BRIEF COMMUNICATION: The current state of the New Zealand goat industry

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Introduction

Goat farming in New Zealand has a lower profile compared to dairy, sheep and beef systems. The goat industry is small in New Zealand (Stafford & Prosser, 2016) and there has been limited consideration of the potential for the industry to expand (Shepard & O'Donnell, 1979). The environmental and commodity market constraints currently impacting pastoral systems in New Zealand provide an opportunity for the goat industry to have a greater economic contribution to New Zealand's agricultural production.

In New Zealand, goats are farmed for milk, meat and fibre production and also act as a mechanism for controlling excess pasture growth, enhancing clover in mixed pasture and controlling weeds (Batten, 2014). The aim of this paper was to present an overview of the goat industry to provide background knowledge for consideration when deciding the direction of the goat industries in New Zealand. As part of the overview, farmers, processors and industry bodies were contacted to obtain an estimate of the number and location of goats farmed in New Zealand. Although some of the sources of information for the goat industry are not perfect, this research is an attempt to bring together information that has not been consolidated in nearly 40 years (Shepard & O'Donnell, 1979) and was achieved as part of a three-part study with companion papers being produced (Lopez-Lozano et al. 2017; Smith et al. 2017). Information from this study were used in conjunction with the value of the goat industry (Lopez-Lozano et al. 2017) to project the potential of the New Zealand goat industry (Smith et al. 2017).

Dairy production

A consideration of the animal statistics indicates an estimated 92 farms running 66,100 dairy goats in New Zealand. The exact number is not known as there is no census undertaken for dairy goats in New Zealand (Stafford & Prosser, 2016). Most ruminant production systems in New Zealand are dominated by outdoor grazing systems (Solis-Ramirez, 2014). However, because of management advantages (for example parasite control), the majority of dairy goats are intensively managed (Gautam, 2012) in open-sided barns with wood-chip or sawdust covered floors. Approximately 72% of the dairy goat population is located in the Waikato region and the remaining 28% being distributed throughout the rest of New Zealand (Figure 1). Approximately 85% of the dairy goats are Saanen breed, a breed associated with greater milk production capacity, while the Toggenburg, British Alpine, and Nubian type crosses comprise the remaining 15%. Average annual milk production and composition of Saanen, crossbred and the average New Zealand doe is provided in Table 1. Information regarding the difference in milk composition between dairy goats and other livestock species can be found in the companion paper (Lopez-Lozano et al. 2017).

In New Zealand, dairy goats are fed fresh forage twice daily which is either brought onto the farm, or grown and harvested on-farm and cut and carried to the side of the barn (Solis-Ramirez et al. 2011). On-farm forage usually consists of ryegrass-based pasture, lucerne and plantain/clover mixes, while supplements include; maize, grains, and molasses (Robertson et al. 2015). Waste feed and manure is either stored and removed periodically or spread on farm as a form of fertiliser (Robertson et al. 2015).

Milking regimes mimic those of typical New Zealand dairy cow operations; milking twice daily, starting in early July and ending in late May the following year. Goats can be milked once they have their first kid at one year of age, unlike cattle where the heifers enter the milking herd at two

Table 1 Average lactation duration, yield and milk composition for Saanen and crossbred dairy goats farmed in New Zealand, for the 2013/14 season (Solis-Ramirez, 2014).

Breed	Lactation length (days)	Average lactation yields (kg/doe/year)		
		Milk	Fat	Protein
Saanen	201	672	21.8	20.7
Crossbred	252	818	27.3	25.6
The average production per doe for dairy goats in New Zealand	234	764	25.2	23.7

Table 2 The total number of goats slaughtered in New Zealand with their meat either exported or sold locally from 2014 to 2016 (Statistics New Zealand, 2016).

Year	Total killed	Exported	Local trade
2014	115,984	89,703	26,281
2015	121,889	88,084	33,805
2016	123,375	77,376	45,999

years of age. Replacement rates in the industry are 10-20% for milking does and 5% for bucks (S. Fraser, personal communication). Currently buck kids are slaughtered at a young age for pet food or rendering (Freeman-Rock, 2015). Common reasons for culling older does are low milk production (35%), poor fertility (14%), lameness (6%), mastitis (6%) and other reasons (39%) (Solis-Ramirez et al. 2011).

Although goat milk production in New Zealand is insignificant in terms of world production (51,127 tonnes in New Zealand in 2016; Smith et al. (2017) vs. 18,340,016 tonnes worldwide in 2014; FAO (2014)), New Zealand developed the world's first goat milk infant formula in 1988 and continues to be the leading international manufacturer of goat milk powders for infants and young children (Stafford & Prosser, 2016).

