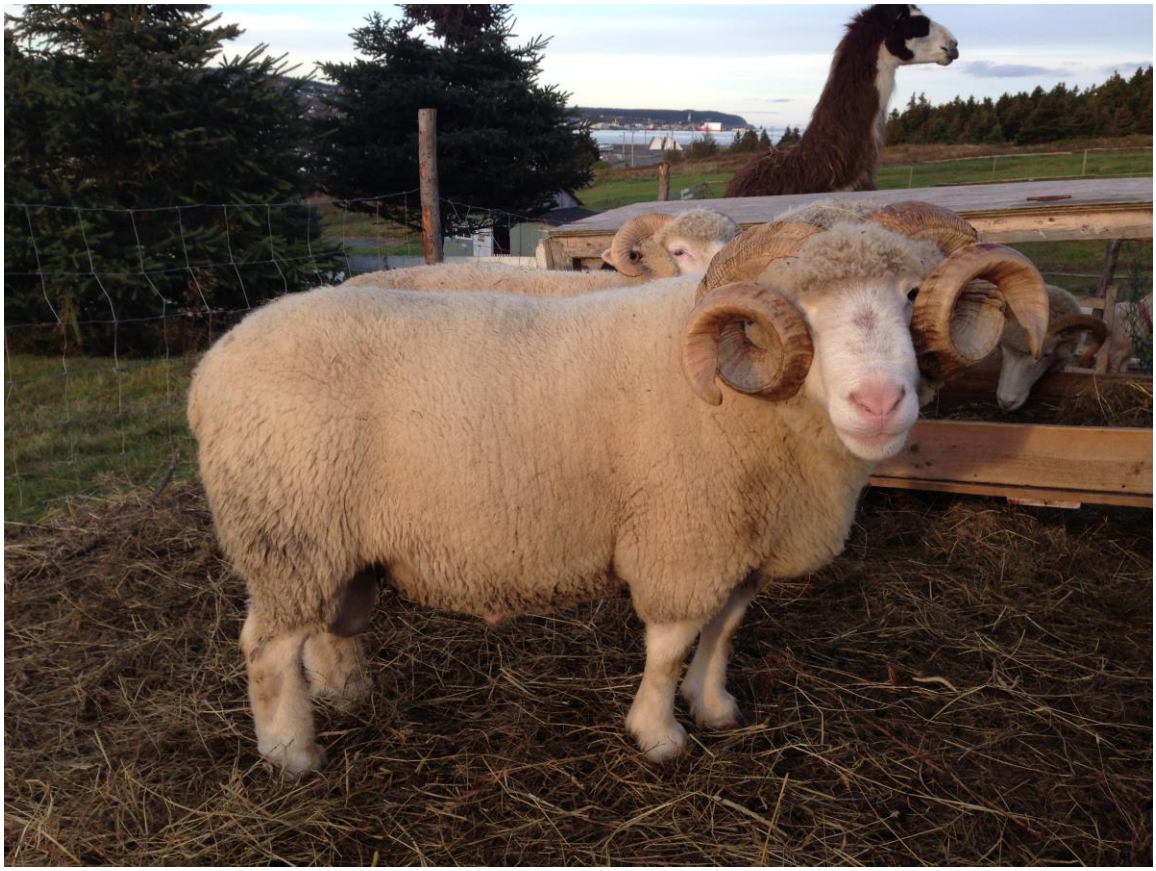
**2013-2014**
**Agriculture Research Initiative**

# Sheep Genetic Enhancement Project Report



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# ACKNOWLEDGEMENTS

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Wilson Reid
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Elaine and Glenn Wells
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Mark Peckham
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# INTRODUCTION

Over the last decade there has been a dramatic decrease in the availability of quality breeding sheep in Newfoundland and Labrador. Previous government programs that provided superior rams have been eliminated and this problem has been compounded by the fact that two purebred breeders and suppliers of quality stock have left the industry. As a result, industry has only been able to avail of purebred animals from expensive sources outside the province. As these animals are often purchased sight unseen there has been a reluctance to invest and the overall result has been a shortage of superior breeding stock. This situation has resulted in lower productivity, lower lambing returns, and consequently, reduced profitability in the sector.

The sheep genetic enhancement project will provide multiple benefits to the Newfoundland and Labrador sheep industry. The industry will receive an influx of genetically superior breeding stock and producers will be able to quantify the impact of introducing genetically superior breeds.

