LEARNING BEHAVIOUR OF HORSE [*Equus ferus caballus* Linnaeus 1758] IN NEPAL CAVALRY BARRACK, SINGHADURBAR, KATHMANDU

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DECLARATION

I hereby declare that the work presented in this thesis has been done by myself, and has not been submitted elsewhere for the award of any degree. All sources of information have been specifically acknowledged by references to the authors or institutions.

Date: 9/29/2015

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Date: 9/29/2015

RECOMMENDATIONS

This is to recommend that the thesis entitled "LEARNING BEHAVIOUR OF HORSE [*Equus ferus caballus* Linnaeus 1758] IN NEPAL CAVALRY BARRACK, SINGHADURBAR, KATHMANDU" has been carried out by Kamal K.C. for the partial fulfillment of Master's Degree of Science in Zoology with special paper [Ecology]. This is his original work and has been carried out under my supervision. To the best of my knowledge, this thesis work has not been submitted for any other degree to any institutions.

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LETTER OF APPROVAL

On the recommendation of supervisor, Professor Dr. Nanda Bahadur Singh. Central Department of Zoology, Tribhuvan University, this thesis submitted by Kamal K.C. entitled "LEARNING BEHAVIOUR OF HORSE [*Equus ferus caballus* Linnaeus 1758] IN NEPAL CAVALRY BARRACK, SINGHADURBAR, KATHMANDU" is approved for the examination and submitted to the Tribhuvan University in partial fulfilment of the requirements for Master's Degree of Science in Zoology with special paper Ecology.

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CERTIFICATE OF ACCEPTANCE

This thesis work submitted by Kamal KC entitled "LEARNING BEHAVIOUR OF HORSE [*Equus ferus caballus* Linnaeus 1758] IN NEPAL CAVALRY BARRACK, SINGHADURBAR, KATHMANDU" has been accepted as a partial fulfilment for the requirements of Master's Degree of Science in Zoology with special paper Ecology.

EVALUATION COMMITTEE

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Abstract

Scientists and equestrians continually seek to achieve a clearer understanding of *Equus* learning behaviour and its implications for training. Behavioural and learning processes in the horse are likely to influence not only *Equus* athletic success but also the usefulness of the horse as a domesticated species. However, given the status and commercial importance of the animal, *Equus* learning behaviour has received only limited investigation. Indeed this experimental research on learning behavior of horse colts studies on different behaviors of horse colt during learning stage. Learning ability index (LAI) is selected as major statistical tool for the comparison of learning ability of different age groups of colts.

Learning behavior of *Equus ferus caballus* was studied at NCB (Nepal Cavalry Barrack) by the direct observation, field survey and questionnaire method. Field research was conducted mainly from June 2014 to August 2014 to explore the learning behavior of colt.

The total populations of horses in NCB were 101 among them 50 were gelds, 6 colts, 13 stallions, 4 fillies and 28 mares. Expert trainers give training to horses having age below 4 years and above 2 years. Horse school in NCB is rectangular having height 3m, length 60 m and breadth 20m. On the ground of horse school there is sand, wooden dust and horse dung up to 15cm height. Each horse is controlled by single trainer. Training is given every day until they do not complete their training.

This research includes the learning behavior of six colts in NCB. During training colts show different behavior like fighting, flighting, kicking and bitting. Trainers of horse teach to horse by repeating every event for many days and they reward to horse if it does nice and punishes if it does mistake (fighting and bitting). They reward by giving food. Every trainer takes stick to punish them. Learning ability test does not show any significant difference among six colts due to the less difference in their age group. Punishment and reward given to the colt don't effect for their learning.

The major recommendations of this study are to use scientific technology and tools in NCB for the training of horses. Horse breeding and training should be improved for the local people, horse club and horse school for the improvement of horse sports. It may help in the development of country in the field of sports.

