



**UNIVERSITI PUTRA MALAYSIA**

***ON-FARM EVALUATION OF GROWTH AND REPRODUCTIVE  
PERFORMANCE OF TIMORENSIS DEER KEPT IN TAMAN  
PERTANIAN UNIVERSITI, UNIVERSITI PUTRA MALAYSIA,  
SELANGOR***

**MUHAMAD ALIF BIN ZAKARIA**

**FPV 2015 31**

**ON-FARM EVALUATION OF GROWTH AND REPRODUCTIVE  
PERFORMANCE OF TIMORENSIS DEER KEPT IN TAMAN  
PERTANIAN UNIVERSITI, UNIVERSITI PUTRA MALAYSIA,  
SELANGOR**

The logo of Universiti Putra Malaysia (UPM) is a shield-shaped emblem. It features a red and white color scheme. At the top left, the letters 'UPM' are displayed in white on a red background. In the center, there is a stylized white book with red pages. The shield is divided into several sections by white lines, creating a geometric pattern. The text 'MUHAMAD ALIF BIN ZAKARIA' is centered over the lower part of the shield.

**MUHAMAD ALIF BIN ZAKARIA**

**FACULTY OF VETERINARY MEDICINE,  
UNIVERSITI PUTRA MALAYSIA**

**SERDANG**

**2015**

**ON-FARM EVALUATION OF GROWTH AND REPRODUCTIVE  
PERFORMANCE OF TIMORENSIS DEER KEPT IN TAMAN PERTANIAN  
UNIVERSITI, UNIVERSITI PUTRA MALAYSIA, SELANGOR**

**BY**

**MUHAMAD ALIF BIN ZAKARIA**

**A project paper submitted to the**

**Faculty of Veterinary Medicine, University Putra Malaysia**

**In partial fulfilment of requirement for the**

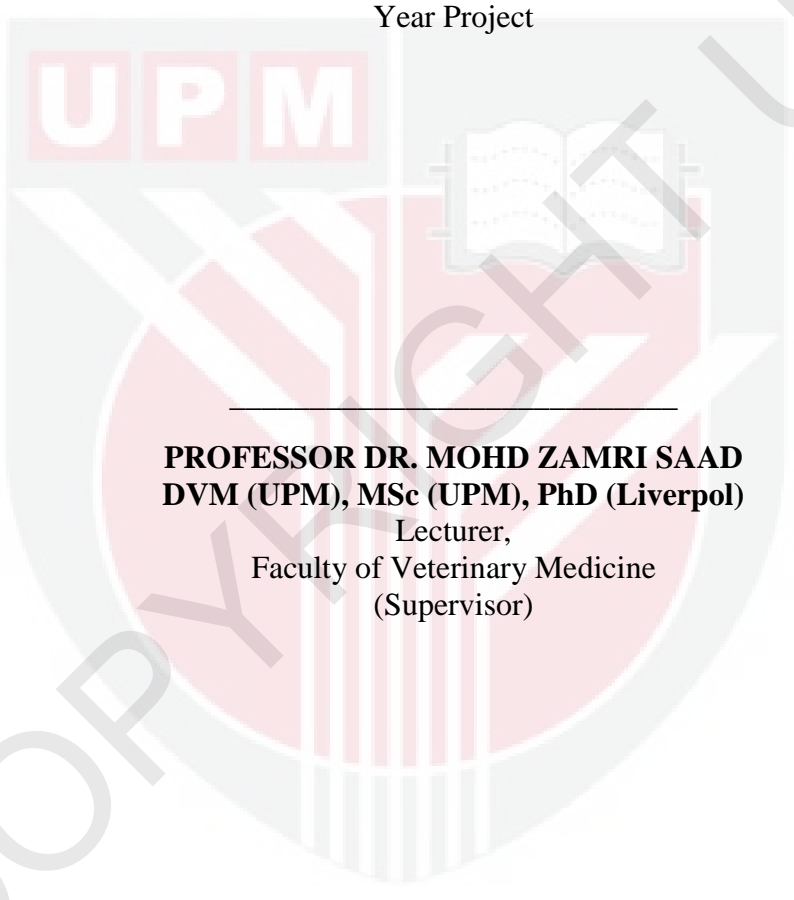
**DEGREE OF DOCTOR OF VETERINARY MEDICINE**

