

# ERADICATE SCRAPIE!

## The Importance of Eradicating Scrapie in Goats in the United States

Eradicate Scrapie Initiative  
2010



NATIONAL SCRAPIE EDUCATION INITIATIVE

# The National Scrapie Eradication Program (NSEP)

- First scrapie case found in a sheep in 1947
- Original eradication program began in 1952
- Present eradication program began in 2001
- Scrapie known to infect both sheep and goats
- Program concentrated on sheep first, because of higher prevalence
- Because goat cases have been identified, it is known that prevalence in goats is NOT zero



# The National Scrapie Eradication Program (NSEP)

- Prevalence in sheep is declining to the level that exists in goats
- Existing cases in goats must be identified through increased surveillance
- Cases are rare but they do occur
- Remaining cases must be found to achieve scrapie-free status in the United States



# Scrapie in Goats

- Scrapie is infectious and fatal
- Fetal membranes and placenta are known routes of transmission
  - Milk from infected ewes has been shown to be infectious in sheep
- Transmission is not completely understood in sheep or goats
- Study of transmission routes is ongoing and may prove different in sheep and goats



# Scrapie in Goats

- Scrapie is rare in goats; but it does happen!
- A scrapie-infected goat can spread the disease to other goats and likely back to sheep
- A scrapie-infected sheep can spread the disease to other sheep and also to goats



# Scrapie in Goats

- Scrapie Eradication in U.S. herd is needed
  - For commerce and shows to continue without restrictions
  - For free trade and movement of goats interstate, intrastate, and internationally
- WHO (World Health Organization)
  - Recommends elimination of transmissible spongiform encephalopathies from food producing animals



# Scrapie in Goats

- Relatively few documented cases
- In most cases, infected goats had historical contact with sheep
- Diagnosis may be missed if both brain and lymph nodes are not examined or if a goat is tested early in the disease process
- Clinical presentation is often confused with other conditions, such as mange



# Scrapie in Goats

- Scrapie can only be diagnosed using laboratory tests on lymphoid tissue or brain:
  - The best tissues are from a fresh head
- Common Clinical Signs:
  - Weight loss, extreme rubbing, abnormal behavior; incoordination, weakness and/or abnormal gait
  - Affected goats may display one or more of these signs
- Most likely affected age groups:
  - 3-5 years of age, but can be 2 years old or older



# Bottom Line

- To achieve scrapie free status in the United States, sufficient surveillance over 7 years is necessary to demonstrate that U.S. sheep and goats are free of scrapie



# We Need Your Help & Vigilance...

- Goal of making United States goat herds and sheep flocks scrapie-free is in sight
- Goat producers are key to achieving this goal
- **We need you to report any suspected case in your herd to your veterinarian, State veterinarian or USDA veterinarian (1-866-873-2824)**



# Scrapie Transmission

- Infected goats have been found that had no known contact with sheep
- Infected goats have been found that have had contact with sheep
- All producers need to know and look out for signs of scrapie in their herds



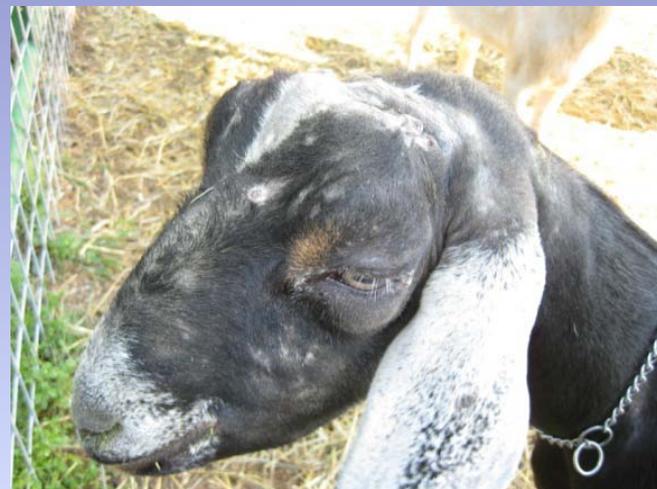
# Because Scrapie in Goats is Rare...

