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Why is it Important to Save the Churro Sheep?

Kathy Schneider

Submitted to Olds College

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Abstract

“Even though the Navajo-Churro breed still exists, it is considered a rare breed. Perhaps no other sheep population in the history of the world has survived such selective pressure with such dignity and spirit” (azdailysun.com, 2006, p.1). The Navajo Churro sheep were the first breed of domesticated sheep in the New World (Oklahoma State University, 2017). Almost brought to the edge of extinction in the last century, the Churro sheep, since the early 1980s, have been making a comeback (ascaisysun.com, 2006). This study will provide a plethora of samples demonstrating the possibilities for the Navajo Churro fiber. A brief synopsis of some of the people, events, places, and art dedicated to the Navajo Churro sheep are highlighted to show the importance of this breed. “Navajo Churro sheep have some outstanding traits that need to be preserved” (Navajo Sheep Project, 2008, p.1). Although a subjective topic, this study is intended to show that it was and is important to save the Navajo Churro sheep.
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Introduction

The Purpose of the Study

"Navajo Churro sheep have some outstanding traits that need to be preserved"

(Navajo Sheep Project, 2008, p.1).

Figure 1. Navajo Churro sheep (Navajo-Churro sheep association, n.d.)
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

The purpose of this study is to show why it was and is important that the Navajo Churro sheep were saved. This will be accomplished by looking at the history, what is happening in the present in relation to the sheep, and the possible future. People, organizations, events, places, and uses for the sheep are included throughout the discussion of the past, present, and future. Samples of fiber, yarn, knitted, crocheted, and woven Churro wool and blends with Churro wool are used to demonstrate the many uses for the Navajo Churro sheep. A brief history is presented below to demonstrate the continued perseverance for the Navajo Churro sheep.

**Brief History of the Navajo Churro Sheep**

It has been reported that sheep have been domesticated since 9000 BC, near present day Iraq (Hovenweep Sheep, n.d.). Later, as stated by Hovenweep, a common sheep, Churra, prospered in the arid, rugged terrain of New Iberia (Spain) (n.d.). The terrain of the southwestern region of the United States is like Spain. The small, low maintenance, hardy, and coarse coated Churra were the sheep of the working class (Hovenweep Sheep, n.d.). These sheep, as reported by Hovenweep Sheep, were chosen by Christopher Columbus to bring to North America, becoming the first domesticated sheep on the North American continent (n.d.). “The Navajo-Churro sheep are descended from the Churra, an ancient Iberian breed” (Department of Animal Science, 1996, p.1).

These sheep were brought to New Mexico’s Rio Grande Valley by Spanish explorers in the 16th century (Slow Food USA, 2017). As noted by the Oklahoma State University Department of Animal Science, the Churro (changed from Churra by American frontiersmen), were prized for adaptability, hardiness, and had a fleece that is
admired by collectors for the luster, silky hand, wide variety of colors and durability (1996).

The Churro, as reported by Slow Food USA, once numbering in the millions, nearly became extinct twice (2017).

First, in the 1860’s when the Navajo were declared enemies of the US government and Kit Carson was sent in 1863 to round up the Dine people, destroy their livestock, and burn their orchards and crops. The Dine were forced on “The Long Walk”, some 400 miles to Bosque Redondo in New Mexico. When they were allowed to return to their homeland in 1868 there were few Churros left to rebuild the flocks. United States government livestock agents re-supplied the Navajo with other breeds such as Cotswold, Rambouillet, Suffolk, Lincoln and others, which supplied plenty of meat, but shorter staple, greasy fleece that was hard to clean and difficult to hand-weave. In the 1930’s a government-mandated livestock reduction program aimed at offsetting the effects of drought and over-grazing forced a massive reduction of all livestock, and especially the slaughter of Churros. By the 1970s, only 450 Navajo-Churro sheep were left in the United States...

Despite the tremendous obstacles to its survival, the Navajo-Churro has been championed (and revitalized) by many individuals and organizations over the last three decades, including Dr. Lyle McNeal of Utah State University, the American Livestock Breeds Conservancy, the Navajo-Churro Sheep Association, Diné Be’ína (Navajo Lifeways), Black Mesa Weavers for Life and Land, and Center for Sustainable Environments at Northern Arizona University. Slow Food has joined a handful of these organizations and an esteemed group of
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

shepherds to develop and support the marketing of Churro meat through the Navajo-Churro Sheep Presidium. (Slow Food USA, 2017, pp. 2,4)

In addition to the above-mentioned organizations, Dr. Lyle McNeal began the Navajo Churro Sheep Project (Smith, L.M., 1998). Smith explains how Dr. McNeal searched canyons for the true descendants of the Navajo Churro sheep, those sheep released by the Navajo in 1863 prior to “The Long Walk” (1998). Colorado State University is also involved with this project and uses land in Hesperus, Colorado for the sheep (Smith, L.M., 1998).

Background information about the Navajo Churro Sheep

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Figure 2. Churro Sheep (Slow Food USA, 2017).
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“The Navajo-Churro sheep boasts many valuable traits. The meat is lean with a distinctive, sweet flavor. In addition to quality meat production, these sheep provide abundant milk and have a highly desirable dual fiber fleece” (Slow Food USA, 2017, p.2). Slow Food also describes the Churro as “hardy, living lightly on the land and requiring less water and forage than other sheep. This is a prized fleece for the weavers due to the large range of natural colors.
According to information from Oklahoma State University (2017, p.1), “the long staple protective top coat and the soft undercoat are well suited to extremes of climate”. Some Navajo Churro rams can grow four fully developed horns. This trait is only seen in a few breeds in the world (Oklahoma State University, 1996). Other qualities of the Navajo Churro, as stated by Oklahoma State University (1996), are their resistance to disease, they survive and prosper with little pampering, yet they respond to individual attention, twins or triplets are not uncommon, and the meat is “incomparably superior, with a surprisingly low fat content” (p.1).

No known limiting factors present in the study

This is a subjective study dedicated to displaying samples made by spinning Churro wool and blends of Churro wool that can accommodate an endless range of uses. The ranges include, but are not limited to, a fine, next to the skin garment to a horse blanket or tapestry to hang on the wall. The study uses facts about the Navajo Churro wool, multiple ways to prepare the fiber, blended and not, organizations, events, people, and places, dedicated to the preservation of the Navajo Churro sheep, to demonstrate why we need these sheep.

This study uses one person to choose, prepare, spin, knit, crochet, and weave the samples. This acts as a controlled variable but can limit the imagination of other possibilities of the fiber. The spinning, when using a short forward draw on the wheel, was held to a constant (Appendix A). This, at times, could have been adjusted to produce a different yarn but the consistent way to spin was preferred for this study.
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

In addition to controlling variables in spinning, the samples are all made by one person. One person cannot be considered an expert in spinning, weaving, knitting and crocheting all the varieties of fiber and yarn.

These variables and controlled constants are considered human error or just the subjective human variable to this study. It does not appear that there are any factors limiting the conclusion of this study, except an opinion of the reader.

Eloquent words

This brief synopsis of the history and concise description of the valuable qualities of the Navajo Churro Sheep is concluded with the eloquent words from The Navajo-Churro Sheep Association, “The fact that these sheep still exist today is a testimony to their endurance and endearment. No other sheep population in the history of the world has suffered such selective pressure with such dignity and spirit” (n.d., para. 1).

Materials and Methods

This study was conducted by preparing and presenting samples of Navajo Churro sheep wool blended and pure. The presentation of the samples will exhibit the enormous variety of uses for the Navajo Churro wool (ranging from next to the skin clothing to horse blankets and ropes). Methods of preparation of the samples involved a wide range of techniques which are explained in detail in the results section for each sample. Some of the methods involved the following: spinning from a raw fleece on a Navajo Spindle to spinning a commercially purchased Churro roving that was combed with a commercially prepared bamboo roving on a Kromski Sonata Spinning wheel. Spinning with the wheel (when using the short forward draft) was accomplished using the same drafting distance,
ratio, and number of treadles to keep a consistent way of spinning (Appendix A). The samples are displayed by knitting, crocheting, weaving, in rovings, skeins, or in a braid.

The samples, which are displayed in the results section of the study, demonstrate what was produced by using the Churro wool in a variety of ways. The samples range from using Churro wool as it was used in the past; by hand carding raw fleece locks, spinning a single yarn with a Navajo Spindle, and then weaving on a Navajo Loom. Samples are displayed to demonstrated moving toward the future by showing a braid made from combing a blend of Tencel and a commercially prepared Churro roving. The materials and methods used throughout this study are intended to demonstrate how the past and present uses of Churro should be continued in the future.

In addition to the display of the samples made from the Churro wool, the present time will be explored by providing information about some of the organizations, events, people, and places associated with the Navajo Churro sheep. In depth research on all of the Navajo Churro sheep related happenings and associations is not warranted for this study. The information presented in the samples section is meant to be a catalyst for further exploration about the Navajo Churro sheep. The information presented in this study was obtained by personal communication, participation in events, visiting locations, and or collecting data through research. The display and presentation of the data includes a mixture of the following: documentation of findings, pictures, and personal communication. The following is a partial list of some of the Navajo Churro related organizations, events, people, places, DVD, and art: Dr. Lyle McNeal, Mora Valley Spinning Mill, Tierra Wools, Weaving Southwest, Lana, Espanola Valley Fiber Arts Center, Churro Week, the Churro Club, Centinela Traditional Arts, Taos Wool
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Festival, Dine be iina, Navajo Churro Sheep Presidium, Sheep is Life Celebration, Slow Foods, Livestock Conservancy, Navajo Sheep Project, Navajo Churro Sheep Association, Porfirio Gutierrez, weavings and Colcha embroidery produced using the Navajo Churro sheep. This study will highlight and describe a small percentage of this list. As previously stated, the succinct highlights provided in the results section, displaying the efforts shown to save the Navajo Churro sheep, is only a fraction of what can be learned about this breed of sheep.

The analysis of this study is subjective. The samples, all the people, places, events, and future uses, are used to demonstrate the need to preserve this breed of sheep that "is no longer threatened with extinction but is still considered a rare breed" (Wikipedia, 2017, para. 4).

The study results are analyzed by an ongoing presentation of all the uses for the Navajo Churro sheep, the people, events, organizations, and art established in the past and still happening in the present. To analyze why it was and is important to save Churro sheep is also displayed in the statement by Cannon, "This started out as story about saving an endangered breed of sheep from extinction, but in the end, it's about more than that. It's about an endangered culture struggling for survival in a shrink-wrapped world" (2010, p.6).

The fiber used to blend with the Churro is described and organized by the type of fiber (protein, cellulose and manmade). Characteristics of the fiber along with the actual fiber are provided in this section. This is intended to be used as a reference to the samples displayed in the results section.
Protein Fibers

Churro Wool

The Navajo Churro Sheep is used for wool, meat and dairy. The fleece consists of an outer coat of fiber measuring six to 12 inches. This protective outer coat comprises 10 to 20% of the fleece. The soft inner coat consists of fibers ranging between 10 to 35 microns and composes about 80% of the fleece. The kemp of the Navajo Churro fleece will only be five % of the fleece (Navajo-Churro Sheep Association, 2010). The natural colors of the Churro are white, light to dark browns, reddish undertones, greys, and blacks. The breed is known for the variety of color. Sometimes the outercoat and undercoat are different colors (Robson & Ekarius, 2011).

Figure 3: Natural Colors of Churro Wool (Schneider, 2017).
This study used different examples of the Navajo Churro wool. The fiber used ranged from raw fleece to commercially produced roving. The specific fiber used for each sample will be provided with the sample produced. This will provide better clarification of the specific Churro fiber used for the sample.

**Babydoll (Southdown) Ram**

The fleece is soft and springy. In textile terms, it runs in the 19 to 22 micron range, which means it's similar to cashmere and can be worn next to the skin without being itchy and uncomfortable (Dilonardo, 2016).

![cleaned Babydoll Southdown locks](image)

**Cormo**

The Cormo Sheep were developed by crossing the Corriedale and Merino which produced a fleece with a micron range between 17 and 23 (Robson & Ekarius, 2011). According to Robson & Ekarius (2011), the wool has a well-defined crimp which provides excellent elasticity. This is a soft fleece with a staple length of three and ¼ inches to five inches (Robson & Ekarius, 2011). As stated by Robson & Ekarius (2011), the Cormo fleece is “definitely suitable for next-to-the-skin and baby garments; the finest Cormos are as gentle as cashmere” (p. 249).
Alpaca

“Alpaca fiber is said to be stronger than mohair, finer than cashmere, softer than cotton, smoother than silk, warmer than goose down and breathes better than thermal knits” (Alpaca Annie, 2011, p.3).

