold. The outer coat hair is the longest and thickest in the winter. As time went on farmers would breed them to keep their coat for agricultural shows. This was during the mid twentieth century. This selective breeding produced Highlands that never cast their coats (Cochrane, 1996).

According to Cochrane Scottish Highland cattle hair felts with the cold water method, producing a very soft fabric which sheds hair easily. The author of this study has tested this method and can confirm Cochrane’s conclusion. A blend with sheep and goat wool produces a more hard wearing felt fabric (Cochrane, 1996, p. 64). The fibers naturally felt on and off the cow. Fibers that have been brushed off will naturally curl in the shape of a donut and felt within days. After washing and combing, if not spun, the fibers will naturally felt again.

Spinning pure Highland hair yields a coarse yarn and outerwear can be made, but it is scratchy next to the skin. A blend is more practical to spin. 100 percent hair was used for making rope and Highland hair rope dates back to between 700 AD and 1500 AD. It was from the remains of an old boat found in 1934 (Cochrane, 1996).

The hair over their eyes is guard hair and grows to 15” covering their faces. This hair would be used for rope or floor mats. The down insulates their bodies and keeps them warm in the harsh winters. In milder climates the Scottish Highland have less down. This is the reason it is important to purchase your Highland in a region where you live because their hair and down adapts to the environment.
In 1910 The Highland Cattle Society stated, "the coat of Highland cattle should be of a healthy, glossy growth, thick, and in parts long. It should not be curled, but should slightly wave" (Cochrane, 1996, p. 64).

According to Cochrane (1996), many families of Highlands believe the black coated Highlands produce the thickest and longest hair and that the lightest Highlands produce the softest and finest guard hair. The reds produce the coarsest fiber.

Fiber quality is supported by three reports from Yocom-McColl Testing Laboratories that follow from the Scottish Highlands used in this study (images 1, 2, and 3, below). Image 1:
Optical Fiber Diameter Analyser (OFDA100)
Micron Test Report

Yocom-McColl Testing Laboratories, Inc.
540 West Elk Place • Denver, Colorado 80216-1823 USA
PHONE (303) 294-0582 • FAX (303) 295-6944
EMAIL: ymccoll@ymccoll.com

Luann Stovall
P.O. Box 83
Smithton MO 65350 USA

Test No: 938061

Animal Name: Black
Breed: Scottish Highland
Sex: Cow
Color: Black

Animal ID: XXXXX
Sample Location: Side
Sample Date: XX/XX/XX
Age: XXXXX

Mean Fiber Diameter: 44.0 microns
Standard Deviation: 14.5 microns
Coefficient of Variation: 33.1 %
Fibers Greater Than 30 microns: 84.1 %

Spin Fineness: 148.2 microns
Mean Curvature (deg/mm): 14.3
SD Curvature (deg/mm): 14.5
Comfort Factor: 15.9 %

This Test Performed According to I.W.T.O Method 47
Optical Fiber Diameter Analyser (OFDA100)
Micron Test Report

Luann Stovall
P.O. Box 83
Smithton MO 65350 USA

Test No: 934537

Animal and Sample Description

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<td>Sample Location: Back</td>
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<tr>
<td>Sex: Cow</td>
<td>Sample Date: XXXXXX</td>
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<tr>
<td>Color: Red</td>
<td>Age: 2007</td>
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Laboratory Data

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<th>Mean Fiber Diameter: 50.8 microns</th>
<th>Spin Fineness: 52.7 microns</th>
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<tr>
<td>Standard Deviation: 14.1 microns</td>
<td>Mean Curvature (deg/mm): 19.0</td>
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<tr>
<td>Coefficient of Variation: 27.8 %</td>
<td>SD Curvature (deg/mm): 22.6</td>
</tr>
<tr>
<td>Fibers Greater Than 30 microns: 91.8 %</td>
<td>Comfort Factor: 8.2 %</td>
</tr>
</tbody>
</table>

Fiber Diameter - microns

This Test Performed According to I.W.T.O Method 47
**Fiber Preparation**

**Washing Raw Fiber:**

Soak fibers in warm water with your choice of soap such as Unicorn Fibre Wash, Orvus paste, or Dawn. Let soak 15 minutes and gently squeeze out water and soap and repeat until the water is clear. Rinse in warm water with a splash of vinegar or Unicorn Fibre Rinse for five minutes. Spin out water or place on a towel and roll up to remove water.

