FARM INNOVATION 2017-2018

Final Report

Applicant: Sheep Producers Association of Nova Scotia (SPANS)
Brad McCallum, Executive Director
60 Research Drive
Bible Hill, NS
B6L 2R2

Project Title: Lamb Ultrasound Scanning Pilot Project

Project number: FI2016-005

Project cooperators:
- Participant breeders
- Nova Scotia Agriculture
- Growing Forward 2 -Canada
- Purebred Sheep Breeders Association of Nova Scotia (PSBANS)
- New Brunswick Sheep Breeders' Association (NBSBA)
- Prince Edward Island Sheep Breeders' Association (PEISBA)
- Perrennia
- Centre de développement du porc du Québec inc. (CDPQ)

1. Executive Summary

This project has provided sheep breeders in the Maritimes with access to ultrasound technology, which measures carcass characteristics of lambs that are breeding candidates without having to slaughter them. Ultrasound measurements allows backfat and loin thickness to be measured directly on the farm and on living animals. These measurements are then processed in a genetic evaluation program in order to generate genetic evaluation data that can help breeders with breeding selection. This project first increased awareness about the advantages of ultrasound technology, as well as how it worked, by providing presentations and demonstrations. Over a period of two years (2016 and 2017), two specialized technicians visited participating sheep farms and measured a total of 719 purebred lambs. They entered data into the genetic evaluation program and forwarded animal genetic evaluations to the breeders. Following this, the technicians provided advice regarding the interpretation of results and how the results may be applied. Due to this work, breeders can now better utilize genetic evaluations related to carcass quality traits. The genetic evaluation data generated from ultrasound measurements allows purebred sheep breeders to select lambs to improve their flock quality by retaining quality replacement ewe lambs and rams. At the same time, this data helps breeders to promote their breeding stock in provincial and national markets. This project therefore has provided breeders with better access to the genetics market. In addition to having better access to the genetics market as well as an accelerated genetic improvement for purebred breeders, commercial lamb producers benefit from having an accurate tool to control and improve carcass quality of their lambs. Better carcass quality and improved access to the genetics market means better revenues for commercial and purebred breeders, while, at the same time, enhances the competitiveness of the whole sheep industry.

2. Project Description

Objective and background

Taking ultrasound measurements on live animals is a proven technology used in the majority of genetic improvement programs all over the world for red meat species such as swine, beef and sheep. The use of this technology has led to significant progress in genetics for carcass quality and has subsequently improved the competitiveness of these industries. The main objective of this project was to develop a sustainable ultrasound measurement service on live lambs in order to measure carcass data (loin eye and back fat depth) and improve the genetic potential of traits related to the quality of carcasses of Maritime sheep flocks. Considering that carcass traits have a good level of heritability, a good portion of improvements made in the purebred sheep population can be transferred to commercial flocks through exchanging genetics between both production levels.

Approach

- On-farm ultrasound measurements were taken on live purebred lambs in flocks of Nova Scotia, New Brunswick and Prince Edward Island that are enrolled and active in GenOvis or bioFlock.
- Loin eye and back fat depth data was processed in a genetic evaluation program to generate genetic values (EPD and indexes) to support selection decisions made by the breeders.
- Information on the scanning sessions requirements, work site description (see ANNEX 1) and the interpretation of results were communicated to the breeders so they can now better utilize genetic evaluations related to carcass quality traits.
- A measurement tool and selection data were provided to help purebred and commercial breeders to improve the quality of their market lamb carcasses.

3. Results and Discussions

- Over the 2 year-period of the project (summer 2016 and summer 2017) five measurement cycles were carried out on the 9 enrolled breeders where 17 scanning visits had been done. Scanning visits were done in the period April to September and on lambs from 8 different breeds.

- Participant locations: 5 breeders from Nova Scotia, 3 breeders from New Brunswick, and 1 breeder from Prince Edward Island.
- Overall, 719 purebred lambs were scanned in the participating flocks over the 2 year-period of the project. The distribution of lambs per breed is presented in Table 1 below.