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LIST OF ABBREVIATIONS

Abbreviated form	Details of abbreviations
cm	Centimeter
CUCVM	Cornell University College of Veterinary Medicine
ICZN	International commission on Zoological Nomenclature
JC	Jockey Club
m	Meter
m^2	Meter Square
LAI	Learning Ability Index
NCB	Nepal Cavalry Barrack
USEF	United States Equestrian Federation
UOC	University of California
VCE	Vivo Colostate Education

1.INTRODUCTION

1.1 Background

The horse *Equus ferus caballus* is one of two extant sub-species of *Equus ferus* (Grubb 2005). *Equus* is classified into four sub genera with seven species, sub-genus *Equus* include *Equus caballus* which is domestic horses or Mongolian wild horse (Ishida 1995). The horse has evolved through domestication to adapt to man and the environment (Price, 1999). It is an odd-toed ungulate mammal belonging to the taxonomic family Equidae (ICZN 2003). The horse has evolved over the past 45 to 55 million years from a small multi-toed creature into the large, single-toed animal of today. Humans began to domesticate horses around 4000 BC, and their domestication is believed to have been widespread by 3000 BC. Horses in the sub-species *caballus* are domesticated (ICZN 2003), although some domesticated populations live in the wild as feral horses. These feral populations are not true wild horses, as this term is used to describe horses that have never been domesticated, such as the endangered Przewalski's horse, a separate sub-species, and the only remaining true wild horse. There is an extensive, specialized vocabulary used to describe equine related concepts, covering everything from anatomy to life stages, size, colors, markings, breeds, locomotion, and behaviour (Grubb 2005).

Horse anatomy enables them to make use of speed to escape predators and they have a well-developed sense of balance and a strong fight-or-flight response. Related to this need to flee from predators in the wild is an unusual trait, horses are able to sleep both standing up and lying down. Female horses, called mares, carry their young for approximately 11 months, and a young horse, called a foal, can stand and run shortly following birth. Most domesticated horses begin training under saddle or in harness between the ages of two and four. They reach full adult development by age five, and have an average lifespan of between 25 and 30 years (Linnaeus 1758).

Horses are prey animals with a strong fight-or-flight response. Their first reaction to threat is to startle and usually flee, although they will stand their ground and defend themselves when flight is impossible or if their young’s are threatened. They also tend to be curious; when startled, they will often hesitate instead of ascertaining the cause of their fright, and may not always flee from something that they perceive as non-

threatening. Most light horse riding breeds were developed for speed, agility, alertness and endurance; natural qualities that extend from their wild ancestors. However, through selective breeding, some breeds of horses are quite docile, particularly certain draft horses (Ensminger 2007). Horses are herd animals, with a clear hierarchy of rank, led by a dominant individual, usually a mare. They are also social creatures that are able to form companionship attachments to their own species and to other animals, including humans. They communicate in various ways, including vocalizations such as nickering or whinnying, mutual grooming, and body language. Many horses will become difficult to manage if they are isolated, but with training, horses can learn to accept a human as a companion, and thus be comfortable away from other horses (Clarkson, 2007). However, when confined with insufficient companionship, exercise, or stimulation, individuals may develop stable vices, an assortment of bad habits, mostly stereotypes of psychological origin, that include wood chewing, wall kicking, "weaving" (rocking back and forth), and other problems (Clarkson 2007).

1.1.1 Scientific Classification

Kingdom: Animalia

Phylum: Chodata

Class: Mammalia

Subclass: Theria

Infraclass: Eutheria

Order: Perissodactyla

Family: Equidae

Genus: Equus

Species: ferrus

Subspecies: caballus

(Linnaeus 1758)

1.1.2 Lifespan

Depending on breed, management and environment, the modern domestic horse has a life expectancy of 25 to 30 years (Ensminger 2007). The oldest verifiable record was "Old Billy", a 19th-century horse that lived to the age of 62 (Wright 1999). In modern times, Sugar Puff, who had been listed in the Guinness Book of World Records as the world's oldest living pony, died in 2007 at age 56 (Ryder 2007).

1.1.3 Life stages

According to Ensminger (2007) the following terminologies are used to describe horses of various ages:

- Foal: a horse of either sex less than one year old.
- Yearling: a horse of either sex that is between one and two years old.
- Colt: a male horse under the age of four years.
- Filly: a female horse under the age of four years.
- Mare: a female horse older than four years.
- Stallion: a non-castrated male horse older than four years.
- Geld: a castrated male horse of any age.

1.1.4 Size and Measurement

The height of horses is measured at the highest point of the withers, where the neck meets the back (Whitaker and Whitelaw 2002). This point is used because it is a stable point of the anatomy, unlike the head or neck, which moves up and down in relation to the body of the horse.