The project involves a comparison of purebred ram and ewe productivity against the productivity of purebred rams bred with standard ewes, and current breeding stock productivity. The purebred ram and ewes are expected to result in the most significant improvements in herd productivity. However, the significant difference in productivity from the introduction of only purebred rams to standard ewes may prove to be the most economical option for introducing purebred genetics into NL sheep flocks.

The breeds included in this project include: Horned Dorset, North Country Cheviot, Suffolk, and Rideau Arcott (See Figure 1). Each breed is very unique in its traits and may be used for a variety of purposes in NL. The **North Country Cheviot** is known for their hardiness, vigor, and premium carcasses; and they are often used in crossbreeding for lamb production. The **Horned Dorset** is a dual-purpose breed of a medium-size and is noted for its excellent ability to complement other breeds. Its ability to breed out-of-season also means it is very fertile. **Suffolk** sheep have a deep, broad body with well-developed hindquarters, which make them popular as a terminal sire. Highly fertile and fast-gaining, the Suffolk will produce heavy lambs that grow well in the feedlot. Finally, the **Rideau Arcott** is not only prolific, but its heavy milking trait makes it suitable for commercial dairying. They also reach puberty at an early age and have an extended breeding season[1].

The ultimate goal of the sheep genetic enhancement project is to improve on-farm competitiveness and profitability through the introduction of genetically superior purebred rams and ewes. The more specific goal is to determine how flocks can be improved through the sole introduction of rams to current breeding stock versus the introduction of rams and ewes, both compared to current flock productivity. Flock improvement will be quantified based on: 1) lambing rates; 2) carcass weights; 3) replacement ewe weights and; 4) replacement ram weights.

The project involves a partnership between Sheep Producers Association of Newfoundland and Labrador and Newfoundland and Labrador Department of Natural Resources.

[1] Saskatchewan Ministry of Agriculture. 2007. Sheep Breeds. [Accessed 13 May 2013] Available at: http://www.agriculture.gov.sk.ca/default.aspx?dn=596af0bf-1205-4871-bf56-7ffcdb4c21d7.


Figure 1. The sheep breeds used in this project include (clockwise from top left): (A) Suffolk; (B) Horned Dorset; (C) Rideau Arcott; and (D) North Country Cheviot.

# METHODS AND MATERIALS

In the first year of the project (2012-2013), the primary focus was on the introduction of new rams to the current flocks of 10 operations. Initially the rationale behind only introducing the rams was because the ram supplies 50% of the genetics. It was anticipated that the introduction of superior rams would provide measurable results that will positively impact the industry on a short and long term basis. The subsequent generations would carry those genetics, ensuring replacement ewes and rams continue to improve the genetic base.

In the subsequent project year (2013-2014), it was decided that in order to determine the true impact on productivity of introducing genetically superior stock to NL sheep farms, ewes and rams should be introduced. As a result, 1 ram and 10 ewes were introduced to 4 sheep farms across the province. There were 3 treatments for each breed on every participating farm:

1. Purebred ram bred with 10 purebred ewes
2. Purebred ram bred with 10 standard ewes
3. Ram presently owned by farm bred with 10 standard ewes

The 10 ewes in each treatment will result in 10 replications at each farm for each of the 3 treatments. The breeds were not compared because of the innate variability between the breeds and the level of variation between each farm is too significant.

The distribution of the rams and ewes were done through a call for letters of interest. A committee made up of government and producer representatives selected participants based on predetermined criteria, which took into consideration their management capacity as a sheep producer and the risk of predators. Committee members included: Dave Jennings, Director, Production and Market Development; Sharon Wright, Manager, Agricultural Extension; Stephen Coombs, Producer Representative; and John Slade, Producer Representative.

The selection committee for the Sheep Genetic Enhancement Project received 8 applications to review for consideration. A matrix was provided to all committee members as a means to objectively score all applicants. Categories assessed, included: management ability; record keeping ability; access to licensed slaughterhouse; predator management measures; minimum of 5 years' experience in sheep; intent to register purebred sheep; flock health program; RFID reader; and scrapie free status timetable. All categories were scored out of 10 (See Appendix A).

There were 4 breeding stocks available to applicants – Rideau Arcott; Dorset; Suffolk; and North Country Cheviot. One of each breed was granted to an applicant based on the applicant's preference of breed and overall score. Selected producers were required to sign a contract agreeing to the registration of all progeny.