**Figure 5.** commercially prepared alpaca roving (purple, blue, and white)

Angora

The angora fiber used for this study was plucked from the bunny and carded with cotton carders with no prior cleaning. This was done to avoid felting prior to spinning. Angora fiber felts very quickly. The fiber was not smooth and had a bumpy presentation. The fiber used demonstrated the characteristics of the angora rabbit as described in the Master Spinner Level Five Notebook (rev. 2012), angora does not have elasticity, it is a light and fine fiber, gives loft to the yarn, and must be held loosely as it tends to cling together. Robson & Ekarius (2011), describe the angora rabbit fur to excel in the qualities of warmth, fluff, delicacy and softness. Other attributes that should be noted are the angora has little resistance to abrasion and tends to mat and felt.
Yarn spun from the wool of dogs makes a luxurious fabric (Adams, 2015). As stated by Adams, the name given to dog wool is chiengora which origination is French for dog and gora for similarities to rabbit or mohair angora (2015). Dog wool yarn exhibits a halo and a soft fuzzy surface (Adams, 2015). Adams (2015) further noted that dog wool is 7-10 times warmer than sheep wool, has little or no crimp, and is weak under tension. The tension applies to both gravity (as in a blanket) and on a loom (Adams, 2015). According to Martinko, the undercoat should be used, not the glossy overcoat (2017). The wool should be brushed, combed or raked (Martinko, 2017). “The longer the undercoat, the better it spins... Great Pyrenees, and other long-haired undercoated breeds spin very well (Martinko, 2017, para. 6). The fiber from a Great Pyrenees dog was used for this independent study.

Figure 7. combed wool from a Great Pyrenees (not cleaned)
Silk

Silk is considered a filament fiber made from proteins from silkworms (Master Spinner Level Four Notebook, rev. 2012). According to the Master Spinner Level Four Notebook, the two common varieties of silk available to handspinners are cultivated (Bombyx) and wild (tussah) (rev. 2012). Some of the characteristics of silk are: luster, ability to absorb moisture, warmth, lightweight, elasticity (more wet than dry), strong and durable (Master Spinner Level Four Notebook, rev. 2012).
Llama

According to The Joy of Handspinning, the characteristics of llama fiber include no lanolin or grease, the fiber is lightweight, soft, less elasticity than wool, luxurious, very durable, there is no pilling, and llama blends extremely well with other fibers. Llamas have a long, thick, straight, and wiry outer coat guard hair that should be pulled or combed out as it resists spinning. The guard hair is good for pillows, ropes, and wall hangings. The soft, shorter, down fiber under coat is wavy, has some crimp, and produces a soft yarn (1999-2017). The llama that was used for this study was clean, soft, and exceptionally easy to blend and spin.

Figure 10. commercially prepared sample of recycled silk

Figure 11. commercially prepared llama roving
Mohair

Mohair fiber is from the Angora goat. The fiber will generally become coarser as the goat ages (Master Spinner Level Two Notebook, rev. 2012). The locks and the commercially produced roving used for this study are noted as kid mohair. It is hard to know exactly the age of the goat.

The qualities shown in the roving appear to match the description of a yearling and fine young goat as noted in the Master Spinner Level Two Notebook (rev. 2012). The yarn, made from the fiber of a yearling and fine young goat, may be too coarse to wear next to the skin, has a high luster, a good body, blends well with many wools, has some curl and a halo is produced (Master Spinner Level Two Notebook, rev. 2012).

The qualities shown in the locks used for this study appear to match the descriptions of the fall and spring kid as noted in the Master Spinner Level Two Notebook (rev. 2012). The characteristics of the fiber of a fall and spring kid goat are described as being extremely soft, can be worn next to the skin, and the locks are round and curly (Master Spinner Level Two Notebook, rev. 2012).

**Figure 12.** young angora goat (mohair) locks
Flax

Heinrich’s 1992 study (as cited in Master Spinner, Level 4, rev. 2012) described the characteristics of flax and linen as flax being the strongest cellulose fiber, only second to silk. When considering natural fibers, linen is one of the least elastic of the natural fibers, it dries quickly, and is very lustrous.
Ramie

Ramie yarn has a silky luster, is strong (stronger wet than dry), very absorbent and quick to dry, it can be spun very fine (more sheen with more twist), has little shrinkage, easily laundered, and does not have much elasticity or flexibility. According to information from the Master Spinner Level Four Notebook (rev. 2012), ramie is stiff and more brittle than flax, it is like linen as it softens with repeated washings and ramie is stronger yet lighter in weight than linen. Ramie should be rolled to store as creasing can cause breakage and tearing (Master Spinner Level Four Notebook, rev. 2012).

Figure 15. commercially prepared ramie roving

Hemp

Hemp roving was used for this study. According to the Master Spinner Level Five Notebook (Rev. 2012), some of the characteristics of hemp include strength (three times stronger than cotton), very durable, breathable, dyes well, and gets softer with each washing. Hemp is suitable for both summer and winter clothing.

Figure 16. commercially prepared hemp roving
Man-made Fibers

Nylon

According to information from the Master Spinner Level Five Notebook (rev. 2012), nylon is made from chemical compounds. These related chemical compounds are hydrogen, nitrogen, oxygen, and carbon in controlled proportions (Master Spinner Level Five Notebook, rev. 2012). Some of the characteristics of nylon, as described in the Master Sinner Level Five Notebook (rev. 2012), are that nylon is one of the most elastic and strong fibers, it is not absorbent, does not shrink, and has excellent drape. The two varieties available for hand spinners are a very soft roving, called fake cashmere, and nylon icicles, which is shiny but not soft, (Master Spinner Level Five Notebook, rev. 2012).

Figure 17. 100% commercially prepared sparkling white icicles (nylon)

Rayon

According to the Master Spinner Level five (rev. 2012, A-6), “rayon is made of pure cellulose, which has been re-formed or re-generated.” All rayon produced is from cotton linters and wood pulp, which could include spruce, hemlock or pine trees (Master Spinner, Level five, rev. 2012). Some of the characteristics of rayon include the
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

following: “weaker than silk, cotton, and linen but stronger than wool, strength is reduced 70% when wet, more elasticity than cotton and linen but less than wool and silk, wrinkles easily, drapes well, good for summer clothing, shrinks more than cotton, should be ironed on low heat as it is damaged by heat, and is very flammable” (Master Spinner, Level five, rev. 2012, p. A-8).

**Figure 18.** commercially prepared rayon roving

![Commercially prepared rayon roving](image)

**Lyocell**

“Lyocell is the generic name for Tencel. Lyocell is an improved version of rayon” (Master Spinner Level five, rev. 2012, A-9). According to information in the Master Spinner Level five Notebook (rev. 2012), some of the differences in Lyocell and rayon are the production of Lyocell is more environmentally conscience by using less energy, producing less waste and pollution (incurring a greater cost of production). Lyocell is produced from trees grown on managed plantations, and the resulting fiber is completely biodegradable (Master Spinner Level five, rev. 2012). “Lyocell does not shrink and wrinkle as rayon does” (Master Spinner Level five, rev. 2012, A-10). Lyocell is used for
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

many types of garments. Some of the features of the fiber are excellent drape, strength, a soft hand, and washes and dyes well (Master Spinner Level five, rev. 2012).

**Figure 19.** commercially prepared lyocell roving

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**Bamboo**

According to the Master Spinner Level Five Notebook (Rev.2012), some of the characteristics of bamboo include softness, natural sheen, warm, and thermal regulating. Bamboo fibers are excellent for clothing and are comfortable to wear (Master Spinner, Level 5, rev. 2012).

**Figure 20.** commercially prepared bamboo roving
Results

Data and Samples

All data and samples will be described with the following details: fiber content, source of fiber, spinning technique, spinning and plying direction of twist, number of plies, finishing of the spun yarn, samples made with the yarn, suitable end use, and comments.

The samples are organized by the type of fiber. The first section will present samples made from using only 100% Navajo Churro wool. The subsequent sections are in the order of blends. The first blend is Navajo Churro blended and or plied with protein fibers, followed by Churro blended with cellulose fiber, and ending with Churro blended with man-made fiber.

100% Navajo Churro Wool

100% Navajo Churro Roving (White)

Fiber Content. 100% Navajo Churro roving

Source of fiber. The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, NM.

Fiber Preparation. The commercially prepared roving was spun from the roving by attenuating the roving as it was spun.

Spinning Technique. A short forward draw using a Kromski Sonata wheel was used to spin the roving (Appendix A). The roving was attenuated as it was spun to produce a thinner yarn.

Spinning and Plying Direction of Twist. The singles were spun Z and S to ply.

Number of plies. Two
**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The two ply yarn was knit, crocheted, and blocked (Appendix A).

**Suitable end use.** This would be good for horse blankets, weavings for the floor or wall, rugged outerwear that would not be in contact of the skin (a vest worn over other clothing).

**Comments.** This roving is typical of the available mill produced Navajo Churro. There are some noils and vegetable matter present. There was kemp present and very long dark and white guard hair. The kemp does not appear to be noticed in the final products.

**Samples.** Refer to figures 21 - 24 for the Churro roving, skein, knitted swatch and crocheted swatch.

*Figure 21.* commercially prepared 100% Churro roving

*Figure 22.* skein of the two ply yarn used for the samples
100% Navajo Churro Roving (Very Dark Brown)

**Fiber content.** Commercially prepared 100% Navajo Churro roving

**Source of fiber.** It was purchased from Tierra Wools in Los Ojos, New Mexico.
The wool was processed at the Mora Valley Spinning Mill in Mora, New Mexico.

**Fiber preparation.** The roving was attenuated as it was spun. It was compacted so it needed to be teased opened to be able to be spun.

**Spinning technique.** The roving was spun using the traditional technique for a supported Navajo Spindle (Appendix A).
Spinning and plying direction of twist. The single was spun Z.

Number of plies. Single

Finishing of the spun yarn. The single yarn was fulled (Appendix A).

Samples made with yarn. The yarn was knit, crocheted, woven using a Navajo loom and blocked (Appendix A).

Suitable end use. Rugs and saddles blankets would be good choices for this yarn. This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin. This is a yarn that could be used for the traditional Colcha embroidery (Appendix A).

Comments. This roving was easy to draft, only had minimal amounts of vegetable matter, the kemp blended in with the roving and yarn well. The roving was smooth with no noils. The finished yarn and samples showed the kemp but it did not appear to make a difference in the texture.

Samples. Refer to figures 25 - 29 for Churro roving, skein, knitted swatch, crocheted, and woven swatch.

Figure 25. commercially prepared 100% Churro roving
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Figure 26. skein of the single yarn used for the samples

Figure 27. knitted Churro swatch

Figure 28. crocheted Churro swatch
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Figure 29. Swatch woven on a Navajo (Heather Grey) churro yarn.

100% Navajo Churro (Heather Grey)

Fiber content. Commercially purchased 100% Churro yarn.

Source of fiber. The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, New Mexico.

Fiber preparation. The batt was attenuated before it was spun to make a loose roving.

Spinning technique. The roving was spun using the traditional technique for a top whorl Turkish Spindle. The plying was done on the Turkish spindle by using the center and end pull cop made by this spindle.

Spinning and plying direction of twist. Singles were spun Z and spun S to ply.

Number of plies. Two

Finishing of the spun yarn. The two ply yarn was fulled (Appendix A).

Samples made with yarn. The yarn was knit and crocheted. All samples were blocked (Appendix A).
Suitable end use. Rugs and saddles blankets would be good choices for this yarn. This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin.

Comments. The batt was free of vegetable matter. The blended presentation of the kemp, outer and inner coat fibers was easy to attenuate and held together to make an airy roving. The roving was not smooth but was easy to spin and with the Turkish spindle.

Samples. Refer to figures 30 - 33 for Churro batt, skein, knitted swatch and crocheted swatch.

Figure 30. commercially prepared 100% Churro batt
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Figure 32. knitted Churro swatch

Figure 33. crocheted Churro swatch

100% Navajo Churro (Light Brown Tips to Brown and White Blend)

**Fiber content.** Locks were selected from the fleece of a 100% Navajo Churro sheep and cleaned. This Churro was also used to blend with the Southdown Babydoll and with mohair locks.