**Separating Hair from Down:**

Place washed fibers on super fine Valkyrie combs and with your hands pull out the hair. After hair has been removed, comb the fibers that are left on the combs and continue to pull out more hair as it appears on the combs. Remove the down and shorter hair and from this pile continue to pull out the finer hair. You will be left with a very small amount of down. Repeat this procedure until you have separated the hair from the down.

Image 4: Using combs to separate down and hair fibers.
**Hand Carders:**

Because Scottish Highland fibers are smooth and slick, they do not latch onto combs; therefore, hand carders are used to align the fibers for spinning. The hair then can be rolled from the short length across and into a sausage so the hair can be spun worsted. When blending with another fiber cut the hair the same length as the primary fiber. 10 percent of Highland is enough to change the structure of the fibers you are spinning. Similar to 10 percent Angora or nylon being blended with another fiber. The fibers can be spun worsted or woolen. If spinning worsted, one rolls the fibers off the hand cards, makes a sausage and spins forward short draw. If spinning woolen, roll off as a rolag.

**Spinning Washed Fibers:**

Because Scottish Highland hair is slick, spinning 100 percent Highland hair can be difficult. From the stack of combed fibers take about a thumb’s width to begin spinning. Treadle slowly and close to the orifice using a forward short draw. Keep hands one and a half inches to two inches apart. Once you establish a steady rhythm, move hands back from the orifice. Spinning 100 percent down is also tricky being that it is so short. Down can be as short as 1/4 inches. Spin from a hand carded rolag using a supported forward short draw to let a little air into the yarn, forming a semi-woolen yarn. It will need plenty of twist to hold together. Or you can spin it with a forward short draw, smoothing out the fibers. Though long draw is the traditional way to spend other down fibers, because Highland down is so short, it is very difficult to spin the fibers supported long draw.
Setting the Yarn:

Set the worsted yarn in a bowl of warm tap water with a few drops of Dawn for 15 minutes. Do not agitate it. Rinse gently with warm tap water until the water is clear and then place it in a bowl with a splash of vinegar water and rinse one more time in a bowl of warm water without vinegar. Setting the woolen yarn is the same but with more movement to the fibers so the fibers are fulled. Be very careful not over full the down fibers or they will stick together and felt. Use water at room temperature: do not adjust water temperature from hot to cold water with Scottish Highland down. It is already a fiber that is naturally inclined to felt. If the Highland is only 10 percent of the blend, you can set it as you would, depending on the wool or fiber.
Samples of Scottish Highland Fibers with Blends and Technical Information

1. Scottish Highland Hair 100 percent  
2. Scottish Highland Down 100 percent  
3. Camel 100 percent  
4. Camel 90 percent Highland Hair 10 percent  
5. Camel 90 percent Highland Down 10 percent  
6. Yak 100 percent  
7. Yak 90 percent Highland Hair 10 percent  
8. Yak 90 percent Highland Down 10 percent  
9. Alpaca 100 percent  
10. Alpaca 90 percent Highland Hair 10 percent  
11. Alpaca 90 percent Highland Down 10 percent  
12. Cormo 100 percent  
13. Cormo 90 percent Highland Hair 10 percent  
14. Cormo 90 percent Highland Down 10 percent  
15. Blue Face Leicester 100 percent  
16. Blue Face Leicester 90 percent Highland Hair 10 percent  
17. Blue Face Leicester 90 percent Highland Down 10 percent  
18. Shetland 100 percent  
19. Shetland 90 percent Highland Hair 10 percent  
20. Shetland 90 percent Highland Down 10 percent  
21. Mohair 100 percent  
22. Mohair 90 percent Highland Hair 10 percent  
23. Mohair 90 percent Highland Down 10 percent  
24. Llama 100 percent  
25. Llama 90 percent Highland Hair 10 percent  
26. Llama 90 percent Highland Down 10 percent  
27. Lincoln Longwool 100 percent  
28. Lincoln Longwool 90 percent Highland Hair 10 percent  
29. Lincoln Lamb 100 percent  
30. Lincoln Lamb 90 percent Highland Down 10 percent
Scottish Highland Hair 100 percent