Table 1: Distribution of lambs scanned per breed over the 2 year-period of the project.

Breed	British Milk Sheep	Canadian Arcott	Dorset	Ile de France	North Country Cheviot	Rideau Arcott	Suffolk	Texel
Lambs (n)	72	28	57	69	49	54	214	176

- Important variations within breed (phenotypic variance) were observed for 35 kg adjusted raw measurements. For example, the differences within the breed between thinner and thicker loin eye depth vary from 7.9 mm to 19.4 mm (details in ANNEX 2) among the breeds measured in the project. These results show there is room for selection and a good potential for genetic improvement considering the good heritability of traits related to carcass quality like loin eye and back fat depth (good heritability means that a good proportion of phenotypic variance is attributable to genetic variance).
- The total eligible project cost for year 2017-2018 was $28,574 but considering that the participation was lower than initially expected, the total real cost of year 2017-2018 was $20,874. The following expense items were lower than what was initially budgeted: specialised technician, breeder, communication and travel. (Details available in the Year 2 claim-Schedule B).

4. Project impact

- Nova Scotia, New Brunswick, and Prince Edward Island sheep breeders had access to on-farm ultrasound measurements in 2016-2017 and to expertise in genetic evaluation of traits related to quality of carcasses.
- Participating breeders had the possibility to use the data measured in the project as well as the genetic evaluation values generated, which worked to support their decisions about genetic selection and also to provide these data to their ewe lamb and/or ram lamb potential buyers (commercial producers and purebred breeders). All of this provided them with an additional and accurate tool for supporting their buying decisions and stimulating the genetic improvement.
- Information communicated in the project resulted in explaining the advantages of using a genetic evaluation program, 2 out of the 9 project participants were not participating before the project and got supported to get started on these programs.
- Increased participation of sheep breeders in the genetic evaluation programs would be a winning condition for the long-term establishment of an affordable ultrasound measurement service in the Maritimes.

5. Communications

- Project participants received individual genetic evaluation reports where the measured lambs had their own carcass trait EPDs values provided through their genetic evaluation program. (see an example in ANNEX 3)
- Project participants received information regarding the interpretation of results and how the results may be applied supporting them to better utilize genetic evaluations related to carcass quality traits. (see ANNEX 4)
- An ultrasound measurement demonstration was held on September 3, 2017 at the 36th Annual Atlantic Sheep Sale '16 in Truro (see ANNEX 5).
- A workshop was held during the Annual General Meeting of the Sheep Producers Association of Nova Scotia on November 19, 2016, where updates on the current ultrasound project and information on ultrasound measurements were presented. (see ANNEX 6)
- A summary of the project (fact sheet) was presented during the Annual General Meeting of the Sheep Producers Association of Nova Scotia on November 2017, where updates on the ultrasound project were presented. (see ANNEX 7)
- An information article on the project will be published and a Powerpoint presentation on the project results will be presented.

ANNEX 1
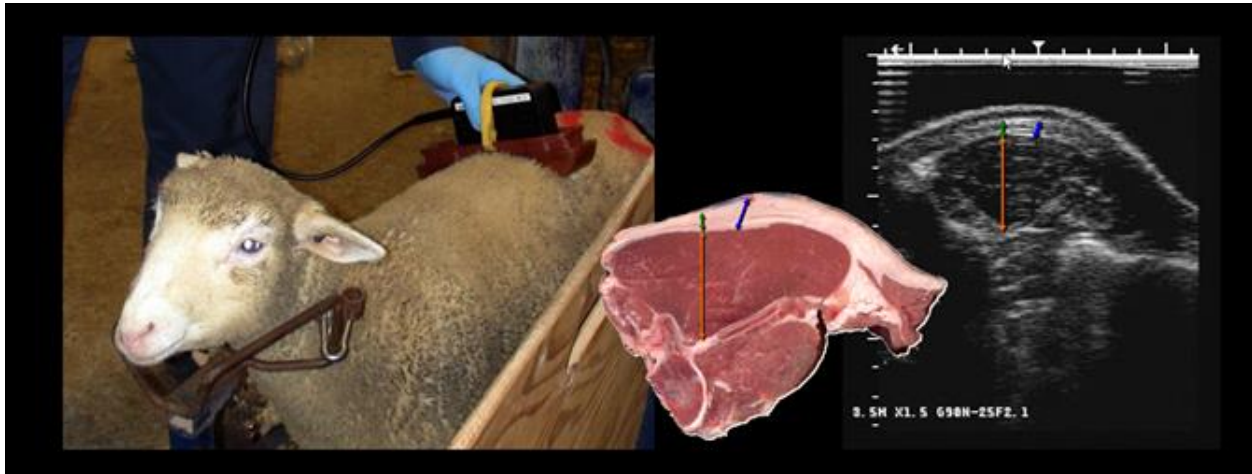
Lamb Ultrasound Scanning Pilot Project