The English-speaking world measures the height of horses in hands and inches: one hand is equal to 4 inches (101.6 mm). The height is expressed as the number of full hands, followed by a point, then the number of additional inches, and ending with the abbreviation "h" or "hh" (for "hands high"). Thus, a horse described as "15.2 h" is 15 hands plus 2 inches, for a total of 62 inches (157.5 cm) in height (Ensminger 2007).

The size of horses varies by breed, but also is influenced by nutrition. Light riding horses usually range in height from 14 to 16 hands (56 to 64 inches, 142 to 163 cm)

and can weigh from 380 to 550 kilograms (840 to 1,200 lb). Larger riding horses usually start at about 15.2 hands (62 inches, 157 cm) and often are as tall as 17 hands (68 inches, 173 cm), weighing from 500 to 600 kilograms (1,100 to 1,300 lb). Heavy or draft horses are usually at least 16 hands (64 inches, 163 cm) high and can be as tall as 18 hands (72 inches, 183 cm) high. They can weigh from about 700 to 1,000 kilograms (1,500 to 2,200 lb) (Bogianni 2008).

The largest horse in recorded history was probably a Shire horse named Mammoth, who was born in 1848. He stood 21.2 ½ hands (86.5 inches, 220 cm) high and his peak weight was estimated at 1,500 kilograms (3,300 lb) (Whitaker and Whitelaw 2002). The current record holder for the world's smallest horse is Thumbelina, a fully mature miniature horse affected by dwarfism. She is 17 in (43 cm) tall and weighs 57 lb (26 kg) (Martin 2006).

1.1.5 Genetics

Horses have 64 chromosomes (VCE 1998). The horse genome was sequenced in 2007 which contain 2.7 billion DNA base pairs (CUCVM 2012).

1.1.6 Colors and markings

Horses exhibit a diverse array of coat colors and distinctive markings, described by a specialized vocabulary. Often, a horse is classified first by its coat color, before breed or sex. Horses of the same color may be distinguished from one another by white markings, which along with various spotting patterns, are inherited separately from coat color (Corum and Stephanie 2003).

Many genes that create horse coat colors and patterns have been identified. Current genetic tests can identify at least 13 different alleles influencing coat color (UOC 2008) and research continues to discover new genes linked to specific traits. The basic coat colors of chestnut and black are determined by the gene controlled by the Melanocortin 1 receptor (Marklund et al. 1996) which is also known as the "extension gene" or "red factor," as its recessive form is "red" (chestnut) and its dominant form is black (UOC 2008). Additional genes control suppression of black color to point coloration that results in a bay, spotting patterns such as pinto or leopard, dilution

genes such as palomino or dun, as well as graying, and all the other factors that create the many possible coat colors found in horses (UOC 2008).

Horses which have a white coat color are often mislabeled; a horse that looks "white" is usually a middle-aged or older gray. Grays are born a darker shade, get lighter as they age, but usually keep black skin underneath their white hair coat (with the exception of pink skin under white markings). The only horses properly called white are born with a predominantly white hair coat and pink skin, a fairly rare occurrence (UOC 2008). Different and unrelated genetic factors can produce white coat colors in horses, including several different alleles of dominant white and the sabino-1 gene (Haase et al. 2007) However, there are no "albino" horses, defined as having both pink skin and red eyes (Mau et al. 2004).

1.1.7 Reproduction and development

Gestation lasts approximately 340 days, with an average range 320–370 days and usually results in one foal; twins are rare (Johnson 2008). Horses are a precocial species, and foals are capable of standing and running within a short time following birth (Ensminger 2007). Foals are usually born in the spring. The estrous cycle of a mare occurs roughly every 19–22 days and occurs from early spring into autumn. Most mares enter an estrous period during the winter and thus do not cycle in this period (Kline 2010). Foals are generally weaned from their mothers between four and six months of age (Ensminger 2007).

Horses, particularly colts, sometimes are physically capable of reproduction at about 18 months, but domesticated horses are rarely allowed to breed before the age of three, especially females (Mcllwraith 2008). Horses four years old are considered mature, although the skeleton normally continues to develop until the age of six; maturation also depends on the horse's size, breed, sex, and quality of care. Larger horses have larger bones; therefore, not only do the bones take longer to form bone tissue, but the epiphyseal plates are larger and take longer to convert from cartilage to bone. These plates convert after the other parts of the bones, and are crucial to development (Thomas 2008).