**Preparation:** Combs, more detail page 12.

**Spinning Technique:** Spun worsted using forward short draw.

**Wheel:** Schacht Sidekick double treadle

**Twist per Inch:** 3

**Wrap per Inch:** 14

**Weight and Yardage:** 6.8 grams, 10 yards

**Bradford Count:** 2.38

**TEX:** R756 Tex2

**Ratio:** 5.7:1

**Ply:** zzS

**Angle of Twist:** 15

**YPP:** 667.6

**NM:** 1

**Suitable End Use:** Ropes, rugs, woven placemats, and hot pads
100% Scottish Highland Fiber: Hair

raw

woven

washed hair

knitted

2 ply.
100 percent Scottish Highland Down

**Preparation:** Cotton hand cards, rolled off into rolags. More detail page 13.

**Spinning Technique:** Spun semi woolen using forward short draw.

**Wheel:** Lendrum castle

**Twist per Inch:** 3.5

**Wraps per Inch:** 12

**Weight and Yardage:** 4.6 grams, 10

**Bradford Count:** 4.45

**TEX:** R756 Tex2

**Ratio:** 5.75:1

**Ply:** zzS

**Angle of Twist:** 10

**YPP:** 667.5

**NM:** 1

**Suitable End Use:** Table runner, placemats, woven rugs, bags.
100% Scottish Highland down

Woven

Knitted

2 ply

Washed down
Scottish Highland

Baby Camel Down 100 percent

**Preparation:** Hand cards, fiber rolled into rolags.

**Spinning Technique:** Spun woolen using supported long draw.

**Wheel:** Schacht DT Matchless

**Ratio:** 9:1

**Twist per Inch:** 4.5

**Ply:** zzS

**Wrap per Inch:** 14

**Angle of Twist:** 30

**Weight and Yardage:** 2.3 grams, 10 yards

**Bradford Count:** 13.16

**YPP:** 1,974

**TEX:** R256 Tex2

**NM:** 4

**Suitable in Use:** Scarves, sweaters, baby wear, shawls, gloves, woven wear, scarves.
100% Camel

- Woven

- Knitted

- Washed

- 2 ply
Baby Camel 90 percent

Scottish Highland Hair 10 percent

**Preparation:** Hand cards rolled into rolags.

**Spinning Technique:** Spun woolen using supported long draw.

**Wheel:** Schacht DT Matchless

**Twist per Inch:** 3

**Wraps per Inch:** 12

**Weight and Yardages:** 2.8 grams, 10 yards

**Bradford Count:** 10.8

**TEX:** R311 Tex2

**Ratio:** 9:1

**Ply:** zzs

**Angle of Twist:** 25

**YPP:** 1,621

**NM:** 3

**Suitable End Use:** Shawls, scarves, mittens, woven wear, vest.
90% Camel
10% Highland hair

woven

Knitted

washed

2 ply
Scottish Highland

Baby Camel Down 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand cards, fiber rolled into rolags.

**Spinning Technique:** Spun woolen using supported long draw.

**Wheel:** Schacht DT Matchless

Twist per Inch: 5

Wraps per inch: 14

Weight and Yardage: 2.8 grams, 10 yards

Bradford Count: 10.8

TEX: R311 Tex2

**Ratio:** 10.5:1

**PLY:** zzS

**Angle of Twist:** 25

**YPP:** 1,621

**NM:** 3

Suitable End Use: Hat, woven or knitted scarf, shawl, sweater.
90% Camel
10% Highland down