**Source of fiber.** The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, New Mexico.
**Fiber preparation.** The Churro was cleaned as a whole fleece (Appendix A), separated by locks, hand teased to open the locks, hand carded and made into rolags.

**Spinning technique.** The rolags were spun using the traditional technique for a supported Navajo Spindle (Appendix A).

**Spinning and plying direction of twist.** Single was spun Z.

**Number of plies.** Single

**Finishing of the spun yarn.** The single yarn was fulled (Appendix A).

**Samples made with yarn.** The yarn was knit, crocheted, and woven using a Navajo loom. All samples were blocked (Appendix A).

**Suitable end use.** This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets. This yarn might be used for garments that are worn next to the skin such as mittens, hats, and scarves. This is a yarn that could be used for the traditional Colcha embroidery (Appendix A).

**Comments.** This roving was easy to draft, only had minimal vegetable matter, the kemp blended in with the roving and yarn well. The roving was smooth with no noils. The finished yarn and samples showed the kemp but it did not appear to make a difference in the texture.

**Samples.** Refer to figures 34 - 39 for Churro locks, skein, rolag, knitted, crocheted, and woven swatches
Figure 35. 100% Churro hand carded rolag

Figure 36. Skein of the one ply yarn used for the samples

Figure 37. Knitted Churro sample
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

100% Navajo Churro (Off White)

**Fiber content.** This is a raw fleece of a 100% Navajo Churro sheep.

**Source of fiber.** Shepard’s Lamb wool purchased from Tierra Wools in Los Ojos, New Mexico. The wool was processed at Mora Valley Spinning Mill in Mora, New Mexico.

**Fiber preparation.** The raw fleece was separated by locks. This fleece demonstrated the characteristics described by Robson & Ekarius (2011), of each

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*Figure 38.* crocheted Churro swatch

*Figure 39.* woven Churro swatch
individual lock having a wide base which taper to a narrow tip. This fiber is well
described by Robson & Ekarius (2011), it is easily separated as it is low in grease yet
smooth to spin due to the cohesive quality of the Navajo Churro wool. The locks were
individually elongated from the tip to form an elongated and semi-consistent sliver.

**Spinning technique.** Spinning this raw fleece did not have the joined together
feel of fiber with high amounts of lanolin (Robson & Ekarius, 2011). The best approach
to spinning this fleece was to use these characteristics by elongating each lock from the
tip and spinning from the cut end using the Kromski wheel (Appendix A) and the Navajo
spindle (Appendix A).

**Spinning and plying direction of twist.** The singles were spun Z for both the
spindle and the wheel. The two ply, using the wheel, was spun S.

**Number of plies.** Single with the Navajo spindle and two ply using the Kromski
Sonata spinning wheel.

**Finishing of the spun yarn.** The single yarn was fulled (Appendix A). The two
ply was soaked (Appendix A).

**Samples made with yarn.** The two ply yarn was knit and crocheted. The single
was woven using a Navajo loom. All samples were blocked (Appendix A).

**Suitable end use.** The two ply and the single yarn would be ideal for the weft-
faced woven rugs and tapestries that the Navajo Churro wool is traditionally used
(Robson & Ekarius, 2011). The two ply yarn would be good for cold weather garments
such as vests, coats, and blankets. This yarn, two ply, might be used for garments that are
worn next to the skin such as mittens, hats, and scarves. The single is a yarn that could be
used for the traditional Colcha embroidery (Appendix A).
Comments. Spinning in the approach described above produced a smooth way to
spin a raw fleece, especially using the wheel. Spinning the elongated lock using Navajo
spindle required more attention to elongating the lock. After washing by soaking and
fulling, the smoothness of the yarn was variable but still produced a good yarn in the
single and two ply.

Samples. Refer to figures 40 - 45 for raw fleece lock, skeins, knitted, crocheted,
and woven swatches.

Figure 40. 100% Churro raw fleece lock

Figure 41. skein of the one ply yarn used for the samples
Figure 42. Skein of the two ply yarn used for the samples

Figure 43. Knitted Churro swatch from two ply yarn spun on the wheel

Figure 44. Crocheted Churro swatch from two ply yarn spun on the wheel
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

*Figure 45.* woven Churro swatch from single yarn spun with the Navajo spindle.

100% Navajo Churro (Light Brown)

**Fiber content.** This was a commercially prepared fiber of 100% Navajo Churro. This fiber was also used when spinning with the Turkish spindle and blended with flax.

**Source of fiber.** Purchased at the Espanola Fiber Art Center in Espanola, New Mexico. It was processed at Mora Valley Spinning Mill in Mora, New Mexico.

**Fiber preparation.** The roving was attenuated as it was spun. It was slightly compacted.

**Spinning technique.** The roving was spun on a Kromski wheel using a short forward draw and plied on the wheel (Appendix A).

**Spinning and plying direction of twist.** Singles were Z and ply was spun S.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The yarn was knit, crocheted, and woven using a Navajo loom. All samples were blocked (Appendix A).

**Suitable end use.** Rugs and saddles blankets would be good choices for this yarn. This yarn would be ideal for the weft-faced woven rugs and tapestries that the
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin.

**Comments.** This roving was easy to draft, had minimal amounts of vegetable matter and some kemp. The roving was smooth with very few noils. The kemp appeared to be incorporated into the yarn and the samples. This did not seem to make a difference in the texture.

**Samples.** Refer to figures 46 - 50 for Churro roving, skein, knitted swatch, crocheted, and woven swatch.

*Figure 46.* commercially prepared 100% Churro roving

*Figure 47.* skein of the two ply yarn used for the samples
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEET?

Figure 48. knitted Churro swatch

Figure 49. crocheted Churro swatch

Figure 50. swatch woven on a Navajo loom
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

100% Navajo Churro (Light Brown)

Fiber content. Commercially prepared 100% Navajo Churro roving. This fiber was also used when spinning with the Kromski wheel and blended with flax.

Source of fiber. Purchased at the Espanola Fiber Art Center in Espanola, New Mexico. It was processed at Mora Valley Spinning Mill in Mora, New Mexico.

Fiber preparation. The roving was attenuated before it was spun when using the Turkish spindle. Attenuating prior to spinning seemed to keep a more consistent amount of fiber to be spun.

Spinning technique. Spun and plied on a Turkish spindle.

Spinning and plying direction of twist. The singles were spun Z and ply was spun S.

Number of plies. Two

Finishing of the spun yarn. The two ply yarn was soaked (Appendix A).

Samples made with yarn. The yarn was knit and crocheted. All samples were blocked (Appendix A).

Suitable end use. Rugs and saddles blankets would be good choices for this yarn. This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin. It would also be good for sturdy socks, other knitted items and for felting (The Land and Lamb Company, Inc., n.d.).

Comments. This roving was easier to draft and keep a consistent thickness if attenuated before spinning. The yarn and samples were thicker and appear to be sturdier
than this same roving spun on the Kromski wheel. This would be a nice yarn for garments that needed to be sturdy. The small amount of vegetable matter, noils, and kemp did not seem to affect the final samples. This was a smooth roving to spin and ply using the Turkish spindle.

Samples. Refer to figures 46 and 51 - 53 for Churro roving, skein, knitted and crocheted swatches.

Figure 51. skein of the two ply yarn used for the samples

Figure 52. knitted Churro swatch
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Figure 53. crocheted Churro swatch

100% Navajo Churro (Light, Silvery Grey)

Fiber content. 100% Churro commercially prepared roving was used. This is the same roving that was used for the blend of Churro and Rambouillet.

Source of fiber. The Churro was purchased at the Espanola Fiber Art Center in Espanola, New Mexico and processed at Mora Valley Spinning Mill in Mora, New Mexico.

Fiber preparation. The Churro was spun directly from the roving. There did not appear to be any noils in the roving. The roving was elongated as it was spun to provide an even intake of fiber. The presentation of the roving was smooth. This made it easy to spin a more consistent yarn.

Spinning technique. Short forward draw using a Kromski Sonata wheel (Appendix A).

Spinning and plying direction of twist. The singles were spun Z and the ply was spun S.

Number of plies. Two.
Finishing of the spun yarn. The two ply yarn was soaked (Appendix A).

Samples made with yarn. The yarn was knit and crocheted. All the samples were blocked (Appendix A).

Suitable end use. Rugs and saddles blankets would be good choices for this yarn. This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin.

Comments. This roving had the characteristics described by Robson & Ekarius (2011) as being easy to separate and possessing an interesting cohesive quality. The absence of vegetable matter and noils made this a smooth fiber to spin. It seemed to be easier, than many of the fibers used in this study, to spin a consistent yarn due to the lack of noils, vegetable matter and the presentation of the roving. The yarn and samples exhibit the “sweet luster” for which Churro is renowned (Robson & Ekarius, 2011). This roving produced a strong, smooth and sturdy yarn.

Samples. Refer to figures 54 - 57 for Churro roving, skein, knitted, and crocheted swatches.

Figure 54. 100% Churro roving
Figure 55. skein of the two ply yarn used for the samples

Figure 56. knitted Churro swatch

Figure 57. crocheted Churro swatch
100% Navajo Churro (Medium Grey)

**Fiber content.** This is a raw fleece from a 100% Navajo Churro.

**Source of fiber.** This Churro roving is 100% certified organic from Shepard’s Lamb. It was purchased from Tierra Wools in Los Ojos, New Mexico.

**Fiber preparation.** Individual locks from the raw fleece were placed on the hand carder, carded, and rolled into rolags.

**Spinning technique.** This fleece demonstrated the characteristics described by Robson & Ekarius (2011), of each individual lock having a wide base which tapers to a narrow tip. The fibers are low in grease, so they were easily separated. The fleece was clean with very little vegetable matter. There were different spinning and plying techniques used with the rolags.

1. Three yarns were spun on the Kromski Spinning wheel using a short forward draw (Appendix A). Most of the time, the rolags were smooth to spin due to the cohesive quality of the Navajo Churro wool. Sometimes there would be bumps in the rolag which was probably due to the fibers sticking together. For two of the yarns the singles were plied using the wheel. For one yarn the single was spun on the wheel using a Navajo ply technique. This produced a three ply yarn.

2. One rolag was spun on the Kromski Spinning wheel using a traditional long draw. It was harder to draw out the fiber smoothly compared to using a short forward draw on the wheel. This was probably due to the fleece being raw and the presence of lanolin. Some of the rolag would stick together instead of elongating smoothly. The singles were plied using a wheel.
Spinning and plying direction of twist. All the single were spun Z. The three and the two ply using the wheel were spun S.

Number of plies. Three of the yarns were two ply using the Kromski Sonata Spinning Wheel. The Navajo plied yarn is three ply.

Finishing of the spun yarn. There were different techniques used in finishing the spun yarn. This is the same order as described in the spinning techniques.

1. The two ply yarn spun on the wheel and plied on the wheel was fulled (Appendix A).
2. The two ply yarn spun on the wheel and plied on the wheel was soaked (Appendix A).
3. The two ply yarn that was spun on the wheel using a traditional long draw was fulled.
4. The three ply yarn that was spun on the wheel and Navajo plied on the wheel was fulled (Appendix A).

Samples made with yarn. The two ply yarns and the three ply yarn were knit, crocheted, and blocked (Appendix A).

Suitable end use. The two ply and the three ply yarns that were spun using a short forward draw for the single would be ideal for the weft-faced in the woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). This yarn could also be used as the warp in weaving. It would also be good for cold weather garments such as vests, coats, mittens, and blankets. The two ply yarn that was spun using a traditional long draw would be suited for all of the above mentioned except using the yarn as a warp for weaving. This yarn was fluffy and fuzzy.
Comments. The yarns produced from the same raw fleece, using minor variations in production and finishing, show some of the diversity that can be accomplished from this wool.

Samples. Refer to figures 58 - 63 for raw fleece lock, carded rolag, skeins, knitted, and crocheted swatches.

Figure 58. 100% Churro raw fleece lock

Figure 59. 100% Churro raw fleece carded rolag
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Figure 60. skein of two ply and knitted and crocheted Churro swatches from two forward draw, plied, and soaked.

Figure 62. skein of two ply and knitted and crocheted Churro swatches from two ply yarn spun using a traditional long draw, plied, and fulled.
Figure 63. Skein of three ply and knitted and crocheted Churro swatches from three ply yarn spun using a short forward draw, Navajo plied using the spinning wheel, and full

Navajo Churro and Protein Fiber Blends

Navajo Churro and Babydoll Southdown Ram (Dark Brown)

Fiber content. 50% Babydoll Southdown ram and 50% Churro

Source of fiber. The Babydoll Southdown ram fleece was from a farm in North Carolina and delivered to Albuquerque. The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, NM. The Churro fiber was also used as a 100% Churro sample and blended with mohair locks.