**University Putra Malaysia**

**Serdang, Delangor Darul Ehsan**

**March 2015**

It is hereby certified that we have read this project paper entitled “On-Farm Evaluation Of Growth and Reproductive Performance of Timorensis Deer Kept In Taman Pertanian Universiti, Universiti Putra Malaysia, Selangor” by Muhamad Alif Bin Zakaria and in our opinion it is satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the course VPD 4999 – Final Year Project

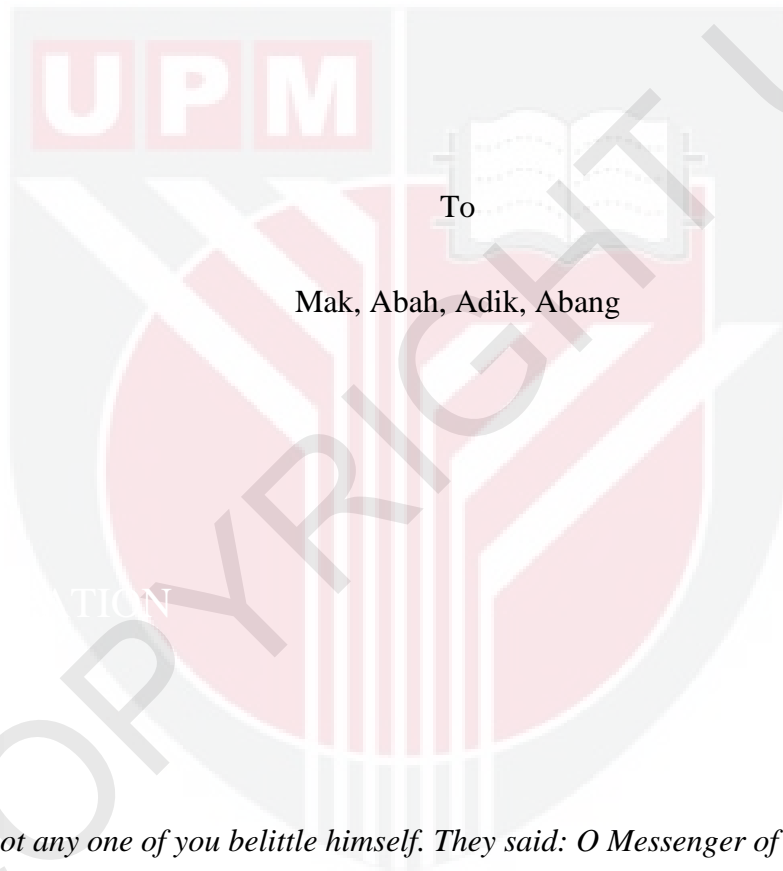
The logo of Universiti Putra Malaysia (UPM) is a shield-shaped emblem. It features a red and white color scheme. At the top, the letters 'UPM' are displayed in white on a red background. Below this, there is a stylized white and red design that incorporates a book and a torch. The shield is set against a light grey background.

---

**PROFESSOR DR. MOHD ZAMRI SAAD**  
**DVM (UPM), MSc (UPM), PhD (Liverpool)**  
Lecturer,  
Faculty of Veterinary Medicine  
(Supervisor)

**DEDICATION**

*In the name of Allah, The Most Benevolent, The Most Merciful*



To

Mak, Abah, Adik, Abang

*Let not any one of you belittle himself. They said: O Messenger of Allah, how can any one of us belittle himself? He said: He finds a matter concerning Allah about which he should say something, and he does not say [it], so Allah (mighty and sublime be He) says to him on the Day of Resurrection; what prevented you from saying something about such-and-such and such-and-such? He say: [It was] out of fear of people. Then He says: Rather it is I whom you should more properly fear.*

(Ibn Majah)

## ACKNOWLEDGEMENT

*In the name of Allah: The Most Merciful and The Most Compassionate*

I would like to express my sincere appreciation and deepest gratitude to my supervisor, Prof. Dr. Zamri Saad for his encouragement, guidance, supervision, patience and dedication, comments and suggestion throughout the completion of this project paper. His guidance and friendship has made this project a meaningful education.

