

# Advanced Fiber Workshop



**SURI NETWORK SYMPOSIUM  
AUGUST 16, 2012**

**Presenters:**

**Debbie Christner, Donna Rudd, Sue Simonton, Margaret Long, Liz Vahlkamp**

# Overview



- **Introduction** **Debbie Christner**
- **End Products – End Game** **Sue Simonton and Margaret Long**
  - Brief examination of the products to be analyzed during the seminar
- **Fiber Processing Overview** **Donna Rudd**
  - Preparing for fiber production
  - Processing overview
- **Histograms and Skin Biopsies** **Liz Vahlkamp**
  - Why we need them
  - Overview of data provided
  - How the information correlates to fiber production
- **Theory to Reality** **Sue Simonton, Margaret Long, Liz Vahlkamp**
  - Experiences from breeders/producers in developing fiber production models
  - Challenges and Opportunities
  - Cost vs. Revenues
  - Luxury vs. Novelty
- **Conclusions** **Donna Rudd, Sue Simonton, Margaret Long, Liz Vahlkamp**

# End Products – End Game



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# General Thoughts



*Comfortable terminology is clever marketing and a good thing, but comfortable fiber that is fine and uniform is the name of the game. The genetic potential of the animals that produce fine and uniform fiber is revealed in the details of objective fiber testing.” Angus McColl, CQ 6/12*

# General Thoughts



- **Breeding matters**
  - The basic fiber traits of any alpaca are determined when you make your breeding decision.
- **Understanding fleece matters**
  - 70% of the value of the fiber is in its fineness.
- **Husbandry matters**
  - Keeping your animals clean and healthy – it's the basics that mean add so much!
- **Processing Challenges**
  - Understanding the machinery we have available and how the fleece interacts with it is critical to producing a quality product
- **Designing Challenges**
  - The U.S., along with Australia and New Zealand, has a chance to develop new, luxury markets for Suri that Peru cannot – education, planning, and implementation are all we need!

# Fiber Processing Overview



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# What Goes Into Making Great Fiber Products?



- **Genetic selection**
  - The quality of your end product starts at conception!
- **Herd management**
  - Pasture care
  - Nutrition
- **Fiber harvesting practices**
- **Long-range planning**
  - What will you do with your fiber?
  - What are the products you will be developing OR the markets into which your fiber will sell?
    - ✦ Your fiber business model will be build around the markets you target.

# What Are Your Fiber Options?



- **Sell raw fiber to end users – hand spinners, fiber artists, etc.**
- **Process fiber at a mill.**
  - A variety of mill options exist – standard processors, specialty processors, top producers, etc.
- **Sell your fiber to a broker/processor**
- **Sell products with other farms in your area on a cooperative basis.**
- **Join a national cooperative to sell end products**
  - Greater variety of products may exist.



# Challenges to Processing Suri



- **Slick fiber**
  - Effects cohesiveness of sliver due to reduced fiber-to-fiber friction.
- **Length of fiber can create issues for mill equipment.**
  - ✦ “Overlong” fiber will tear up in picker and carder, creating excess shed, lower yield if combing,
- **Lock style can be a challenge**
  - ✦ Too tightly twisted makes the locks hard to open
  - ✦ Too straight can prove challenging to draft and spin
- **Lack of uniformity creates problems**
  - Lack of uniformity in length effects spinning
    - ✦ Creates thick and thin spots due to lack of fiber-to-fiber friction
  - Lack of uniformity in micron creates lower quality yarns due to “compromised” level of twist.
  - Lack of uniformity of color is more likely to create a non-uniform micron average.