Fiber preparation. The Churro was cleaned as a whole fleece (Appendix A), separated by locks, hand teased to open the locks, and drum carded to make a batt.

The Babydoll Southdown was very dirty. It was washed as a whole fleece, the locks were teased open by hand and hand carded to remove the remaining vegetable matter and fluff open the fiber.
The Southdown hand carded little batts were split top to bottom from the side and placed in a thin layer on the drum carder and carded. Then, the Churro carded batt was also split from top to bottom from the side and placed on the drum carder in a thin layer and carded. All the Southdown and the Churro were drum carded in this fashion.

The resulting blended drum carded batt (containing the Babydoll Southdown and the Churro) was then split from top to bottom along the side to make a roving, elongated and spun using a spinning wheel and a Navajo spindle.

**Spinning technique.** Some roving was spun on a wheel using a short forward draw and plied on the wheel (Appendix A). Some roving was spun on the Navajo spindle using the traditional long draw technique used for this spindle (Appendix A).

**Spinning and plying direction of twist.** The wheel spun yarn was spun Z for the singles and plied S. The single spun on the spindle is Z.

**Number of plies.** Two (wheel spun) and single (spindle spun)

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A). The single yarn spun using the Navajo spindle was fulled (Appendix A).

**Samples made with yarn.** The two ply wheel spun yarn was knit and crocheted. The single was woven on a Navajo loom. The crocheted, knitted and woven swatches were blocked (Appendix A).

**Suitable end use.** This yarn is very versatile. It could be used for outdoor wear such as mittens, vests, jackets, or hats. It also appears to be sturdy enough to be used for rugs, blankets, or oven mitts.

**Comments.** The Babydoll Southdown locks were very short and full of lanolin. This produced a two ply yarn with elasticity. The Churro locks did not contain much
lanolin, were long, and had little elasticity compared to the Babydoll. The difference in the fibers was recognized when carding and spinning. The Southdown batt quickly produced noils when carded. The lanolin in the Southdown seemed to act as an adhesive to help keep the fiber together when spinning but often the soft, short, Babydoll fibers pulled away from the longer Churro fibers. This resulted in places of inconsistency in the blending of fiber to produce yarn.

The single spun on the Navajo spindle was hard to spin a consistent blended yarn. The differences in length and texture was apparent and could have been a reason for the inconsistency of the yarn.

The both yarns produced could be described as sturdy, semi soft (not scratchy or soft), yarn with elasticity.

**Samples.** Refer to figures 34 for Churro locks, and 64 - 69 for blended roving, skeins, knitted and crocheted swatches, and woven swatch using a Navajo Loom.

**Figure 64.** blended Churro and Babydoll Southdown roving
**Figure 65.** skein of fulled single spun yarn using the Navajo spindle

**Figure 66.** skein of two ply yarn spun using the wheel

**Figure 67.** knitted Churro and Babydoll Southdown blend swatch
Navajo Churro and Cormo Blend (Off White)

**Fiber content.** Commercially blended 50% Cormo and 50% Churro roving

**Source of fiber.** It was purchased from Tierra Wools in Los Ojos, New Mexico.

The roving was processed at Mora Valley Spinning Mill in Mora, NM.

**Fiber preparation.** The roving was very compacted, so it needed to be teased opened to be spun. After hand teasing the roving, it was attenuated before spinning.
Spinning technique. The roving was spun on a Kromski Sonata wheel using a short forward draw (Appendix A).

Spinning and plying direction of twist. Singles were spun Z and the ply was spun S.

Number of plies. Two

Finishing of the spun yarn. The two ply yarn was soaked (Appendix A).

Samples made with yarn. The yarn was knit and crocheted. All the samples were blocked (Appendix A).

Suitable end use. This would be good for cold weather garments that could be worn next to the skin, such as scarves, mittens, coats, vests, socks and blankets.

Comments. There are some noils, vegetable matter, and kemp present in the roving. It has the characteristics of Cormo that make it more elastic and softer than the Churro alone. Wool from the Cormo Sheep offers excellent elasticity and fluffiness (Robson & Ekarius, 2011).

Samples. Refer to figures 70 - 73 for Churro and Cormo roving, skein, knitted swatch and crocheted swatch.

Figure 70. commercially blended 50% Cormo and 50% Churro roving
**Figure 71.** Skein of the two ply yarn used for the samples

**Figure 72.** Knitted Churro and Cormo blend swatch

**Figure 73.** Crocheted Churro and Cormo blend swatch
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Navajo Churro and Alpaca Ply (Off White, Purple, and Blue)

**Fiber content.** 100% Commercially prepared alpaca roving (purple, blue, and white) and 100 % Churro roving (off white) were plied together. The same Churro roving was plied with an alpaca and mohair blend and use to blended with bamboo.

**Source of fiber.** The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, NM and processed by the Mora Valley Spinning Mill in Mora, New Mexico. The alpaca roving was purchased from Lone Some Stone Natural Fiber Mill and Yarn in Granby, Colorado during the Taos Wool Festival in Taos, New Mexico.

**Fiber preparation.** The Churro roving and the alpaca roving were both spun from the roving.

**Spinning technique.** The alpaca and the Churro were spun separately on a Kromski Spinning wheel using a short forward draw. They were plied using the wheel. Spinning was controlled by spinning at a constant rate. (Appendix A).

**Spinning and plying direction of twist.** The wheel spun yarn has ZZ singles and S ply. This applies to the alpaca and the Churro.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The two ply wheel spun yarn was knit, crocheted, and woven. The crocheted, knit and woven swatches were blocked (Appendix A).

**Suitable end use.** This yarn is very versatile. It has elasticity, strength, sheen,
and has a soft texture. This yarn could be worn next to the skin for articles such as camisoles and used for outdoor wear such as mittens, vests, jackets, scarves or hats. It also could be used for the weft in weavings.

Comments. Both fibers were spun separately from the commercially prepared roving. The alpaca was a much smoother spin than the Churro. The Churro had some vegetable matter, some noils, has kemp and longer guard hair. This made a roving that is not as smooth to spin, but still a very smooth fiber to spin and ply. The plied singles result in a yarn that can be used for a wide range of garments. The qualities displayed in the yarn include characteristics of both the Churro and the alpaca. The yarn is soft, strong, and has elasticity.

Samples. Refer to figures 74-78 for Churro roving, two ply spun yarn, knit, crocheted, and woven swatches

Figure 74. Churro roving

Figure 75. Alpaca and Churro skein
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Figure 76. knit Churro and alpaca plied swatch

Figure 77. crocheted Churro and alpaca

Figure 78. woven Churro and alpaca plied
WHY IS IT IMPORTANT TO SAVE THE CHURRO SHEEP?

Navajo Churro plied with an alpaca and mohair blend (Off White and Brown)

**Fiber content.** Commercially prepared 60% alpaca and 40% mohair blend roving (light brown) and 100% commercially prepared Churro roving (off white) plied together. The same Churro roving was also blended with bamboo and plied with alpaca roving.

**Source of fiber.** The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, NM and processed by the Mora Valley Spinning Mill in Mora, New Mexico. The alpaca and mohair blend roving was processed and purchased from the Mora Valley Spinning Mill in Mora, New Mexico.

**Fiber preparation.** Both rovings used were commercially prepared. The Churro roving and the alpaca and mohair blend roving were both spun from the roving.

**Spinning technique.** The alpaca and mohair blend and the Churro were spun separately on a Kromski Spinning wheel using a short forward draw and plied using the wheel. Spinning was controlled by spinning at a constant rate. (Appendix A).

**Spinning and plying direction of twist.** The wheel spun yarn has ZZ singles and S ply. This applies to the alpaca and mohair blend and the Churro.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The two ply wheel spun yarn was knit, crocheted, and woven. The crocheted, knit and woven swatches were blocked (Appendix A).

**Suitable end use.** This yarn is very versatile. It has elasticity, strength, sheen, and has a soft texture. This yarn could be worn next to the skin for articles such as camisoles and used for outdoor wear such as mittens, vests, jackets, scarves or hats. It
also could be used for the weft in weavings. The characteristics of the alpaca, mohair, and Churro appear to be present in the spun yarn.

**Comments.** Both fibers were spun separately from the commercially prepared roving. The alpaca and mohair blend had some noils from the commercial carding. It tended to have thick and thin spots when elongated for spinning. This was probably due to the differences in the fibers (alpaca and mohair). The Churro had some vegetable matter, little noils, and has kemp. Despite the need to control the roving thickness and watch the fiber as it was spun, both rovings were smooth to spin and ply. The plied singles result in a yarn that can be used for a wide range of garments. The qualities displayed in the yarn include characteristics of both the Churro and the alpaca and mohair. The yarn is soft, strong, has a nice sheen, and elasticity.

**Samples.** Refer to figures 74 and 79-83 for Churro roving, alpaca and mohair blend roving, two ply skein, knitted, crocheted, and woven swatches

*Figure 79.* alpaca and mohair roving

*Figure 80.* alpaca and mohair and Churro skein
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Figure 81. knit Churro and alpaca/mohair swatch

Figure 82. crocheted Churro and alpaca/mohair plied swatch

Figure 83. woven Churro and alpaca/mohair plied swatch
Navajo Churro Blended with Angora Rabbit (Heather Grey)

**Fiber content.** A commercially prepared Churro batt (heather grey) was blended with angora rabbit fiber. The blend was 50% Churro and 50% angora rabbit. This Churro batt was also used when spinning with a Turkish spindle as 100% Churro.

**Source of fiber.** The Churro batt was purchased from the Espanola Valley Fiber Arts Center in Espanola, New Mexico. The batt was processed at the Mora Valley Spinning Mill in Mora, New Mexico. The angora rabbit fiber was plucked from two locally raised (Albuquerque, New Mexico) German cross angora rabbits.

**Fiber preparation.** The angora fiber was plucked from the bunnies and then hand teased to separate the fiber and remove any vegetable matter. The Churro batt was elongated from the batt to open the fiber. The angora fiber and the Churro were carded together on cotton carders and rolled into slivers.

**Spinning technique.** The angora and Churro blend slivers were spun on a Kromski spinning wheel using a short forward draw and plied using the wheel. Spinning was controlled by spinning at a constant rate. (Appendix A).

**Spinning and plying direction of twist.** The singles were spun Z and plied S.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The yarn was knit, crocheted and woven into swatches. All the swatches were blocked (Appendix A).

**Suitable end use.** This yarn has elasticity, is soft, has a fuzzy presentation, would be warm, and is light weight. It would be ideal for next to the skin garments such as mittens, hats, scarves, vests, leggings, or cowls. The characteristics of the rabbit fiber,
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easily felting and having little resistance to abrasion, would probably exclude this fiber from the traditional uses of a 100% Churro yarn such as rugs, saddle blankets or the weft in weaving.

**Comments.** The Churro batt was free of vegetable matter. The blended presentation of the kemp, outer and inner coat fibers was easy to attenuate and held together when carded with the angora. The angora fiber had some vegetable matter, a few felted mats, and a short staple length when compared to the elongated batt of the Churro. The cotton cards appeared to blend the fibers well when made into slivers. The slivers were not smooth since the angora still exhibited lumps and bumps of fiber.

Characteristics of both fibers are demonstrated in the blended yarn. The yarn is soft, light, and strong. The swatches are soft and will possibly demonstrate the “halo” (Appendix A) and become softer because of the angora fiber.

**Samples.** Refer to figures 30 and 84 - 87 for Churro batt, blended angora and Churro sliver, skein, knit and crocheted swatches.

**Figure 84.** 50% Churro 50% angora sliver
**Figure 85.** skein of the two ply yarn used for the samples

**Figure 86.** Knit Churro and angora blend swatch

**Figure 87.** Crocheted Churro and angora blend swatch
Navajo Churro and Rambouillet Blend (Light Grey)

**Fiber content.** 100% Churro (light, silvery grey) roving and 100% Rambouillet roving were blended. Both the Churro and Rambouillet were commercially prepared roving. The same Churro roving was also used as a 100% Churro sample.

**Source of fiber.** The Churro was purchased at the Espanola Fiber Art Center in Espanola, New Mexico and processed at Mora Valley Spinning Mill in Mora, New Mexico. The Rambouillet was purchased and processed at the Mora Valley Spinning Mill in Mora, New Mexico.