My special thanks to Dr. Baljit Singh, Pn Shafinash, Pn Aznida, En Wan, En Mat, and all staff of Small Ruminant Unit, Field 16, Taman Pertanian Universiti for granting me access to the records. The cooperation, assistance, friendliness and hospitality, especially Mr Rejalana have not only made this study possible but also a thoroughly enjoyable stay.

To Prof. Arif and Dr. Annas gain my heartfelt thanks for their assistance in the statistical analysis. And also Mrs Zura for her willingness to help.

I would like to thank my parents and my family for their support and blessing, all my coursemates and who involved in my project preparation either directly or indirectly.

Thank you very much.

MUHAMAD ALIF BIN ZAKARIA

MARCH 2015

## CONTENTS

<b>TITLE .....</b>	<b>i</b>
<b>CERTIFICATION .....</b>	<b>ii</b>
<b>DEDICATION.....</b>	<b>iii</b>
<b>ACKNOWLEDGEMENT .....</b>	<b>iv</b>
<b>LIST OF TABLES .....</b>	<b>vii</b>
<b>LIST OF FIGURES .....</b>	<b>viii</b>
<b>ABSTRACT.....</b>	<b>xi</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 LITERATURE REVIEW.....</b>	<b>3</b>
2.1 Deer farm.....	3
2.2 Timorensis deer ( <i>Cervus timorensis</i> ) .....	4
2.2.1 Growth performances.....	5
2.2.2 Birth weight and pre-weaning growth performances.....	6
2.2.3 Weaning weight and pre-weaning average daily gain (ADG).....	6
2.2.4 Reproductive performances .....	7
<b>3.0 MATERIALS AND METHODS .....</b>	<b>8</b>
3.1 Farm.....	8
3.2 Study parameters .....	8
3.2.1 Reproductive parameters.....	8

3.2.2	Fawn growth performance parameters.....	9
3.3	The evaluation .....	9
3.3.1	Data collection .....	9
3.3.2	Data processing .....	9
3.3.3	Evaluation .....	10
3.4	Assumptions .....	10
3.5	Hypotheses .....	10
<b>4.0</b>	<b>RESULTS</b> .....	<b>11</b>
4.1	Management system .....	11
4.2	Record and data management system .....	13
4.3	Breeding protocol .....	13
4.4	Farm performance .....	14
4.5	Influence of monthly rainfall on farm performance .....	17
4.6	Constraints.....	18
<b>5.0</b>	<b>DISCUSSION</b> .....	<b>20</b>
<b>6.0</b>	<b>CONCLUSION</b> .....	<b>28</b>
	<b>REFERENCES</b> .....	<b>29</b>



**LIST OF TABLES**

**Page**

**Table 1** : Nutritional content of deer meat in comparison with other livestock ..... 4

**Table 2** : Rate of mortality of timorensis fawn between 2011 and 2014 ..... 14

**Table 3** : Cause of death for timorensis deer ..... 15



© COPYRIGHT

**LIST OF FIGURES**

**Page**

**Figure 1** : Correlation between monthly rainfall and average daily gain..... 17

**Figure 2** : Effect of monthly rainfall on average fawning percentage ..... 18



**ABSTRAK**

Abstrak daripada kertas yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada kursus VPD 401 – Projek Ilmiah Akhir Tahun

**PRESTASI KESIHATAN DAN PEMBIAKAN RUSA TIMORENSIS DI  
TAMAN PERTANIAN UNIVERSITI, UNIVERSITI PUTRA MALAYSIA****Oleh****Muhamad Alif Bin Zakaria****2015****Penyelia : Prof. Dr. Mohd Zamri bin Saad**

