A selection index for profitability in a commercial outdoor flock of dairy sheep in New Zealand

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Origins of the Dairymeade Breed

- Kingsmeade flock established 1996 with ewes of the New Zealand Coopworth breed, selected for easy machine milking and outdoor farming
- All inseminated with semen from East Friesian rams specially imported in 1992 and released from quarantine in 1995
- East Friesian selected from among European breeds for large body size, high lambing percentage and high milk production, lean meat and moderate wool production

23 years of recording

- Breeding records are based on a complete record of breeding in the flock from 1996 to the present
- Up to 2018 a total of 5,091 animals are pedigree recorded and have birth data, litter details and survival

DairyMeade breed type

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The goal is farm profit by selling high quality sheep milk products

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Material and methods

Birth and weaning weight of 1,381 lambs recorded from 2013 to 2018.

Records from 280 ewes recorded on three production seasons

- Ewe live weight
- Udder scores
- Milk meters are used to measure daily yield of milk, protein and fat
- Lactation yield of each ewe calculated using random regression with a 3rd orthogonal polynomial - 445 lactations

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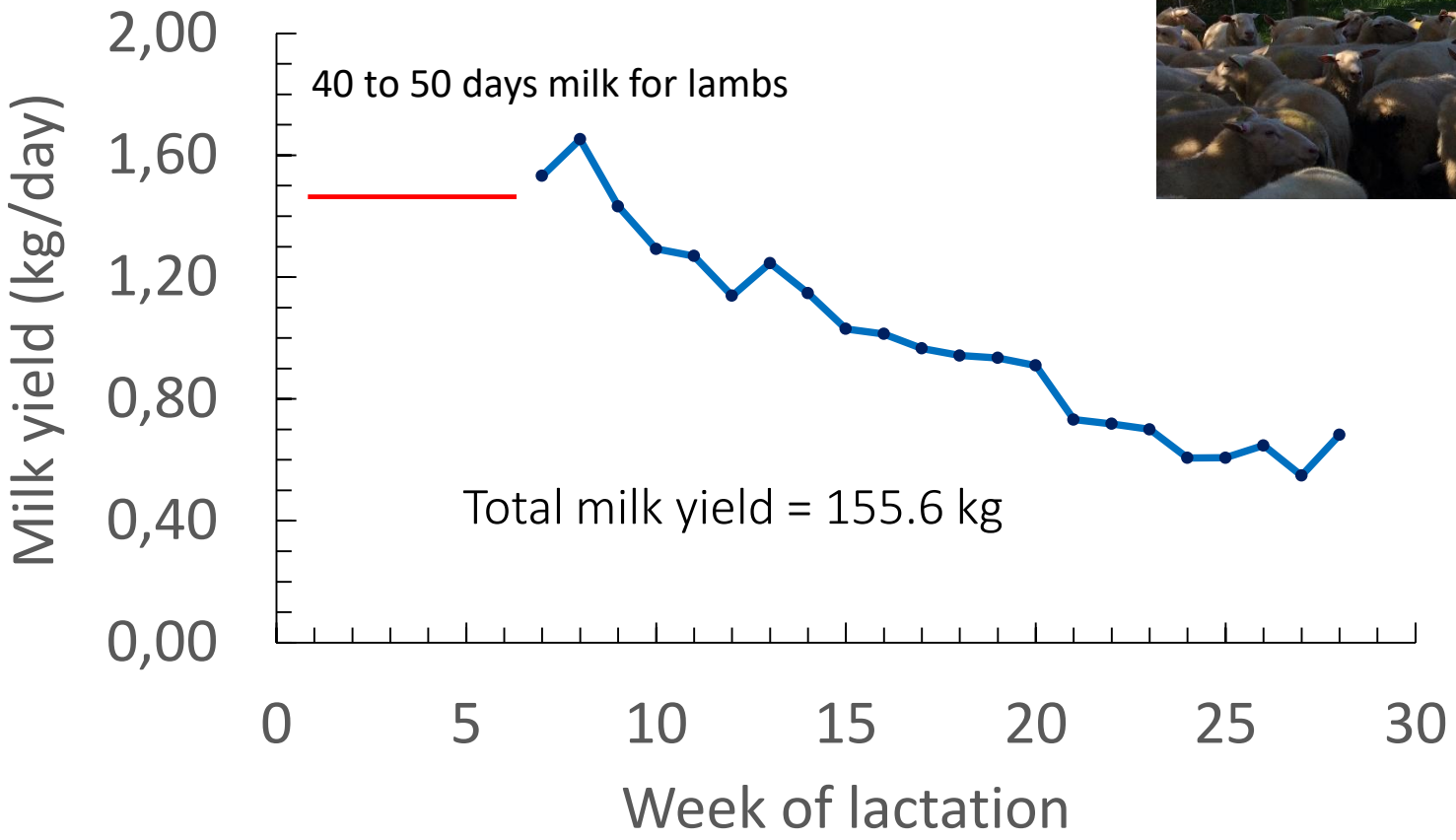
Results



