

### Feeding and Producing Sheep for Maximum Fiber Production – Is it Realistic?

Presenter:



#### Dr. Nancy Irlbeck Colorado State University

Host/Moderator: Jay Parsons

#### September 10, 2013

This webinar is being offered in cooperation with the American Sheep Industry Association Rebuild the Sheep Inventory Committee.





## Comparative Nutritionist

315

Corbis.com

Silver Moon

#### 06.28.2009 10:50





03.21.2009 16:30

#### 06.28.2009 10:50

### **WOOL SHEEP**

#### 01.22.2009 09:45

### **Romeldale CVM**

### Wensleydale

#### 06.06.2009 14:44

#### Teeswater

a lassa

#### 14:44 <mark>16.06.2009</mark>



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## Karakul

1

Pull

17

## Karakul



# What do you look for in good fiber?1. Low Micron Count2. Fleece Weight

#### 03.21.2009 16:30

## Shrek Merino

OMG-Facts.org



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## **Factors Affecting Fiber**

## Genetics Environment





http://www.jsba.org/



http://www.ymccoll.com/fibers.html

#### **Coarse wool**



#### **Cashmere goat**



#### **Mohair – Angora Goat**



## Fine merino wool Typical wool fiber Chinese sheep wool



http://www.gutenberg.org/files/17740/17740h/17740-h.htm



## **Fiber Microscopy**

http://www.ymccoll.com/fibers.html

**Follicles** Are Actually An **Extension Of The** Skin

#### DIAGRAM OF AN ACTIVE HAIR FOLLICLE



http://www.vetmed.vt.edu/education/curricul um/vm8054/labs/lab15/lab15.htm

DERMAL PAPILLA

#### Dermis

#### Sebaceous gland-

-APM

-Sweat gland

#### Hair bulb

#### Hypodermis

http://www.vetmed.vt.edu/education/curricul um/vm8054/labs/lab15/lab15.htm

## Maximum # of follicles that a lamb can form is determined genetically



### Actual # of follicles formed is controlled by the environment

PRIMARY FOLLICLE = sweat gland; arrector pili muscle (APM) and a sebacious gland

#### Sebacious = lanolin

#### SECONDARY FOLLICLE = only sebacious gland



## **Factors Affecting Fiber**

## Genetics Environment





http://www.jsba.org/

## **Factors Affecting Fiber**

## GENETICS Environment





http://www.jsba.org/

Rare for a pasture sheep to reach maximum genetic potential for wool production.

## **Genetic Selection**

**Consistent Selection of One Trait Increases Risk of Negative Traits** 

Selecting for fiber fineness decreases the body size and fleece weights















## PSE

## **Factors Affecting Fiber**

## Genetics ENVIRONMENT





http://www.jsba.org/
### **Reproduction X Nutrition**

1. First 50 days of pregnancy – Minimal fetus or placenta growth

- 2. Day 50-100 Rapid Placenta Growth
- 3. Day 100-150 Rapid Fetal Growth

# **Physiological Status**

- **Growth** 
  - Neonate vs Early vs Late
- **Flushing**
- □Gestation 1<sup>st</sup> 2/3 vs last 1/3
- □ Lactation Early vs Late
- Maintenance



# Non-Pregnant Status



88 Days **Of 150** Days Gestation

Mid Second Trimester



112 Days Of 150 Days Gestation

Early Third Trimester



123 Days Of 150 Days Gestation

Mid-Third Trimester



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PRIMARY FOLLICLE = sweat gland; arrector pili muscle (APM) and a sebacious gland

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Primary Follicle Development Day 60 to Day 90 of Gestation Secondary Follicle Development Day 90 to Birth Density of follicles is determined prior to birth and will not change

#### **Genetics X Nutrition**

### Genetics

Primary follicles begin form in skin of fetus between day 50-70 (90) of fetal development

### **Environment - Nutrition**

Secondary follicles form after day 90 of fetal development



http://www.lifetimewool.com.au/ewe%20man agement/progenyperf.aspx

### **NUTRITION IMPACTS**

Pre-weaning
 Pregnancy
 Lactation

Post-weaning



http://www.jsba.org/

### Fine wool greater impact From Nutrition!!

### **Shrek Merino**

**OMG-Facts.org** 

If poor nutrition during pregnancy & lactation will impose permanent limitation for wool production

Lambs whose dams are poorly fed = less 2<sup>nd</sup> follicle development

Progeny of young ewes = less 2<sup>nd</sup> follicle development

**Twin lambs = less 2<sup>nd</sup> follicle development** 

# Single Lamb





# Multiple Lambs

# Single Lamb

# Ultrasound?

Multiple Lambs

# Cost of that 2<sup>nd</sup> lamb?

Ì



Therefore pre-weaning environment is critical for realizing genetic potential of an individual sheep



http://moosemtnranch.com

Secondary Fibers are the Most Important (2<sup>nd)</sup>

Reduction in nutrition during development will significantly impact development of and final density of 2<sup>nd</sup> follicles

High 2<sup>nd</sup> follicle density associated with decreased fiber diameter and higher fleece weight

2<sup>nd</sup> fibers contribute the majority of fiber to adult wool fleece

### **Factors Affecting Fiber Diameter**

- 1. Age of animal
- 2. Sex of animal
- 3. Level of nutrition



# What do you look for in good fiber?1. Amount of wool2. Low Micron Count





LTEM 3.6

### Progeny clean fleece weight is affected by ewe nutrition from early to mid-pregnancy



www.lifetimewool.com.au



#### Late pregnancy nutrition effects progeny fleece weight



www.lifetimewool.com.au

LTEM 4.9



LTEM 3.7

### Progeny fibre diameter is affected by ewe nutrition from early to mid-pregnancy



www.lifetimewool.com.au



### Late pregnancy nutrition effects progeny fibre diameter



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### 154# Ewe – Ca & P Requirements

	Grams Ca	Grams P
Maint	2.5	2.4
1 <sup>st</sup> 15 weeks	3.5	2.9
Flushing	5.7	3.2
Gest 130-150 vs 180-225	6.2/7.6	5.6/6.4
Lactation s/t	9.3/11.0	7.0/8.1





### 3<sup>rd</sup> Cutting



# Coarse Grind

# Fine Grind





## **Third Cutting**



### **Heated Water**

1104






# Caution with Sheep & Copper!

25 ppm =



#### Copper Deficiency = Achromotrichia 10:1 Cu:Mo



#### Other Species Minerals?

### Block or Loose Salt?

#### Overfeeding Creates Coarse Wool!!







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## Questions?!