Satu kajian ke atas prestasi kesihatan dan reproduksi rusa Timorensis telah dijalankan di Ladang 16, Taman Pertanian Universiti. Ladang ini telah ditubuhkan bagi memberi kemudahan pembelajaran, pameran kepada orang ramai dan sebagai ladang contoh untuk penternak rusa. Kajian ini dijalankan terhadap rusa baka Timorensis, merangkumi aspek kesihatan dan pembiakan. Namun, umur pada kebuntingan pertama, berat lahir, purata pertambahan berat harian dan umur mula beranak tidak dapat dianalisa kerana ketiadaan rekod. Kadar kelahiran yang tinggi dicatatkan antara bulan Oktober dan Disember dan kadar tertinggi pada bulan Disember. Peratus kelahiran untuk tempoh 4 tahun bagi rusa Timorensis adalah 60% sementara peratus kematian pula adalah rendah (<10%). Kadar tumbesaran harian

ialah  $0.02 \pm 0.02$  kg ( $n=140$ ) dan tidak terdapat perbezaan signifikan antara kadar pertumbuhan bagi setiap tahun ( $p > 0.05$ ). Namun, taburan hujan menunjukkan perkaitan positif dengan kadar kelahiran ( $p < 0.05$ ). Oleh itu, kemungkinan terdapat musim membiak bagi rusa timorensis di ladang ini iaitu di musim kemarau bulan Februari hingga April yang menghasilkan musim beranak pada musim tengkujuh bulan Oktober hingga Disember. Oleh itu, pihak ladang sepatutnya mengenal-pasti musim pembiakan ini dengan mengambil langkah sewajarnya untuk menyiapkan pembiak betina untuk pembiakan dan tenaga pekerja untuk menyambut kelahiran.

***Kata kunci:*** rusa, aspek kesihatan, aspek reproduksi, Ladang 16, UPM

**ABSTRACT**

Abstract from a project paper submitted to the Faculty of Veterinary Medicine as partial fulfilment of the requirement of the course VPD 4999 – Final Year Project

**ON-FARM EVALUATION OF GROWTH AND REPRODUCTIVE  
PERFORMANCE OF TIMORENSIS DEER KEPT IN TAMAN PERTANIAN  
UNIVERSITI, UNIVERSITI PUTRA MALAYSIA**

**By**

**Muhamad Alif Bin Zakaria**

**2015**

**Supervisor : Prof. Dr. Mohd Zamri bin Saad**

A retrospective study was conducted to evaluate the health and reproductive performances of timorensis deer kept in Field 16, Taman Pertanian Universiti. The farm was built with the aim of being a model farm for teaching, public exhibition, and a model for farmers. This study involved all timorensis deer kept at the farm. Available farm records between 2011 and 2014 were collected and analysed. However, the age at first fawning, mean birth weight (kg), fawning intervals, litter size, age at first parturition and parturition interval (months) could not be analysed since the records were not kept. Most fawning occurred between October and December each year with apparent peak in December. The mean fawning percentage for the past 4 years was 60% while the average rate of mortality was low (<10%).

The average daily gain was  $0.02 \pm 0.02$  kg ( $n=140$ ) and there was no significant ( $P>0.05$ ) difference between the average monthly ADG every year. The risk factors particularly the monthly rainfall showed significant ( $p<0.05$ ) negative correlation with the monthly ADG but positive correlated with monthly rate of fawning ( $p<0.05$ ). Therefore, there might be a breeding season within the mild dry months of February to March that resulted in fawning season in the rainy months of October to December. Thus, the farm should recognize these seasons to take appropriate actions in preparing hinds for breeding and farmhands in handling fawning.