# The Process of Processing Fiber



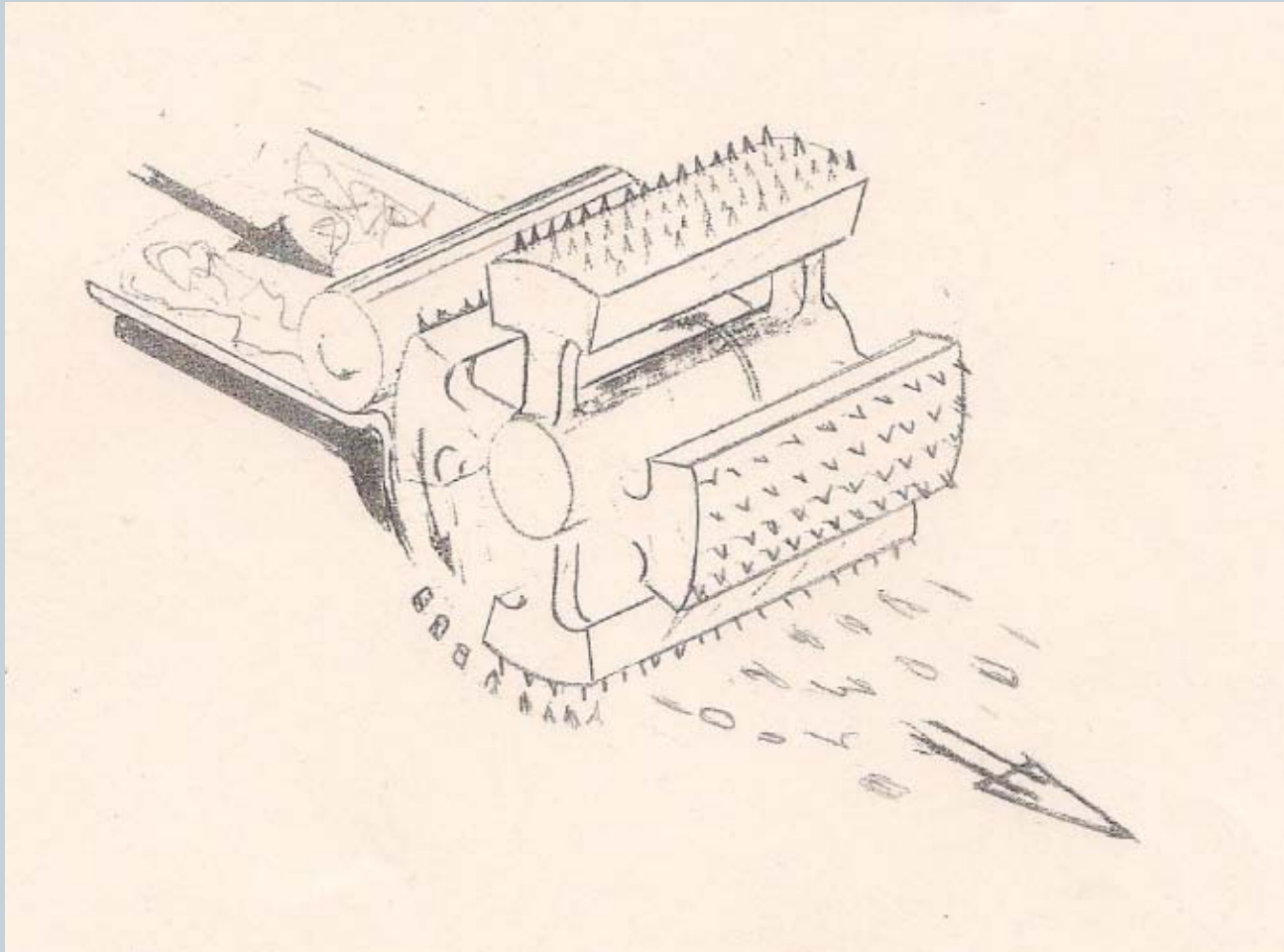
- **Woolen system**
  - Fibers go right from the carder to the spinning frame
    - ✦ No pin drafting or combing, so fibers are not aligned
    - ✦ Good for short fibers and fibers with loft
- **Semi-worsted system**
  - Mini-mill system – no pin drafter, only a draw frame, which elongates the sliver after carding, thereby straightening some of the fibers.
  - Non-mini-mill system – uses pin drafter (after carder) to align the fibers
- **Worsted system**
  - Uses comb, after pin drafter, to comb out all short fibers, neps, and noils.
  - “Top” is combed fiber – virtually all commercially processed fiber, purchased for spinning, is purchased as Top.

