A review of early weaning of calves and improved nutrition in cattle and buffalo in Cambodia

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Abstract

A desktop review of scientific literature was conducted between August and October 2011 reviewing current knowledge available on the use of early weaning (EW) practices of beef calves in both developed and developing countries. The intention of application is for smallholder farms in Cambodia to focus more efforts to wean their beef calves earlier through better nutrition from silage-based feeds and forages. This would then lead to the ability to focus more on the growth and development of these calves as the next generation of animals on farm. Due to the limited available research in Cambodia, information and results from early weaning management in other countries such as Brazil, USA and Australia were referenced to obtain some basic guidelines for this project. Comparisons in key development parameters such as body weight, feed efficiency and reproductive performance were made between early weaned and conventionally weaned calves from research conducted in developed countries. Early weaned calves (70-180 days old) showed higher weight and average weight gains and younger and heavier calves at slaughter when compared to conventionally weaned calves. However a study conducted on Shorthorn calves showed the conflicting results with conventionally weaned animals at an average of 19.4kg heavier than early weaned calves. Dams of early weaned calves were also more likely to be reproducitively capable of going back into calf the following season due to the retention of their body weights. The restricted feed and nutrition available in Cambodia for cattle and the overall poor body condition scores suggest that early weaning would be a cost effective strategy to increase productivity on smallholder farms. With higher rates of reproductive performance in breeder cows, not only will farmers be able to get more calves in an animal’s productive life, EW proposes that if these calves are properly managed and provided with better nutrition, they will be able to contribute more efficiently to the family’s total income.

Introduction

Cambodia is a nation that has faced nearly three decades of civil war, leaving it with a lack of basic infrastructure and in a state of extreme poverty (Engvall et al 2008, Ear 2005). The average farm income based upon surveys done in the Kampong Cham province by a current project (Nolan 2011) ranged from US$1900 to $3300. Cattle and buffalo play a vital role in 90% of smallholder farms, contributing 20% to their total income (Sath et al. 2008). The breakdown of the usage of cattle on these smallholder farms revealed that 50% of cattle are used for breeding purposes, 30% draught and 20% for sale, which highlights the importance of focusing on the initial stages of growth and development in the animal.

By addressing the issue of early weaning of calves in Cambodia through better nutrition, the ultimate application will be to provide better education and recommendations to smallholder farmers in order to enhance the productivity of their cattle and buffalo.


Earlier weaning of beef calves is commonly carried out in times where feed is scarce and breeding females are at risk of being reproductively compromised due to lack of adequate nutrition (Rasby 2007, Weatherly 2008, Dixon et al. 2011). It benefits the dam, as the strain of lactation to support the calf requires almost double the daily energy and protein requirement as a dry cow, causing her to lose body condition and weight rapidly.

This is important in Cambodia, as feed is already limited and of poor quality. Weaning calves early would minimize the extra feed needed for the cow to lactate for an extended period of time and hence minimize cost to the farmer. By reducing the lactational stress upon the cow postpartum, early weaning could lead to “increased body energy reserves at calving and minimize the effects of negative energy
balance on postpartum intervals and subsequent breeding performance.” (Odhiambo et al. 2009) therefore prolonging each animal’s productive life.

Objectives

The objectives of the project from which this paper arises are to develop recommendations suitable for improving production of beef cattle and buffalo in Cambodian smallholder farms through the early weaning of calves using better nutrition from improved forages and silage-based feeds.

Materials and Methods

The University of Sydney library database was accessed for peer reviewed scientific articles on early weaning of beef and dairy calves. Articles were obtained systematically via databases such as Medline and CABS abstract through a keyword search. The outline provided in the research proposal was followed with regards to the 4 different stages of researching.

1. Revision of current literature review
2. Exploration of how information impacts weaning age of calves based upon previously published data
3. Investigation of early weaning of calves and effect on key health and developmental parameters, with regards to herd restocking
4. Collation of collected information and presentation

Results

Revision of current literature review

Cassava (Manihot esculenta) leaf and root, sweet potato (Ipomoea batatas) and Trichanthera (Trichanthera gigantea) were identified as three potential forage and silage-based feeds that would provide cattle and buffalo in Cambodia with better nutrition, based upon research from adjacent countries. Success rates of the acceptance and adoption of silage-based feeds and forages by smallholders would primarily depend upon the personal advantages seen by farmers. The majority of farmers were more likely to change their feeding practices if there was less labour involved as well as more time saved (Nolan 2011).

