DOI: 10.17138/TGFT(7)455-458

ILC2018 Poster and Producer Paper*

Production of *Leucaena leucocephala* 'silage' for sale as animal feed: A case study from Sikiew District, Northeast Thailand

Producción de 'ensilaje' comercial de Leucaena leucocephala*: Un estudio de caso en el distrito de Sikiew, Noreste de Tailandia*

S. HARRISON[1], W. SRISOMPORN[2] AND G. NAKAMANEE[3]

[1]*Srakaew Animal Nutrition Research and Development Center, Klonghad, Srakaew, Thailand*
[2]*Roied Animal Nutrition Research and Development Center, Suwannaphumi, Roied, Thailand*
[3]*Nakhonratchasima Animal Nutrition Research and Development Center, Pakchong, Nakhonratchasima, Thailand*

Keywords: Forage conservation, forage utilization, shrub legumes.

Introduction

Worldwide, leucaena (*Leucaena leucocephala*) is used not only for fodder for livestock but also for fuelwood and human consumption. It was first introduced to Thailand a long time ago and has been used for reforestation for long periods. Leucaena has now become naturalized in many regions of Thailand. Farmers harvest this naturally occurring leucaena and use it to feed their animals in a number of ways. In Sikiew District, Nakhonratchasima Province, in Northeast Thailand, a group of farmers have adopted a novel approach and make 'partial' leucaena silage for sale.

Site characteristics

Nakhonratchasima Province, located in the lower part of Northeast Thailand (15º N, 102° E), consists of 32 districts with a total area of 20,494 km^2. For Sikiew District, annual average daily temperature is 27.4 ºC, average humidity is 71% and average annual rainfall is 970 mm, which is received in April–October (LNRHIC 2018). Sikiew District is in the upland area at 200–250 masl. Cassava, maize, sugar cane and livestock are the main agricultural products from the district (DOPA 2018).

Producing *Leucaena leucocephala* 'silage' in Sikiew District

In 2008, a group of 5 farmers was established to make 'partial' leucaena silage for sale. 'Partial silage' is the term used to describe fresh forage which is sealed in plastic bags but is often consumed before the full fermentation process associated with conventional silage making has been completed. Farmers collect wild leucaena, chop and pack it in bags and sell it in the form of fresh bagged leucaena. Currently 3 of these farmers continue to produce this feedstuff for sale. Mr Charoon is 1 of the 3 who continue to do so. Each day from 07:00 h to 11:00 h he, his wife and 2 workers collect wild leucaena in the village area (Figures 1 and 2), travelling up to 65 km in the dry season to obtain enough material. They transport the leucaena home in a utility at about 11:00 h, before chopping it with a small machine (Figures 3 and 4) and packing it into plastic bags (30 kg), which are tied tightly at the top (Figures 5–7). No special attempt is made to extract air before tying. The real cost of production is US$ 0.052/kg.

Livestock farmers buy this material once or twice a month for feeding to their stock (Figure 8) rather than having to obtain fresh forage daily. They immediately start feeding the material in a fresh state and continue to feed it out until the supply is consumed, which might take

Correspondence: W. Srisomporn, Roied Animal Nutrition Research and Development Center, Suwannaphoom, Roied 45130, Thailand. Email: watanawans@gmail.com

*Poster paper presented at the International Leucaena Conference, 1–3 November 2018, Brisbane, Queensland, Australia.

Figure 1. Harvesting wild leucaena.

Figure 2. Loading green leucaena onto truck.

Figure 3. Feeding leucaena through small chopper.

Figure 4. Chopped leucaena.

up to 30 days. No obvious spoilage occurs despite the exposure to air. The price charged is dependent on the distance between the village, where the 'silage' is made, and the livestock farm. While most customers are in the same district, some farmers are in another district, which is about 89 km away. The 'farm gate' price is US$ 0.049/kg, and the delivered price increases in proportion to the distance to the livestock farm, e.g. US$ 0.062/kg for nearby areas and US$ 0.072/kg for farms in other districts. Although cost of production is higher than the selling price, silage producers accept this arrangement because they deduct only costs of hired labor plus fuel from the amount they receive at sale to determine their net returns. Six dairy cattle farmers and 3 dairy goat farmers have contracted to purchase 3 t silage/month/farm.

