West Virginia Univer-

News Ewe Can Use

Volume 6, Issue 4 2004

Published in Conjunction with the West Virginia University Davis College of Agricul-

Performance Testing and It's Role in Flocks in WV

Brad D. Smith, WVU Extension Agent in Grant County

One of the greatest opportunities sheep producers get to improve their flocks comes when they can obtain and use performance data (flock production records). Performance data are most commonly collected on economically important traits that can be categorized into three general areas: ewe productivity, lamb growth, and carcass merit.

We know that ewe productivity (number of lambs weaned per ewe) is one of the factors that has the most influence on the profitability of the ewe flock in WV. However, the heritability of reproductive traits is low and we will not realize as much of a change in the genetic makeup of the flock as we do when we select for growth rate or carcass merit, which are moderate to highly heritable traits. That is not to say that we shouldn't continue to select for multiple births. If we are true animal breeders, and not just lamb multipliers, we should be concerned with all of the traits that are economically important in our particular production system and the entire sheep industry. Traits with low heritability are just more dependent on environmental influences than they are on genetics.

The purpose of a performance testing program is to assess the genetic merit of various economically important traits. Remember, the expression of a trait in an animal is called its phenotype, which is dependent on two factors – genetics and environment. A performance test program simply tries to eliminate or adjust for the environmental differences to determine the genetic merit of the animal for a specific trait.

Methods of livestock selection have evolved into systems that allow us to much more accurately identify breeding stock that is genetically superior for specific traits. Some of these proven procedures include:

On-farm performance test programs allow us to accurately evaluate and compare animals within the contemporary group (those reared under the same management and environment).

Central performance test stations allow us to accurately evaluate some traits and compare animals from various flocks. This system works best to evaluate post-weaning gain, muscular development, reproductive soundness, and structural soundness. A central test station allows numerous breeders to work together in a common environment, and normally provides external daily supervision and evaluation to reduce bias and provide more validity.

The National Sheep Improvement Program (NSIP) allows us to produce across-flock genetic evaluations that even more accurately evaluate a broader range of economically important traits. This system utilizes individual performance data collected from within a contemporary group, as well as pedigree, and progeny data to calculate EPD's. EPD stands for "Expected Progeny Difference". An EPD is an estimate of the genetic value that will be passed on to the progeny of that animal. Specifically, the EPD of an animal is the expected difference between the performance of that animal's progeny and the average progeny performance of all the animals in the breed, for that trait. EPDs may take a little getting used to, but once you get the hang of them, they give the most objective and reliable estimation of genetic value possi-

(Continued on page 2)

West Virginia
Sheep Management
Project
P.O. Box 96
Franklin, WV 26807

Phone 304-358-3660
Fax 304-358-3661

Name
Project Director
e-mail
fane.irvine@mail.wvu.edu

Website:
www.caf.wvu.edu/

Address Corrections

Please notify us if your address has changed or if you do not wish to continue receiving *"News Ewe Can Use"*.

(Continued from page 1)

ble.

The West Virginia Sheep Management Project has identified the lack of availability, adoption and use of performance testing systems by WV Shepherds as a problem affecting the potential profitability of the sheep industry in this state. Education and assistance in conducting on farm performance tests has not been available on a statewide level since we lost the WVU Extension Sheep Specialist position over 10 years ago. The WV Central Performance Ram Test program was discontinued nearly as long ago, due to lack of commitment by producers. NSIP generated EPD's are fairly new and not readily understood by producers who have not been utilizing them with other livestock species. They are available only for some purebred breeds at this point and the data collection forms are fairly complicated.

To help address these identified needs, the West Virginia Sheep Management Project has begun to develop a performance test program (computer program) that will not only calculate the on-farm performance records, but will hopefully also serve as a data collection form for NSIP data. The Sheep Short Course will be held on December 4th and will focus on performance testing procedures and the opportunities to again conduct a WV Central Performance Ram Test program that are being pursued.