Pertinent Information for Breeders

Project Objective

Develop a sustainable ultrasound measurement service on live lambs in order to measure carcass data and improve the genetic potential of traits related to the quality of carcasses of Maritime sheep flocks. Provide this genetic selection tool to the purebred sheep breeders of three Atlantic Provinces (Nova Scotia, New Brunswick and Prince Edward Island).

Project Description

- The on-farm measurements will be done over a two-year period (summer 2016 and summer 2017)
- The measurements will be executed on live purebred lambs by an accredited CDPQ technician using an approved portable ultrasound machine provided by the technician.
- Lambs have to be scanned between 73 and 135 days of age. Ideally, this measurement is carried out simultaneously with the weighing 100 days in order to minimize the manipulations performed by the breeder.
- Depending on the distribution of the lambing seasons of interested breeders, we would carry out one or two measurement cycles per year. The schedule of measurement cycles will be determined in such a way to maximize the number of lambs that will qualify within the scanning timeframe.
- Participants will receive genetic evaluation reports where every lamb measured will have its own carcass trait EPD values provided through their respective genetic evaluation program.

Breeder Involvement and responsibilities

- **Breeders must be enrolled and active in a genetic evaluation program (GenOvis or bioFlock) to participate in the project**

- Fill out the project enrollment form and pay the enrollment fees. According to the project proposal's budget, each breeder must pay $100 per year plus $2 per lamb scanned.
- Authorize the CDPQ technician to access the flock data in the genetic evaluation program (GenOvis or bioFlock) and to record the back fat and loin depth measurements after the visit. By filling out the project enrollment form, this authorization is automatically provided.

- **Important:** The breeder should declare as soon as possible its lambing periods as well as an estimation of the total number of purebred lambs to be measured by ultrasound.

- **Important:** As soon as most of the lambing season is completed, individual lamb ID and birthdates have to be sent to the CDPQ technician in order to schedule the ultrasound measurements visit. These data can be sent in an electronic format (ex: Excel), on a paper list, or directly in the GenOvis or bioFlock online database.

Work Site Description

- A clean and lighted indoor area should be available.
- A functional weighing scale has to be provided by the breeder.
- Lambs to be measured should be grouped together before the arrival of the technician.
- At least one person from the farm (ideally two) must assist the technician during the session.

During the Scanning Session

- Lambs will be weighed.
- Lambs will be clipped by the ultrasound technician (small zone on the back).
- During scanning, the lamb should be quiet, motionless and in a normal position. Various working tools can be used as a trim table or any other equipment that can hold the lamb. The breeder can also hold the lamb while the technician takes the measurements.
- The measurement site is between 3-4 lumbar vertebras. The technician will take two measurements of backfat and one measurement of loin depth from the same image.
- Lamb ID, sex, weight, fat and loin depth will be recorded. Ideally, ewe lambs and ram lambs have to be measured.
- Approximately 20 lambs per hour can be scanned (depending on the farm's facilities). Lambs have to be scanned between 73 and 135 days of age.