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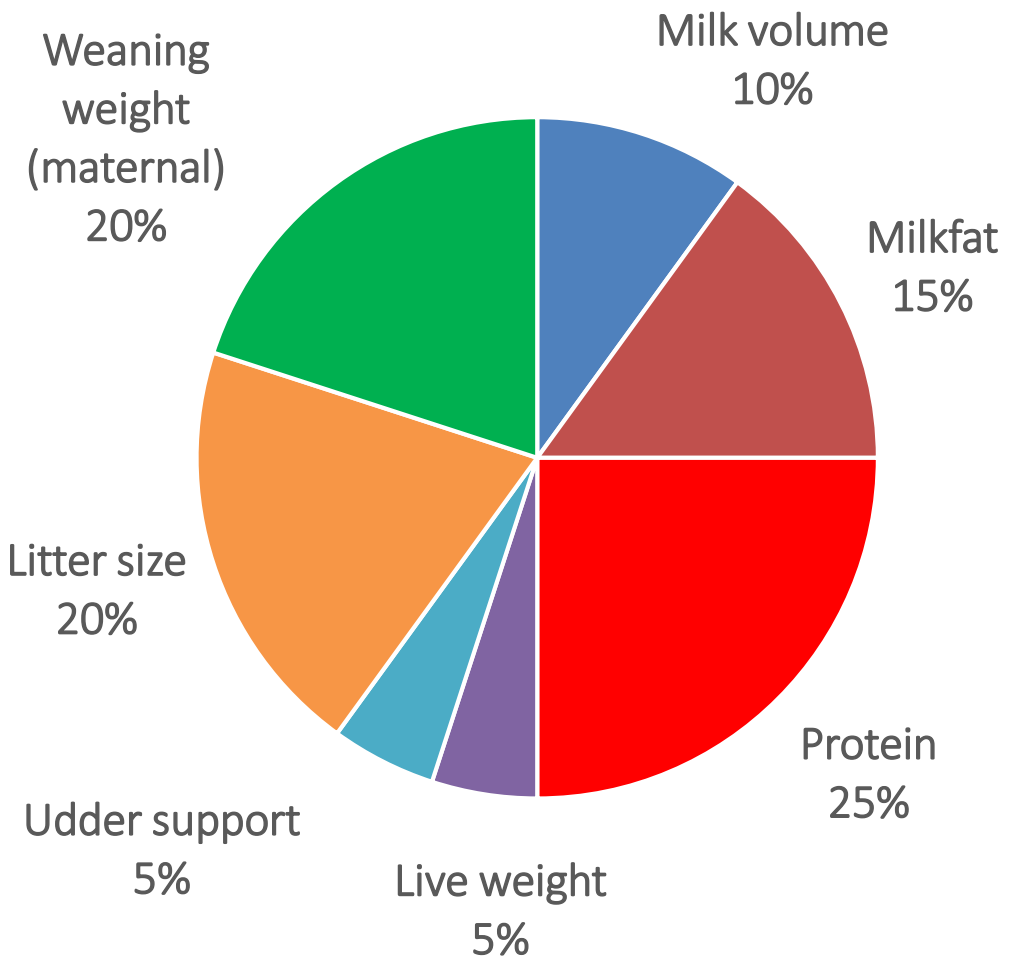
Results

Trait	N	Mean	SD	Min	Max
Birth weight, kg	1,371	4.5	1.06	1.8	8.0
Weaning weight, kg	1,371	17.3	3.56	7.5	39.6
Milk yield, kg	445	155.6	51.73	58.5	319
Fat yield, kg	445	9.1	2.71	3.97	24.4
Protein yield, kg	445	9.5	2.93	3.3	18.3
Ewe live weight, kg	395	62.0	9.38	37.5	91
Litter size, lambs	500	1.8	0.67	1	4
Udder support	294	3.7	0.93	1	5

DairyMeade Breeding Index (DMBI)

		NZ$
Milk volume (litres)	x	2.43
Protein yield (kg)	x	10.88
Fat yield (gm)	x	4.42
Ewe live weight (kg)	x	- 4.97
Udder support (1 to 5)	x	75.70
Litter size (1 to 4)	x	524.10
Weaning weight (maternal effect) (kg)	x	0.31



- Lower body weight better - less feed for maintenance
- Maternal and direct effect for lamb weaning weight separated

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DairyMeade Breeding Index

AnimalID	Estimated Breeding Value							DMBI, $
	Milk, L	Fat, kg	Protein, kg	Lwt, kg	WW_{mat}, kg	Litter size	Udder support	
KM-2012-130	40.2	1.04	2.32	-6.5	0.13	-0.05	0.06	136.3
KM-2012-183	18.9	0.88	1.01	11.2	-0.46	0.15	0.41	112.5
KM-2013-37	22.0	1.14	1.34	5.7	-0.82	0.11	0.07	106.0
KM-2012-45	10.7	0.43	0.58	1.2	-0.35	0.15	-0.04	104.3
KM-2011-142	26.9	1.01	1.45	2.9	-0.16	0.03	0.16	99.6
KM-2011-164	17.9	0.78	1.08	-3.1	0.35	0.04	0.06	99.3
KM-2011-135	14.6	0.39	0.70	0.8	-0.13	0.08	0.20	96.3
KM-2013-86	24.5	1.18	1.52	4.9	-0.31	0.08	-0.05	93.8
KM-2012-42	17.7	0.61	0.89	-1.9	-0.24	0.05	-0.02	90.9
KM-2011-62	26.3	1.23	1.50	1.7	-0.10	0.03	-0.09	88.3

- Selection of best ewes and rams as parents of future replacements
- Selection of new-born female lambs

Future plans

- Further work is required to estimate the EVs of the traits using a farm model integrated with a milk processing model
- Expand the breed population through adding daughter flocks which also use performance recording, combine data from many flocks
- Incorporate genomic selection into the breeding program
- Use embryo transfer and semen sexing to breed from the best animals

Wool Blacks

Sub-flock of sheep
Same milking ability
Blacks breed blacks
Very good outdoors