**Fiber preparation.** The Churro roving and the Rambouillet were carded separately on the drum carder. The batts were alternately layered on hackles, dizzed (Appendix A) and made into a roving.

**Spinning technique.** The roving was spun on the Kromski Sonata wheel (Appendix A) using a short forward draw.

**Spinning and plying direction of twist.** The singles were spun Z and plied S.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The yarn was knit, crocheted, and woven. The samples were blocked (Appendix A).

**Suitable end use.** This would be good for cold weather garments coats, vests, or hats. It could possible by worn next to the skin depending on the tolerance of the person wearing the garment. This might include socks, mittens, sweaters, or scarves. This yarn could be knit, crocheted, woven or felted into wall hangings, rugs, blankets or placemats. The fiber produced a very versatile yarn.
**Comments.** The Churro has a base color of a silvery grey also includes kemp and what appears to be a very long outercoat of both white and black fiber. This roving has more abrasive or course feel than many of the other Churro roving used for this study. The Rambouillet and the Churro blend produced a strong, elastic, lofty yarn that feels somewhere between soft and sturdy. The characteristics of the Rambouillet add to the qualities of the Churro to make this a versatile yarn. According to Ekarius and Robson (2011) the Rambouillet is not in the ultrafine range as Merinos but in the medium – fine range. It is good to blend because it contributes bounce, flexibility, and superb for next-to-the skin fabrics (Robson & Ekarius, 2011).

**Samples.** Refer to figures 54 and 88 - 92 for Churro roving, blended Churro and Rambouillet roving, skein, and knitted, crocheted, and woven swatches.

*Figure 88.* blended 50% Rambouillet and 50% Churro roving

*Figure 89.* skein of the two ply yarn used for the samples
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Figure 90. knitted Churro and Rambouillet blend swatch

Figure 91. crocheted Churro and Rambouillet blend swatch

Figure 92. woven Churro and Rambouillet blend swatch
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Navajo Churro and Mohair Blend (Orange, Blue, Grey, and White)

**Fiber content.** 75% Navajo Churro and 25% mohair blend. The blue Churro roving was also used to blend with lyocell and as a 100% Churro Navajo ply border on the hemp and Churro blend weaving.

**Source of fiber.** The Churro roving is 100% certified organic. It was purchased from Tierra Wools in Los Ojos, New Mexico. The wool is processed at the Mora Valley Spinning Mill in Mora, New Mexico. The mohair roving was purchased in Taos, New Mexico at La Lana Wools. This store is no longer in business.

**Fiber preparation.** The Navajo Churro was a combination of three separate rovings (grey, orange, and blue). All the rovings were stacked in alternating layers on combs, combed, and then dizzed to make a blended roving. The orange and blue Navajo Churro needed to be hand teased to separate the compacted fibers.

**Spinning technique.** Two different techniques were used to spin the roving. One roving was spun on a Kromski Spinning Wheel using a short forward draw. This was then plied on the wheel. Spinning was controlled by spinning at a constant rate (Appendix A). One roving was spun using Navajo spindle (Appendix A).

**Spinning and plying direction of twist.** All the singles were spun Z. The two ply, using the wheel, was spun S.

**Number of plies.** Single and two ply

**Finishing of the spun yarn.** The two ply yarn was soaked to clean and rinse (Appendix A). The single was fulled (Appendix A).

**Samples made with yarn.** The two ply yarn was knit and crocheted. The single was woven. All samples were blocked (Appendix A).
Suitable end use. The two ply yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). The single has more of the halo that is characteristic of mohair (Master Spinner Level Two, rev. 2012). The showy fibers from the halo might not make this a good yarn to use in weaving as the fiber could snag. Both the single and the two ply yarn would also be good for cold weather garments such as vests, coats, and blankets. This fiber might be too scratchy to be used for garments that are worn next to the skin such as mittens, hats, and scarves. It appears to have qualities of both the Churro and the mohair. It is strong, durable, has luster, elasticity, is softer than Churro but not as soft as mohair (Master Spinner Level Two, rev. 2012).

Comments. The commercially carded Churro (blue and orange) was compacted and had quite a few noils. These rovings were not easy to spin. The grey Churro had very few noils and a smoother presentation. After stretching out and teasing open the fiber of the blue and orange Churro, the combing seemed to be a good way to blend the Churro and the mohair. All the fibers had a similar staple length. The common length of fiber appeared to assist in distributing the colors evenly. The resulting roving still shows all the colors. The roving remained unified as it was spun. This was a semi smooth roving to spin after spending the time needed in preparation. The two ply yarn is smooth except for the bumps from the noils and the long outercoat and kemp fibers. The single yarn is not very even or smooth. The single appears to be softer, fuzzier, and has a strong luster. Both yarns are strong and have nice qualities.

Samples. Refer to figures 93-100 for commercially prepared carded Churro rovings, combed mohair and Churro blend, two ply skein of blended Churro and mohair,
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single skein of blended Churro and mohair, knit and crocheted samples (two ply), and woven (single) swatch.

**Figure 93.** commercially produced Churro roving (blue)

**Figure 94.** commercially produced Churro roving (grey)

**Figure 95.** combed 25% mohair and 75% Churro blend roving
Figure 96. two ply skein of blended Churro and mohair

Figure 97. single skein of blended Churro and mohair

Figure 98. knitted two ply Churro and mohair swatch
Navajo Churro and Mohair Blend (Brown and Silver)

**Fiber content.** A blend of 50% Navajo Churro cleaned locks (brown with light tips) and 50% mohair clean locks. This same Churro was also used as a blend with Southdown Babydoll and as a 100% Churro sample using a Navajo spindle.

**Source of fiber.** The Churro was purchased, as a whole fleece, from the Espanola Valley Fiber Arts Center (EVFAC) in Espanola, New Mexico. The mohair locks were purchased in Taos, New Mexico at the Taos Wool Festival. The mohair originally comes from KAI MOHAIR Natural Colored Angora Goats (www.kairanch.com).
**Fiber preparation.** The Churro was cleaned as a whole fleece (Appendix A). The cleaned locks were long, fluffy, and ended in a tight, pointed tip. The best way to separate the individual lock was to hand tease the tips open.

The mohair locks were curly, soft, and needed to be hand teased to open the locks before carding. The mohair locks were very lightly carded on the hand cards.

The best approach to blending these fibers was to hand card the separated mohair locks and then add the separated Churro locks. Hand carding was done to blend the fibers. The hand carded blend was rolled into a rolag.

**Spinning technique.** The rolag was spun using Navajo Spindle (Appendix A).

**Spinning and plying direction of twist.** The single was spun Z.

**Number of plies.** Single

**Finishing of the spun yarn.** The single was fulled (Appendix A).

**Samples made with yarn.** The single yarn was knit and crocheted. All samples were blocked (Appendix A).

**Suitable end use.** The single has a definite halo that is characteristic of mohair (Master Spinner Level Two, rev. 2012). The showy fibers from the halo might not make this a good yarn to use in weaving (weft or warp) as the fiber could snag. Weaving can be accomplished, but care must be taken due to the halo. This single yarn would be good for cold weather garments such as vests, coats, and blankets. The yarn and the samples do appear to be soft enough for garments that are worn next to the skin such as mittens, hats, and scarves. The single yarn appears to have qualities of both the Churro and the mohair. It is strong, durable, has luster, elasticity, and is much softer than Churro (Master Spinner Level Two, rev. 2012).
Comments. Teasing open the locks and tips of the fibers was necessary before carding any of the fiber. This presented a good way to blend the fibers. The best way to spin this fiber was to elongate the rolag first. This made an even presentation of fiber when spinning. The fulled single yarn appears to be strong, soft, and has similar qualities of a two ply yarn when it is knit and crocheted.

Samples. Refer to figures 34 and 101 -104 for the Churro lock, carded rolag of mohair and Churro blend, one ply skein of blended Churro and mohair, and knit and crocheted samples (single).

Figure 101. carded 50% mohair and 50% Churro blend rolag

Figure 102. one ply skein of blended Churro and mohair
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Figure 103. knit one ply Churro and mohair swatch.

Navajo Churro and Great Pyrenees (Off White)

Fiber content. This is a blend of 50% Navajo Churro (off white) batt and 50% Great Pyrenees dog fiber. This Churro batt was also used when blending with hemp and with nylon.

Source of fiber. The Navajo Churro batt was purchased from the Espanola Valley Fibers Arts Center in Espanola, New Mexico. It was carded in Mora, New Mexico at the Mora Valley Spinning Mill. The dog (Great Pyrenees) fiber was brushed and used without any other preparation.
Fiber preparation. The batt of Churro wool was drum carded, taken off the drum carder and then the dog fiber was drum carded. The two batts of Churro and dog fiber were split from the side, top to bottom and stacked in thin layers on top of each other and then carded using the drum carder. The resulting batt was then split from the side, top to bottom to make a roving for spinning.

![Batt of carded Great Pyrenees fiber stacked on carded Churro wool.](image)

*Figure 105. Batt of carded Great Pyrenees fiber stacked on carded Churro wool. (Schneider, 2017)*

Spinning technique. The roving was spun on a Kromski Spinning Wheel using a traditional long draw technique. The two ply yarn was then plied on the wheel.

Spinning and plying direction of twist. The singles were spun Z and plied S.

Number of plies. Single and two ply

Finishing of the spun yarn. The two ply and the single yarn were fulled (Appendix A).
Samples made with yarn. The two ply yarn was knit and crocheted. The single was knit. All samples were blocked (Appendix A).

Suitable end use. This yarn would be good for cold weather garments to be worn outdoors such as vests, coats, blankets, mittens, hats, and scarves. The addition of dog fiber would make anything made from this yarn very insulating and warm. This yarn would probably be too warm to use for garments to wear indoors.

Comments. The commercially carded Churro was not smooth, contained noils, some vegetable matter, kemp, and very apparent dark and white guard hair. The Great Pyrenees fiber carded into a fluffy batt. The batts appeared to blend well when drum carded but there was some apparent separation when spinning using the long draw technique. Spinning using this technique was not smooth. The halo of the dog and the roughness of the Churro seemed to make a consistent draw hard to achieve. The result produced a strong, semi soft yarn with a halo that will probably grow.

Samples. Refer to figures 106 - 112 for commercially prepared, fluff, Churro batt, carded dog and Churro roving, two ply and single skeins of blended Churro and dog, knitted and crocheted swatches.

Figure 106. 100% Navajo Churro batt (off white)
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**Figure 107.** 50% Great Pyrenees and 50% Churro roving

**Figure 108.** two ply skein of 50% Churro and 50% dog blend

**Figure 109.** single skein of 50% Churro and 50% dog blend
**Figure 110.** knitted Churro and dog swatch from **two ply yarn**

**Figure 111.** crocheted Churro and dog swatch from **two ply yarn**

**Figure 112.** knitted Churro and dog swatch from **single yarn**
Navajo Churro and Llama Blend (Grey and Brown)

**Fiber content.** A blend of 50% Navajo Churro (grey) roving was blended with 50% llama roving.

**Source of fiber.** The Churro roving is 100% certified organic. It was purchased from Tierra Wool in Los Ojos, New Mexico. The wool was processed at Mora Valley Spinning Mill in Mora, New Mexico. This Churro roving was also used to blend with ramie and rayon. The llama was commercially prepared roving purchased at the Taos Wool Festival in Taos, New Mexico from Tall Tail Ranch in Colbran, Colorado.

**Fiber preparation.** The rovings were blended by layering thin layers of Churro and llama on the blending board. The blended fiber on the board was then rolled into rolags.

**Spinning technique.** The rolags were spun using a short forward draw on the Kromski wheel (Appendix A).

**Spinning and plying direction of twist.** Singles were spun Z and the ply was S.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The yarn was knit, crocheted, and woven using a Navajo loom. All samples were blocked (Appendix A).

**Suitable end use.** This blend produced a yarn that is ideal for a wide variety of uses. The yarn could be used for rugs, saddle blankets, weft and warp in weaving, cold weather outerwear, and next to the skin garments.

**Comments.** The Churro roving had no vegetable matter, the kemp presence is obvious in the yarn but not as obvious in a knit, crocheted, or woven swatch. The Churro
roving was smooth with very few noils. The llama roving is very soft, clean and has no noils. The llama appears to be a mix of the longer outercoat and the finer and shorter undercoat. The llama roving clearly shows the two separate colors of grey and brown. The Churro and llama were blended very lightly by using the blending board. This produced a rolag that was easy to draft and spin. The separate colors are presented in the yarn and the samples. This llama and Churro blend has potential to be used for almost any type of material or garment.