- You need to be aware of the clinical signs of scrapie in goats
- You need to appreciate why this disease is challenging to diagnose



# Clinical Signs of Scrapie in Goats:

- Pruritus (itching) of head or other areas of the body
- Hair loss and abrasions from rubbing
- Hypersensitivity to touch
- Ataxia - loss of coordination
- Weakness or inability to get up
- Weight loss
- Aggression or other behavioral changes
- Infected goats may have any combination of these signs



# Clinical signs

- Rarely occur in goats less than 24 months of age and
- Has not been reported in goats under 12 months of age
- Variable presentation
- Differs individual to individual



# Clinical Signs of Scrapie in Goats:



Goat experimentally infected with scrapie



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# Clinical Signs of Scrapie in Goats:



Goat experimentally infected with scrapie



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# Clinical Signs of Scrapie in Goats:



Goat with naturally occurring case of scrapie

# Case Studies of Goat Scrapie Diagnosis

- “West Coast Case” - 2001
- “Great Lakes Case” – 2007



# “West Coast Case” Detail

- Late in 2001, 2 goats died at a high desert goat operation in Southern California
- Producer suspected cause of death MIGHT be scrapie and called California Animal Health Officials
- One of the dead goats was necropsied and found to be infected with scrapie; thus it became the index animal.



# “West Coast Case” Detail

- A third goat exhibited scrapie signs
  - Necropsy of third goat confirmed it was infected with scrapie also
- Goats originated from multiple sources.
- One Barbados sheep wether cohabited with the goats in 2001 and 2002
- Suffolk sheep were in the facility three years before in 1998 and some ewes had lambed there



# “West Coast Case” Detail

- The California Department of Food and Agriculture (CDFA) took possession of the 31 goats (28 does & 3 bucks) and one sheep remaining in the herd
- The producer received indemnity from the Federal Government under the National Scrapie Eradication Program
- The goats and sheep were evaluated by California and Federal Officials



# “West Coast Case” Detail

- Eleven goats were necropsied or died of various conditions, including old age (at this stage of the process) while in the care and possession of the CDFA
- None of the eleven goats died from or were found to have scrapie
- There were four different breeds among the 31 goats: LaMancha, Oberhasli, Nubian and Tennessee Fainting



# “West Coast Case” Detail

- Of the 31 goats:
  - One Nubian doe was the offspring of one of the infected goats
  - The remaining 20 goats and 1 sheep were moved to a research facility at the University of Idaho
  - These goats were monitored and studied closely
  - None of the 21 remaining animals died of scrapie or showed scrapie infection when necropsied
  - During this time RAMALT test had not been developed and 3rd eyelid tests were not validated for goats.
  - The study ended in 2006



# “West Coast Case”

- Summary
  - The fact that these exposed goats never developed scrapie demonstrates the complexity of scrapie in goats.



*Another case to appreciate why  
this disease is challenging to  
diagnose...*



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# “Great Lakes Case” Overview

- Oct. 2007 - Pet Nubian doe is reported by attending veterinarian as suspect
  - Euthanized in Nov. 2007 and confirmed positive for scrapie in Dec. 2007.
- Dec. 2007 - USDA APHIS works with source herd owner to move most of herd to Agricultural Research Service (ARS) Pullman, WA site.
- Owner received indemnity for herd and the exposed animals were traced to other premises.



# “Great Lakes Case” Detail

- Index Goat (Positive Goat #1)
  - 3 year old Nubian doe sold in July 2007 as a pet goat
  - Reported as suspect by veterinarian on 10/09/07
  - Clinical signs: Pruritus (itching) of head, hair loss on both sides of head, skin thickening, aggressive behavior and hypersensitive to touch
  - Preliminary diagnosis of mange, negative response to treatment
  - Euthanized as a suspect scrapie case on 11/15/07
  - Confirmed positive on 12/12/07. Positive tissues included obex (brain), retropharyngeal lymph nodes and tonsils



# “Great Lakes Case” Detail

- Source Herd History
  - Originally owned 2 sheep breeds; Cheviot followed by Suffolk
  - Both sheep breeds lambed on the farm
  - Later owned sheep and goats together:
    - Pygmys and Suffolks; then Nubians and Suffolks
  - After the Suffolks were gone, owner still had Nubians and added Alpines. More recently Angoras were added to herd
  - There were Nubians, Alpines, a few Nu/Al crosses, and Angoras at the time of the investigation
  - Records were not complete for all animals



# “Great Lakes Case” Detail

- Last 2 Suffolk sheep were sold as club lambs in 2002
- First Nubian goats purchased in 2000 and were commingled with lambing ewes from 2000-2002
- Three of the original Nubians purchased in 2000 were present at the time of the investigation in Nov 2007 and were negative
- But, two of these does had positive kids that were born in 2004 & 2006, after the Suffolk sheep were gone
- All dairy goat kids were hand-raised
- Infected kids were fed on available goat milk
  - It is not known if the milk was pasteurized or heat-treated
  - Heat will not inactivate scrapie