Why does all this matter? Let's take sire selection for example. A ram provides one half of the genetic makeup of a lamb crop and sires many more lambs than a ewe can produce. What's the value of a ram? I've seen estimates that range anywhere from 2-6 times the value of a market lamb. In today's market that equates to $250-$750. What's the value of the same ram if he was performance tested? While performance testing does not in any way change the true genetic value of the ram, it does change the accuracy with which we can select a genetically superior ram. If the ram has a Postweaning EPD of 10 pounds (that means the lambs he sired are on average 10 lbs. heavier than the breed average at 120 days) and the ram sires 200 lambs throughout his lifetime, then he has produced 2000 lbs. more lamb than the ram that is at breed average. Remember, without the use of performance data to select a superior ram the comparison could have been with a ram below breed average for postweaning gain, making that difference even higher. While the additional 2000 lbs. is not all net profit, for simplicity we will say this ram provided $1,800.00 (2000 lbs. * .91/lb) more revenue than a breed average ram.

Visual appraisal is an important part of livestock selection, but we cannot continue to make the showring the emphasis of the sheep industry in this state. The showring is an important niche market that provides a value-added aspect for a specialty product. Sheep shows provide great opportunities for fellowship and camaraderie of our producers and they serve to promote youth development objectives of our 4-H and FFA livestock programs, but the issues of the showring should not be the primary focus of our industry. It's time we begin to treat the sheep industry as a meat animal production system with goals to efficiently produce a high quality, safe, wholesome product that is desirable to the consumer.

Preventive Health Measures: Vaccination Practices of U.S. Sheep

Although vaccination decreases the incidence or severity of a specific disease, few vaccinations completely prevent a disease. The effectiveness of vaccinations often depends on the quality of the vaccine and the timing of administration. The decision to vaccinate depends on the risk of the disease, the stage of disease, the stage of production, as well as the age of the animal being vaccinated.

The data presented in this article were printed in the March 2004 APHIS ("safeguarding American Agriculture") Veterinary services info sheet. During 2001, the USDA's National Animal Health Monitoring System collected data on health and management practices from sheep producers from 22 states. These States represented 87.4 percent of the US sheep inventory and 72.3 percent of the US sheep producers.

The four most common diseases present on US sheep operations in the past three years were; stomach or intestinal worms, sore mouth, enterotoxemia/ overeating disease, and footrot. Figure 1 shows the percentage of US sheep operations experiencing these diseases.

The three most commonly used vaccines for replacements or breeding sheep in 2000 were; clostridia C and D; tetanus toxoid; and clostridia 7- or 8-way. Few producers used either sore mouth or footrot vaccines. Figure two shows the percentage of US sheep operations using these vaccines.

Sore Mouth (Contagious Ecthyma/ORF)

Sore mouth vaccine is a live, virulent virus that can introduce the disease to uninfected operations. In 2000, 5.1 percent of operations administrated the sore mouth vaccine to their replacement or breeding ewes. An additional 14.0 percent of operations vaccinated nursing lambs with the sore mouth vaccine, and 4.2 percent of operations vaccinated breeding

(Continued on page 3)

In This Issue...

Toxoplasmosis and Sheep

A common unicellular parasite of cats is *Toxoplasma gondii*. As with most parasites, this parasite is species specific by having all felids, mostly the common domestic cat, as its final hosts. Cats usually become infected by ingesting oocysts shed in other cats' feces. After ingestion, the oocysts continue development in the cat's intestines to form schizonts and gamonts in the epithelial cells of the intestines. Both of these stages greatly multiply the number of parasites in the cat's intestines, which leads to the formation of more oocysts, which may infect any mammalian species, including sheep.

When non-feline hosts ingest oocysts, they become intermediate hosts in which the parasite develops a tissue phase by penetrating the intestinal wall and spreading throughout the animal by the blood vascular system. In the early acute stage (tachyzoite) the parasite multiplies quickly within host cells. Most animals respond by producing antibodies that limit the spread of tachyzoites and limit the pathogenic or damaging effect of these organisms. Cysts are usually formed which contain bradyzoites that are slower growing and may lie latent in the intermediate host. It is these stages that may infect predators or humans that consume meat containing these intermediate stages. It is this method of transmission that may cause abortions, stillbirths, or CNS damage to human fetuses.