**Key words:** *on-farm, performance, Deer, health status, reproductive status*

## 1.0 INTRODUCTION

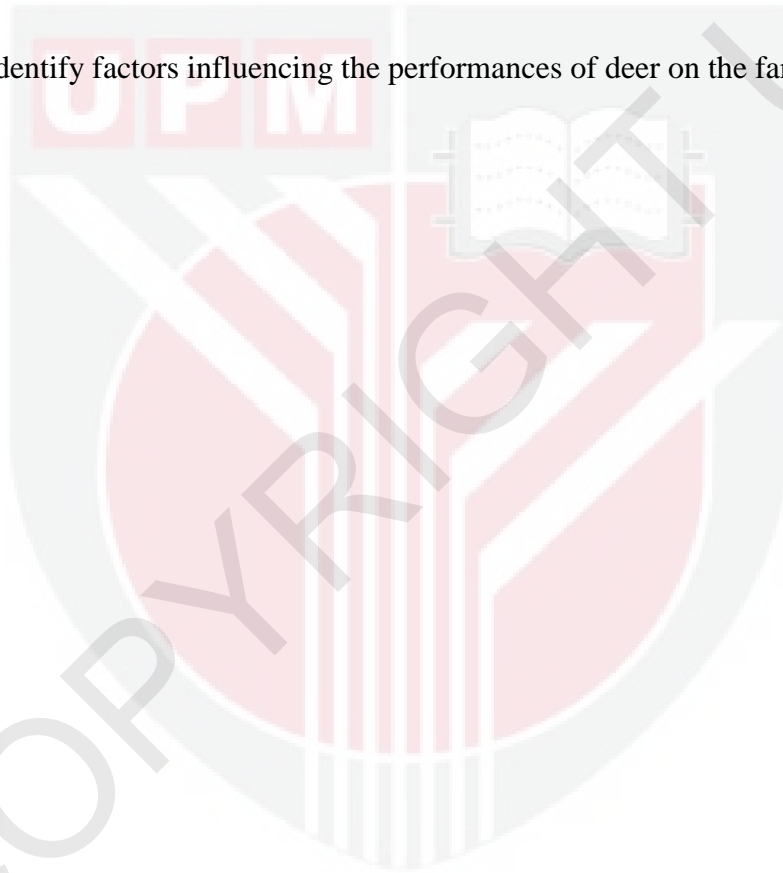
Deer industry is a relatively new growing industry in Malaysia. It is becoming important to the Malaysian economy in trying to meet the increasing demand for meat and to reduce the dependence on imports. With the increasing both consumption and population, there is a need to look for other animal as an alternative source of meat, which has the same potency as conventional animal. Deer is one of the wild animals, which are later domesticated in the 20th century and have a wide prospect to be developed. Currently, in the whole world, there are less than 20 species of wildlife that has been domesticated in order to produce meat as a source of protein.

Universiti Putra Malaysia (UPM) keeps two types of deer, the Sambar and Timorensis deer. The timorensis were brought in from Mauritius while the Sambar was local deer. The university is planning to improve the efficacy of the animal health and reproductive management, so that it can be developed into a showcase farm to the public, a model farm for farmers and a good teaching farm for students on campus. Since the university believes in the concept of halal meat production, it is determined to implement good husbandry practice so as to produce good quality wholesome products. Therefore, the deer project is aimed to be developed into an economic unit to create income for the university.

Before implementations for improvement could be carried out, it is important to understand the current situation. Thus, it is essential to collect and analyse the baseline data on current performance. The justifications of this project are mainly to know the actual risk factors that contribute to the overall performance of the farm.

The objectives of the project are:-

1. To document the husbandry practices of deer in Taman Pertanian Universiti, Universiti Putra Malaysia
2. To measure productive and reproductive performances of deer under farm management conditions.
3. To identify factors influencing the performances of deer on the farm