# Process of Processing Fiber (cont'd)

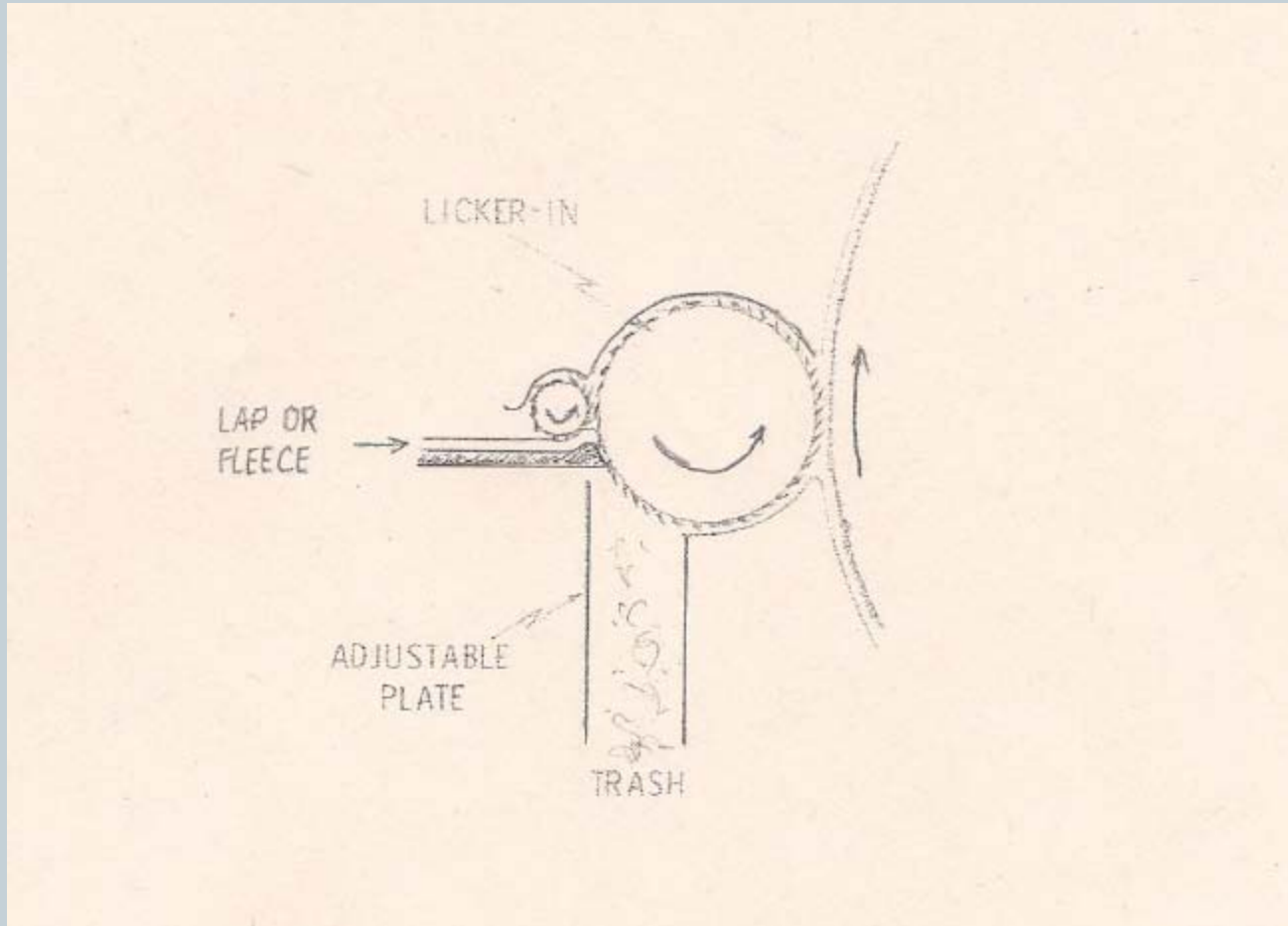


- **Opening and Picking**
  - Breaks up dense clumps of fiber and opens prior to washing and carding.
    - ✦ Will rip and tear long matted locks resulting in reduced quality.
    - ✦ Conditioner is added at this point
    - ✦ Fiber blending may occur at this point
- **Dehairing**
  - Separates coarse hair from fine
  - Removes some debris and second cuts
  - Not all mills have this machinery
    - ✦ Typically adds an additional charge – need to weigh cost vs benefit.