The intestinal stage of *Toxoplasma* does not normally cause disease. It is the tissue stage of the tachyzoites and bradyzoites in the sheep intermediate host that cause abortions, stillbirths, or the birth of weak lambs. Shepherds may experience all of the above conditions within their flock, depending on the stage of pregnancy that a ewe becomes infected. Unfortunately these same production losses may be caused by chlamydia, vibriosis, campylobacter, or leptospirosis. It is important that the producer determine the cause of the lamb losses to take the correct actions to minimize future losses. That means getting your flock veterinarian involved.

Toxoplasmosis in sheep may be diagnosed by examining aborted fetuses, placental membranes, culturing *Toxoplasma*, or serological samples. Blood samples should be taken as soon as the abortion occurs and a follow-up sample 1 to 2 weeks later from the same animal to test for changes in blood antibody titres.

Many times, producers will experience abortions associated with *Toxoplasma* in their young ewes during their first pregnancy. If these ewes are kept and rebred, they often lamb normally since they have developed a level of immunity as a result of their original infection.

Even though there is no approved treatment for ewes exposed to or infected by *Toxoplasma*, your veterinarian may prescribe the use of Rumensin or Deccox to lessen the effects of *Toxoplasma.* A vaccine is available in England, but has not yet been approved for use in the United States.

Farmers may reduce the incidence of infection in sheep by taking measures to reduce the chance of contamination of their animals' feed and water by cat feces that contain the *Toxoplasma* oocysts.

Robert E. Pitts,
Extension Veterinarian

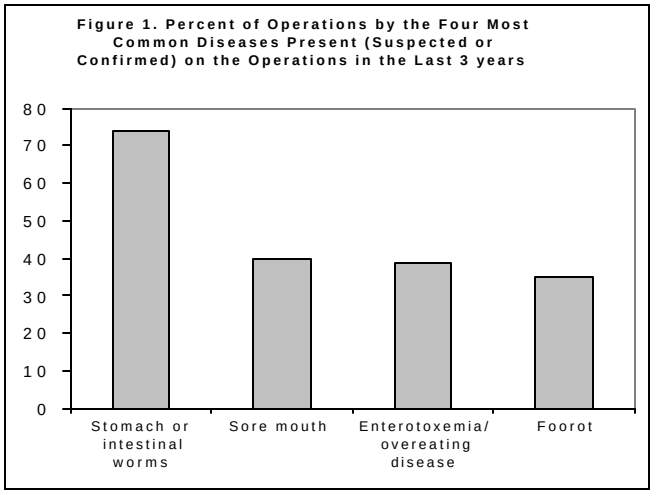
(Continued from page 2)
rams in 2000.

Enterotxemia (Overeating Disease) and Other Clostridial Diseases

Enterotoxemia is caused by *Clostridium perfringens* type C or type D strains.Although enterotoximia is most common in growing lambs, mature sheep being fed lush pasture, or concentrate, are at risk. Type C or D toxoid is used to vaccinate against entertoxemia. Overall, 48.4 percent of operations gave the clostridia C and D vaccine to replacement or breeding ewes; 66.9 percent gave it to nursing lambs; and 36.0 percent gave the vaccine to breeding rams.

Infectious Footrot

The best strategy to control footrot is to preventing introduction into the flock. Althought vaccinations for footrot are now available, few producers vaccinated for footrot. Only 7.1 percent of operations vaccinate breeding or replacement ewe, 2.3 percent vaccinated nursing lambs, and only 5.7 percent of operations vaccinated breeding rams.



Caseous Lymphadenitis (lumpy Jaw)

Caseous Lymphadenitis is caused by *Corynebacterium psuedotuberculosis* and is a major cause of carcass condemnation at slaughter. The disease can cause abscesses in the skin or subcutaneous lymph nodes which may break open on the skin surface. In some animals, the disease may disseminate into the mediastinal lymph nodes or lungs. Although the vaccine for Caseous Lymphadenitis does not eliminate the disease, it does reduce the disease incidence and severity.

While 20.4 percent of operations reported having caseous lymphadenitis within the previous 3 years, only 3.1 percent gave the caseous lymphadenitis vaccine to replacement or breeding ewes in 2000. In addition, 1.2 percent and 2.4 percent of operations gave the vaccine to nursing lambs and to breeding rams respectively, in 2000.

Abortions

Although there are three major

(Continued on page 7)

What Can Shepherds Expect From A Coyote Control Program?