To facilitate data collection, 2 data sheets were produced and distributed to participating producers by the Department of Natural Resources. The sheets that were distributed are titled "Carcass & Replacement Information" and "Lambing Percentage". Examples can be found in Appendix A.

# RESULTS & DISCUSSION

Throughout the 2013 pasture season 4 different species of rams and ewes were introduced to 4 operations across Newfoundland and Labrador, as displayed in Table 1. Species included: Suffolk; North Country Cheviot; Rideau Arcott; and Horned Dorset (Figures 2-5).

Table 1. Farmers who received rams and ewes from the sheep genetic enhancement project, and their respective breed of ram.

| ***Applicant*** | **Location** | ***Breed*** |
|---|---|---|
| Wilson Reid | Salmon Cove | Rideau Arcott |
| Elaine and Glenn Wells | Robinsons | Dorset |
| Howard Morry | Harbour Grcae | North Country Cheviot |
| Mark Peckham | Salmon Cove | Suffolk |

The project is in the very preliminary stages, so there will be no relevant data until the Fall of 2014**.**

Project data collected from 2013 to 2015 will be compared against flock average data measurements of present breeding stock. Staff of Department of Natural Resources (Production and Market Development Division) will collect and analyze data. At the completion of the project, the measurable impact of the introduced purebred stock on flock productivity will be calculated.

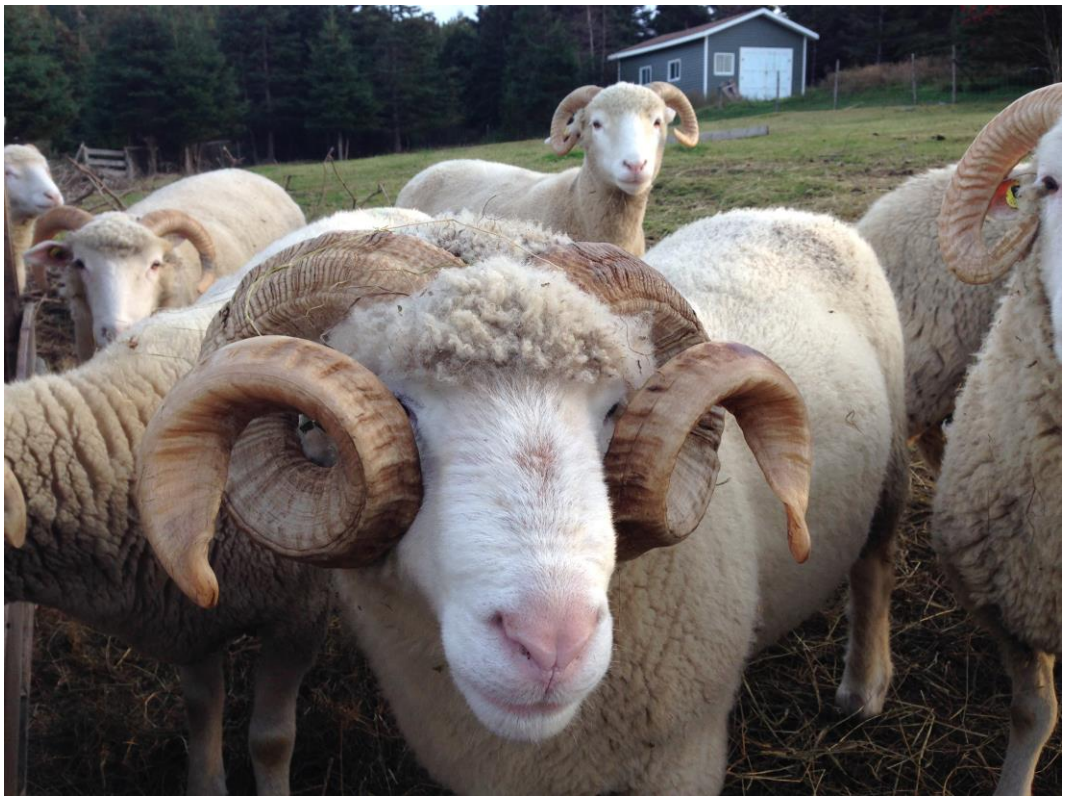

Figure 2. Dorset ram in the foreground with ewes at Bill Coopers in October 2013.