blended

woven

Knitted

2-ply
Scottish Highland

Yak 100 percent

**Preparation:** Handcards, fiber rolled into rolags

**Spinning Technique:** Spun woolen, traditional long draw

**Wheel:** Schacht Matchless  
**Ratio:** 21:1

**Twist per inch:** 6  
**Ply:** zzS

**Wraps per inch:** 20  
**Angle of Twist:** 20

**Weight and Yardage:** 2.4 grams, 10 yards

**Bradford Count:** 12.6  
**YPP:** 1,892

**TEX:** R267 Tex2  
**NM:** 4

**Suitable End Use:** Woven or knitted scarf, sweater, shawl, gloves, mittens, baby wear.
100% Yak

woven

Knitted

2 ply

washed
Yak 90 percent

Scottish Highland Hair 10 percent

**Preparation:** Highland hair cut length of Yak, hand carded and rolled into rolags.

**Spinning Technique:** Traditional long draw.

**Wheel:** Schacht Matchless

**Ratio:** 21:1

**Twist per Inch:** 5.5

**Ply:** zzS

**Wraps per Inch:** 15

**Angle of Twist:** 15

**Weight and Yardage:** 2.9 grams, 10 Yards

**Bradford Count:** 10.43

**YPP:** 1,566

**Tex:** R322 Tex2

**NM:** 3

**Suitable End Use:** Woven scarf, shawl, mittens or gloves, vest, woven table runner, knitted vest.
90% Yak
10% Highland Hair

Woven

Knitted

Washed blended

2 ply
Scottish Highland

Yak 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand carded and rolled into rolags.

**Spinning Technique:** Spun woolen, traditional long draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 6.5

**Ratio:** 21:1

**Ply:** zzS

**Wraps per Inch:** 16

**Angle of Twist:** 15

**Weight and Yardage:** 2.2 grams, 10 yards

**Bradford Count:** 13.75

**YPP:** 2,064

**TEX:** R244 Tex2

**NM:** 4

**Suitable End Use:** Baby sweater, baby knitted cardigan, hat, mittens, woven or knitted shawl or scarf, adult sweater, gloves.
90% Yak
10% Highland Down

Woven

Knitted

2 ply

Washed blended
**Scottish Highland**

**Alpaca 100 percent**

**Preparation:** Hand carded, rolled as a sausage.

**Spinning Technique:** Spun semi worsted, forward short draw.

**Wheel:** Schacht Matchless  
**Ratio:** 21:1

**Twist per Inch:** 5  
**Ply:** zzS

**Wraps per Inch:** 18  
**Angle of Twist:** 15

**Weight and Yardage:** 1.8 grams, 10 yards

**Bradford Count:** 9  
**YPP:** 2,522

**TEX:** R200 Tex2  
**NM:** 5

**Suitable End Use:** Woven as weft for shawl, scarf, fabric for top woven, knitted baby sweater.
100% Alpaca

woven

Knitted

washed

2 ply
Alpaca 90 percent

Scottish Highland Hair 10 percent

**Preparation:**  Hand carded, made into rolags.

**Spinning Technique:**  Spun woolen, long draw.

**Wheel:**  Schacht Matchless  
**Ratio:**  21:1

**Twist per Inch:**  5.5  
**Ply:**  zzS

**Wraps per Inch:**  15  
**Angle of Twist:**  20

**Weight and Yardage:**  2.2 grams, 10 yards

**Bradford Count:**  13.76  
**YPP:**  2,064

**TEX:**  R244 Tex2  
**NM:**  4

**Suitable End Use:**  Woven scarf, table runner, knitted lace shawl, woven vest.
90% Alpaca
10% Highland Hair

woven

Knitted

washed blended

2ply
Alpaca 90 percent

Scottish Highland Down 10 percent

**Preparation:** Hand carded and rolled in rolags.

**Spinning Technique:** Spun woolen, traditional long draw.

**Wheel:** Schacht Matchless  
**Ratio:** 21:1

**Twist per Inch:** 4.5  
**Ply:** zzS

**Wraps per Inch:** 14  
**Angle of Twist:** 15

**Weight and Yardage:** 1.9 grams, 10 yards

**Bradford Count:** 15.9  
**YPP:** 2,389

**TEX:** R211 Tex2  
**NM:** 5

**Suitable End Use:** Baby sweater, woven scarf, shawl, woman’s top, woven table runner.
90% Alpaca
10% Highland Down

Woven

Knitted

Washed blended

2 ply
Cormo 100 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 6.5

**Wraps per Inch:** 12

**Weight and Yardage:** 2.3 grams, 10 yards

**Bradford Count:** 13.16

**TEX:** R256 Tex2

**Ratio:** 9:1

**Ply:** zzS

**Angle of Twist:** 20

**YPP:** 1,974

**NM:** 4

**Suitable End Use:** Knitted hat, gloves, sweater, scarf, shawl.
100% Cormo

woven

Knitted

washed

2 ply
Cormo 90 percent
Scottish Highland Hair 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Techniques:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless

**Ratio:** 9:1

**Twist per Inch:** 6

**Ply:** zzS

**Wraps per Inch:** 10

**Angle of Twist:** 20

**Weight and Yardage:** 3.7 grams, 10 yards

**Bradford Count:** 8

**YPP:** 1,227

**TEX:** R411 Tex2

**NM:** 2

**Suitable End Use:** Knitted outerwear, scarf, gloves, boot socks, woven table runner, woven placemats.
90% Cormo 10% Highland Hair

washed

woven

Knitted

2 ply
Cormo 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand carded, rolled into rolls.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 5

**Ratio:** 9:1

**Wraps per Inch:** 14

**Ply:** zzS

**Angle of Twist:** 25

**Weight and Yardage:** 2.4 grams, 10 yards

**Bradford Count:** 12.6

**YPP:** 1,892

**TEX:** R267 Tex2

**NM:** 4

**Suitable End Use:** Knitted baby or adult sweater, knitted hat, gloves, scarf, shawl.
90% Cormo
10% Highland down

Woven

Knitted

100% down

Washed blend

2 ply
### Bluefaced Leicester 100 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

<table>
<thead>
<tr>
<th>Wheel:</th>
<th>Schacht Matchless</th>
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<tr>
<td>Twist per Inch:</td>
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<td>Ply:</td>
<td>zzS</td>
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<tr>
<td>Angle of Twist:</td>
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<tr>
<td>Weight and Yardage:</td>
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<tr>
<td>Bradford Count:</td>
<td>8.9</td>
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<tr>
<td>TEX:</td>
<td>R378 Tex2</td>
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<td>YPP:</td>
<td>1,335</td>
</tr>
<tr>
<td>NM:</td>
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</table>

**Suitable End Use:** Knitted scard, gloves, sweater, shawl.
100% Blue Face Leicester

- Woven
- Knitted
- 2-ply
Bluefaced Leicester 90 percent
Scottish Highland Hair 10 percent

**Preparation:**  Hand carded, rolled into rolags.

**Spinning Technique:**  Spun woolen, supported long draw.

**Wheel:**  Schacht Matchless  
**Ratio:**  9:1

**Twist per Inch:**  5  
**Ply:**  zzS

**Wraps per Inch:**  11  
**Angle of Twist:**  25

**Weight and Yardage:**  3.4 grams, 10 yards

**Bradford Count:**  8.9  
**VPP:**  1,335

**TEX:**  R378 Tex2  
**NM:**  3

**Suitable End Use:**  Knitted outerwear, scarf, vest, lined hat, woven scarf or shawl.
90% BFL
10% hair (Highland)

Blended

woven

Knitted

2 ply
Bluefaced Leicester 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 5.5

**Ply:** zzS

**Wraps per Inch:** 13

**Angle of Twist:** 20

**Weight and Yardage:** 3.3 grams, 10 yards

**Bradford Count:** 9.17

**YPP:** 1,376

**TEX:** R367 Tex2

**NM:** 3

**Suitable End Use:** Knitted outerwear, scarf, shawl, hat, gloves, woven scarf.
90% BFL
10% Highland down

woven

Knitted

2 ply

Blended
Scottish Highland

Shetland 100 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless  
**Twist per Inch:** 4.5  
**Wraps per Inch:** 10  
**Ratio:** 9:1  
**Ply:** zzS  
**Angle of Twist:** 20

**Weight and Yardage:** 4.5 grams, 10 yards  
**Bradford Count:** 6.73  
**YPP:** 1,909

**TEX:** R500 Tex2  
**NM:** 2

**Suitable End Use:** Knitted scarf, shawl, sweater, woven scarf, table runner, mug rugs.
100% Shetland

Woven

Knitted

2 ply

washed
Scottish Highland

Shetland 90 percent
Scottish Highland Hair 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless  
**Twist per Inch:** 5  
**Wraps per Inch:** 10  
**Ratio:** 9:1  
**PLY:** zzS  
**Angle of Twist:** 20

**Weight and Yardage:** 4.6 grams, 10 yards

**Bradford Count:** 6.58  
**TEX:** R511 Tex2  
**YPP:** 987  
**NM:** 2

**Suitable End Used:** Knitted sweater, scarf, shawl, hat, mittens, woven scarf, table runner.
90% Shetland
10% Scottish Highland Hair

woven

Knitted

blended

2 ply
Shetland 90 percent

Scottish Highland Down 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Schacht Matchless  
**Ratio:** 9:1