# Picker - Diagram



# Dehairer - Diagram

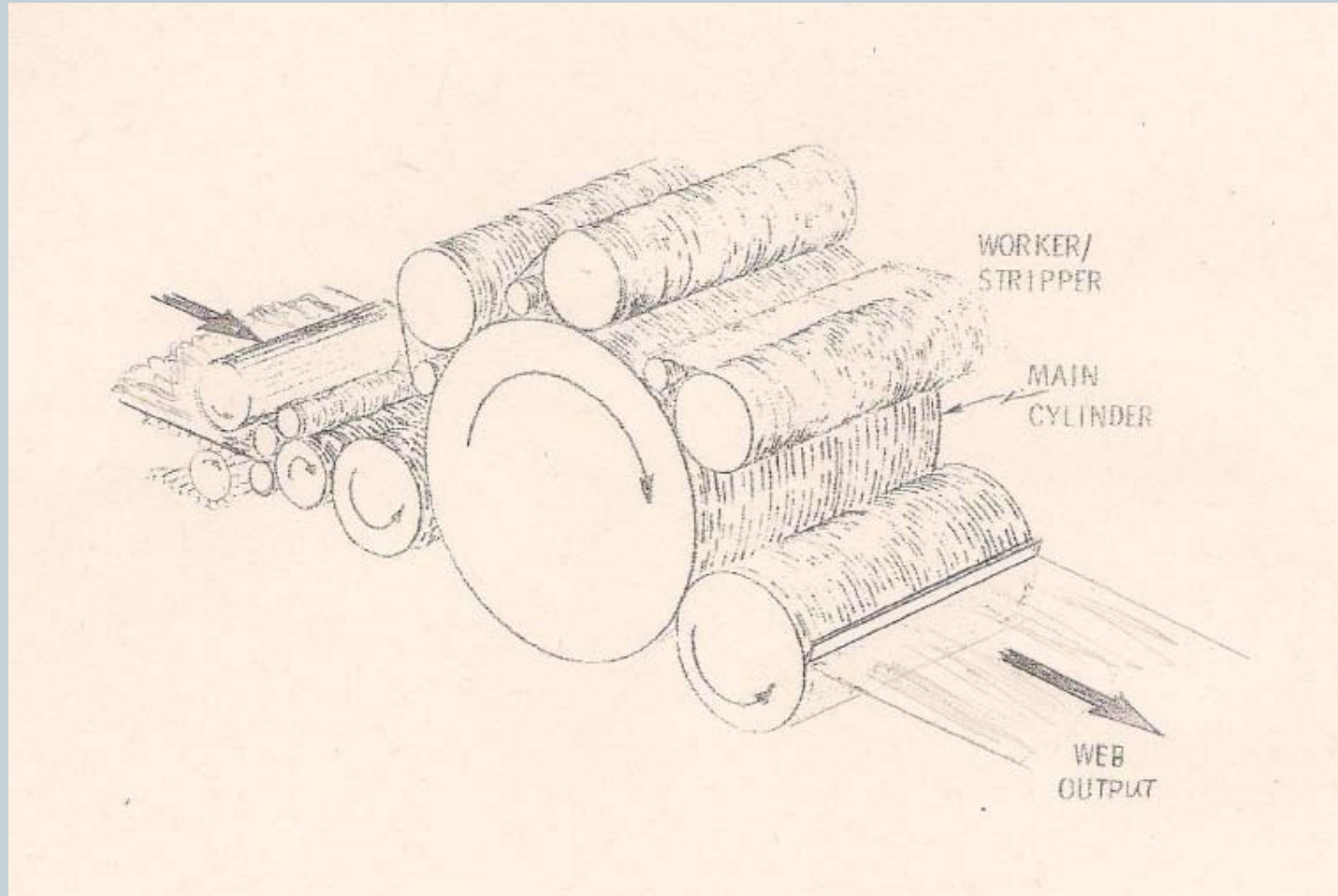


# Process of Processing Fiber (cont'd)



- **Carding**
  - Opens and separates the fibers by brushing
  - Carder is comprised of:
    - ✦ Slowly rotating, wire covered “worker” roller.
    - ✦ Rapidly rotating cylinder (the “swift”)