After the Technician's Visit

- For each lamb scanned and known in the genetic evaluation program database, the technician will record the ultrasound data. Beforehand, the breeder must enter each lamb's information (sire, dam, birth date, weights …).
- Genetic evaluations (EPDs and indexes) will be generated and returned to the breeders as a useful tool for supporting selection decisions and marketing of breeding stock.

Project Leaders from CDPQ Genetics Division

Germain Blouin	Israël Michaud	Raymond Deshaies
gblouin@cdpq.ca	**imichaud@cdpq.ca**	**rdeshaies@cdpq.ca**
418 650-2440, ext. 4333	418 650-2440, ext. 4341	418 650-2440, ext. 4343
	Cell phone: 581 997-3362	Cell phone: 819 384-5870

ANNEX 2

		Ultrasound Summary (mm)		Deviation in mm (Max - Min)	
Lamb Ultrasound Scanning Pilot Project (2016-2017) *					
Table 2: Average, minimum, maximum and deviation of 35kg adjusted raw performances by breed					
		Loin depth adjusted at 35 kg	Fat depth adjusted at 35 kg	Loin depth adjusted at 35 kg	Fat depth adjusted at 35 kg
Breed A					
Average	Av.	27,4	2,9	18,4	7,3
Minimum	Min.	18,5	1,8		
Maximum	Max	36,9	9,1		
Breed B					
Average	Av.	27,0	2,3	19,4	4,1
Minimum	Min.	18,0	1,1		
Maximum	Max	37,4	5,2		
Breed C					
Average	Av.	28,0	2,5	10,1	4,3
Minimum	Min.	23,8	1,0		
Maximum	Max	33,9	5,3		
Breed D					
Average	Av.	28,7	4,2	12,9	4,7
Minimum	Min.	21,6	1,5		
Maximum	Max	34,5	6,2		
Breed E					
Average	Av.	26,3	3,7	11,3	3,2
Minimum	Min.	20,5	2,5		
Maximum	Max	31,8	5,7		
Breed F					
Average	Av.	27,5	2,9	7,9	4,5
Minimum	Min.	23,6	1,0		
Maximum	Max	31,5	5,5		
Breed G					
Average	Av.	23,7	3,1	12,7	3,1
Minimum	Min.	17,1	1,6		
Maximum	Max	29,8	4,7		
Breed H					
Average	Av.	23,3	2,4	14,8	2,4
Minimum	Min.	18,2	1,0		
Maximum	Max	33,0	3,4		

* Ultrasound measurements were taken by CDPQ specialized and accredited technicians.