**Twist per Inch:** 4  
**Ply:** zzS

**Wraps per Inch:** 11  
**Angle of Twist:** 19

**Weight and Yardage:** 3.1 grams, 10 yards

**Bradford Count:** 9.76  
**YPP:** 1,465

**TEX:** R345 Tex2  
**NM:** 3

**Suitable End Use:** Knitted hat, sweater, scarf, woven shawl, scarf, table runner.
90% Shetland
10% Highland down

woven

Knitted

blended

2 ply
Mohair 100 percent

**Preparation:** Preparation method outlined on pages 12-14.

Combed.

**Spinning Technique:** Spun worsted, forward short draw.

**Wheel:** Matchless Schacht  
**Twist per Inch:** 5  
**Wraps per Inch:** 20  
**Ratio:** 10.5:1  
**Ply:** zzS  
**Angle of Twist:** 15

**Weight and Yardage:** 2.9 grams, 10 yards  
**Bradford Count:** 5.59  
**TEX:** R322 Tex2  
**YPP:** 1,566  
**NM:** 3

**Suitable End Use:** Knitted lace shawl, woven scarf, woven shawl, woven table runner.
100% Mohair

woven

Knitted

washed

2 ply
Mohair 90 percent
Scottish Highland Hair 10 percent

**Preparation:**  Hand carded, rolled into rologs, sausages.

**Spinning Technique:**  Spun semi worsted, supported long draw.

**Wheel:**  Schacht Matchless  
**Ratio:**  15:1

**Twist per Inch:**  4  
**Ply:**  zzS

**Wraps per Inch:**  20  
**Angle of Twist:**  10

**Weight and Yardage:**  3.6 grams, 10 yards

**Bradford Count:**  4.5  
**YPP:**  1,261

**TEX:**  R400 Tex2  
**NM:**  3

**Suitable End Use:**  Knitted lace shawl or scarf, woven scarf, shawl, table runner.
90% Mohair
10% Highland Hair

woven

Knitted

2 ply

washed blended
Scottish Highland

Mohair 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand carded, rolled into sausages.

**Spinning Technique:** Spun semi worsted, supported long draw.

**Wheel:** Schacht Matchless

**Twists per Inch:** 4

**Wraps per Inch:** 20

**Ratio:** 15:1

**Ply:** zzS

**Angle of Twist:** 20

**Weight and Yardage:** 3.3 grams, 10 grams

**Bradford Count:** 4.9

**TEX:** R367 Tex2

**YPP:** 1,376

**NM:** 3

**Suitable End Use:** Knitted scarf or shawl, woven scarf or shawl.
90% Mohair  
10% Highland Down

Woven

Knitted

2 ply

Washed blended
Llama 100 percent

**Preparation:** Hand carded, rolled sausages for rologs.

**Spinning Technique:** Spun semi woolen, supported long draw.

**Wheel:** Schacht Matchless  
**Ratio:** 9:1

**Twist per Inch:** 4  
**Ply:** zzS

**Wraps per Inch:** 13  
**Angle of Twist:** 10

**Weight and Yardage:** 5 grams, 10 yards

**Bradford Count:** 3.24  
**YPP:** 908

**TEX:** R556 Tex2  
**NM:** 2

**Suitable End Use:** Outerwear, knitted or woven, scarf, hat, mittens, vest.
100% Llama

woven

Knitted

washed

2 ply
Scottish Highland

Llama 90 percent
Scottish Highland Hair 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun semi woolen, forward short draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 4

**Wraps per Inch:** 14

**Ratio:** 9:1

**Ply:** zzS

**Angle of Twist:** 15

**Weight and Yardage:** 4 grams, 10 yards

**Bradford Count:** 7.57

**TEX:** R444 Tex2

**YPP:** 1,135

**NM:** 2

**Suitable End Use:** Woven or knitted outerwear, sweater, scarf, woven table runner, placemats.
90% llama 10% Highland hair

Woven

Highland blend washed

Knitted

2 ply
Llama 90 percent
Scottish Highland Down 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun semi woolen, forward short draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 5.5

