GROWTH PERFORMANCE AND ECONOMIC ANALYSIS OF NATIVE PIGS FED DIET WITH OR WITHOUT TRICHANTERA LEAF MEAL (*Trichantera gigantea)*

VIANCA VANESSA S. CASIMIRO

An Undergraduate Thesis Submitted to the Faculty of the Department of Animal Science, College of Agriculture, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines
in Partial Fulfillment of the Requirements
for the degree of

BACHELOR OF SCIENCE IN AGRICULTURE
(Animal Science)

JUNE 2019

ACCEPTANCE SHEET

This undergraduate thesis entitled **"GROWTH PERFORMANCE AND ECONOMIC ANALYSIS OF NATIVE PIGS FED DIET WITH OR WITHOUT TRICHANTERA LEAF MEAL (*Trichantera gigantea*),"** prepared and submitted by **VIANCA VANESSA S. CASIMIRO**, in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL SCIENCE (ANIMAL SCIENCE)**, is hereby accepted:

ANTONIO J. BARROGA, Ph.D.
Adviser

5-7-19
Date Signed

JOSEPH R. MENDOZA, M.Sc.
Critic

5-14-19
Date Signed

ANTONIO J. BARROGA, Ph.D.
Department Research Coordinator

5-15-19
Date Signed

Accepted as partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL SCIENCE (ANIMAL SCIENCE):**

ERNESTO P. GARILLO, Ph.D.
Chair, Department of Animal Sciences

5-17-19
Date Signed

Lansangan
EDILYN V. LANSANGAN, Ph.D.
College Research Coordinator

22 May 2019
Date Signed

ERNESTO A. MARTIN, Ph.D.
Dean, College of Agriculture

5-22-19
Date Signed

BIOGRAPHICAL SKETCH

The author was born on August 26, 1999 at Science City of Munoz, Nueva Ecija. She is the second daughter of Mr. Luis Casimiro and Hazel Casimiro.

She finished her primary education at San Sebastian School in April 2011 and completed her secondary education in Munoz National High School in March 2015. At the same year, she enrolled at Central Luzon State University wherein she took up a degree of Bachelor of Science in Agriculture, major in Animal Science specialized in Swine Production under the supervision of Dr. Antonio J. Barroga.

Among the struggles she experienced, she learned to handle hardships and challenges of a college student but was able to overcome them through perseverance, hardwork and faith in a long way.

ACKNOWLEDGEMENT

The author owes sincere thankfulness to Almighty God for all the knowledge, strengths and blessings. All praise is for Lord God.

To her present adviser and former critic, Dr. Antonio J. Barroga, for all advices, guidance, endless concern and amazing lessons he taught that inspired and motivated her.

To her former adviser, Prof. Jayson J. Juan, for the support, encouragement, thoughtfulness throughout the thesis.

To her critic, Mr. Joseph R. Mendoza who provided guidance, opinions and valuable recommendations towards the improvement of the manuscript

Grateful acknowledgement is due to Dr. Ernesto A. Martin, Dean of College of Agriculture; Dr. Ernesto P. Garillo, Department Chairperson; Assoc. Prof. Edilyn V. Lansangan, College Research Coordinator and to all faculty of the Department of Animal Science.

To the Native Pig Project caretaker, Kuya Janjan for assistance. Also, to caretaker of the Poultry Module I, Kuya Rolly for the allowing her to use the machine in mixing the feeds for dietary treatments.

To her family, especially to her parents, Mr. Luis and Mrs. Haze Casimiro, who inspired her to appreciate everything, taught values and faith.To her mother who sacrificed time from the beginning up to her college studies. To her brother, Perth Luis and sister Zhaira Mae, who always provide attention and loving consideration.

To her classmates, Jerome Labasan, Bernard John Abalos, Mark Carlos Geronimo, Dexter Apil, for the support and help they provided throughout the feeding trial. Also, to Jessa Esteban, Rosa Mia Plucena, Angela Genove, Christine Claro, Marvin Martinez, Jan

Michael Gumangan, Razle Martin and Raymart John Queliza for support. To Sir Aldrin Geronimo and Ma'am Leira Suarez for guidance and support. These people are incredible and beautiful inside and out.