ANNEX 3

Compact Lamb Report for Management Group

Weighing — 50 day: 26 Apr 16 · 100 day: 10 juin 16 · EPDS

	IDENTIFICATION SECTION									EPDS															
SireBreed DamBreed	Foster Recipient	BirthDate	Sx B R	B DC	AD	BW	W50 Adj.	W100 Adj.	ADG	UW Age	UL UF	ULA UFA	LINT Ac/%	LS-D Ac/%	LS-M Ac/%	#BL Ac/%	#WL Ac/%	50M Ac/%	50D Ac/%	100D Ac/%	LOIN Ac/%	FAT Ac/%	Gx %	Mx %	Tx %	TxM %
		2016-02-13	M 2		7.7	35.0 / 30.5	55.0 / 52.7	0.44	54.0 / 135	32.8 / 3.6	26.9 / 2.4	0.44 2/9	-0.06 8/1	-0.03 5/1	-0.17 12/6	0.05 13/73	-0.36 37/16	0.21 39/50	-0.8 40/7	-0.27 38/99	-0.59 34	-0.8 7	-0.27 46	-4.33 11	0.23 -3.68	
		2016-02-13	F 2		6.4	20.5 / 19.5	29.0 / 29.6	0.20	29.0 / 135	22.0 / 1.7	23.6 / 2.1	0.44 2/9	-0.07 8/1	-0.02 5/1	-0.17 12/6	0.04 37/1	-1.41 39/1	0.04 40/1	-1.4 38/99	-3.96 39/1	-3.28 40/1	-4.91 34	-5.83 46	1.11 61	-8.91 1		
		2016-02-19	M 2		5.9	22.7 / 21.5	43.0 / 44.0	0.45	44.0 / 129	31.9 / 2.6	29.1 / 2.0	0.28 0/18	-0.08 9/1	-0.03 3/1	-0.15 5/10	0.60 38/8	-0.56 40/59	-0.02 40/37	-0.94 38/99	0.02 38/99	-3.40 45	1.11 61	-0.49 24	-2.31 1			
		2016-02-19	F 2		5.0	21.4 / 21.9	38.0 / 41.6	0.39	39.5 / 129	27.9 / 3.0	26.7 / 2.5	0.28 0/18	-0.05 9/1	-0.02 3/3	-0.15 5/10	-0.08 38/10	-0.49 40/42	-0.08 40/1	-0.71 38/99	-1.112 40/37	-4.11 14	-0.49 24	-3.85 9				
		2016-02-20	F 1		8.2	38.6 / 31.3	58.0 / 54.4	0.46	58.0 / 128	34.8 / 4.7	28.7 / 3.2	0.42 2/10	-0.05 8/1	-0.02 5/1	-0.17 10/6	0.00 37/42	-0.01 39/66	0.93 40/1	-0.55 39/55	0.82 39/89	-3.36 60	1.68 14	-2.58 21				
		2016-02-21	F 2		7.7	28.2 / 24.0	47.0 / 46.4	0.45	48.0 / 127	32.4 / 3.4	29.0 / 2.5	0.12 0/33	-0.04 8/1	-0.04 3/1	-0.08 10/52	0.16 36/62	-0.31 32/48	0.73 33/18	-0.78 30/99	0.19 47	-1.15 62	1.17 54	-0.27				
		2016-02-22	F 1		8.2	32.7 / 29.2	53.0 / 53.3	0.48	52.0 / 126	34.9 / 5.1	30.4 / 3.9	0.54 5/6	-0.04 9/1	-0.02 5/1	-0.15 16/9	0.09 37/50	-0.13 39/78	0.83 39/83	-0.27 37/99	1.57 27	2.56 78	-1.44 37				
		2016-02-21	M 2 0 / 5C	3	5.9	24.0 / —	46.4 / —	—	50.0 / 127	29.0 / 3.4	2.5 / —	0.12 3/1	-0.05 8/1	-0.02 3/1	-0.04 10/52	-0.08 10/52	0.09 36/62	0.76 59	-0.87 46							
		2016-02-28	M 1		8.6	36.4 / 31.7	55.0 / 52.4	0.41	58.0 / 120	26.8 / 2.6	26.8 / 1.1	0.15 1/30	-0.09 8/1	-0.04 4/1	-0.13 2/1	0.12 10/91	-0.38 38/31	-1.01 39/53	-0.70 37/99	-3.69 54	0.62 25	-2.3				
		2016-02-28	F 3		3.2	14.5 / 20.1	31.0 / 39.7	0.39	33.0 / 120	25.7 / 2.3	26.2 / 2.4	0.22 0/23	-0.06 9/1	-0.02 4/1	-0.09 8/16	-0.06 35/16	0.16 38/31	-1.12 39/53	-0.9 37/99	-2.81 20	-0.01 41	-2.42 23				
		2016-02-28	F 3	52	4.1							0.22 0/23	-0.09 9/1	-0.02 4/1	-0.09 8/1	-0.60 37/7	0.40 40/49	-0.28 39/1								
		2016-02-28	F 3	47 5D	3.2							0.22	-0.09 9/1	-0.02 4/1	-0.09 5/30	7/21	7/21									
		2016-02-29	F 2		7.3	24.1 / 27.2	43.0 / 49.6	0.45	42.0 / 119	29.2 / 2.2	27.3 / 1.7	0.08 1/40	-0.07 8/1	-0.03 4/1	-0.14 8/13	0.18 10/91	-0.64 38/50	0.20 40/7	-0.61 38/97	-0.97 33	0.15 45	-2.6 21				
		2016-02-29	F 2		6.4	26.4 / 29.7	47.0 / 54.2	0.49	48.0 / 119	36.2 / 4.7	32.8 / 3.8	0.08 1/40	-0.03 8/2	-0.01 4/13	-0.14 2/2	-0.02 12/91	1.43 38/75	0.12 40/94	-0.15 38/97	1.25 67	-1.75 33	2.47 46				
		2016-03-02	F 1		6.4	20.0 / 20.2	35.0 / 38.1	0.36	38.0 / 117	28.1 / 2.7	27.3 / 2.5	0.42 5/3	-0.06 2/4	-0.02 5/3	-0.20 8/13	0.04 12/96	-0.59 38/50	0.04 40/7	-0.55 38/97	-0.69 25	-5.25 3	-0.28 45	-4.61 21			
		2016-03-03	M 1		6.8	28.2 / 27.3	52.0 / 53.8	0.53	52.0 / 116	33.3 / 3.9	28.0 / 2.8	0.43 0/10	-0.03 1/1	-0.01 2/13	-0.21 5/2	0.11 7/89	2.23 37/55	0.19 40/85	0.9 39/85	2.19 80	-2.32 26	3.15 83	-1.7 33			
		2016-03-06	M 1		5.5	24.0 / 23.6	48.0 / 50.2	0.53	50.0 / 113	32.8 / 3.4	2.5 / —	1/18	8/1	4/4	8/13	10/64 35/49	38/89	39/89	37/99	85	50	89	60			