# “Great Lakes Case” Detail

- Procedures at ARS location
  - Dec. 2007 – Jan. 2008
    - Goats are moved from farm to Agricultural Research Service of USDA (ARS)
    - ARS performs rectal biopsies (RAMALT) and genotypes all goats
  - Results:
    - 1 clinical doe with positive RAMALT\* (age 3 years)
    - 2 preclinical does (positive RAMALT but clinically normal, aged 2 years)

\* Recto-anal mucosa associated lymphoid tissue



# “Great Lakes Case” Detail

- Nov. 2007 – Jan. 2008
  - From Source Herd:
    - Found 6 positives including index animal and trace outs
  - High-risk animals:
    - Maintained at ARS: Offspring of scrapie positive goats
    - Continued to be biopsied and monitored furthering the understanding of the science of goat scrapie
    - As of October 2009, 2 positive offspring.



# "Great Lakes Case" Detail

- Index Goat (Positive goat #1)
  - May 2004 – Index Doe is born
  - April 2007 – Index Doe kids
  - July 2007 – Index Doe is sold
  - Nov 2007 – Index Doe is euthanized as suspect
  - Dec 2007 – Index Doe is confirmed scrapie-positive
  - One offspring of Index Doe is #3896:
    - #3896 is still alive at ARS and negative on rectal biopsy three different times



# “Great Lakes Case” Detail

- Positive Goat #2
  - April 2005 - Nubian Doe#2 is born
  - March 2006 Doe #2 sibling born & tested negative in 2008
  - February 2007 – Doe #2 kids – has one doe kid
  - Doe #2 is euthanized on arrival at ARS due to abortion.
  - Doe offspring of #2 is:
    - Alive at ARS and
    - Negative on rectal biopsy two different times
    - Positive on the third and died shortly after test



# “Great Lakes Case” Detail

- Positive Goat #3
  - April 2006 - Nubian Doe #3 is born
  - April 2007 - Nubian Doe #3 sibling born and rectal biopsy tested negative in 2008
  - March 2008 - Twin bucks born to Nubian Doe #3 at ARS, and Nubian Doe #3 was rectal biopsy positive at time of kidding
  - 2009 Nubian Doe #3 was euthanized at ARS due to showing signs of tremors (RAMALT+)
  - Twin buck kids are:
    - Alive at ARS and negative on rectal biopsy at 15 months of age



# “Great Lakes Case” Summary

- Observations and Test Results:
  - Goats present at the time of the scrapie investigation were either purchased goats or goats born on the farm after the sheep had left.
  - Dams of positive goats, that were available, tested negative.
  - Offspring of positive does are being repeatedly tested.
  - There have been offspring that have tested positive.
  - Also offspring that test negative will be tested at intervals.
  - None of the available goats that had commingled with the sheep tested positive.



# Official National Scrapie Eradication Program

- Requires most goats to be officially identified when
  - Sold, or
  - Exhibited.
- Requires sale records to be kept for 5 years.
- Goat owners have options for official ID:



# Official Identification

- Options include:
  - Tattoos:
    - **Ears or in the case of earless goats the tail folds**
      - **Right ear or fold - registered herd prefix or if not registered the herd ID assigned by APHIS**
      - **Left ear or fold - a unique individual identification number as shown below.**
    - In order for registry tattoos (that are not the same as the herd ID assigned by APHIS) to be considered official ID the goat must be accompanied by a copy of its registration certificate or a health certificate listing the tattoo number and the registry.



# Example of Registry information



5316



## American Dairy Goat Association

ADGA Registry, based on original import records, is your warranty of good breeding and worldwide acceptance. Since 1904  
P.O. Box 885, 209 W. Main Street, Spindale, NC 28160 (828)286-3801 Fax (828)287-0476 www.ADGA.org