1.1.8 Intelligence

Studies have indicated that horses perform a number of cognitive tasks on a daily basis, meeting mental challenges that include food procurement and identification of individuals within a social system. They also have good spatial discrimination abilities (Leste-Lasserse 2009). Studies have assessed equine intelligence in areas such as problem solving, speed of learning, and memory. Horses excel at simple learning, but also are able to use more advanced cognitive abilities that involve categorization and concept learning. They can learn using habituation, desensitization, classical conditioning, and operant conditioning, and positive and negative reinforcement (Leste-Lasserse 2009). One study has indicated that horses can differentiate between "more or less" if the quantity involved is less than four (Coarse 2008).

Domesticated horses may face greater mental challenges than wild horses, because they live in artificial environments that prevent instinctive behaviour whilst also learning tasks that are not natural (Leste-Lasserse 2009). Horses are animals of habit that respond well to regimentation, and respond best when the same routines and techniques are used consistently. One trainer believes that "intelligent" horses are reflections of intelligent trainers who effectively use response conditioning techniques and positive reinforcement to train in the style that best fits with an individual animal's natural inclinations (Leste-Lasserse 2009).

1.1.9 Sleep patterns

Horses are able to sleep both standing up and lying down. In an adaptation from life in the wild, horses are able to enter light sleep by using a "stay apparatus" in their legs, allowing them to doze without collapsing (Pascoe 2007). Horses sleep well when in groups because some animals will sleep while others stands guard to watch for predators. A horse kept alone will not sleep well because its instincts are to keep a constant eye out for danger. Unlike humans, horses do not sleep in a solid, unbroken period of time, but take many short periods of rest. Horses spend four to fifteen hours a day in standing rest, and from a few minutes to several hours lying down. Total sleep time in a 24-hour period may range from several minutes to a couple of hours, mostly in short intervals of about 15 minutes each (Pascoe 2007).

1.1.10 Domestication

Domestication of the horse most likely took place in central Asia prior to 4000 BC. Two major sources of information are used to determine where and when the horse was first domesticated and how the domesticated horse spread around the world. The first source is based on palaeological and archaeological discoveries and the second source is a comparison of DNA obtained from modern horses to that from bones and teeth of ancient horse remains (Kuznetsov 2006).

The earliest archaeological evidence for the domestication of the horse comes from sites in Ukraine and Kazakhstan, dating to approximately 3500–4000 BC. By 3000 BC, the horse was completely domesticated and by 2000 BC there was a sharp increase in the number of horse bones found in human settlements in northwestern Europe, indicating the spread of domesticated horses throughout the continent (Kuznetsov 2006). The most recent, but most irrefutable evidence of domestication comes from sites where horse remains were interred with chariots in graves of the Sintashta and Petrovka cultures 2100 BC (Lau et al. 2009).

Domestication is also studied by using the genetic material of present day horses and comparing it with the genetic material present in the bones and teeth of horse remains found in archaeological and palaeological excavations. The variation in the genetic material shows that very few wild stallions contributed to the domestic horse, while many mares were part of early domesticated herds (Lindgren 2004). This is reflected in the difference in genetic variation between the DNA that is passed on along the paternal, or sire line (Y-chromosome) versus that passed on along the maternal, or dam line (mitochondrial DNA). There are very low levels of Y-chromosome variability, but a great deal of genetic variation in mitochondrial DNA (Vila et al. 2001). There is also regional variation in mitochondrial DNA due to the inclusion of wild mares in domestic herds (Cai et al. 2009).

1.2 Research objectives

The general objectives of this study are to assess the learning behaviour of colts in NCB, Singhadurbar, Kathmandu.

The specific objectives of this study are:

1. To explore how horse can learn different skills (walking, obstacle walking and jumping).
2. To document learning behaviour of horse in NCB, Singhadurbar, Kathmandu.
3. To document difference in learning ability among colts.

1.3 Rationale of the study

Nepal army in NCB they are unable to get better performance from horse. This scientific research in this field may help to Nepal army in NCB for achievement of better goal in future. This research will help to document teaching technique in NCB. This research will help to find LAI value of horses in NCB.

