CHAPTER 1

Introduction

1.1 Overview and the importance of the research

Goats played important role to save as the bank account and they were the main economical income of livelihood in local farmer in Laos (Phengsavanh, 2003). Almost goats production, they normally allowed to graze freely in fallow crop land and forests (NAFRI, 2005) with poor management and low nutrition supply. Concentrates have not been widely used (Xaypha, 2005) and low reproduction was obtained (Phengsavanh, 2003). Feeding systems based on poor quality of tropical foliages, especially in dry season period is a big problem of goat production in Laos (Xaypha, 2005).

Many researchers have found that foliages from fruit trees and other trees, such as legumes and some crops are important protein sources, (Phengvichith and Preston, 2011; Kounnavongsa *et al.,* 2008). These protein with high intake and digestibility could be offered goats as feeds results in good growth performance (Kongmanila *et al.*, 2012). Paper mulberry leaves (*Broussonetia papyrifera*) has been considered as good protein source for goat's feed (Silivong *et al.,* 2012). It is a fodder tree that can be found everywhere in Laos and it can be available for ruminant all year round. There was well-documented that goats offered only free grazing was not sufficient for body weight increase of goats (Kochapakdee *et al.*, 1994; Mushi *et al.*, 2009). Feed that contain energy and protein played significant role on growth of goats, concentrate supplementation is well recognized on growth and productivity of goats. Dry matter (DM) intake (333.6, 374.7, 416.3 and 456.5 g/day for 150, 200, 250 and 300 g concentrate supplementation, respectively) was influenced by the level of concentrate in the diet. Milk yield was increased (206.8, 233.4, 359.3 and 374.7 ml/day for 150, 200, 250 and 300 g concentrate supplementation, respectively) with the supplementation of concentrate. It is suggested to supplement 250 g of concentrate daily to female goats (Sultana *et al.,* 2012). And moreover the researchers have reported that good

nutritional condition has a strong influence on the activity of the hypothalamic-pituitary-gonadal axis (HPG axis) in small ruminants (Miller *et al.,* 1998; Ohkura *et al.,* 2004; Zabuli *et al.,* 2010). Nutrition is considered to be an important factor that affects the reproductive capacity and influences the onset of ovarian activity in female goats (Walkden-Brown *et al.,* 1994; Zarazaga *et al.,* 2005). The mechanism of nutritional effects on follicular growth and development (folliculogenesis) is probably not affected by the quantity of nutrient supply; it is much more likely that there are specific nutrient signaling effects that link reproduction with favorable environmental conditions for reproduction (Scaramuzzi *et al.,* 2006). Moreover, management of feeding with concentrate supplementation during the estrous cycle has been indicated as a tool to increase the ovarian function and the reproductive capability in small ruminants (Zabuli *et al.,* 2010; Naqvi *et al.*, 2011).

The increased popularity of goat meat and, hence, goat production leads to increased interest in reliable methods to manage reproduction in goats (Whitley and Jackson, 2004). Estrous synchronization is a key element in all of the assisted reproductive technology protocols and has a major influence on enhancing the overall capabilities of reproductive function in female goats (Navanukraw *et al.,* 2014). It has been reported that estrous synchronization has been successfully used for management of reproduction in goats (Sonmeza *et al.,* 2009). Feed flushing (concentrate addition) has been already applied as a feeding strategy prior to breeding; however, concentrate supplementation of paper mulberry leaf-based diets during the estrous synchronization protocol, particularly, their effect on estrous response, ovarian follicular performance, and productivity in local female goats in Laos, has not yet been determined.

1.2 Objectives

The specific objectives were:

1 To evaluate the effect of concentrate supplementation levels with paper mulberry leaves on growth performance of goats

2 To evaluate the effect of concentrate supplementation with paper mulberry leaves on response to synchronization of estrus in local female goats in Laos

1.3 Education/application advantages

- Utilization of local resources as paper mulberry leaves for feed source on goat production will be benefit for farmers.

- Local goat production in Laos will be improved on growth and reproductive performance by using concentrate supplemented with paper mulberry leaves as a roughage feed.

- Synchronization of estrus in female goats will be disseminated, increase goats population and suitable with a commercial goat production in the future for reproductive management.