**Ratio:** 9:1

**Ply:** zzS

**Wraps per Inch:** 16

**Angle of Twist:** 15

**Weight and Yardage:** 3.8 grams, 10 yards

**Bradford Count:** 7.96

**YPP:** 1,195

**TEX:** R422 Tex2

**NM:** 2

**Suitable End Use:** Outerwear knitted or woven, scarf, vest, gloves, shawl.
90% Llama 10% Highland Down

Woven

Knitted

2 ply

Washed blend
Lincoln Adult 100 percent

**Preparation:** Fibers combed.

**Spinning Technique:** Spun worsted, forward short draw.

**Wheel:** Schacht Matchless  
**Twist Per Twist:** 4  
**Wraps per Inch:** 14  
**Ratio:** 9:1  
**Ply:** zzS  
**Angle of Twist:** 10

**Weight and Yardage:** 4.4 grams, 10 yards  
**Bradford Count:** 3.68  
**TEX:** R489 Tex2  
**YPP:** 1,032  
**NM:** 2

**Suitable End Use:** Rugs, outerwear woven, woven table runner, placemats, bags, inkle weaving, tapestry.
100% Lincoln Longwool

Woven

Knitted

washed

2 ply
Lincoln Adult 90 percent
Scottish Highland Hair 10 percent

**Preparation:** Hand carded, rolled into sausages (rologs).

**Spinning Technique:** Spun semi worsted, forward short draw.

**Wheel:** Schacht Matchless

**Twist per Inch:** 3.5

**Ratio:** 9:1

**Ply:** zzS

**Wraps per Inch:** 15

**Angle of Twist:** 10

**Weight and Yardage:** 4.8 grams, 10 yards

**Bradford Count:** 3.38

**YPP:** 946

**TEX:** R533 Tex2

**NM:** 2

**Suitable End Use:** Rugs, tapestry, bags, woven table runner, placemats, outerwear, woven scarf.
90% Lincoln Longwool 10% Highland hair

woven

knitted

2 ply
Lincoln Lamb 100 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Lendrum castle

**Twist per Inch:** 4

**Wraps per Inch:** 12

**Ratio:** 9.3:1

**Ply:** zzS

**Angle of Twist:** 10

**Weight and Yardage:** 5.2 grams, 10 yards

**Bradford Count:** 5.8

**YPP:** 873

**TEX:** R578 Tex2

**NM:** 2

**Suitable End Use:** Knitted sweater, knitted or woven scarf, woven pillow, knitted lace shawl.
100% Lincoln Lamb

Woven

Knitted

2 ply
Scottish Highland

Lincoln Lamb 90 percent
Lincoln Down 10 percent

**Preparation:** Hand carded, rolled into rolags.

**Spinning Technique:** Spun woolen, supported long draw.

**Wheel:** Lendrum castle

**Twist per Inch:** 4

**Wraps per Inch:** 12

**Ratio:** 9.3:1

**Ply:** zzS

**Angle of Twist:** 10

**Weight and Yardage:** 4.8 grams, 10 yards

**Bradford Count:** 6.3

**TEX:** R533 Tex2

**YPP:** 946

**NM:** 2

**Suitable End Use:** Woven pillow, outerwear, scarf, shawl, woven vest.
90% Lincoln lamb
10% Highland down

Knitted

Woven

Blend

2-ply
Scottish Highland can be a joy to spin. It takes a small amount blended with other fibers to change the way the fibers flow through fingers as the fibers twist and move onto the bobbin. The consistency of the fibers with the 10 percent blend of either Scottish Highland hair or Scottish Highland down made the drafting smoother in most circumstances. The Scottish Highland fibers also gave the yarns more structure and substance without adding coarseness.

It was very interesting how the Valkyrie supercombs were able to hold back the down fibers in separating the hair from the down. This only worked with these particular combs.

A very important observation with Scottish Highland fiber is the fact the fibers wanted to felt all the time. This was true in all stages of the fiber preparation. If the Scottish Highland fiber sits it will start to curl on itself in a circle much like a donut.

Scottish Highland cows are the oldest domesticated cows and have been domesticated for about 1,000 years. Their beauty has brought smiles to peoples all over the world. They are perfect cows for a fiber hobby farm: They give us food, milk, beauty and fiber!
References