1.4 Limitations

Present research work is meant for Master Level Dissertation and following limitations were felt during the study.

1. Research time provided by NCB is short.
2. Difficulty due to the exchange of different officers of NCB from time to time.
3. Limited number of horses.
4. Budget constraint was the primary limitation for the research camp.

1. LITERATURE REVIEW

Grubb (2005) explained that *Equus ferus caballus* is one of two extant sub-species of *Equus ferus*. Katz (1927) explained that much reported research has dealt with the horse's intelligence rank with respect to other domestic animals. Kratzer (1971) reported that few definitive studies have been conducted to investigate individual variations in learning ability among horses. Warren (1962) explained that measurement of LAI in horse was feasible technique. Ensminger (2007) reported about strong flight-fight response of horses. Leste-lessere (2009) explained about bad behaviour of horse when they got more rest. Myers and Mesker (1960) showed that a

horse could respond to different fixed ratio and fixed interval positive reinforcements schedules. Mccall (1981) reported horse could learn each new problem.

Pfungst (1907) documented that horses had very good discriminating stimuli, it was clearly demonstrated by horse kluge hans. Trapy (1975) reported that the positive and negative reinforcement connected the specific stimulus, so that when the specific stimulus presented again there was greater chance of the horse making the correct response and also he indicated that the horse probably learns best through either a delayed or a trace conditioning procedure. Hagg (1980) reported that *Equine* learning ability was similar under positive and negative reinforcement; it reported that horses learned better in both positive and negative reinforcement. Mader and Price (1980) reported that older horse show a slower rate of learning than younger horses. This decrease in performance as the horse age may be caused by a decrease in reactivates in older horses. Older horses may have slowed reaction times because their perceptual or physical abilities may decrease due to their increased age.

Baer (1983) reported that horses learn bad behaviour from each others. Nicol (2002) reported that many examples of excellent memory and recall ability have been documented in the horse also he reviewed studies on the ability of a number of species of domestic animals to acquire information and skills by observation of other animals. Williams et al. (2002) reported that there was no difference in learning ability at three months different age of horses. Leste-lessere (2009) reported that intelligent horse was the reflection of intelligent trainer. Heird et al. (1981) reported early handling of horses has a positive influence on their subsequent learning ability.

Clarkson (2007) explained that many horses will become difficult to manage if they were isolated, but with training, horses can learn to accept a human as a companion. Baker and Crawford (1986) indicated that horse do not learnt by observing another horse task. Dixon (1970) reported that the pony seemed to learn a general solution to the discrimination and also he demonstrated the depth of equine discrimination. Houpt et al. (1982) compared the learning abilities of the foals to that of their dams and reported that the foals scored better on the learning test. Wolff and Hausberger (1996) suggested that there may be a genetic influence whereby the ability to deal with spatial tasks in the horse is more likely to be inherited from the sire. Grubb (2005) have recently stressed the importance of the providing appropriate conditions for the domestic horse based on the range of behavioural and learning activity demonstrated in feral or free-ranging equine groups.