New Zealand Dairy Goat Co-operative (NZDGC) is the main processor of dairy goat milk in New Zealand, accounting for 80% of the dairy goat population. However, other dairy processors are emerging, such as the NZ Nutritional Goat Co-operative (NZNGC), New Image Group (NIG) and NZ Dairy Collaborative Group (NZDCG), which are supplied by 7%, 7% and 5% of the dairy goat population, respectively. The main dairy goat products sold domestically include cheese, yoghurt, ice cream, powdered milk, ultra-heat treated (UHT) and whole milk, while exported products include nutritional formula, milk powder and goat milk tablets (Lopez-Lozano et al. 2017). The distribution of dairy goat farms and processors is shown in Figure 1.

Meat production

Globally, consumption of goat meat has increased over the past 20 years (Madruga & Bressan, 2011). The carcass, regardless of age, breed or region provides a source of high-quality protein (Hogg et al. 1992), healthy fat profile (increased unsaturated fat/saturated fats ratio) and minimal cholesterol content (Anaeto et al. 2010). Despite the popularity of goat meat globally, New Zealanders consume a limited quantity of goat meat (Table 2). The 77,376 goats slaughtered in New Zealand is exported (Table 2) to Japan, Middle East, Caribbean, Turkey, India, China and the United States of America (Lopez-Lozano et al. 2017). Due to the downturn in lamb and beef prices and increased domestic demand for goat meat, there has

Figure 1 Distribution of dairy goat farms and processors in New Zealand. Black filled shapes are the different processors and the empty similar shapes represent the farms which supply each processor. Source: Personal communication with dairy goat farmers, dairy goat milk processing companies and the Agribase database.

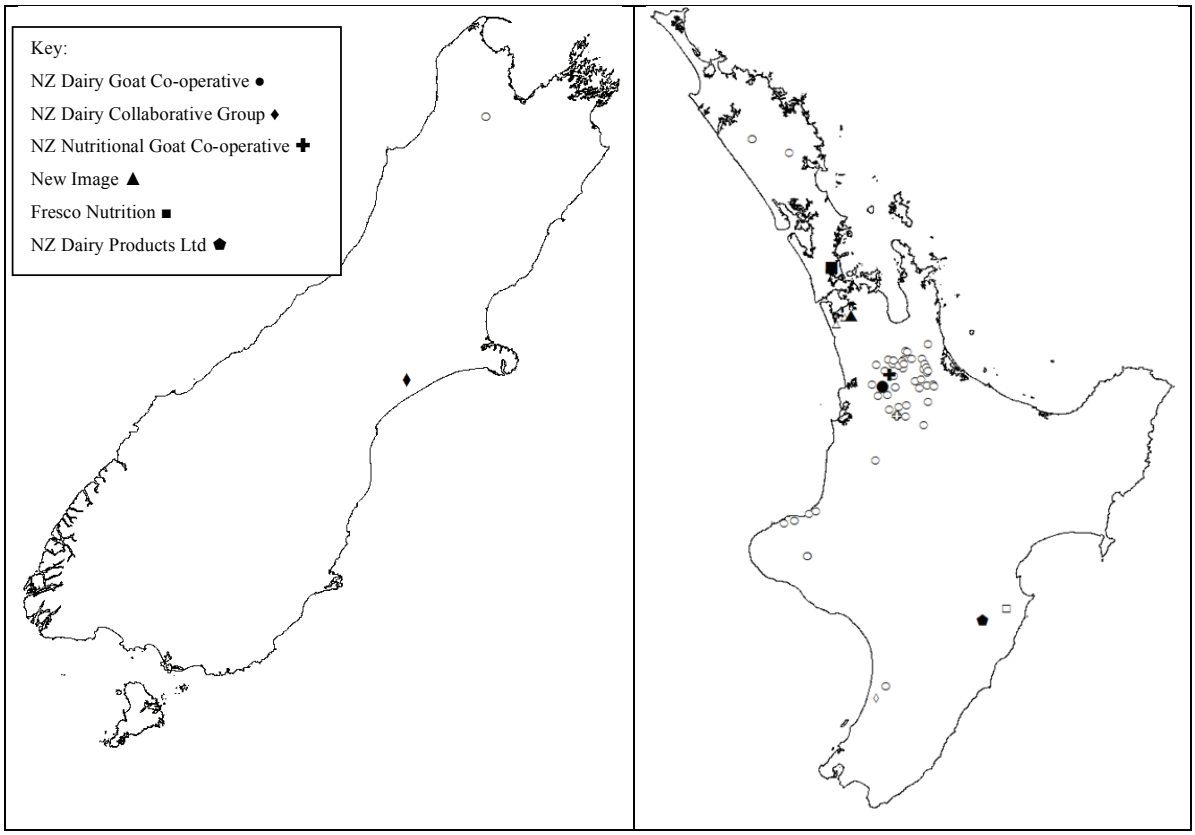

Figure 2 Distribution of goats farmed for meat and abattoirs which process goat meat in New Zealand. Black filled squares are the abattoirs and empty similar squares are goat-meat farms. Source: Personal communication with goat farmers, meat processing abattoirs, members of the NZ Boer Goat Breeders Association and the Agribase database.

