

Behavioural, physiological and production effects of dairy cow-calf rearing systems

Background

Naturally, following parturition the calf would remain with the cow, nursing for many months and forming strong bonds with its mother, other cows and calves within the herd (Kilgour and Dalton, 1984; Vitale et al., 1986). In contrast, the dairy-bred calf may be removed from its dam within a few hours of birth and placed in individual or group housing. Calves are fed colostrum and milk artificially until weaning whilst the cow re-enters the milking herd (von Keyserlingk and Weary, 2007). Public concern about separating the cow and calf soon after birth is increasing (Johnsen et al., 2016). Early separation is perceived to be unnatural and problematic for the welfare of the cow and calf, with emotional distress and compromised calf health the critical areas of concern (Ventura et al., 2013).

Recent studies have shown that allowing the calf to remain with the dam beyond the first 24 hours with either free cow-calf contact or restricted suckling contact has positive effects, including greater weight gains than conventionally reared calves, a reduction in abnormal behaviours such as tongue-rolling and cross-sucking during the pre-weaning period and increased opportunity for the cow and calf to express natural behaviours such as licking, rubbing and staying close to one another (Johnsen et al., 2016). However, despite a need for more natural rearing systems, on-farm it is not always practical for the farmer to allow the cow and calf to remain together for long periods following birth. Concerns include a reduction in saleable milk, increased labour and a lack of control over transmittable diseases such as Johne's, which is transferred in colostrum and milk from the dam to her calf (Stabel, 1998).

One option to reduce these concerns is to allow the cow and calf contact but prevent the calf from nursing. Krohn et al. (1999) found that calves housed with the dam but prevented from nursing had a higher weight gain than calves given the same amount of milk but isolated from the dam. A study by Johnsen et al. (2015) found that a maternal bond formed even in the absence of nursing, with no difference in the amount of time the cow and calf spent in close proximity between calves fed from a milk feeder and those that could nurse from the dam. These findings show that cow-calf housing systems could be developed to have a positive effect on weight gain and allow a maternal bond to form without allowing the calf to nurse. However, in the study by Johnsen et al. (2015) an udder net was used to prevent the calf from nursing which is not a practical solution. The removal and reattachment during milking increases labour and it could not be used in an automated milking system (AMS), which are increasingly common (Barkema et al., 2015).

Therefore, more research is required to investigate possible cow-calf rearing systems which accommodate the welfare requirements of the animals, is workable and economically viable for the farmers and acceptable to the general public. Specifically, research on the effects of rearing the cow and calf together without allowing the calf to suckle is required to establish whether such systems meet the needs of the cow and the calf and provide an opportunity for them to experience a much closer and more natural relationship. In addition, it is necessary to determine the long-term effects of cow-calf rearing systems.

Aims and Objectives

The aim of this project is to explore whether cow-calf rearing systems that keep the cow and the calf together, allowing the opportunity for the expression of natural behaviours such as licking, rubbing and close contact, but without allowing the calf to suckle can improve cow

and calf welfare and productivity on-farm. The objectives are:

1. To determine whether there are any behavioural, health or physiological differences between individually housed calves allowed contact with the dam (but not allowed to nurse) until weaning and those separated from the cow within 24 hours of birth.
2. To examine the effects of different cow-calf housing designs, such as individual vs. group housing for calves and lying vs. standing areas for cows around the contact area on the behaviour, physiology and health of cows and calves allowed contact from birth until weaning (but not allowed to nurse) compared to those separated within 24 hours of birth.
3. To explore the longer term effects of cow-calf rearing systems on calf growth, health, fertility, behaviour and milk yield into the first lactation.