The author wants to acknowledge everyone for so many things, and doesn't think she expressed it enough, but she appreciates it a lot. The people who played a huge part in making this possible for her, and for that, she is overwhelmed with gratefulness. This message is a little symbol of her gratitude for being with her in this life and creating everything worthwhile.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX FIGURES

ABSTRACT

CASIMIRO, VIANCA VANESSA S., Department of Animal Sciences, College of Agriculture, Central Luzon State University, Science City of Munoz, Nueva Ecija, Philippines, **June 2019, GROWTH PERFORMANCE AND ECONOMIC ANALYSIS OF NATIVE PIGS FED DIET WITH OR WITHOUT TRICHANTERA LEAF MEAL (*Trichantera gigantea*)**

Adviser: ANTONIO J. BARROGA, Ph.D.

The study was conducted to assess growth performance and economic benefits of native pigs fed diet with or without *Trichantera (Trichantera gigantea)* leaf meal (TLM) in growing native pigs. A total of ten (10) 88 days old growing native pigs with a mean body weight of 5.54 ± 0.30 kg were used in the experiment and were allocated into two dietary treatments with 5 replicates at one pig per replicate. The two dietary treatment were namely. Treatment 1 which was a basal diet (100% BD) composed of rice bran, limestone, salt, molasses, poultry by product, antioxidant, vitamin -mineral premixes while treatment 2 was 85% BD + 15% TLM.

Result showed significant differences ($P<0.05$) on average daily feed intake. Body weight gain, average daily gain and feed conversion ratio of growing native pigs at all feeding period were comparable. There was also no economic benefit for growing native pigs fed diet with *Trichantera*. Considering that there was a significant difference in feed intake by growing native pigs fed diet with 15% *Trichantera*, higher inclusion for *Trichantera* may elicit significant response in future investigation.

Keywords: *Trichantera gigantea*; Native pigs, Growth performance; Economic analysis.

LITERATURE CITED

Arango, J. F. (1990). Evaluacion de tres niveles de nacedero *Trichantera gigantea* en ceba de conejos nueva zelanda. Tesis de grado, Zootecnia. Universidad Nacional De Colombia, Palmira.

Araque, H., González, C., Pok S. & Ly, J. (2005). Comportamiento productivo de cerdos en etapa de finalización alimentados con harinas de hojas de morera y *Trichantera*. Revista Científica, 15:517-522.

Baguio, S. S. (2017). R&D activities to improve native pig production. DOST-PCAARRD S&T Media Service. Retrieved from http://www.pcaarrd.dost.gov.ph/home/portal/index.php/quick-information-dispatch/2971-r-d-activities-toimprove-native-pig-production

Berdos, J. I. (2018). Nutritional and feeding value of *Trichantera* (*Trichantera gigantea*) as a dietary supplement for Itik (*Anas platyrhynchos*) Pinas layers under litter-floor management system. Master's Thesis. Department of Animal Science, College of Agriculture, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines.

Bondoc, O. L., Dominguez, J. M. D., & Peñalba, F. F. (2013). DNA barcoding of domestic swine breeds and crossbreeds (*Sus scrofa*) in the Philippines. *Philippine Journal of Veterinary and Animal Sciences*, 39(1), 31-42.

Bondoc, O. L. & Ramos, S. M. (1998). Findings of a survey of native pigs in some provinces of the Philippines. Retrieved from http://agris.fao.org/agrissearch/search.do?recordid=ph1998100836 Business Diary Philippines. (2018). Raising native animals. Retrieved from http://businessdiary.com.ph/6301/raising-native-animals

Cabarles, J. Jr. (2007). Effect of industrialized animal production in the livestock industry of the Philippines and to the livelihood of marginal farmers. Retrieved from http://www.fao.org/ag/againfo/programmes/en/genetics/document/Interlaken/sidvent/3_3/cabarles.pdf

Caldecott, J. O., Blouch, R. A., & Macdonald, A. A. (1994). The bearded pig, *Sus barbatus*. In pigs, peccaries, and hippos. IUCN/SSC action plan for the suiformes. Oliver, W. (Ed.) Cambridge and Gland.

