Pelletized Forage-Based Rations as Alternative Feeds for Improving Goat Productivity

E. A. Orden  
*Central Luzon State University, Philippines*

E. M. Cruz  
*Central Luzon State University, Philippines*

A. N. Espino  
*Central Luzon State University, Philippines*

Z. M. Battad  
*Pampanga Agricultural College, Philippines*

R. G. Reyes  
*Central Luzon State University, Philippines*

*See next page for additional authors*

Follow this and additional works at: [https:// uknowledge.uky.edu/igc](https://uknowledge.uky.edu/igc)

Part of the Plant Sciences Commons, and the Soil Science Commons

This document is available at [https://uknowledge.uky.edu/igc/22/1-11/33](https://uknowledge.uky.edu/igc/22/1-11/33)

The 22nd International Grassland Congress (Revitalising Grasslands to Sustain Our Communities) took place in Sydney, Australia from September 15 through September 19, 2013. Proceedings Editors: David L. Michalk, Geoffrey D. Millar, Warwick B. Badgery, and Kim M. Broadfoot

Publisher: New South Wales Department of Primary Industry, Kite St., Orange New South Wales, Australia

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.
Presenter Information
E. A. Orden, E. M. Cruz, A. N. Espino, Z. M. Battad, R. G. Reyes, M. E. M. Orden, N. O. Frias, A. G. Gibe, N. A. Del Rosario, and E. C. Villar

This event is available at UKnowledge: https://uknowledge.uky.edu/igc/22/1-11/33
Pelletized forage-based rations as alternative feeds for improving goat productivity

EA Orden, EM Cruz, AN Espino, ZM Battad, RG Reyes, MEM Orden, NO Frias, AG Gibe, NA Del Rosario, and EC Villar

A Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines
B Pampanga Agricultural College, Magalang, Pampanga, Philippines, http://www.pac.edu.ph/
C PhilMECH, Science City of Muñoz, Nueva Ecija, Philippines, http://www.philmech.gov.ph/
D Philippines Council for Agriculture & Aquatic Resources Research & Development, Los Baños, Laguna, Philippines, http://www.pcaarrd.dost.gov.ph/
Contact email: eoorden@yahoo.com

Keywords: Pellets, Leucaena, forage, goats.

Introduction

Goat farming is very popular in the Philippines as it is considered by many to be a viable rural enterprise. Despite this, the goat industry is faced with many challenges, including problems relating to high pre-weaning mortality, poor nutrition and lack of strategic approaches to accelerate genetic improvement. The long term rate of increase of goat numbers is only 0.97% per annum, due to high offtake rates and low productivity. Thus, the Philippine goat population is only expected to reach 4.27 million by 2020 (compared with the target of 6.2 million), given the 3.88 million population in 2010 (Alo 2012). Interventions are needed to accelerate growth of the goat population. Goats are typically fed on locally available resources which are characterised by low quality and highly variable availability. These characteristics can be overcome through processing techniques such as sun drying and pelleting to ensure year round feed supply. Pelleting offers particular advantages. Feeding animals with pellets provides better feed efficiency, greater starch digestibility, less feed waste, non-selective feeding, better handling and storage, and increased income due to more efficient feeding and higher productivity. While pellets are available for swine, poultry and buffalo in the Philippine market, pellets for goats are not currently available. The aim of this study was to develop pelletized forage-based rations for goats and evaluate them for their technical and financial viability.

Methods

Leaves of the tree legume Leucaena leucocephala and Napier grass (Pennisetum purpureum) were harvested at about 35 days of age, shredded and sun dried for 3-4 days to attain 80-85% DM. These were ground to pass through 1 mm screen mesh using a hammer mill to produce leaf meals. The compositions of the experimental rations are shown in Table 1.

To evaluate PRG, a total of 16 Anglo-Nubian crosses with mean body weight (BW) of 12.46 kg were used in a 120 day-feeding trial. The animals were kept in individual pens and divided into two groups; 6 animals in the Control1 group (silage + 120 g concentrate) and 10 animals in the PRG. In the middle of the feeding trial, three animals were randomly selected from each group to determine digestibility of the PRG. Voluntary DM intake and fecal output for 7 days were collected.

To evaluate feeding value of PRL, a 105-day feeding trial was conducted using 12 multiparous goats (6 Anglo-Nubian crosses and 6 Boer crosses with mean body weight (BW) of 32.65 kg). For each breed type, 3 does were fed PRL + fresh Napier while 3 does were fed with Control2 diet, forage + 250 g concentrate mix.