Ewe Flock Averages

	Mummified	Stillborn	0-10 days	11-50 days	51-100 days	Total at 50 days
	0.0	0.0	5.9	11.8	17.6	17.6

Averages:

% Death Loss:	0-10 days	11-50 days	51+100 days	Total at 50 days
	0.28	0.22		
	-0.05	-0.09	-0.04	-0.12
	-0.02	-0.04	-0.09	-0.13

Ultrasound summary

	Av. weight # lambs	Av. Loin Min. Max.	Av. Adj. Loin Min. Max.	Av. Fat Min. Max.	Av. Adj. Fat Min. Max.	# of Lambs 50 days / 100 days
	46,1 14	31,1 / 27,9	27,9 / 23,6	23,6 / 1,7	1,7 / 2,6	14 / 14
		22,0 / 32,8	36,2 / 3,9	3,9 / 1,1	1,1 / 3,9	

Summary

# Sires	# Dams	# Lambs	# Born Alive	Single %	Twin %	Triple %	4+ %	#Born per Lambing	#Alive per Lambing	#Weaned per Lambing
2	11	17	17	35.3	47.1	17.6	0.0	1.55	1.55	1.45

	Birth	50 days	100 days
Av. actual weight	6,3	26,6	35,3
Av. adjusted weight	6,3	45,3	47,1

Av. ADG: 0,43 · Age spread: 22

2016-07-05   1 / 2

EPD Run Date 2016-07-02
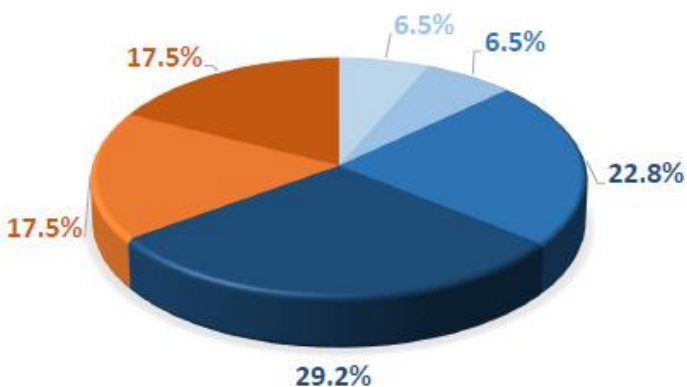
GenOvis

36th Annual Sale of Breeding Stock

Sponsored by the

Purebred Sheep Breeders' Association of NS

Program

Friday, September 2nd

6:00 pm	All entries for the sale must be in the barn.
3:00 pm	Veterinarian will begin to check rams.
	Culling committee will begin to check ewes.
8:00 pm	Shepherd's Social (sponsored by PSBANS)

