BRIEF COMMUNICATION: Onset of breeding season in Dorset Horn ewes

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Introduction

There has long been interest in accelerated lambing systems such as the STAR system developed at Cornell University (Lewis et al. 1998). Economic modelling of such systems has shown that it can be profitable, through improved utilisation of pasture and ewes being in a productive state for more of their life (Morel et al. 2004). Despite the modelling of such a system supporting its use, there has not been significant uptake of such systems in New Zealand. One of the requirements, and conversely, limitations, of an accelerated lambing system is that the ewes need to be successfully bred outside of their normal breeding season, which commences during decreasing daily photoperiod in late summer/autumn. This has proven to be challenging during the spring and summer, even when using hormonal methods in Romney and East Friesian-based composite (deNicolo et al. 2008). Some breeds are reported to have genetic based naturally extended breeding seasons such as the merino, Poll Dorset (McQueen & Reid 1988) and Dorset Horn (Kelly et al. 1976); anecdotally the Dorset Horn has been referred to as being aseasonal (does not exhibit seasonality and can therefore get in lamb at any time during the year). Further support that the natural onset of oestrus is under genetic control was provided by Smith et al. (1992) who reported the heritability of standardised lambing date to be 0.23 in a flock of Poll Dorset x Romney selected for advanced onset of breeding. This paper reports on a trial conducted over two years to investigate the onset of the breeding season for 18 purebred Dorset Horn (DH) ewes and 100 DH x Coopworth (DHx) ewes.

Materials and methods

In 2005, 18 purebred spring born DH and 100 DH x Coopworth ewes were sourced as ewes at approximately one year of age from flocks in the Taranaki and South Otago regions (latitude -39, longitude 174, 200m above sea level and latitude -45, longitude 169, elevation 300m respectively) that had evidence of ewes conceiving year round (data not supplied by the breeders). The ewes were relocated to, and run on, Jennersmead Research Farm (Feilding, Manawatu, latitude -40.3, longitude 175.6, elevation 57 metres). Vasectomised Poll Dorset (PD) rams were introduced in early October, followed by entire DH rams in late October. The vasectomised and entire rams were fitted with crayoned harnesses and the onset of the breeding season recorded for each ewe. The ewes lambed in late autumn and the lambs were weaned in August. The trial was repeated in the following year (2006-2007) using the same ewes which were then approximately two years of age. The recording of the ewes concluded in March 2007.

Results and discussion

Sheep are seasonal breeders, with the natural onset of oestrus occurring for most breeds after the summer solstice, when daily photoperiod begins to decrease (Hafez 1952) and seasonal breeding has been documented in a number of New Zealand (NZ) studies (McQueen & Reid 1988; Smith et al. 1989; Knight et al. 1990). Furthermore, even though oestrus can be induced with hormonal intervention, conception rates are low outside of the normal breeding season in NZ environments (deNicolo et al. 2008). There is conflicting evidence regarding the breeding season of DH, which is discussed later. However, there is considerable anecdotal evidence which suggests that the DH may not exhibit seasonally related anoestrus.

A summary of the results obtained across the two years of the trial is provided in Table 1. In both years no DH or DHx ewes were marked by the vasectomised PD rams, and even with the introduction of the entire DH rams, the ram effect (Martin et al. 1986), which would have seen ewes exhibit oestrus approximately 17 days (mid-November) after the introduction of the entire rams, was not triggered. Indeed in Year 1, the first DH ewe was not marked until 13 December, and in Year 2 the first DH ewe (a different ewe to Year 1) was not marked until 1 January, with the dates 10 days and 3 days later for the DHx ewes for the respective years.

Table 1 Onset of the breeding season of Dorset Horn and Dorset Horn x Coopworth ewes run on a property in the Manawatu after introduction of crayon-harnessed vasectomised Poll Dorset rams in early October and entire Dorset Horn rams in late October.

	Dorset Horn (n=18)		Dorset Horn x Coopworth (n=100)	
	2005/2006	2006/2007	2005/2006	2006/2007
First ewe marked	13 Dec	1 Jan	23 Dec	4 Jan
Last ewe marked for first time	16 Jan	3 Feb	30 Jan	19 Feb
Average Date of 1st crayon mark	29 Dec	13 Jan	11 Jan	22 Jan

These results do not support that all DH are truly aseasonal, at least in the environment in which they were run in this trial. This non-aseasonality is supported by the study of Kelly et al. (1976) in which it was demonstrated in Otago that although the DH did have an earlier average onset of the breeding season compared to Romney-based breeds and Merinos, the average date of onset was not until late February after the introduction of vasectomised rams in late January. Likewise, Polled Dorset rams grazed in the Manawatu district proved to be season in terms of reproductive hormones and semen characteristics, although this was less marked than for their Merino and Romney counterparts (Barrell & Lapwood 1978). However, these findings differ from overseas studies of Dufour (1974) and Lewis et al. (1996) who observed that a proportion, albeit low, of DH ewes exhibited oestrus throughout the year, and there is anecdotal evidence of DH breeding year round in some NZ flocks.

The magnitude of the between-year differences is large, almost the length of an oestrus cycle. This demonstrates that variation in onset of breeding likely arises from many factors in addition to breed and latitude (Kelly et al. 1976; Knight et al. 1992).

The lack of true aseasonality and the variability observed in the onset of the breeding season has implications for farmers considering implementation of any accelerated lambing systems without hormonal intervention that require a mating to take place in late winter, early summer (Lewis et al. 1996). However, these results together with previous studies do support that the DH breed may have a genetic propensity for an extended breeding season, and that through genetic selection this could be extended, as demonstrated by McQueen & Reid (1988). Additionally, the possibility that the number of animals observed was insufficient to observe outliers cannot be ruled out, and further investigation of flocks that report aseasonality is required.

Conclusions

This study has shown that the DH and DHx ewes are not truly aseasonal, but do exhibit a variable earlier onset of the breeding season than is normally expected in other breeds. Therefore large-scale screening of DH and DH-derived ewe populations is required to identify outliers, from which breeding programmes could be established to ultimately achieve aseasonality.

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