Introduction

At a recent meeting in Jackson County, WV Cooperative Extension Agent Ed Smolder reminded the audience of the three "P's" of sheep and goat farming: **P**roduction, **P**arasites and **P**redators. Production, of course, refers to maximizing the number of animals available to market and Parasite and Predator management refers to minimizing losses of those animals between birth and sale. Attention to each of these variables is necessary to maximize the producer's profits.

Traditionally, dogs have represented the most significant predation threat faced by West Virginia sheep producers. The arrival of the eastern coyote in West Virginia in the early to mid 1980's changed this. By the early 1990's, coyote depredations were recognized as a serious threat to West Virginia's livestock industries. During the summer of 1995, West Virginia shepherds participated in a survey designed by Thomas McConnell of the West Virginia University Cooperative Extension Service to evaluate the effect of predation on West Virginia livestock producers. The survey indicated that during the 1994-1995 season shepherds lost an estimated 4,630 lambs and ewes to coyote predation, a total economic loss of $329,050 (McConnell, 1995).

Because of the severity of West Virginia's coyote predation problem, the West Virginia Integrated Predation Management Program was initiated in the spring of 1996. This program is carried out by USDA-APHIS-Wildlife Services and integrates and applies or assists the producer in applying a combination of non-lethal and lethal alternatives to minimize coyote predation on sheep, goats, and cattle.

What can producers expect from such a program and does the current program meet those expectations, are fair questions to ask. This article examines expected predation rates on sheep by coyotes without and with a program, coyote depredation rates on individual farms and the cost benefit of the current program.

Sheep/Lamb Depredations Rates

According to NASS (1999), predation is the leading cause of sheep and lamb mortality. Coyote depredations account for 60.7% of the total sheep/lamb losses to predators (NASS 1999). McConnell (1995) found that 51% of the shepherds that left the sheep business, prior to the creation of the West Virginia Integrated Predation Management Program, did so because of sheep losses to predators. How severe can these losses be? A number of studies have been conducted to determine what predation rates would be on sheep and lambs without any predator control. The rate of predator losses in the absence of a predation management program ranged from 1.4% to 8.1% for adult sheep and from 6.3% to 29.3% for lambs in several studies (Table 1).

To what extent are predator control programs able to reduce these losses? This, of course, is dependent on a number of variables such as the coyote population, range vs. farm flocks, type of habitat, participation by the producers, tools available, expertise of the trappers and program funding. However, with coyote management programs in place, losses are generally reduced significantly. NASS (1999) reported, predation losses averaged 1.6% of adult sheep and 6.0% of the calculated lamb crop when non-lethal and lethal control strategies were used. In West Virginia, during 1999, with an integrated predation management program in place, the reported losses of state-wide sheep and lamb inventories to coyotes were 0.7% and 5.0%, respectively (NASS 2000).

Individual Farm Reduction in Coyote Depredation

The West Virginia Integrated Predation Management Program has recorded the sheep killed per farm ratio for cooperators since the initiation of the program in 1996. This value reached its lowest level in 2003, with 2.3 sheep/lambs killed per cooperating farm (Table 2). To determine if this reduction in predation allows sheep production to remain profitable for cooperating producers, lamb losses for the years 1999 and 2003 where analyzed to determine the percent lamb crop available to market (Table 3). The West Virginia lamb crop was below average during 1999 and above the ten-year average in 2003. This analysis assumes the loss of an adult sheep would result in the holding back of a potentially marketable lamb as a replacement (e.g. a ewe lamb would be held back to replace an adult ewe killed by coyotes). A lambing rate of 100% is generally considered the breakeven point for West Virginia sheep operations (E. Smolder, WV Cooper-

Table 1. Reported predator losses in the absence of a predation management program.

Source	Location	Year	Sheep lost %	Lambs lost %
Henne (1977)	Montana	1974	8.4	29.3
Munoz (1977)	Montana	1975	3.7	24.4
McAdoo and Klebenow (1978)	California	1976	1.4	6.3
Delorenzo and Howard (1976)	New Mexico	1974	n/a	12.1
Delorenzo and Howard (1976)	New Mexico	1975	n/a	15.6
McConnell (1995)	West Virginia	1995	4.3	22.3

Table 2. The number of sheep killed per farm of sheep producers participating in the West Virginia Integrated Predation Management Program, FY1996 – FY2003.