A second leucaena producer conducts a similar business with only family labor. Each day he and his wife collect leucaena for 5 hours and spend 2 hours chopping it up and filling bags. He has 10 contracted farmers who purchase 3 t silage/month/farm.

Approximate chemical composition of 'silage' that they produce is as follows: CP 21.9%, crude fat 1.46%, crude fiber 16.4%, ash 7.7%, NFE 52.5%, ADF 37.8%, NDF 56.0%, ADL 9.6%, cellulose 28.2% and hemi-celluloses 18.0%.

Figure 5. Filling plastic bags with chopped leucaena.

Figure 6. Weighing filled bag.

Figure 7. Tying top of bag.

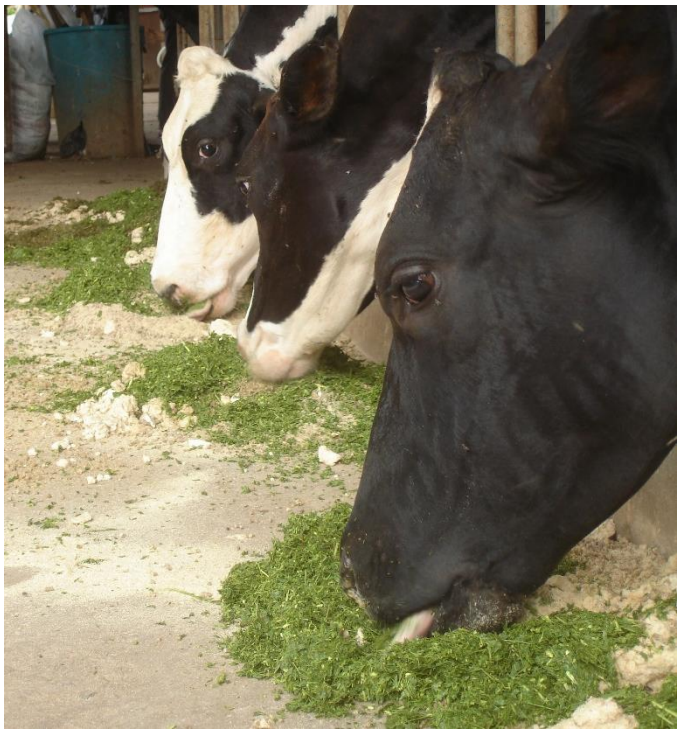

Figure 8. Dairy cows eating leucaena silage.

One of Mr Charoon's customers, Mr Wiwat established a dairy farm more than 10 years ago and feeds his cows (75% Holstein Friesian crossbreds) with Napier grass silage (4 kg/hd/d), leucaena (4 kg/hd/d), cassava peel (16 kg/hd/d) and 18% CP concentrate pellets (9–10 kg/hd/d). Average milk yield is 22–24 kg/hd/d, cost of feed for 1 kg milk is US$ 0.20 and price of milk is US$ 0.56/kg. While all cows conceive, the calving interval is 14–15 months. He has not observed symptoms of mimosine toxicity in his cows despite feeding leucaena for more than 10 years.

Another customer is a dairy goat farmer who feeds his goats with leucaena silage (2.4 kg/hd/d) plus 12% CP concentrate pellets (500 g/hd/d)**.** Average milk yield is 9 kg/hd/d. The price of goat milk is US$ 1.38/kg.

Acknowledgments

The authors thank all farmers for their time and co-operation in providing valuable information.

References

(Note of the editors: All hyperlinks were verified 21 August 2019.)

DOPA (Department of Provincial Administration). 2018. Sikiew District development plan. DOPA, Phra Nakhon, Bangkok, Thailand. goo.gl/5sQjGN

LNRHIC (Lower Northeastern Region Hydrological Irrigation Center). 2018. Hydrology irrigation for lower north-eastern region. LNRHIC, Nakhon Ratchasima, Thailand. goo.gl/s16dEp

(Accepted 25 October 2018 by the ILC2018 Editorial Panel and the Journal editors; published 3 September 2019)