Callo-Etis, V. N. (2015). Economic potential of raising Philippine native pigs on *Trichantera* (*Trichantera gigantea*) diets. *IAMURE International Journal of Business and Management*, 10(1). Retrieved from http://ejournals.ph/form/cite.php?id=3744

Centro Para La Investigacion En Sistemas Sostenibles De Produccion Agropecuaria (CIPAV). (1996). Arboles utilizados en la alimentacion animal como fuente proteica. Cali, Colombia, 123.

Cook, B. G., Pengelly, B. C., Brown, S. D., Donnelly, J. L., Eagles D. A., Franco M. A., Hanson J., Mullen B. F., Partridge, I. J., Peters, M., ... Schultze-Kraft R. (2005). Tropical forages. Csiro, DPI&F(Qld), Ciat and Ilri, Brisbane, Australia.

De Haan, N. A., Bosma, A. A., Macdonald A. A., & Oliver. W. L. R. (1994). Report a species of wild pig in the Philippines with a type of centric fusion new to *Sus*: 13/16. In proceedings 10th European Colloquium on Cytogenetics of Domestic Animals Utrecht. Utrecht University, 75–77.

Department of Science and Technology & Philippine Council for Agriculture, Aquatic and Natural Resources Research (DOST-PCAARRD). (2016). Philippine pork to the world. Livestock research division, development of the Department of Science and Technology and Philippine Council for Agriculture, Aquatic and Natural Resources Research S&T Media Service. Retrieved from http://www.pcaarrd.dost.gov.ph/home/portal/index.php/quick-information-dispatch/2681-philippine-pork-to-the-world

Feedipedia. (2017). Nacedero (*Trichantera gigantea*). Feedipedia, a programme by INRA, CIRAD, AFZ and FAO. Http://www.feedipedia.org/node/7270

FFTC. 2014. Proceedings of the Conference on Recent Progress in Swine Breeding and Raising technologies and Cutting-Edge Reproductive Technologies and Perspective for their usage in Swine. Tainan, Taiwan, June 2-6 2014. In Pig Production in Indonesia by Ir. Pollung H. Siagian, MS.

Geromo, F. B. (1993). Survey and evaluation of indigenous pig production and management practices in the Zamboanga Peninsula, Philippines. Retrieved from http://agris.fao.org/agris-search/search.do?recordid=ph9410631

Gomez, M. E., & Murgueitio, E. (1991). Efecto de la altura de corte sobre la produccion de biomasa de nacedero (*Trichantera gigantea*). *Livestock Research for Rural Development* 3(3), 14-23. Retrieved fromwww.fao.org/livestock/agap/frg/conf96.htm/rosales2.htm

Gonzalvo, S., Nieves, D., Ly, J., Macias, M., Caron, M., & V. Martinez, V. (2001). Algunos aspectos del valor nutritivo de alimentos venezolanos destinados a animales monogástricos. *Livestock Research for Rural Development*. 13(20). Retrieved from http://www.lrrd.org/lrrd13/2/gonz132.htm

Groves, C. P. (1997). Taxonomy of wild pigs (*Sus*) of the Philippines. *Zoological Journal of the Linnean Society*, 120(2), 163–191. Retrieved from https://doi.org/10.1111/j.1096-3642.1997.tb01277.x

Heaney, L. R., Gonzalez, P. C., & Alcala, A. C. (1987). An annotated checklist of the taxonomic and conservation status of land mammals in the *Philippines. Silliman Journal.* 34(1,4), 32-66. Retrieved from http://www.lrrd.org/lrrd9/4/mauro942.htm

Jaya, A. F., Soriano, M. L. L., Vallador, D. M., Intong, R. L., & Carpentero, B. B. (2008). Utilization of Madre de Agua (*Trichanthera giganteavar Guianensis*) leaf meal as feed for growing-finishing pigs. *Philippine Journal of Veterinary and Animal Sciences*, 34(2),117-126.