Saturday, September 3rd

10:00 am	Sale office opens to issue buyer numbers.
10:15 am	Lamb ultrasound scanning demonstration
11:00 am	Welcome by the president of PSBANS
11:10 am	Sale Begins:

Order of Sale   - Registered Ewes
                 - Crossbred Ewes
                 - Rams

Canteen Service available during the day in the sale barn

Accommodations
The following accommodations are available in the area
It is advisable to make reservations due to holiday weekend

Willow Bend Motel	902-895-5325	Stonehouse Motel	902-893-9411
Comfort Inn	902-893-0330	Best Western Glengary	902-893-4311
Rainbow Motel	902-893-9438	Super 8 Motel	902-895-8884
	Holiday Inn	902-895-1651	

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For more Information contact:

Holly Hines	Andrew Hebda	Bruce Sinclair
902-893-6639	902-369-2969	902-783-2093
hhines@dal.ca	nantymor9982@ns.sympatico.ca	bruce.sinclair@ns.sympatico.ca

Lamb Ultrasound Scanning Pilot Project - Summary – Nov 2017

Project Objectives

Taking ultrasound measurements on live animals is a proven technology used in the majority of genetic improvement programs all over the world for red meat species such as swine, beef and sheep. The use of this technology has led to significant progress in genetics for carcass quality and has subsequently improved the competitiveness of these industries. With the support of Farm Innovation Program (Nova Scotia Agriculture - Growing Forward 2 -Canada) and Maritime sheep producer's associations, the main objective of this project was to develop a sustainable ultrasound measurement service on live lambs in order to measure carcass data (loin eye and back fat depth) and improve the genetic potential of traits related to the quality of carcasses of Maritime sheep flocks.

Approach

- Take on-farm ultrasound measurements on live purebred lambs in Nova Scotia, New Brunswick and Prince Edward Island that are enrolled and active in GenOvis or bioFlock.
- Provide carcass data (loin eye and back fat depth) that will be used in a genetic evaluation program to produce genetic values (EPD and indexes) to support selection decisions made by the breeders.
- Provide a measurement tool and selection data to help purebred and commercial breeders improve the quality of their market lamb carcasses.

Project results

- Over the 2 year-period of the project (summer 2016 and summer 2017) five measurement cycles were carried out on the 9 enrolled breeders where 17 scanning visits had been done. Scanning visits were done in the period April to September.
- Participant locations: 5 breeders from Nova Scotia, 3 breeders from New Brunswick, and 1 breeder from Prince Edward Island.
- Overall, 719 purebred lambs were scanned in the participating flocks over the 2 year-period of the project. The distribution of lambs per breed is presented in Table 1 below.

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- Project participants received individual genetic evaluation reports where the measured lambs had their own carcass trait EPDs values provided through their genetic evaluation program.
- An ultrasound measurement demonstration was held on September 3, 2017 at the 36th Annual Atlantic Sheep Sale '16 in Truro (see ANNEX 3).
- A workshop was held during the Annual General Meeting of the Sheep Producers Association of Nova Scotia on November 19, 2016, where updates on the current ultrasound project and information on ultrasound measurements were presented.

Goals achieved in the project

Nova Scotia, New Brunswick, and Prince Edward Island sheep breeders had access to on-farm ultrasound measurements in 2016 and in 2017. Participating breeders had the possibility to use the data measured in the project as well as the genetic evaluation values generated, which worked to support their decisions about genetic selection and also to provide these data to their ewe lamb and/or ram lamb buyers supporting their buying decisions.