    - ✦ A third, wire covered roller (the “stripper”), which returns the fiber to the worker roller
- **NOTE:** picker and carder “take no prisoners” – both can tear at fiber – so length and condition (i.e. tenderness or cotting) can impact the quality of the fiber.

# Carder - Diagram



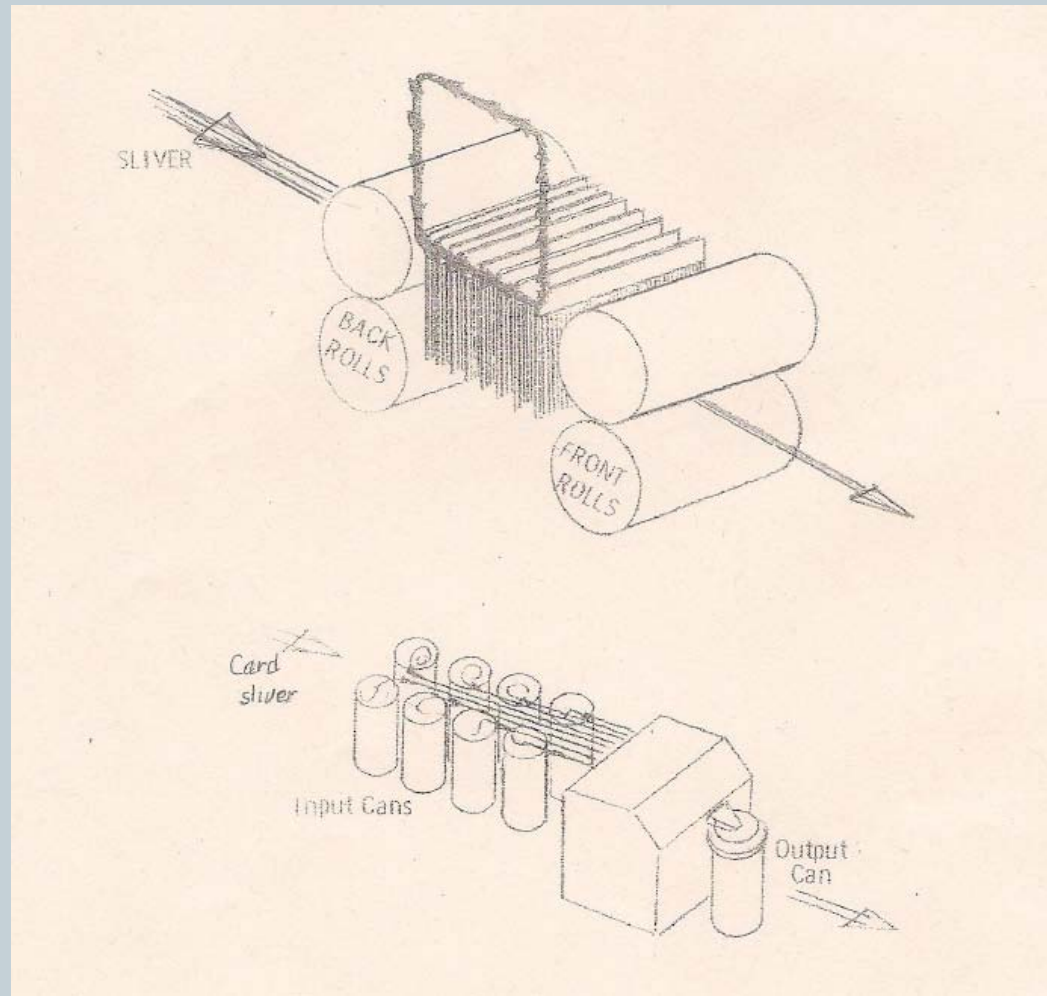
# Process of Processing Fiber (cont'd)