About 10% representative samples of feed, ords, and feces were collected, pooled and subjected to DM, and crude protein (Kjeldahl method) analysis following the AOAC (1984) procedure. Neutral Detergent Fiber was analyzed following Goering and Van Soest (1970) method.

Feed intake, BW, milk yield and nutrient digestibility were subjected to ANOVA using the General Linear Model
Table 2. DM intake, final wt and ADG and feed conversion efficiency of upgraded goats fed with Control and PRG. SEM = Standard Error of Mean; ns $P > 0.05$; * $P < 0.05$; ** $P < 0.01$.

|                     | Control | PRG    | SEM  | Level of Sig. |
|---------------------|---------|--------|------|---------------|
| Daily DM intake (kg)| 0.574   | 0.688  | 0.018| *             |
| Final weight (kg)   | 19.74   | 22.07  | 0.550| *             |
| Ave. daily gain (kg)| 0.061   | 0.079  | 0.005| *             |
| Feed conversion efficiency (kg DM/kg gain) | 9.66 | 7.44 | 0.380 | * |
| DM digestibility (%)| 70.96   | 68.42  | 2.868| ns            |
| CP digestibility (%)| 65.13   | 80.04  | 4.688| **           |
| NDF digestibility (%)| 52.42   | 74.21  | 6.747| **           |

Table 3. Average daily DM intake and milk yield of Anglo Nubian and Boer crosses fed with Control and PRL. SEM = Standard Error of Mean. There were no significant differences.

|          | Control2 | PRL | SEM |
|----------|----------|-----|-----|
| Anglo- Nubian DM Intake, kg | 1.10     | 1.08 | 0.09 |
| Milk Production, ml | 527.67   | 587.27 | 2.00 |
| Boer DM Intake, kg | 1.11     | 1.05 | 0.10 |
| Milk Production, ml | 464.67   | 475.29 | 1.93 |

procedure of Statistica for Windows, Version 8. Partial budget analysis was conducted to determine the financial benefits of feeding PRG and PRL pellets versus the Control diets.

Results
Growing goats fed PRG had higher consumption and nutrient digestibility than those fed Control1. PRG produced bigger and heavier animals (Table 2). The ADG of 79 g for PRG fed goats resulted in a final weight of 22.35 kg which is higher than the 19.74 kg in the Control1. Aside from the higher BW, animals fed PRG required only 7.44 kg DM to produce a kg gain, which is 2.22 kg lower ($P<0.05$) than the 9.66 in the Control1. The incorporation of processed *Leucaena* and napier reduced particle size that increased rumen outflow rate (Orden, et al. 2000) of the forage components of the PRG. The breakdown of PRG’s fiber components and the presence of more degradable CP resulted in higher DM intake of goats fed with PRG.

Lactating goats fed PRL had DM intake and milk yield comparable with those fed with Control2 diet (Table 3). DM intake was > 3% of BW, indicating that normal consumption was achieved. This result suggests that PRL could be a viable feeding option for lactating does whether of Boer or Anglo-Nubian bloodline. Feeding pellets is a labor-reducing and productivity increasing technology.

Partial budget analysis showed a net gain of P242.93/growing goat and P825.93/doe. These pelletized rations are an acceptable feeding option as goat raisers are willing to buy pellets and pay a small premium for quality.

Conclusion
The results of the feeding trials and financial analysis indicated the high potential of forage-based pelletized rations as alternative feeds productive and sustainable goat farming enterprises.

References
Alo AMP (2012) Goat Industry Science and Technology Plans and Potential Outcomes. PCARRD, Los Baños, Laguna.
OAC. (1984) Official Methods of Analysis, 13'h Ed. Association of Official Analytical Chemists. Washington D.C.
Goering HK, Van Soest PJ (1970) Forage Fiber Analysis. United States Dept. of Agric. Hand Book No. 379.
Kearl AJ (1982) Nutrient Requirement of Farm Animals. Reston, Virginia, Reston Publishing Company, Inc.
Orden EA, Yamaki K, Cruz EM, Orden MEM, Abdurazak SA, Ichinohe T, Fujihara T (2000) *L. leucocephala* and *G. sepium* supplementation in sheep fed with ammonia treated rice straw: Effects on intake, digestibility, microbial protein yield and live-weight changes. *Asian-Australasian Journal of Animal Science* 13(12), 1659-1666.