**Samples.** Refer to figures 113-117 for Churro roving, skein of llama and Churro blend, knit swatch, crocheted, and woven swatch.

**Figure 113.** commercially prepared 100% Churro roving (grey)

**Figure 114.** skein of the two ply yarn used for the samples
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*Figure 115.* knit Churro and llama blend swatch

*Figure 116.* crocheted Churro and llama blend swatch

*Figure 117.* swatch woven on a Navajo loom
Navajo Churro, Tussah Silk, and Recycled Silk (Brown and Multicolored)

**Fiber content.** The blend used was 76.6% Navajo Churro (brown fluff), 15.7% tussah silk, and 7.75% recycled silk.

**Source of fiber.** The Navajo Churro fluff was purchased from the Espanola Valley Fibers Arts Center (EVFAC) in Espanola, New Mexico. It was carded in Mora, New Mexico at the Mora Valley Spinning Mill. The tussah silk has an unknown place of purchase. It is a commercially prepared roving. The recycled silk (Appendix A) was purchased in Santa Fe, New Mexico at a fiber show.

**Fiber preparation.** The Churro fluff and the tussah were alternately layered on the hackle, dizzed, and made into a roving. This blended roving was put on a blending board. The recycled silk pieces were then added to the Churro and tussah on the blending board. This blend of Churro fluff, tussah, and recycled silk was made into rolags.

**Spinning technique.** The rolags were spun on a Kromski Spinning wheel using a short forward draw technique (Appendix A) and plied on the wheel to make a two ply yarn. The rolags were also spun using a Navajo Spindle to make a single yarn.

**Spinning and plying direction of twist.** The singles were spun Z and plied S.

**Number of plies.** The yarn produced using the spinning wheel is two ply. The yarn produced using the Navajo spindle is one ply.

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A) and the one ply was fulled (Appendix A).

**Samples made with yarn.** The two ply yarn was knit and crocheted. The one ply was woven on a Navajo loom. All samples were blocked (Appendix A).
Suitable end use. The two ply and one ply yarn would work well for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). This yarn exhibits the qualities of both the Navajo Churro and the silk. It is strong, has some luster, and some elasticity. The two samples appear to be very sturdy and well suited for rugs, ropes, halters, leashes, and horse blankets. Braiding this yarn would produce good mats and utility rugs. This yarn could be used for garments not worn next to skin such as vests or coats. Garments for both cold and warm weather could be made from this yarn depending how tightly the yarn was knit, woven, or crocheted.

Comments. The commercially carded Churro fluff was a big mound of fiber with a lot of noils, kemp, long guard hair, vegetable matter and no consistent idea of a staple length. This would be a very good fluff to felt for a piece of material.

An uneven, very strong, colorful art yarn was produced after blending the fluff with the silk roving and the recycled silk pieces and then spinning on the wheel and the spindle. The fiber needed the processes of using the hackles and then the blending board to achieve a good blend of fibers. The samples exhibit some elasticity, but the knitting and crocheting processes were difficult due to the tightness of the yarn. There did not appear to be much elasticity.

Samples. Refer to figures 118-124 for commercially prepared carded fluff Churro, 76.6% Churro, 15.7%, and 7.75% blended rolag, two ply skein of blended Churro and silk, one ply skein of blended Churro and silk, knitted, crocheted, and woven swatches.
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Figure 118. 100% Navajo Churro commercially prepared carded fluff

Figure 119. 76.6% Churro, 15.65% tussah silk and 7.75% recycled silk blend

rolag

recycled silk
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Figure 121. one ply recycled silk

Figure 122. knitted Churro and silk blend from two ply yarn

Figure 123. crocheted Churro and silk blend from two ply yarn
Navajo Churro (Light Brown) Blended with Flax

**Fiber content.** This is a blend of 75% commercially prepared Navajo Churro roving (light brown) and 25% commercially prepared flax top. This roving was also used to spin a 100% wool sample on the wheel and 100% Churro sample using the Turkish spindle.

**Source of fiber.** The Churro was purchased at the Espanola Fiber Art Center in Espanola, New Mexico and processed at the Mora Valley Spinning Mill in Mora, New Mexico. The flax was purchased at the Espanola Fiber Art Center in Espanola, New Mexico. It was a donated item and no other information was provided.

**Fiber preparation.** The Churro and the flax were combed and dizzed to produce a blended roving. The fibers were stacked in alternating layers on the combs.

**Spinning technique.** The blended roving was spun and plied on a top whorl spindle.
Spinning and plying direction of twist. The singles were spun Z and ply was spun S.

Number of plies. Two

Finishing of the spun yarn. The two ply yarn was soaked (Appendix A).

Samples made with yarn. The yarn was knit and crocheted. All the swatches were blocked (Appendix A).

Suitable end use. This yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would be good for the warp as it appears to have the qualities of flax; it is strong, has the least elasticity of the natural fibers, and once it is stretched it stays stretched (Master Spinner Level four, rev. 2012). Rugs and saddles blankets would be good choices for this yarn since it is strong and has some elasticity. It also would be good for a variety of garments from vests, coats, mittens, and scarves. This blend might be good for a next to the skin warm weather garment since linen is cool which makes it a good choice for warm weather apparel (Master Spinner Level four, rev. 2012).

Comments. The blended roving was easy to draft and keep at a consistent thickness when spinning. The handle and wraps per inch are different than expected. It is a thicker and heftier yarn than anticipated. The roving was smooth to spin and ply using a top whorl spindle. The fibers appeared to be the same length so combing, dizzing, and spinning were smooth and appeared to be a good way to produce yarn. The small amount of vegetable matter, noils, and kemp did not seem to affect the final samples. The qualities of both fibers are represented in the yarn.
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Samples. Refer to figures 46 and 125 - 127 for Churro roving, skein, knitted and crocheted swatches.

**Figure 125.** skein of the two ply Churro and flax yarn used for the samples

**Figure 126.** knitted Churro and flax swatch

**Figure 127.** crocheted Churro and flax swatch
Navajo Churro and Hemp (White)

**Fiber content.** A blend of 60% Navajo Churro (off white) batt and 40% hemp roving. The Churro was also used to blend with dog and nylon.

**Source of fiber.** The Navajo Churro batt was purchased from the Espanola Valley Fibers Arts Center in Espanola, New Mexico. It was carded in Mora, New Mexico at the Mora Valley Spinning Mill. The hemp roving was a donation from the Las Aranas Spinners and Weavers Guild.

**Fiber preparation.** The batt and the roving were stacked in alternating layers on combs, combed, and then dizzed (Appendix A) to make a blended roving.

**Spinning technique.** The roving was spun on a Kromski Spinning wheel using a short forward draw. This was the plied on the wheel. Spinning was controlled by spinning at a constant rate. (Appendix A).

**Spinning and plying direction of twist.** All the singles were spun Z. The two ply using the wheel was spun S.

**Number of plies.** Single and two ply

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A). The single was fulled (Appendix A).

**Samples made with yarn.** The two ply yarn was knit and crocheted. The single was woven. All the swatches were blocked (Appendix A).

**Suitable end use.** The two ply and the single yarn would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). It would also be good for cold weather garments such as vests, coats, and blankets. Due to the nature of hemp, this yarn might be used for
garments that are worn next to the skin such as mittens, hats, and scarves. It appears to have qualities of both the Churro and the hemp. It is strong, softer than Churro but not as soft as hemp.

**Comments.** The commercially carded Churro was not smooth, contained noils, some vegetable matter, kemp, and very apparent dark and white guard hair. The hemp roving was smooth. Combing the Churro and the hemp seemed to be a good method of blending as the fibers had a similar staple length on the combs. The fibers appeared to blend well after combing and dizzing. This blend was apparent as the roving remained unified as it was spun. Neither fiber seemed to pull away from the other. Garments made with this blend would probably become softer after several washings due to the nature of the hemp.

**Samples.** Refer to figures 106 and 128-132 for commercially prepared carded Churro batt, two ply skein of blended Churro and hemp, one ply skein of blended Churro and hemp, knitted, crocheted, and woven (single) swatches.

**Figure 128.** two ply skein of 60% Churro and 40% hemp blend
**Figure 129.** one ply skein of 60% Churro and 40% hemp blend

**Figure 130.** knit Churro and hemp swatch from two ply yarn spun on the wheel

**Figure 131.** crocheted Churro and hemp swatch from two ply yarn spun on the wheel
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Figure 132. woven Churro and hemp swatch from the single blend which includes a border made by Navajo Plying of Churro roving using a Navajo Spindle (Appendix A).

Navajo Churro and Ramie Blend (Grey with White)

Fiber content. The commercially prepared Navajo Churro (grey) was blended with ramie. The blend is 50% Churro and 50% ramie. The Navajo Churro was also used to blend with llama and rayon.

Source of fiber. The Churro roving is 100% certified organic. It was purchased from Tierra Wools in Los Ojos, New Mexico. The wool is processed at Mora Valley Spinning Mill in Mora, New Mexico. The ramie was commercially prepared roving from an unknown source.

Fiber preparation. The rovings were lightly hand carded together on cotton carders and made into slivers. This was done to preserve the color and texture of both fibers and the prevent the appearance of noils.

Spinning technique. The slivers were spun with a short forward draw on the Kromski wheel (Appendix A).
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Spin and plying direction of twist. Singles were spun Z and the ply was S.

Number of plies. Two

Finishing of the spun yarn. The two ply yarn was soaked (Appendix A).

Samples made with yarn. The yarn was knit, crocheted, and woven using a Navajo loom.

Suitable end use. This blend produced a yarn that would be good for rugs, saddle blankets, weft and warp in weaving. It would also be good for cold weather garments such as vests, coats, and blankets that would not be next to the skin. If a ramie and Churro blend were spun fine, this blend might make a good yarn for summer wear. Ramie is ideal for warm weather use as it is porous, absorbent, and quick to dry (Master spinner Level Four Notebook, rev. 2012). A garment made with Churro and ramie would probably soften with repeated washing.

Comments. This sliver was easy to draft, had no vegetable matter, the kemp presence is obvious in the yarn but not as obvious in a knit, crocheted, or woven swatch. The sliver was smooth with very few noils. The yarn and the finished samples seemed to exhibit the ramie as highlights in the grey Churro. This is probably due to the equal mix of fiber and the light carding.

Samples. Refer to figures 113 and 133 - 137 for Churro roving, carded sliver, skein, knit swatch, crocheted, and woven swatch.

Figure 133. Sliver from carded Churro and ramie blend
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Figure 134. skein of the two ply yarn used for the samples

Figure 135. knitted Churro and ramie blend swatch

Figure 136. crocheted Churro and ramie blend
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Figure 137. Churro and ramie blend on a Navajo loom.

Navajo Churro and Man-Made Fiber Blends

Navajo Churro and Bamboo Blend (White)

Fiber content. This is a blend of 33% commercially prepared bamboo top and 66% Churro roving (off white). The Churro roving was also used with the alpaca and Churro plied yarn and the alpaca and mohair blend plied with the Churro.

Source of fiber. The Churro was purchased from Espanola Valley Fiber Arts Center (EVFAC) in Espanola, New Mexico and processed by the Mora Valley Spinning Mill in Mora, New Mexico. The bamboo top was purchased from Chamomille Connection.

Fiber preparation. The Churro roving and the bamboo top were combed, dizzed (Appendix A) and made into rovings.

Spinning technique. The roving was spun on a Kromski spinning wheel using a short forward draw and plied on the wheel. Spinning was controlled by spinning at a constant rate (Appendix A). The three ply yarn was spun from a single and Navajo plied using the Kromski spinning wheel.
**Spinning and plying direction of twist.** The wheel spun yarn (two and three ply) has Z singles and S ply.

**Number of plies.** Two and three ply

**Finishing of the spun yarn.** The two ply and three ply yarns were soaked (Appendix A).

**Samples made with yarn.** The two ply wheel spun yarn was knit, crocheted, and woven. The three ply yarn was knit. The samples were blocked (Appendix A).

**Suitable end use.** This yarn is very versatile. It has elasticity, strength, sheen, and has a soft texture. This yarn could be worn next to the skin for articles such as camisoles and used for outdoor wear such as mittens, vests, jackets, scarves or hats. It also appears to be sturdy enough to be used for rugs, blankets, or the weft in weavings.