- **Draw frame (mini-mill system)**
  - Rollers pulling and somewhat attenuating carded fibers from batt to create long rovings.
- **Pin Drafter (gilling)**
  - Drafts sliver down to desired size by drawing two or more slivers thru the pins combining them into one.
  - Reduces unevenness (auto levels the weight) and size of sliver and also straightens fibers (removes hooks).
  - This process is used prior and after combing to ensure blending, alignment of fibers, even weight per unit length removal of hooks.
  - Two sets of rollers and slivers dragged from one to another through a bed of moving pinned combs, pins pushed into sliver move forward same speed as fiber.
  - At other end, rollers pull fibers faster than the pins are moving so the sliver is drawn thru the pins giving a combing effect.
- **Benefits**
  - Blending of fibers
  - Aligning of fibers
  - Improving the weight uniformity of the sliver
  - Ensuring hooks are removed



# Pin Drafter - Diagram



# Process of Processing Fiber (cont'd)



- **Spinning frame**
  - Sliver comes up from the container in a vertical manner and over the top of the frame – entering the draft zone.
  - Sliver comes through a set of three rollers
    - ✦ The first roller grips the sliver and moves more slowly than the second and third rollers.
    - ✦ Variation of length in fiber should typically be no greater than two inches – three inches at the most, though not ideal.
  - Challenges for Suri at the spinning frame are
    - ✦ The likelihood of sliver coming apart as it is lifted up to the top of the frame.
    - ✦ Fibers that are too long – rollers will tear the fibers or become tangled and stop the machine.




# Histograms and Skin Biopsies



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# Why We Need Histograms and Biopsies



- Scientific data allows us to improve our national herd in the quickest and most efficient manner.
- Sight and feel are subjective and will miss important traits that improve the quality of our finished goods
  - If we want to promote our fiber as luxury, we need the science to back it up!
- Good Fiber traits  maximum raw fiber prices
-  lower grading and processing costs
-  higher revenues
- With result like this, you can't afford NOT to test!

# Understanding Histograms



- **MFD or AFD – Mean (Average) Fiber Diameter**
  - The average micron in a group of 2,000+ fibers
  - Tool to indicate how soft or coarse the handle will be.
- **SD - Standard Deviation**
  - The variance of microns within your sample
  - One standard deviation represents 68% of the sample population
  - Two standard deviations represent 95%
  - Three standard deviation represent 99.7%
  - SD gives you the variance within your sample, but does not allow you to compare between samples with different MFDs.
  - An indication of handle, ease of processing and durability/quality of finished product.

# Understanding Histograms (cont'd)



- **CV – Coefficient of Variation**

- The SD divided by the MFD.
- Represented as a percentage
- Allows a comparison of variance (or uniformity) between samples.  
*This is what commercial buyers will look for when buying bales.*
- Similarly to SD, this is an indication of hand, ease of processing, and quality of finished good.
- Typically want the CV to be  $\leq 20\%$ .
- If the SD stays the same, but the MFD increases, CV will improve.

MFD	SD	CV
20.0	5.0	25%
25.0	5.0	20%

# Understanding Histograms cont'd



- **% Fibers > 30 microns**
  - Fibers greater than 30 microns are thought to create the “prickle factor”.
  - As the percentage increases, the fiber devalues, regardless of MFD.
  - Typically, as the MFD increases, a greater percentage of fibers will fall into the category of > 30 microns.
  - Also, low MFD samples with wide SD's will show a greater percentage of fiber over 30 microns.