© COPYRIGHT



## REFERENCES

- Audige' L, W. P. (1999). Reproductive performance of farmed deer (*Cervus elaphus*) in New Zealand. I. Descriptive Data. *Animal Reprod Sci*, 55: 127-41.
- Cranbrook, E. (1991). Mammals of South-east Asia. *New York, NY: Oxford University Press*.
- Dahlan, I. (2000). Intergrated production systems for deer farming in Malaysia. *Agro-search*, 7(1): 23-28.
- Dahlan, I. (2009). Characteristics and Cutability of Farmed Rusa Deer (*Cervus Timorensis*). Carcasses for Marketing of Venison. *Asian-Aust. J. Anim. Sci*, Vol. 22, No. 5: 740-746.
- Deer farming: health and welfare. (2012). *Department for Environment, Food & Rural Affairs*.
- Drew, K. R. (1991). Venison- A marketable product. *In Proceeding Of a Deer course for Veterinarians. Deers Branch of New Zealand Veterinary Association*, (pp. 8: 31-35).
- Dryden, G. M. (2000a). An overview of sub-tropical and tropical deer productionsystems. *Asian-Aust. J. Anim. Sci*, 13(Suppl. C): 62.
- English AW, M. R. (1992). Causes of perinatal mortality in farmed fallow deer (*Dama dama*). *Aust Vet J*, 69: 191-3.
- English, A. W. (1988). *Diseases of deer. Vade Mecum series for domestic animals. No. 11. Univ. Sydney. Australia*.

- Fennessy PF, M. G. (1990). Hormonal induction of twinning in farmed red deer (*Cervus elaphus*): comparative mortality and growth of twins and singles to weaning. *Anim Prod*, 51: 623-30.
- Garcy 'a AJ, L.-C. T.-L. (2006). Compensatory extension of gestation length with avance of conception in red deer (*Cervus elaphus*). *J Exp Zool*, 305: 55-61.
- Haigh J, B. J. (2005). A cross-sectional study of reproductive indices and fawn mortality in farmed whitetailed deer. *Can Vet J*, 46: 413-6.
- Idris, I. (1996). Performance of Sambar Deer Under Different Shade Intensities. *Second National Congress on Genetics, Genetics Society of Malaysia*, (pp. 302-304).
- JC, H. (2001). The gestation length of wapiti (*Cervus elaphus*) revisited. *Anim Reprod Sci*, 65: 89-93.
- Kitchener, D. L. (1990). Wild Mammals of Lombok Island. *Records of the Western Australian Museum*, 33: 105-106.
- MJ, H. (1994). *The ecology and management of rainforest ungulates in Sabah, Malaysia: Implications of forest disturbance. Final Report*. Sabah, Malaysia.
- Perkins, J. R. (1991). Texas Parks and Wildlife Department Fisheries & Wildlife Division 1991. *Contribution of Federal Aid Project W-129-M*.
- Putman, R. (1988). *The Natural History of Deer*. Ithaca, NY: Comstock Publishing Associates.

- Richardson. (2009). Factor affecting Deer Diet and Nutrition. In *Wildlife Management Handbook* (pp. 11 B1-5).
- Roffe, T. (1993). Perinatal mortality in caribou from the Porcupine herd, Alaska. *J Wildlife* , 29: 295-303.
- Schwartz, C. R. (1993). Reproductive characteristics of Alaskan moose. *J Wildlife Manage*, 57: 454-68.
- Shin, H. T. (2000). Nutritional Requirements and management strategies for farmed deer. *Asian-Aust. J. Anim. Sci*, 13(4): 561-573.
- Suzuki M, O. N. (1993). Reproduction of female sika deer ( *Cervus Nippon yesoensis* Heude, 884) in Ashoro district, Hokkaido. *J Vet Med Sci*, 55: 833-6.
- Takatsuki, S. (1998). The twinning rate of sika deer, *Cervus Nippon*, on Mt. Goyo, northern Japan. *Mammal Study*, 23: 103-7.
- V, G. (1998). *Deer of the world: their evaluation, behaviour, and ecology*. Stackpole Books, Mechanicsburg.
- Whitehead, G. (1972). *Deer of the world*. London, U.K: The Anchor Press.
- Whitehead, K. (1993). *The Whitehead Encyclopedia of Deer*. Stillwater, MN: Voyager Press Inc.
- Wodzicki, K. (1950). *Introduced Mammals of New Zealand*. Wellington, New Zealand: Department of Scientific and Industrial Research.