**Comments.** The bamboo top and Churro roving were blended to make a smooth roving that could be elongated as it was spun. The spun yarn was plied and the washed and rinsed to present a lustrous, strong, yarn with elasticity. This was an easy fiber to comb and diz as the staple lengths were very long and about the same length.

**Samples.** Refer to figures 74 and 138 - 144 for Churro roving, blended bamboo and Churro roving, two and three ply spun yarn skeins, knit, crocheted swatches, and woven swatch on Navajo loom.

*Figure 138. combed bamboo and Churro roving*
Figure 139. bamboo and Churro two ply skein

Figure 140. knitted Churro and bamboo blend two ply swatch

Figure 141. crocheted Churro and bamboo blend two ply swatch
Figure 142. woven two ply Churro and bamboo blend swatch

Figure 143. three ply skein of Navajo plied bamboo and Churro Na

Figure 144. knitted Navajo three ply yarn
Navajo Churro (Blue) and Lyocell (Tencel) Blend

**Fiber content.** This is a blend of 74% Navajo Churro and 26% lyocell. “Lyocell is the generic name for Tencel” (Master Spinner Level five, rev. 2012, p. A – 9). The blue Churro was also used in the blue, orange, grey Churro blended with mohair. It was also used as the three ply border on the Churro and hemp blend weaving.

**Source of fiber.** The Churro roving is 100% certified organic. It was purchased from Tierra Wools in Los Ojos, New Mexico. The wool is processed at the Mora Valley Spinning Mill in Mora, New Mexico. The lyocell roving was purchased in Taos, New Mexico at La Lana Wools. This store is no longer in business.

**Fiber preparation.** The Navajo Churro was hand teased to separate the compacted fibers before placing the roving on the combs. The roving was stacked in alternating layers on the combs, combed, and then dizzed to make a blended roving.

**Spinning technique.** All the singles were spun on a Kromski Spinning wheel using a short forward draw. Spinning was controlled by spinning at a constant rate using the wheel (Appendix A). Two different techniques were used to ply the singles. The two ply was plied using the spinning wheel. The three ply was accomplished by using the Navajo Spindle (Appendix A).

**Spinning and plying direction of twist.** All the singles were spun Z. The two ply, using the wheel, was spun S. The three ply, using the Navajo spindle was spun S.

**Number of plies.** A two ply yarn was spun using the wheel. The three ply yarn was plied on the Navajo spindle.

**Finishing of the spun yarn.** Both the two and three ply yarns were soaked to clean and rinse (Appendix A).
Samples made with yarn. The two ply yarn was knit and crocheted. The three ply yarn was braided.

Suitable end use. The two ply and the three ply yarns would be ideal for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius, 2011). This yarn exhibits the qualities of both the Navajo Churro and the lyocell. It is strong, soft, has luster, elasticity, and drape. It could be used for cold weather garments such as vests, coats, and blankets. It is also suitable for garments that are worn next to the skin such as camisoles, skirts, mittens, hats, and scarves. The three ply yarn appears to have an added strength. Uses for the three might include ropes, halters and leashes for animals and braiding to make rugs or mats.

Comments. The commercially carded Churro (blue) was compacted and exhibited many noils before and after combing and dizzing. The staple lengths of the lyocell and the Churro were similar in length. This made it easy to prepare the roving for spinning. The resulting roving still shows all the colors. The roving remained unified as it was spun. This was a smooth roving to spin. The two ply yarn is smooth except for the bumps from the noils and the long outercoat and kemp fibers. This did not appear to affect the yarn. The Navajo three ply yarn seems to show the kemp and long outer coat fibers more than the two ply yarn that was spun on the wheel. Both yarns are strong and have nice qualities.

Samples. Refer to figures 93 and 145 - 150 for commercially prepared carded Churro roving (blue), combed lyocell and Churro blend roving, two ply and three ply skeins of blended Churro and lyocell, knitted and crocheted samples (two ply), and braided (three ply) sample
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*Figure 145.* combed 26% lyocell and 74% Churro blend roving

*Figure 146.* two ply skein of blended Churro and lyocell

*Figure 147.* knitted two ply Churro and lyocell swatch
**Figure 148.** Crocheted two ply Churro and lyocell swatch

**Figure 149.** Navajo three ply skein of blended Churro and lyocell

**Figure 150.** Braided three ply Churro and lyocell sample
Navajo Churro and Nylon Blend (White)

**Fiber content.** This is a blend of 82% Navajo Churro (off white) batt with 18% sparkling white icicle (nylon). The Navajo Churro was also used to blend with dog and hemp.

**Source of fiber.** The Navajo Churro batt was purchased from the Espanola Valley Fibers Arts Center (EVFAC) in Espanola, New Mexico. It was carded in Mora, New Mexico at the Mora Valley Spinning Mill. The nylon was also purchased from the Espanola Valley Fiber Arts Center in Espanola, New Mexico. The nylon was a commercially prepared roving.

**Fiber preparation.** The batt of the Churro wool was drum carded, taken off the drum carder and then the nylon fiber was drum carded. The two batts of Churro and nylon fiber were split from the side, top to bottom, and stacked in thin layers on top of each other on hackles. The fiber was stacked in alternating layers to fill the hackles and then dizzed to make a roving (Appendix A).

**Spinning technique.** The roving was spun on a Kromski spinning wheel using a short forward draw technique (Appendix A). The two ply yarn was the plied on the wheel.

**Spinning and plying direction of twist.** The singles were spun Z and plied S.

**Number of plies.** The yarn produced is two ply.

**Finishing of the spun yarn.** The two ply yarn was soaked (Appendix A).

**Samples made with yarn.** The two ply yarn was knit and crocheted.

**Suitable end use.** The two ply yarn would work well for the weft-faced woven rugs and tapestries that the Navajo Churro wool is traditionally used (Robson & Ekarius,
2011). This yarn exhibits the qualities of both the Navajo Churro and the nylon. It is strong, has luster, sparkle, and some elasticity. The two samples appear to be very sturdy and well suited for rugs, ropes, halters, leashes, and horse blankets. Braiding this yarn would produce good mats and utility rugs. This yarn could be used for garments not worn next to the skin such as vests or coats. Garments for both cold and warm weather could be made from this yarn depending how tightly the yarn was knit, woven, or crocheted.

Comments. The commercially carded Churro was not smooth, contained noils, some vegetable matter, kemp, and very apparent dark and white guard hair. Even after carding and dizzing off the hackles, the roving was still uneven and inconsistent in texture. The spinning process was not smooth. The resulting yarn is not consistent or smooth. Knitting and crocheting the yarn was tight as there was very little elasticity despite the nylon. The produced samples demonstrate the utility type yarn that was spun with this blend.

Samples. Refer to figures 106 and 151 - 154 for commercially prepared carded fluff Churro batt, 82% Churro and 18% nylon blended roving, two ply skein of blended Churro and nylon, knit and crocheted swatches.

Figure 151. 82% Churro and 18% nylon blend roving
Figure 152. two ply skein of 82% Churro and 18% nylon blend

Figure 153. knit Churro and nylon swatch from two ply yarn

Figure 154. crocheted Churro and nylon swatch from two ply yarn
Navajo Churro and Rayon Blend (Dark Grey)

**Fiber content.** This is a blend of 85% Navajo Churro (grey) roving with 15% commercially prepared rayon roving. The Navajo Churro roving was also used to blend with llama and ramie.

**Source of fiber.** The Churro roving is 100% certified organic. It was purchased from Tierra Wools in Los Ojos, New Mexico. The wool is processed at Mora Valley Spinning Mill in Mora, New Mexico. The rayon was commercially prepared roving donated by the Espanola Fiber Arts Center in Espanola, New Mexico.

**Fiber preparation.** The rovings were blended by hand carding the and then rolling into rolags. The rayon was very compacted and needed to be hand teased to separate. Once separated, the rayon and the Churro staple lengths appeared to be similar. The rayon was very fluffy.

**Spinning technique.** The rolags were spun using a traditional long draw technique on the Kromski wheel.

**Spinning and plying direction of twist.** Singles were spun Z and the ply was S.

**Number of plies.** Two

**Finishing of the spun yarn.** The two ply yarn was fulled (Appendix A).

**Samples made with yarn.** The yarn was knit and crocheted. The samples were blocked (Appendix A).

**Suitable end use.** This blend produced a yarn that is ideal for a wide variety of uses. The blend, how it was spun, and finished produced a hefty yarn that could be used for garments not worn next to skin such as vests or coats. It appears to be a strong yarn that would be good from rugs, mats, or saddle blankets. There are qualities of both rayon
and wool present. It is semi fluffy and lofty but also does not so much elasticity. The rayon blended with the Churro makes this a softer yarn than 100% Churro. Rayon is very flammable so this must be considered when using this yarn.

**Comments.** The Churro roving had no vegetable matter and very few noils. The kemp and long guard hair presence is obvious in the yarn but not as obvious when it was knit or crocheted. The small amount of rayon in the blend was noticed in drafting when using the traditional long draw. It was not as smooth as the Churro and less elastic. This did produce some uneven spots as the rovings as the rolags did not draft smoothly all the time.

**Samples.** Refer to figures 113 and 155 – 158 for Churro roving, Churro and rayon blended rolag, skein of rayon and Churro blend, knit and crocheted swatch.

*Figure 155.* Churro and rayon blended rolag

*Figure 156.* skein of the two ply yarn used for the samples
People, Places, Organizations, Events, and More

The Navajo Churro sheep have people supporting the continued effort to save the sheep. As stated by the group Ganados del Valle (Livestock Growers of the Valley), “Ganados aims to insure that weaving, wool growing and shepherding continue as a way of life. Its cooperative breeding program works to save the old Spanish Churro sheep line from extinction” (para. 6, n.d.). A brief description of some of these people, places, organization, events, will be presented. These groups do not have boundaries and appear to strengthen with cooperation.
Dr. Lyle McNeal

Dr. McNeal of the Department of Animal, Dairy, and Veterinary Science at Utah State University in Logan, Utah, searched canyons for descendants of the original Navajo Churro sheep (Smith, L.M., 1998). His concern that the Navajo Churro sheep were facing extinction was the beginning of the Navajo Churro Sheep Project (Smith, L.M., 1998).

In a conversation at the Espanola Valley Fiber Arts Center during Churro Week, Dr. McNeal stated how important and necessary the continued education and commitment to preserving the Navajo Churro sheep remains (L. McNeal, personal communication, October 1, 2016). Dr. McNeal was a presenter during Churro Week in 2016.

Advisory Council for the Navajo Churro Sheep Project

Some of the members on the Advisory Council for the reestablishment of the Churro include: Robert Redford (also raises Churro sheep), Ronald Malouf, president and CEO of Malouf Company, Reeve Lindbergh-Tripp, daughter of Charles Lindbergh, and John Ernst, president and CEO of Bloomingdale Properties in New York (Smith, L.M., 1998).

Lana

Lana is a fiber experience that was held on October 7th and 8th, 2017, in Arroyo Seco, New Mexico. This is an educational fiber gathering made possible by Weaving Southwest (T. Lovelace, personal communication, September 8, 2017). Fiber artists demonstrated many Churro related arts such as Colcha, Navajo weaving, Navajo horse cinch weaving, Rio Grande weaving, and spinning on a Rio Grande wheel (T. Lovelace, personal communication, September, 8, 2017).
Colcha Exhibit

Traditional to contemporary pieces of Colcha embroidery (Appendix A) were exhibited at La Hacienda de Los Martinez Museum in Taos, New Mexico. Several pieces of embroidery and other artifacts involving the Navajo Churro sheep were part of the exhibit which opened June 30, 2017 through August 4, 2017.

Figure 159. Colcha embroidery (Schneider, 2017).

Churro Week

“Celebrate the deep local roots of the livestock. From October 2-7, the Espanola Valley Fiber Arts Center (EVFAC) is hosting a series of workshops, films, fieldtrips and lectures to teach visitors and participants about the Navajo-Churro breed. Events are held throughout northern New Mexico” (Espanola Valley Fiber Arts Center, 2017, para. 1). This event is sponsored by the Navajo-Churro Sheep Association and the Espanola Valley Fiber Arts Center every year in October.
**Tierra Wools**

Tierra Wools, Los Ojos Handweavers, LLC, is a weaver, spinner, and grower owned company located in Los Ojos, New Mexico (Ganados del Valle, n.d.). Tierra Wools originated as one of the programs of the wool committee of Ganados del Valle (Flock of the Valley) (Wilson, 2017, pp. 28-31). As stated by Wilson (2017, pp. 28-29), after Tierra Wools was established, “the whole building filled with artisans busy spinning, dying, and weaving the wool. New jobs were created and the wool producers could sell their wool through Tierra Wools or as finished rugs and weavings”. Antonio and Molly Manzanares, directors of Tierra Wools, sell wool, yarn, blankets, weaving and Shepherds Lamb meat (Wilson, 2017, p. 29). Molly, Antonio and others started a Navajo sheep breeding program and now have the largest flock of Churro sheep in the nation, about 300 head” (Wilson, 2017, p. 31).