Kambashi, B., Boudry, C., Picron, P., & Bindelle, J. (2014). Forage plants as an alternative feed resource for sustainable pig production in the tropics: A review. Animal, 8(8), 1298-1311. Doi:10.1017/s1751731114000561

Kephart, K.B., G.B. Hollis & D.M. Danielson. (2010). Forages for Swine. Retrieved from https://articles.extension.org/pages/27447/forages-for-swine

Lawton, M. & Pok S. (2011). A note on acceptability studies of mulberry leaf meal in young Mong Cai pigs. *Revista Computadorizada de Producción Porcina*, 18:113-116

Leterme, P., Londono, A.M., Estrada, F., Souffrant, W.B., & Buldgen, A. (2005). Chemical composition, nutritive value and voluntary intake of tropical tree foliage and cocoyam in pigs. *Journal of the Science of Food and Agriculture*, 85(10),1725-1732.

Ly, J., Ty, C., & Phiny, C. (2001). Evaluation of nutrients of rubber seed meal in Mong Cai pigs. *Livestock Research for Rural Development* 13(2). Retrieved from www.cipav.org.co/lrrd/lrrd13/2/ly132.htm

Ly, J. & Pok S. 2014. Use of Mulberry foliage for pigs in the integrated tropical systems. *Cuban Journal of Agricultural Science*, 48:63-66.

Maddul, S. B. (1991). Production management and characteristics of native pigs in the Cordillera. Philippines University, Los Banos, College, Laguna. Retrieved from http://agris.fao.org/agris-search/search.do?recordid=ph9111197

Manaig, E. M. (2017). Effects of *Trichantera* leaf meal and fermented leaves on the growth performance and carcass characteristics of grower-finisher pigs. Issn: 2320-5407 Int. J. Adv. Res. 5(4), 1147-1153.

Mejia, C. E. & Vargas, J. E. (1993). Analisis de selectividad de ovejas africanas con cuatro tipos de forrajes. *Livestock Research for Rural Development*, 5(3):37-41.

Molina, J. Q. (2004). BAI grows, sell fodder tree as feed for animals. Retrieved from www.philstar.com/business/agriculture Monleon, A. F. (2014). Marinduke pig. Leaflet. STAARRDEC, Marinduke State College (MRC).

Monleon, A. M. (2015). Sources of variance in pre-wean growth traits of Marinduque pig (*Sus domesticus*) *International Journal of Scientific and Research Publications*, 5(10), ISSN 2250-3153 www.ijsrp.org

Muñoz, C. H. (2003). Sustitución parcial de alimento commercial por Morera (*Morus alba*) en la alimentación de cerdas gestantes. Aspect s técnicos y económicos. Thesis of Magister Scientiarum. Instituto Tecnológico Agropecuario Número 2 de Conkal. Yucatán (México), pp 85.

Nguyen, T. H. N., Preston, T. R., & Dolberg, F. (1996). Effect of shade on biomass production and composition of the forage tree *Trichantera gigantea*. Livestock Research for Rural Development. Vol. 8(2): 93-98.

Oh, J.-D., Cacho, R. G. C., Choi, J.-Y., Seo, J.-H., Song, K.-D., Vega, R. S. A., Santiago, R. C., Octura, J. E. R., Kim, S.-W., Kim, C.-W., Kim, S.-H., Kong, H.-S., Lee, H.-K., … Cho, B.-W. (2013). Genetic analysis of Philippine native pigs (*Sus scrofa L.*) Using microsatellite loci. *Philippine Journal of Science* 143 (1): 87-94.

Oliver, W. L. R., Cox, C. R., & Groves, C. P. (1993). The Philippine warty pigs (*Sus philippinensis and Sus cebifrons*). In pigs peccaries and hippos: status survey and action plan. Edited by W.L.R. Oliver. Gland Switzerland, IUCN. 145-155

Oliver, W. L. R., Cox, C. R., & Groves, C. P. (1994). The Philippine warty pigs, *Sus philippinensis*, and *Sus cebifrons*. In pigs peccaries and hippos IUCN/SSC action plan for the suiformes.