The impact of improved forages upon weaning age of calves

The higher nutritive values of the previously proposed feeds allow the breeder cow to have higher body reserves, shown to have vital effects especially near parturition on milk output, weaning weight, conception and mortality (Dixon 2011, Lobato et al. 2010). Cows given better nutrition pre-calving showed higher body weights (442.1 kg) and Body Condition Score (BCS= 3.76) at the beginning of the breeding season, higher pregnancy rates (82.3%) and earlier conception compared to cows that were grazed on natural pasture (Lobato 2010). The productivity of the cow-calf system is improved significantly when cows have the necessary body reserves prior to calving and are able to store consumed energy, in the form of rump fat, as a result of early weaning (Odhiambo 2009).

Early weaning and impact on herd restocking, cow reproductive performance and carcass characteristics

Reproductive capacity: Pregnancy rates of early weaned cows (86.34%) were higher than in conventionally weaned cows (55.45%) (Vaz & Lobato 2010). Better nutrition through forages and silage-based feeds provided for pregnant dams and early weaned calves were shown to increase productivity through the maintenance of body condition post partum. Studies showed that some cows of early weaned calves had increased conception rates from 50-97 % in primiparous cows (Odhiambo 2009).

Carcass characteristics: Several studies showed that the early weaned calves resulted in higher weight averages and average daily weight gain. This also meant that these calves were younger animals at slaughter. (Vaz 2010, Rasby 2007, Weatherly 2008, Vaz 2011, Azim 2011).
In Figure 1, we see that for all three studies, EW>CW. The study conducted by Vaz 2010 was on heifers that had undergone EW themselves and subsequently produced calves that were EW and Azim (2011) had low comparative values as their study was comparing weaning periods in buffalo calves.

![EW and CW mean weights (kg) for three studies](image)

*Figure 1. Early weaning (EW) and Conventional weaning (CW) mean weights for three different studies.*

However, early weaned animals were also shown to be significantly lighter (P<0.001) than conventionally weaned calves with the weight difference between the two groups at approximately 19.4 kg in a study conducted with Shorthorn cattle in Australia (Wolcott 2010). They also found that early weaned animals tended to eat slightly less (difference of 0.4 kg) and weaning age did not significantly impact feed efficiency (residual feed intake, P=0.64, feed conversion ratio, P=0.27). Similar results were seen with crossbred zebu and taurine calves where conventionally weaned calves were heavier (Average Body Weight=152.0 kg) than early weaned calves (Average BW=83.2 kg). The weaning age of the animal did not have any influence upon other carcass characteristics at slaughter (Piva 2007).

**Discussion**

Early weaning is a management strategy which is becoming more and more popular in developed countries due to the favourable implications when compared to conventional weaning in the beef industry. As mentioned above, it is primarily recommended during periods of drought and expectation of low quality feed to give breeding females the best chance against reproductive failure due to high nutrient requirements and poor diet quality.

When considering EW compared to CW, the main factors that farmers would consider for their livelihoods would be the live weight of the animal produced and how much labour and time would be needed to be invested. As research has shown, EW calves tend to be slightly heavier than CW calves, a trend which is carried out through to adulthood. The practice of EW also means that less nutrition needs to be provided to the cow as her lactation period is decreased dramatically. Rasby (2007) shows that on average, cows that calve at a higher BCS have a shorter calving interval and that cows that calve in poor body conditions are more likely to have better reproductive performance when their calves are weaned earlier. Rasby also shows that EW calves are relatively efficient at feed efficiency provided that stress is minimized and EW are exposed to high starch diets such as sweet potato earlier in life.

With the introduction of improved forages to improve nutrition available for cattle and buffalo already successful in several provinces of Cambodia; Kampong, Battambond, Pursat, Kampong Speu, Takeo, Kampong Thom and Svay Rieng (Nolan 2011), the potential for farmers to alter traditional practices i.e. EW of calves, is quite conceivable for this country.

However, it would be highly desirable that further research and trials are conducted within Cambodia and with smallholders to account for cattle genetics and local environmental conditions.

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References


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