Year	Number of Sheep Operations[1]	Number of Producers Assisted (%)	Number of Sheep Killed	Sheep Killed per Farm	Number of WS Specialists
1995	1600	40	1111[2]	27.8	
1996	1400	40 (2.9)	101	2.5	3.0
1997	1300	56 (4.3)	240	4.3	3.0
1998	1100	85 (7.7)	460	5.4	3.0
1999	1000	104 (10.4)	385	3.7	3.5
2000	1000	110 (11.0)	288	2.7	3.5
2001	1000	142 (14.2)	490	3.5	4.0
2002	1100	124 (11.3)	283	2.3	4.0
2003	1100	122 (11.0)	365	3.0	2.5

(1) Source: National Agricultural Statistics Service state livestock inventories for West Virginia, 1995 – 2003.

(Continued from page 4)

ative Extension Service, personal communication). A coyote predation rate of .3% of the adult sheep and 22.3% of the lambs was used to determine expected losses without a predation management program (McConnell 1995). In both 1999 and 2003, the West Virginia Integrated Predation Management program allowed the average cooperating producer to remain above production cost. However, without predation management services, it is expected that the lamb crop available to market would have fellen below production cost in 1999 and would have been only marginally profitable in 2003. We attribute these reductions in sheep depredation to the use of an integrated approach and implementation of a preventive control strategy.

Program Benefit – Cost

Savings attributed to the West Virginia Integrated Predation Management Program to protect sheep can be calculated using NASS (2000) predation loss survey and state sheep inventory data (Table 4). The West Virginia USDA Wildlife Services' expenditure for predator damage management to protect sheep in FY 1999 was $390,000. The total benefit ($634,784) of the program would indicate a 1.63:1 benefit:cost ratio. This benefit is conservative, because the cost savings do not include projected losses to cattle and goats. The West Virginia Integrated Predation Management Program provided assistance to cattle and goat operations that were not included in this analysis. The marketing of animals saved as a result of predation management, benefits many segments of the rural economy, not just the individuals involved in direct production. Jahnke et al. (1987) reported a three-fold economic multiplier effect for the benefits of predation management in Wyoming. If this factor is applied to the total value of sheep saved in West Virginia, then the value of predation management to businesses not involved in direct agricultural production would be $1,904,352. The gross total benefit to all segments of the West Virginia economy would be $2,539,136. The gross total benefit of the program would indicate a 4:1 benefit:cost ratio.

Conclusion

Predator management is one of the essential "3 P's" that leads to profitability in sheep farming. The sharp producer incorporates predator management strategies into his or her production plan, just as one would plan for parasite control. The data presented in this paper demonstrates that a fully integrated predation control strategy can allow producers to continue profitably producing sheep, even in the face of West Virginia's newest predator, the coyote. The goal of the West Virginia Integrated Predation Management Program is to educate and assist livestock producers in reducing coyote depredations on sheep, goats and cattle to the lowest level possible.

Table 3. The percent lamb crop available to market with and without the West Virginia Integrated Predation Management Program in 1999 and 2003.

Average WV Sheep Operation				Without Predation Management		With WV Integrated Predation Management Program	
Year	Adult Sheep	Lamb Crop	Lambing Rate	Expected # Sheep/ lambs Killed	Lamb Crop Available to Market	Sheep/lambs Killed Cooperating Farm	Lamb Crop Available to Market
1999	40 (30 ewes)	36	120%	9.75	87%	3.7	108%
2002	34 (21 ewes)	30	143%	8.15	104%	3.0	129%

Table 4. Savings attributed to USDA APHIS Wildlife Services' Integrated Predation Management Program in West Virginia, FY1999.

Sheep and lambs	Inventory (1)	Reported losses with WS program (%) (2)	Projected loses without WS program (%) (3)	Difference	Average 1999 $ value per head (4)	Total Saved
WV Sheep	40,000	300 (0.7)	1,720 (4.3)	1,420	$83	$117,860
WV Lambs	36,000	1,800 (5.0)	8,028 (22.3)	6,228		$516,924
Total	76,000	2,100	9,748	7,648		$634,784

(1) Source: NASS (2000).
(2) Source: NASS (2000).
(3) Source: McConnell (1995)
(4) Source: West Virginia Agricultural Statistics Service (1999)

(Continued from page 5)

Literature Cited

Delorenzo, D. G., and V. W. Howard, Jr.. 1976. Evaluation of sheep losses on range lambing operation without predator control in southeastern New Mexico. Final rep. to the U. S. Fish and Wildl. Serv., Denver Wildl. Res. Ctr., New Mexico State University State University, Las Cruses, NM.