Osorto, W.A. (2003). Harina de morera como ingrediente de la ración alimenticia de cerdos en crecimiento y engorda. Thesis of Magister Scientiarum. Instituto Tecnológico Agropecuario Número 2 de Conkal. Conkal (México), pp 86

Phuc, B. H. N, Ogle, B., & Lindberg, J. E. (2001). Nutritive value of Cassava leaves for mono-gastric animals. In: proceedings of International workshop on current Research and Development on use of cassava as animal feed. Khon Kaen University, Thailand.

Piper, P., Hung, H., Campos, F., Bellwood, P., & Santiago, R. (2009). A 4000-year-old introduction of domestic pigs into the Philippine Archipelago: implications for understanding routes of human migration through island Southeast Asia and Wallacea. Antiquity, 83(321), 687-695. Doi:10.1017/s0003598x00098914

Preston T. R. (1992.) The role of multipurpose trees in integrated farming systems for the wet tropics. In: legume trees and other fodder trees as protein source for livestock. FAO animal production and health paper no. 102. Edited by a. Speedy and p. Pugliese. 193-209.

Preston, T. R. (1995). Tropical animal feeding. A manual for research workers. FAO Animal Production and Health Paper 126. ISBN 92-5-103758-2 Http://www.fao.org/docrep/003/v9327e/v9327e00.htm Queensland Government. (2019). Nutrition basics Retrieved from https://www.daf.qld.gov.au/business-priorities/agriculture/animals/pigs/feed-nutrition/nutrients-diets/basics

Rosales, M. (1997). *Trichantera gigantea* (Humboldt and Bonpland) Nees: a review. *Livestock Research for Rural Development,* 9(37). Retrieved from http://www.lrrd.org/lrrd9/4/mauro942.htm

Rosales, M., Galindo, W. F., Murgueitio, E., & Larrahondo, J. (1989). Anti-nutritional substances in the leaves of Guamo, Nacedero, and matarraton. *Livestock Research for Rural Development,* 1(1).

Sarria, P. Villavicencio, E., Orejuela, L. E. (1991). Utilisation of Nacedero foliage *(Trichantera gigantea)* in fattening pig diets. *Livestock Research for Rural Development,* 3(2),51-58.

Sarria, P. (1994). Efecto del Nacedero (*Trichantera gigantea*) como reemplazo parcial de la soya en cerdas en gestacion y lactancia recibiendo una dieta basica de jugo de cana. *Livestock Research for Rural Development* 6(1):62-73.

Sarria, P. (2007). Description of three tropical forage resources: *Xanthosoma sagittifolium*, *Trichantera gigantea* and *Morus alba*, In: Fodder Banks for Sustainable Pig Production Systems (P. Leterme, A. Buldgen, E. Murgueitio, E. & C. Cuartas, editors). Centre for Research on Sustainable Agricultural Production Systems (CIPAV). Cali, p 87-101.

Sarwatt, S. V., Laswai, G. H., & Ubwe, R. (2003). Evaluation of the potential of *Trichantera gigantea* as a source of nutrients for Rabbit diets under small-holder production system in Tanzania. *Livestock Research for Rural Development*, 15(82). Retrieved from http://www.lrrd.org/lrrd15/11/sarw1511.htm

Tepper, S.J. (2006). Comportamiento productivo de de cerdos estabulados y a campo alimentados con recursos alternativos. Thesis of Magister Scientiarum. Universidad Central de Venezuela. Maracay, pp. 5.

Vicencio, N. G., Viernes V. D. Jr., Ocampo, L. C., & Ocampo, M. B. (2017). Gross anatomy of the female reproductive organs of Philippine native pig (sus scrofa l.). *International Journal of Agricultural Technology*. 13(7.2):1627-1638.

Villar, E. C., Maleon, N. O., & Facundo, D. T. (2002). The swine industry in the Philippines: a focus on smallholders. In priorities for pig research in Southeast Asia and the Pacific to 2010. Canberra: *Australian Centre for International Agricultural Research*. 46–57. Retrieved from http://www.aciar.gov.au/web. Nsf/doc/acia-5nd732