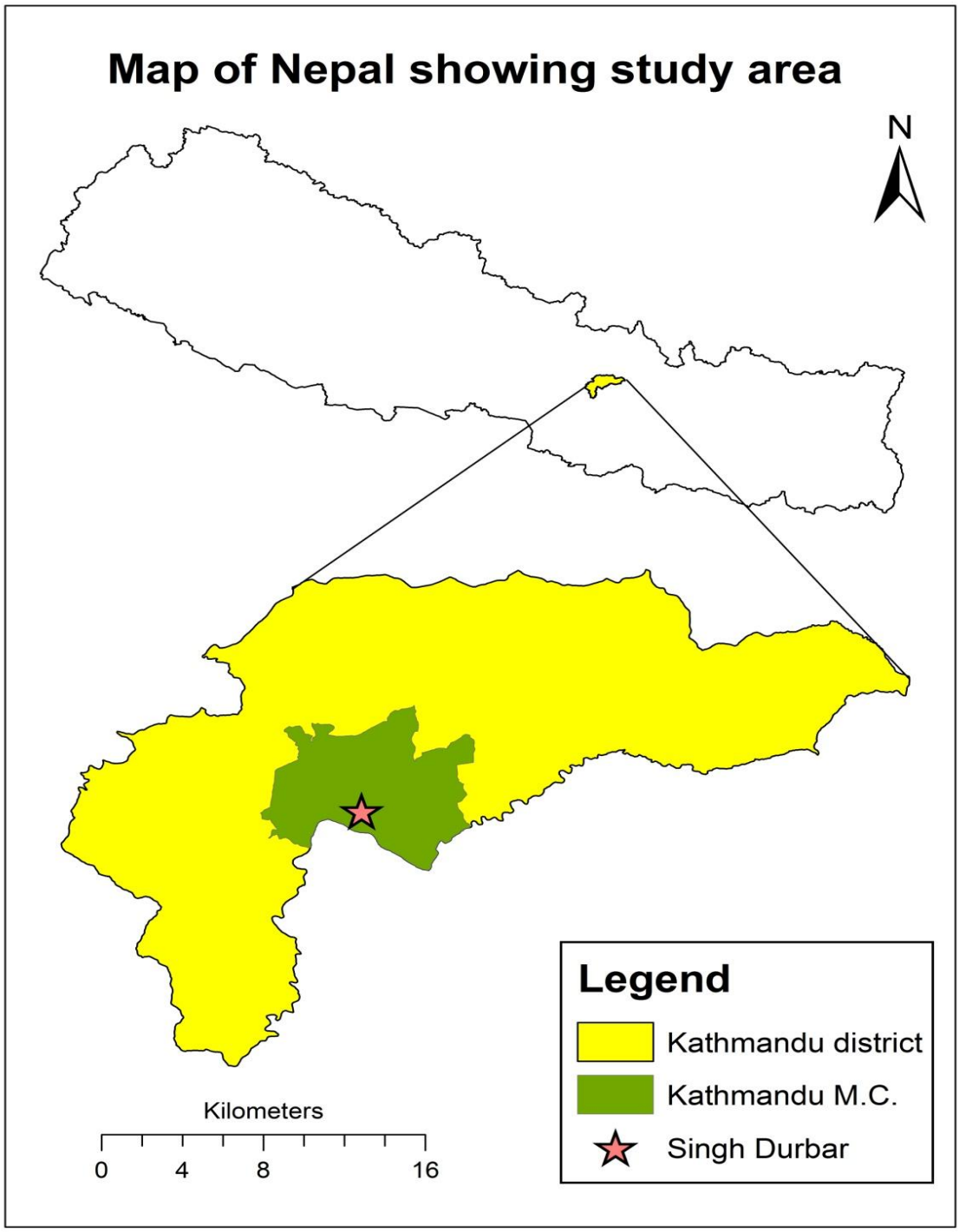
Nicol (2002) reported that there was poor correlation between learning behaviour in individual horses and the subsequent performance of the same horses during different experimental tasks. At best it appeared that learning behaviour was a function of the individual horse and any correlation with performance levels in subsequent experimental trials was very much dependent upon the specific task involved. Thomas (2008) compiled results based on experimental trials demonstrating the ability for concurrent discrimination in horses.

Davis and Cheeke (1998) declared intelligence and learning ability in the horse relative to other species was the subject of some considerable speculation, particularly an anecdotal level. Sappington et al. (1997) concluded that equine learning between simple discrimination tasks was poorly correlated. In addition, it has also been reported that performance under one set of experimental conditions were not necessarily predictive of similar performance levels involving different experimental conditions. Santamaria et al. (2005) concluded that specific training for jumping at an early age was necessary because effects on both technique and jumping capacity were only temporary in nature.

3. MATERIALS AND METHODS

3.1 Study Area

This study was conducted in Kathmandu municipality in Kathmandu district, Central Development Region of Nepal (CDR) where the NCB is located. The district is located from 27°27′E to 27°49′E longitude and 85°10′N to 85°32′N latitude (DDC 2014).



Map 1: Map of Nepal showing study area.

3.2 Preliminary Field survey

A preliminary field survey was carried out according to suggestions of Research Supervisor from June, 2014 to August, 2014 for the primary, secondary and tertiary data collection. Data were collected according to information given by Chief of NCB,

trainers and respondents of interview. Different data in different stages were collected by count during survey of research.