Henne, F. R. 1975. Domestic sheep mortality on a western Montana ranch. M.S. Thesis, Univ. Montana, Missoula, MT.

Jahnke, L. J., C. Philips, S. H. Anderson, and L. L. McDonald. 1987. A methodology for identifying sources of indirect costs of predation control: a study of Wyoming sheep producers. ASTM Spec. Tech. Publ. 974:159-169.

McAdoo, J. K., and D. A. Klebenow. 1978. Predation on Range Sheep with No Predator Control. J. Range Manage. 31(2):111-114.

McConnell, T. R. 1995. West Virginia's Sheep Predator Situation: Findings of the 1995 WV Shepherds Survey. West Virginia University Cooperative Extension Service, Morgantown, WV.

Munoz, J. R. 1977. Cause of sheep mortality at the Cook Ranch, Florence, Montana, 1975-1976. M. S. Thesis, Univ. Montana, Missoula, MT.

NASS. 1999. 1999 Livestock Wildlife Damage Survey Results, U. S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services.

NASS. 2000. Sheep and goat predator loss. National Agricultural Atatistics Service, Washington, D.C. 10 pp.

Editors Note:

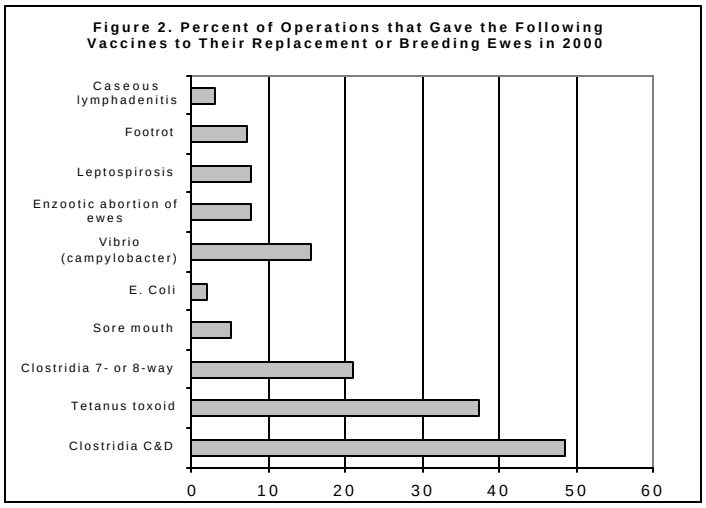
West Virginia Integrated Predation Management Program is currently operating in the counties of Grant, Greenbrier, Hampshire, Hardy, Mercer, Mineral, Monroe, Pendleton, Pocahontas, and Randolph. If you are a producer in one of these counties and are experiencing coyote problems contact

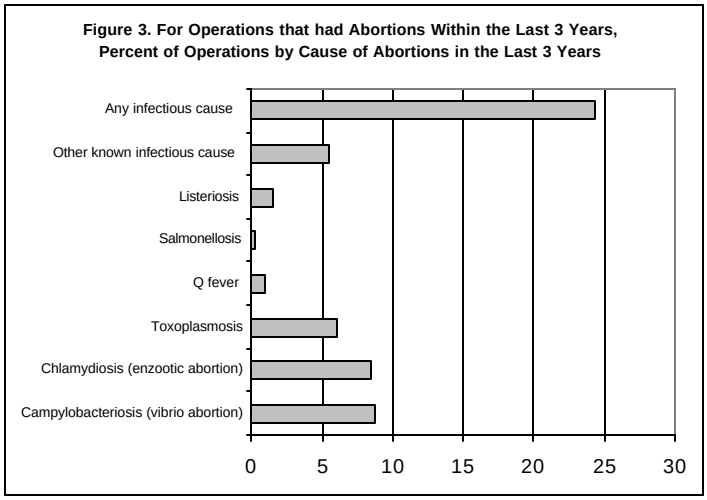
Wildlife Services
304-636-1785

For these services to be provided outside of these ten counties additional funding is needed.