<b>MFD</b>	<b>SD</b>	<b>CV</b>	<b>% &gt; 30 m</b>
25.8	4.9	19	14.2
19.0	5.3	28.2	4.7

# Understanding Skin Biopsies



- **Density** – tells you the number of follicles per square millimeter.
  - Should be a correlation between increased density and fineness.
  - Could assist with longevity of fineness as animal ages.
  - Density is not something that can be readily felt with the hand – medullation, micron size, spread between primaries and secondaries are all factors that can “trick” the hand.
- **Secondary to Primary Ratio (S/P)** - an indication of softness of hand
  - Secondaries are finer than primaries – as such, the greater the number of secondaries, the better the MFD.
- **Primary micron average to Secondary micron average.**
  - Speaks to softness of hand, and also ease of processing and quality of end product.
  - A spread of 5 or less is thought to be ideal. Average in Suris is closer to 9 right now.
  - A wide spread can alter the Grade of the fleece to the negative.
  - A study by Dr. Evans indicates that it takes only one generation to pass on a wide spread, but three generations to erase that spread!
- **Medullation** – impacts processing
  - Medullated fibers have air pockets that make the fiber more stiff and harder to process.



# Developing Markets – Theory to Reality



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# Little Gidding Suri Alpaca Farm



- Sue Simonton and her daughter Margaret Long began developing a line of yarns for sale in 2004.
- Both have strong backgrounds in knitting.
- Target market is high end knitters
  - Their customers have the following traits:
    - ✦ Are tactile – prefer to work with an ultra-fine fiber
    - ✦ Expect high quality
    - ✦ Willing to pay for the right fiber
- Sue and Margaret use fiber from their own herd, and are now starting to purchase from others due to success of yarn sales.
- The goal of this endeavor is to develop a herd with luxury fiber traits that will allow Sue and Margaret to pay for their breeding operation with the sale of their yarns. As such, they breed for:
  - Fineness and its “stayability”
  - Uniformity – of color and of micron within the lock, across the blanket, across the herd
  - Independence of lock (i.e. no coting)
  - White and light fawn fleece (must be able to dye)
- Challenge for Sue and Margaret is finding other farms that share their breeding goals and can provide entire clips with these features.
  - The greater the volume of fiber, the less the cost – greater return to the growers.

# Little Gidding Suri Alpaca Farm

## Lessons Learned



- **Fineness sells**
  - 70% of the value of fleece is in its fineness.
- **Fiber must match the machinery**
  - Most machinery in the U.S. is not designed for long-stapled fiber.
  - Most machinery in the U.S. is not designed for ultra-fine fiber.
  - Combing machines designed for non-wool fibers are difficult to find.
- **Washing is a critical component of the process, but is often overlooked by processors.**
- **All of these facts prove challenging to produce the best yarn possible.**

# The North American Suri Company



- Started by Liz Vahlkamp in 2010 in recognition of the need to develop a commercial outlet for Suri fiber.
- Purchases whole clips for cash from farms
- Grades, provides some additional processing, and provides product development support.
- Allows those who excel at selling Suri end products to focus on what they do best and let someone else take the grading and low level processing off of their hands.
- Allows for larger purchases by commercial mills.
- What is needed in this endeavor to drive costs down and profits to farms up?
  - Uniformity – speeds up grading, improves processing, buyers will pay more.
  - Fineness – can't keep Grades 1,2, & 3 in stock – but what to do with the large volume of Grades 4, 5, & 6? Same cost to process, product revenues are smaller – margins thin, little return to growers.
  - Good pasture management is critical
  - Good shearing practices are critical
  - Luxury vs. novelty – quality fiber is critical to creating a sustainable fiber industry – novelty will not pay the bills for long!

# Conclusions



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# Concluding Thoughts



- **The impact of breeding decisions is huge!**
- **Challenges to processing make your breeding decisions even more important.**
  - **Regardless of whether you process and sell your own fiber or sell your clip to a third party.**
- **Fineness and uniformity are critical to developing a luxury fiber market for Suri.**