Figure 3. North Country Cheviots at Elaine and Glenn Wells in Fall 2013

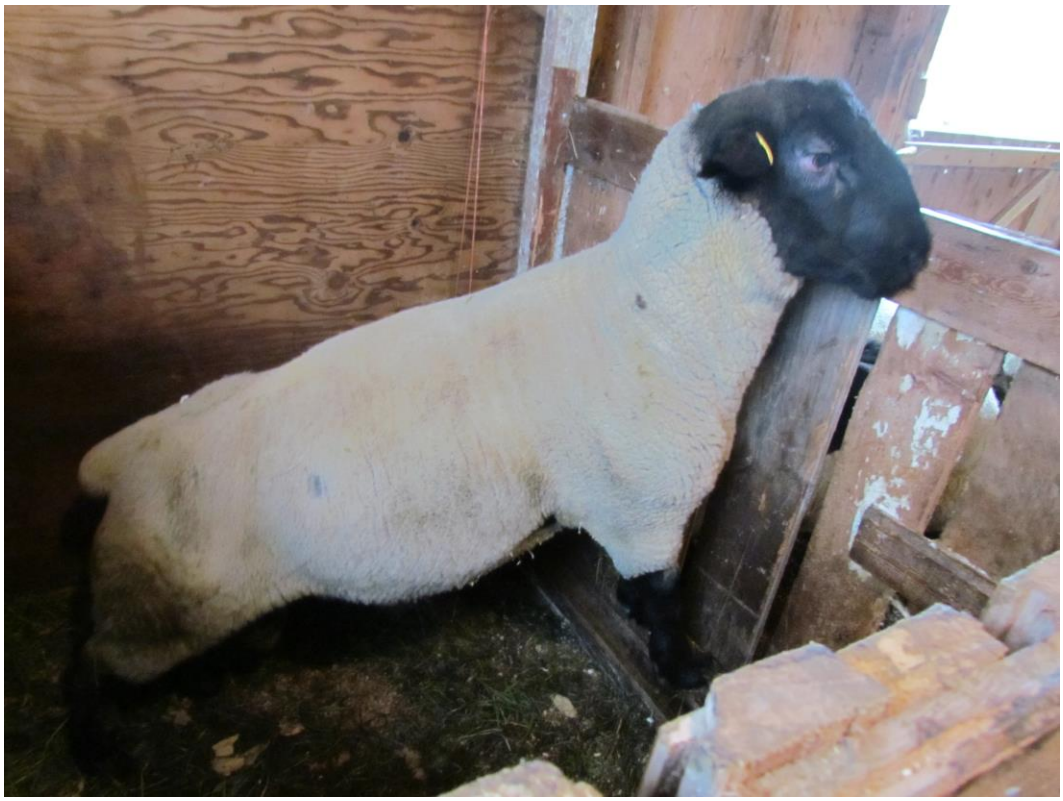

Figure 4. Suffolk in Fall 2013 at Mark Peckham's farm in Salmon Cove.

Figure 5. Rideau Arcotts at West Alba Farms in October 2013.

# ECONOMIC IMPACT ANALYSIS

The results of the sheep genetic enhancement project will be improved productivity, increased lambing returns, and ultimately, increased profitability in the sector. This will be achieved over a short period of time through enhanced genetics on sheep farms, helping to create a more viable sheep industry.

# CONCLUSION

Rams were successfully introduced to the 10 participating farms. They are tagged and their production will be monitored over the coming project years. Relevant data will begin being collected in spring 2013.

# APPENDIX A

# Sheep Genetic Enhancement Applicant Selection Matrix

| | **Applicant** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Category** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Comments |
| Management Ability | | | | | | | | | |
| Record Keeping Ability | | | | | | | | | |
| Access to Licensed Slaughterhouse | | | | | | | | | |
| Predator Management Measures | | | | | | | | | |
| Minimum 5 Years' Experience in Sheep | | | | | | | | | |
| Register Purebred Sheep | | | | | | | | | |
| Flock Health Program | | | | | | | | | |
| RFID reader | | | | | | | | | |
| Scrapie Free Status Timetable | | | | | | | | | |
| **Total** | | | | | | | | | |

# Sheep Genetic Enhancement Project

## Lambing Percentage

Farmer: _____ Ram #: _____

Year: _____ Breed: _____

| Ewe # | # Lambs Born | # Lambs Raised | Date Born | Birth Weight |
|---|---|---|---|---|
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# Sheep Genetic Enhancement Project

## Carcass & Replacement Information

Farmer: _____ Ram #: _____

Year: _____ Breed: _____

| Lamb # | Carcass Weight | Date | Replacement Ewe Weight | Date | Replacement Ram Weight | Date |
|---|---|---|---|---|---|---|
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