EWE LAMB REPLACEMENT AND RETENTION PAYMENT PROGRAM

At this time the Pocahontas County Farm Service Agency is awaiting proper clearance for the proposed regulation and application form to become available for sign-up in the Ewe Lamb Replacement and Retention Payment Program (ELRRPP). The proposed rule with request for comments was published in the Federal Register on September 7, 2004. Now there is a 30-day public comment period on the proposed rule and a 60-day public comment period on the information collected on the application form. The information collection package has not been approved by the Office of Management and Budget. Therefore, the application form is not yet available and a sign-up period for program benefits has not been determined. This office will use every available source to notify producers when applications are available. We encourage you to contact your local Farm Service Agency if you have any questions or concerns regarding this or any program.





(Continued from page 3)

causes for abortions in sheep, there are vaccinations for only two. *Campylobacter fetus* subspecies *intestinalis* and *jejuni*, commonly referred to as vibrio infections, and *Chlamydophila abortus*, or EAE, which causes enzootic abortions; currently have commercially available vaccinations. A vaccination for the third major cause of abortions in sheep; *Toxoplasma gondii* is not available.

The leading cause of abortion in the participating flocks for the previus three years were: campylobacteriosis or vibrio abortion (8.8 percent of operations); chlamydiosis or enzootic abortion (8.5 percent of operations); and toxoplasmosis (6.0 percent of operations). In 2000, 15.5 percent of operations reported vaccinating replacement or breeding ewes for vibrio abortion. In addition, 7.6 percent of operations with replacement or breeding ewes vaccinated for enzootic abortion in 2000 (Figure 3).

Injection Practices

In 81.7 percent of the operations the same needle was used on more than one animal when giving vaccines in 2000. As expected, the percentage of operations that routinely used the same needle on more than one animal increased as operation size increased. The majority of operations (61.7 percent) that used the same needle on more than 1 animal changed the needle after using it on 20 or fewer animals. Only 20.5 percent of the operations used the same needle on an average of 41 or more animals.

Nearly all operations (85.7 percent) had weaned (feeder) lambs intended for market in 2000. Half (50.5 percent) of these operations vaccinated their weaned lambs, and the majority (87.6 percent) gave the vaccines subcutaneously. While few producers (15.3 percent) gave any vaccines intramuscularly, the majority of those producers (44.8 percent) gave the vaccinations primarily in the leg. Only 2.9 percent reported giving any vaccines in the loin muscles, and those were producers with fewer than 100 ewes.

Conclusion

The best way to prevent or to reduce the severity of a disease is the use of a vaccination program. Vaccination programs are flock specific and there is not a "one size fits all" vaccination program. Recommendations for a vaccination program should be made on individual producer basis to address the various health problems encountered within a specific flock. Your local veterinarian should be consulted for advice on developing sound flock vaccination programs and protocols.

SourceMarch 2004 APHIS ("safeguarding American Agriculture") Veterinary services info sheet

News Ewe Can Use

WV Sheep Management Project
P.O. Box 96
Franklin, WV 26807-0096

Mark Your Calendars!!!

Small Ruminants Feild Day October 23, 2004

The West Virginia Sheep Management Project along with the Davis College of Agriculture, Forestry, and Consumer Sciences and WVU Extension Service will host a forage field day for small ruminants on **October 23rd** at the Dorcas Elementary School and Spring Run Farm.

Speakers include Dr Barton Baker and Dr Gene Felton from WVU and Dr Will Getz from Fort Valley State University.

Docas 4-H club will be serving lunch and the charge for the meal will be $6.00.

For directions see insert inside.

October 29th - Pendleton Woolen Mills will open its new store at the Charleston Townceneter Charleston, WV

December 4th - West Virginia Sheep Short Course
Clinton Hedrick Building, Riverton, WV

December 11th - Buckeye Shepard's Symposium, Marion, OH
contact: Roger High (614) 246-8299 or rhigh@ofbf.org

December 13-15th - Live Lamb Carcass Evaluation shortcourse, The Ohio State University Animal Science Department
contact: Rogar High (614) 292-0589 or high.1@osu.edu