3.3 Primary data collection

Primary data collections were done by direct field visit to the NCB. The primary data were collected during the time of horse training. Aggressive behaviour shown by the different colts inside the horse school during learning time were counted and classified into different behaviours such as fighting, flighting, kicking and biting. Total reward, punishment, trails and errors were also counted. Data were collected from the different respondents through the interview. Data were collected during the morning time from 6:00 am to 8:00 am in three different stages for 45 days. Total 90 hours research was done. They are Primary, Secondary and Tertiary stages.

3.3.1 Primary stage of walking inside school

Primary stage of learning was supposed as the learning stage of horse without carrying any seat and rider. All colts from the age group 2 to 3 years were taken by the trainers by lunging rash. In this stage the horse colt could not understand any word used by the trainers. Horse's colts only tried to escape from the trainers. They were afraid of trainers. They tried to flight and fights. All trainers took the colt by lunging rash having 3m length. It's very difficult time to teach the young colts. Trainers first entered with the colts from the door of school and reached up to the opposite side of the door. They walked in rectangular path. Horse school consists of sand on the ground with 15-20 m height. Trainers walked with horse in different directions. Some time from north to south, east to west, west to east and south to north, trainers taught the horse colts to walk in circular path either from left to right or from right to left. Many turns they gave trials to the colts after completing many turns in kept circular path. They again kept the horse colts in the rest making parallel to each other. For every time to take next step, every trainer asked to their senior for performance. At last they took the colt by lunging rash to the stable of horse at NCB and care to their respective colts. They provided veterinary care to the colts whether that colts were suffering from any diseases or not and checked their temperature.

3.3.2 Secondary stage of walking inside school.

Secondary stage of learning was supposed as the learning stage of horse with carrying only seat. At this stage some colts were able to understand the words of trainers. Due

to the seat on their back colts tried to throw that seat. They wanted to fight and bit to the trainers but also trainer controlled by lunging rash. In this stage also the trainer brought the colts by lunging rash and walked inside the school in different direction in rectangular path. They made the horse to walk in the circular path either from left to right or from right to left after complete of the walk of each colt. Trainer told troat, cantor and gallop and showed other adult horse walking by troat, cantor and gallop hence the new learner also copied to them and started walking in that steps of walking. In this way the new learner also start to walk in troat, cantor and gallop. As same as in the primary stage they brought the horse in rest at last and made them stand parallel to each other and put two hands on back of the colt and hang on their back. It meant that the horse needed to carry more load again after some day. It was a way to make them ready to carry rider after some days. Finally they returned to horses stable.

3.3.3 Tertiary stage of walking in ground

Tertiary stage of learning was supposed as the learning stage of horse by carrying rider. In this stage the colt felt very difficult to carry the load of rider and always tried to throw the rider. They were always afraid and wanted to escape. Rider felt more risk in this stage. For few days they didn't perform the steps of walk like 'troat' 'cantor' and 'gallop' which they learnt during the secondary stage of walking. It was difficult to handle the colt by the rider. Sometime the colt threw the rider and rider was injured. Rider took many turns by ridding on horse in circular path either from the left to right or right to left. At tertiary stage the horse were taken to the next ground having wide space than the horse school area. At last of the training day all the riders came closer to the senior trainers and made the horses come to rest and made them to stand parallel to each other. Finally they sent horses back to the stable and provided care to the colts.

3.3.4 Primary stage of obstacle walking

Primary stage of obstacle walking horses were free without load and handled them by lunging rash by trainers to obstacle path. The trainers ran with them and horse also ran with the trainers but it was the difficult task because the horses were afraid of walking in the obstacle path and many times tired to flight and fight.

3.3.5 Secondary stage of obstacle walking

Secondary stage was same as the primary stage of obstacle walking but the horses were carried the seat on their back. The horse felt difficult to carry seat and try to throw down but finally they felt easy to carry that seat.

3.3.6 Tertiary stage of obstacle walking

The horse felt more difficult and showed more aggressive behaviour. They tried to throw the rider by taking the front leg up and made inclined height on their back. Rider controlled at this phase but also the rider fall down and felt injured. After many trials gave to the colt's everyday the colts understood their work and started performing the task easily. Sometimes rider didn't rode on horse in this stage.