*Figure 160. Showroom at Tierra Wools (Schneider, 2017).*
The Mora Valley Spinning Mill – Tapetes de Lana Weaving Center

The Mora Valley Spinning Mill is in Mora, New Mexico. Joseph, (personal communication, March 15, 2017) explained that the mill and weaving center are a nonprofit organization that give the people in the area a place to process their wool and sell the products. Information from Mora Valley Spinning Mill. (n.d.), stated this thought with the words, “…dedicated to nourishing the arts and re-empowering rural communities…” Joseph (personal communication, March 15, 2017) explained that in the recent past the people of the community were forced to burn their wool due to happenings such as years of drought, global warming, and the loss of help from the government. Joseph stated that now the Mora Valley Spinning Mill and Tapetes de Lana is available to support this art and the local people have a chance to stay in their community and work (personal communication, March 15, 2017). The mill also has a spin for trade program for individuals who have fiber but cannot afford processing (Mora Valley Spinning Mill., n.d). In addition to supporting the community, the Mora Valley Spinning Mill and Tapetes de Lana sell natural fiber yarn, batts, roving and cleaned fleece (Mora Valley Spinning Mill., n.d). This mill has a special interest in spinning yarns form heritage breeds of sheep (Mora Valley Spinning Mill., n.d). The Mora Valley Spinning Mill specializes in Churro wool and supplies Churro wool to the Woolery (Joseph, personal communication, March 15, 2017).
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Figure 161: Skirting room at Mora Valley Spinning Mill (Schneider, 2017).

Conclusion

Interpretation of the Study

The goal of this study was to demonstrate why it was and is important to save the Navajo Churro sheep. This was accomplished by the presentation of many samples and the discussion of the huge variety of uses for the yarn made using the Churro fiber. The documentation of the history, people, places, events, arts, and organizations show the perseverance and continued need for the Navajo Churro sheep. The subjectivity of the study is not relevant to the fact that the Navajo Churro sheep was an important part of history and are needed in the future. Some of these facts are reviewed below.

In 1865 the U.S. government devastated the Navajo peaceful way of life and destroyed orchards, fields, livestock, and displaced the people (The Arizona Experience, n.d.). After three years the Navajo returned to their land. With careful fostering the Churro once again flourished numbering over estimated half-million sheep (The Arizona
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Experience, n.d.). Once again, the U.S. government intervened and called for a stock reduction in the 1930s (The Arizona Experience, n.d.).

"By 1977, less than 500 ‘old type’ Navajo-Churro sheep remained. This hardy heritage breed was in danger of extinction" (The Arizona Experience, n.d., p.2). “Despite the tremendous obstacles to its survival, the Navajo-Churro has been championed (and revitalized) by many individuals and organizations over the last three decades…” (Slow Food, 2017, p. 3). Some of these individuals and organizations have been discussed and or mentioned in the study. Further study is encouraged by the reader to learn more about the Navajo Churro sheep. The information provided from this study and in appendix B is given to for this purpose. In addition to the rich history, the fiber of the Churro has special qualities that have been useful in many respects, specifically in the Navajo weavings. The samples that are displayed and described in the results section provide detail about the Churro and the possibilities with blends. Past, present and future uses are all displayed with the samples.

Viewing the prepared samples in the results section demonstrate the enormous plethora or uses for the Navajo Churro fiber. The Navajo Churro fiber can be used as a single, spun using a Navajo spindle, to create the time honored Colcha embroidery (Appendix A). This same fiber can be blended with a man-made fiber (lyocell) and braided to make a rope or a leash for a dog. The Churro blended with alpaca or angora rabbit is soft enough to be worn next to the skin. These are facts that show the continued usefulness of this fiber.

In addition to this heritage breed providing wool for the fiber artists, it is a vital food in many homes (Navajo-Churro Sheep Association, n.d.). “The meat is lean and
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flavorful and part of the SlowFood Ark of heritage foods” (The Land and Lamb Co., n.d) (Appendix B).

The intention of this study was to show why it was and is important that the Navajo Churro sheep were saved. It is hoped that the reader will also believe this ending quote by the Navajo Churro Sheep Project, “Navajo Churro sheep have some outstanding traits that need to be preserved” (2008, p.1).
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References


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http://www.hovenweepsheep.com/history.html


http://joyofhandspinning.com/llama/


http://www.joyofhandspinning.com/using-a-diz.shtml


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Appendix A

Appendix A contains detailed information concerning some of the procedures needed to prepare the yarn. Appendix A also contains definitions and additional detail, if needed, in describing techniques used with the yarn and other not commonly known information.

Blocking Samples

This was accomplished by submerging the sample in tepid water to saturate then positioning, in as close as possible to an even shape, between towels. The drying sample was held in place by pieces of granite placed on top of the towels to keep the sample flat as it dried.

Cleaning a Whole Fleece

The whole fleece was rolled out on the ground. Vegetable matter, dirt, and any other impurities were removed. The wool was washed by separating the fleece and submerging it in several large buckets with hot water and soap (Master Spinners, Level 1, rev, 2010). The wool was soaked for about 30 minutes, removed, and placed in several buckets of clear warm water. It was rinsed several times in buckets until there was no more soap present. The wool was dried on a surface of clean window screen on a metal mesh table in the New Mexico brilliant sun.

Colcha Embroidery

Information obtained in a video by El Rancho de Las Golondrinas (2017), explained that Colcha is a type of embroidery done by women in Northern New Mexico. The El Rancho de La Golondrinas video (2017), highlights the Churro sheep as the common sheep that were introduced in North America from Spain. The process of raising
the Navajo Churro sheep, shearing, carding, spinning, weaving, and then covering or embellishing the woven background with embroidery was shown in the video (El Rancho de Las Golondrinas, 2017).

![Figure 162. Colcha embroidery stitch and description (Schneider, 2017).](image)

**Diz**

As described by the Joy of Handspinning (1999-2012), this is the last step when finishing the combing process. The wool is drawn off the comb and pulled through a diz. A diz is a disc or oval that can be made of wood, plastic, metal, cardboard, or even a seashell with a hole in the middle. Thread the fiber through the hole of the diz and push the diz toward the comb as you draw the wool off the comb (The Joy of Handspinning, 1999-2012).

**Finishing Yarn**

The spun yarns were either soaked or fulled according to the yarn
and the needed result. The following soaking and fulling procedures were followed. If there were changes in the procedure this is noted in the text.

**Soaking procedure.** The yarn was soaked in hot, soapy, water, and then rinsed under hot running water. It was then soaked in hot water with vinegar, spun by holding the skein at one end and spinning it in a full extended circle in one direction and then the opposite to spray the water away from the skein. The skein was then lightly snapped between outstretched hands several times to extend and align the full skein. It was then hung to dry.

**Fulling procedure.** Fulling a spun yarn, as described by MacKenzie McCuin (2009), is achieved by using hot soapy water in a container, submerging the yarn, agitating vigorously, rinsing in cold water, and repeating the process. The yarn was then beat several times against a rough stucco wall and hung to dry.

**Halo**

"The tips of the angora fur will fluff out into either a lovely fuzz or a full-fledged halo" (Robson & Ekarius, 2011, p. 405). This is evident with the angora rabbit fiber and the dog fiber.

**Navajo Plying Using a Navajo Spindle**

Navajo plying is also referred to as chain plying (Waltin, 2017). A three ply yarn is made out of a single yarn and then saved on the spindle. This technique is the same as making a chain crochet (Waltin, 2017). The basic step of a chain crochet is to pull the single yarn through a loop held open and continue this motion. Information was taken from a video by J. Waltin showing the process in real time and in slow motion (Waltin, 2017).
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A sample of Navajo plied 100% commercially carded Churro was used for a border in the weaving of hemp and Churro blend.

Recycled Silk

These multicolored pieces of recycled silk fibers are the remnants from silk weaving mills from India. The pieces were used in this study by pulling or cutting apart the silk remnants. This results in a variety of colors, textures, and amounts of recycled silk used in one spot. The recycled silk was added to the fiber blend by placing the pieces in the blend of fiber on the blending board.

Spinning on a spinning wheel at a constant rate

Spinning was done on a Kromski Sonata Spinning Wheel. This was done to control the variable of the spinning wheel. The yarns spun on the Kromski using a short forward draw were controlled by using a ratio of 1 to 12 and using three treadles in a drafting distance of six inches. The plying with the Kromski was achieved by treadling twice in a drafting distance of six inches using a ratio of 1 to 12.

Spinning using a Navajo spindle

The Navajo spindle is a support spindle so a long draw style of drafting is used (Master Spinner Level Three, rev. 2013). As explained in the Master Spinner Level Three Notebook (rev. 2013), holding the yarn at a 45 degree angle can be helpful in drafting. Further explanation in the Master Spinner Level Three Notebook states, give the spindle a spin, build up twist to strengthen yarn, stop the spindle, draft, spin, and then wind on to the shaft (rev. 2013). “Very experienced spindle spinners may draft and spin at the same time” (Master Spinner Level Three, rev. 2013, D-3).
Another helpful source of information on how to spin using a Navajo spindle is found on a short and silent video by Waltin (2017). The video shows the general technique of spinning a single using a Navajo spindle (Waltin, 2017). The drafting, spinning, and winding on process are shown in real time and in slow motion (Waltin, 2017).

**Navajo weaving**

Different areas of the reservation have become famous for distinct styles and designs. But all weave basically in the ancient manner. Although some spun wool is now purchased commercially, generally sheep must be raised and the wool sheared, carded, spun, dyed, and rolled into balls. The loom is usually set up outdoors with the vertical warp stringed between heavy logs suspended from trees or a wooden frame. The rug is woven by passing the weft over and under the warp threads and beating it down securely with a wooden comb. Heddles attached to every other thread open a shed to pass the weft through. A rug may take many weeks or months to weave, depending on its size. The design, no matter how intricate, is kept in the head of the weaver until it appears, wondrously, centered and perfect, row by row. (Cook, n.d., para. 4)

The glossy Churro fiber is used in the Navajo weavings (Production of yarn., n.d.). The Navajo weavings are known for the incredible luster, fine texture and the durability (Production of yarn., n.d.).
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Figure 163. Weaving on a Navajo loom (Schneider, 2017).
Appendix B

The information included in Appendix B is provided for further study and opportunities related to the Navajo Churro sheep.

Sources for Further Study

Clara Sherman “From Sheep to Rug”

https://www.youtube.com/watch?v=8E3somPUnk

Dine be iina, Inc., a nonprofit organization (The Navajo Lifeway)

http://www.navajolifeway.org

Espanola Valley Fiber Arts Center – thump a Churro bag https://www.evfac.org/

Figure 164. Mural on the wall at the Espanola Valley Fiber Arts Center

(Schneider, 2017)

The Livestock Conservancy – Navajo Churro sheep

http://www.livestockconservancy.org/index.php/heritage/internal/navajo-churro
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Navajo-Churro Sheep Association [http://www.navajo-churrosheep.com](http://www.navajo-churrosheep.com)

The Navajo Sheep Project [http://www.navajosheepproject.com](http://www.navajosheepproject.com)

Navajo weaver Clara Sherman carding and spinning [https://www.youtube.com/channel/UCEDw2ocowYpdkot5yceqwZ](https://www.youtube.com/channel/UCEDw2ocowYpdkot5yceqwZ)


SlowFood Ark [https://www.slowfoodusa.org/ark-item/navajo-churro-sheep](https://www.slowfoodusa.org/ark-item/navajo-churro-sheep)

An Unbroken Thread – wool and weaving in Northern New Mexico DVD from Espanola Valley Fiber Arts Center [www.evfac.org](http://www.evfac.org)

Weaving Southwest Churro club [https://www.weavingsouthwest.com/pages/the-churro-club](https://www.weavingsouthwest.com/pages/the-churro-club)

![Navajo Churro sheep](image.png)

*Figure 165: Navajo Churro sheep (Slow Food USA, 2017).*