Figure 3 Distribution of goats farmed for mohair and the two mohair warehouses in New Zealand. Black filled triangles are the warehouses and white filled triangles are goat fibre farms. Source: Personal communication with goat farmers, the two mohair warehouses (Mohair Pacific and Ohuka Farms), and the Agribase database.

been an increasing interest in farming goats for meat (Rural Delivery, 2010). The total number of goats processed in the last three seasons is shown in Table 2, however, 90% of these goats were feral.

Goats are predominantly farmed for weed control, with meat and fibre production in many instances being a secondary benefit. Feral goats make up the majority of goats farmed for meat, however, it is not clear exactly how large the feral population is.

Boer goats in New Zealand were originally imported from South Africa, and are considered to have some of the best Boer genetics in the world (Malan, 2000). Based on this review, there are estimated to be 7,175 Boer goats on 29 farms, scattered mainly throughout the South Island and ranging in size from 20-600 goats (Figure 2). The smaller properties tend to be small-scale breeders, while the larger operations also farm other livestock enterprises (L. Milne, personal communication). Majority of goat operations for meat production are predominantly pasture-based and provide supplements such as hay, lucerne, timothy, nuts, and concentrates when needed (Stafford & Prosser, 2016).

Does used to produce progeny for meat are mated at a buck-to-doe ratio of 1:50 with a target mating live weight of approximately 40 kg (Meat and Wool New Zealand, 2008). The bucks are introduced to the flock in April and kidding starts in September. Due to differences in pasture growth and weather conditions in different regions of the country, the kidding date can range from July to December. The Boer kids are weaned at two to six months of age and the target weaning weight is 30 kg.

Generally, farmed goats are slaughtered at approximately 9–18 kg carcass weight (CW), and with high-quality feed, kids can reach this CW by eight months-of-age (Meat and Wool New Zealand, 2008). At the same age, purebred Boer can reach an even greater CW of 25 kg (P. Loughhead, personal communication). Despite the relatively low number of goats slaughtered in New Zealand annually (Table 2), some companies have formed (e.g., Shingle Creek Chevon) which supply and export high-quality goat meat to national and international consumers. With this said, farmers face difficulties sending their goats to slaughter as few processors have equipment suitable for processing goats.

Fibre production

The goat-fibre industry predominantly produces mohair from Angora goats. Mohair is a luxury fibre commonly used for clothing and furnishing. However, this industry is also relatively small with the current estimate of 9,320 Angora goats farmed on 110 properties (Figure 3). Despite New Zealand providing small quantities of quality fibre (25 mega-tonnes exported in 2015; Lopez-Lozano et al. (2017)), the industry suffers from fluctuating demand for Mohair and to a lesser extent, cashmere (Morand-Fehr et al. 2004).

Angora goat farms range from flat paddocks with perennial ryegrass pastures, to rolling hills with poor quality pastures and undeveloped steep hill country. Hay, bailage and grain are fed as supplementary feeds during the winter months (Stafford & Prosser, 2016). Unlike dairy goats, Angora goats are bred at two years of age. Some farms mate does once they reach 35 kg live weight, or at three years of age (L. Milne, personal communication). Bucks are introduced to the flock mid-March, for six to eight weeks. Kidding occurs in September and kids remain with the does until weaning at three to four months of age (J. Freeman, personal communication). At 12 months, kids with inferior type fleeces, poor constitution, or lameness are culled. Buck kids are castrated and kept as wethers with two to four bucks kept for replacement breeding stock. Wethers are profitable in the flock as they can produce 3 kg more fibre per year than does (L. Milne, personal communication). The second culling period is at 18 months of age for poorly fleeced hoggets, while does with good fleeces and/or those that produce kids with very good fleeces may remain in the flock until they are 9-10 years old (L. Milne, personal communication).

Angora goats are shorn twice a year (February and August) and produce 4-6 kg of mohair per animal per year (L. Milne, personal communication). The main classes of mohair are kid (23-25 micron), young goat (27-31 micron) and adult (33-36 micron). Mohair fleeces are sent to one of the two mohair warehouses in New Zealand; Ohuka Farms in the North Island and Mohair Pacific in the South Island (Figure 3). Once at the warehouse, fleeces are sorted into classes and sent in bulk to South Africa to be processed, auctioned and exported to core markets such as Japan, China and Italy (Fox, 2015).

Conclusion

Dairy goat farming in New Zealand is a successful industry able to access niche markets for high-value dairy products. Although there is significant potential for premium goat meat and mohair production in New Zealand, the current main constraint is the lack of a critical mass of stock numbers to consistently supply the substantial export markets.

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