### Certificate of Registry

AMERICAN SAANEN

NAME: CALIFORNIA DENALI ENIGMA REGISTRATION ID: AS1345711

SIRE: AS1257164  
WILLOW-LANE ATLAS DENALI  
AI \*B

DAM: AS1201370  
DES-RUHIGESTELLE ESPRIT  
8\*M AR2002 LA2002

SIRE'S SIRE: AS1064696  
WILLOW RUN DRZ ATLAS  
++\*B AR2000 ST2004

SIRE'S DAM: AS0973850  
GCH WILLOW-LANE EQUUS ELLENORE  
AI 5\*M AR1996 ST2000

DAM'S SIRE: AS1053784  
DES-RUHIGESTELLE LEONARD  
++\*B AR2002 ST2002

DAM'S DAM: AS1141275  
GCH DES-RUHIGESTELLE ELENTARA  
7\*M AR2001 LA2003, 2002, 2001

SEX: DOE DATE OF BIRTH: 03/14/2005  
HORN INFORMATION: DISBUDED TATTOO: RE: UCL ID: V316  
EAR INFORMATION: ERECT

BRED BY: UNIVERSITY OF CALIFORNIA, DAVIS  
0588103 DAVIS, CA

OWNED BY: UNIVERSITY OF CALIFORNIA, DAVIS  
0588103 03/14/2005 DAVIS, CA

ISSUE DATE: 07/25/2005

TO VERIFY AUTHENTICITY OF THIS CERTIFICATE, RUB OR BREATHE ON THE OVAL; COLOR WILL DISAPPEAR, THEN REAPPEAR.

Under the Rules of the American Dairy Goat Association

The herein described animal has been accepted for registry in the American Dairy Goat Association under the Bylaws and policies of the Association. This certificate is issued in reliance on the truth of the statements submitted on the application for registry or transfer, but is in no event deemed a guarantee by the Association of the breeding or ownership of the animal. If an animal has been admitted to entry or transferred through error, misrepresentation, or fraud, such entries or transfers are void, together with any entries and transfers that may have been made of progeny of any such animals, and the American Dairy Goat Association assumes no liability for damages arising from such entry or transfer. Alterations to this certificate except, as made by the ADGA office, render it NULL AND VOID.

Shirley McKelzie  
ADGA Association Manager

CERTIFICATE OF TRANSFER

I have on \_\_\_\_\_  
sold this animal to \_\_\_\_\_ BUYER ID \_\_\_\_\_  
address \_\_\_\_\_  
(CITY) (STATE) (ZIP CODE)  
0588103 UNIVERSITY OF CALIFORNIA, DAVIS  
OWNER ID NAME  
When this animal is sold, CERTIFICATE OF TRANSFER block must be completed and signed by seller. CERTIFICATE OF REGISTRY should then be returned promptly to ADGA with appropriate transfer fee. OWNER (SELLER) SIGNATURE \_\_\_\_\_




20050035347

1-3-271-EG

A copy of this registration form is required to accompany the goat when moved to shows/sales and the official tattoo is its means of official ID. SCRAPIE EDUCATION INITIATIVE

# Official Identification

- Official tail tattoo in LaMancha
- For more information:  
Call 866-USDA-TAG, or  
<http://www.eradicatescrapie.org/EducationalResources/GoatIDPPT.html>



# Official Identification

- Options include:
  - Registered Tattoos or APHIS assigned Tattoos
    - Ear
    - Tail in LaManchas
  - **Official Ear tags**
    - See Goat Identification PowerPoint at [www.eradicatescrapie.org](http://www.eradicatescrapie.org) for details
    - or
    - Call 866-USDA-TAG



# ID and Record Keeping

- Producers' role is vital
  - Scrapie in goats is hard to diagnose and potentially under-recognized
- Keeping good records is essential
- In these real-life case illustrations, maintaining records for > 5 years would have been valuable
- Traceable identification is key to finding infected animals that may transmit scrapie



# Goat Scrapie Summary

- Much is being learned about how scrapie behaves in the goat species from naturally infected and exposed goats donated to ARS
- Other routes of transmission in addition to placental infection may be important such as ingestion of infected milk



# Goat Scrapie Summary

- It is challenging to diagnose scrapie in the live goat because fewer positive staining lymphoid follicles are seen in biopsy samples as compared to sheep.
- Role of Genetic protection?
  - Currently being studied worldwide



# Goat Scrapie Summary

- Continued study of naturally infected goats is needed
- Encouraged to submit tissue to a veterinarian/lab from mature goats that are thin and fail to regain condition, rub a lot, uncoordinated or weak that do not improve after a few weeks or that die
- Be aware that infected goats can spread scrapie to other goats
- Understand the risk of introducing infection to goat herds or sheep flocks when purchasing goats of unknown history



# If you observe one of your goats exhibiting signs of scrapie...

- Call Your Veterinarian
- Call Your State or USDA Veterinarian (toll free 1-866-873-2824)

*Don't wait; ACT IMMEDIATELY*

*You'll be helping yourself, your herd  
and your industry!*

[www.eradicatescrapie.org](http://www.eradicatescrapie.org)



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