3.3.7 Primary stage of jumping

Jumping trial was not given to horse during the initial phase of learning but after some days of primary walking trials when they were on control of the trainers small jumping trials was given in small height which was very simple every day the height was increased with very small measurement and trial was given to the different colts. During the primary stage of jumping the colt didn't carry any load on back.

3.3.8 Secondary stage of jumping

Jumping trial of horse by carrying seat on back is considered as the secondary stage of jumping. At first the horse felt difficult to jump by carrying load but after some days they performed the trials correctly like as in the primary stage the trial was given every day by increasing the height.

3.3.9 Questionnaire survey

Questionnaire survey was performed with the different respondents. They were the senior trainers, junior trainers and other trainers of the NCB. For the Questionnaire Survey the question was prepared and submitted to the different trainers and they choose the options from the different questions and collected the data. They could understand the English language so it was very easy to collect the data from the questionnaire survey. About 30 respondents were selected for this research for the questionnaire survey. They showed positive attitude toward this research.

3.3.10 Interviews and Discussions

Interviews were taken from the different senior trainers as well as the junior trainers of horse during the time of data collection. It was great discussion with different members of NCB about the learning behaviour of horse. All the interviewers gave

their experienced views and attitudes. Veterinary doctor of NCB also gave some idea and view for the research. Positive interviews and discussions on the research topic gave a lot of enthusiasm. Persons who were involved in interview for this research as follow were General Jagdish Chandra Pokhral, DPR major Tilak K.C., Lieutenant Colonol Kiran K.C, Jamdar Jagadish Ghishing, Sergent Madan Kumar Pandey and other trainers.

3.3.11 Photography

Photography was done for some of important events with camera having 16× lens. Photos of horses were taken during the training of horses.

3.4 Secondary data collection

Different data were collected from theses, journal, books, internet and documents of NCB etc.

3.5 Statistical Analysis

LAI is defined as the ratio of 1000 to the product of mean trial (M.T.) and mean error (M.E.) (Fisker and Potter, 2000). The general formula LAI is:

$$\text{Learning Ability Index } (LAI) = \frac{1000}{M.E. \times M.T.}$$

4. RESULTS

4.1 Behaviour of colt-A during different stages of walking.

During primary stage of walking average 24 trials were given for 2 hours per day in the rectangular path in which 46% was kicking, 24% fighting, 16% flighting and 14% biting behaviour showed by colt-A.

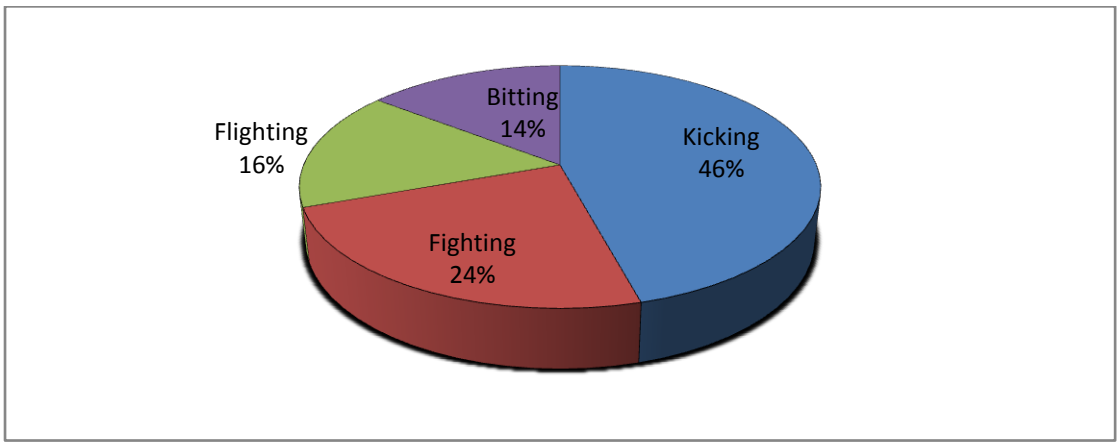


Figure 1: Behaviour of colt-A during primary stage of walking (Source: Field Survey, 2014)

During secondary stage of walking average 83 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 32% was kicking, 25% fighting, 19% flighting and 1% biting behaviour showed by colt-A.

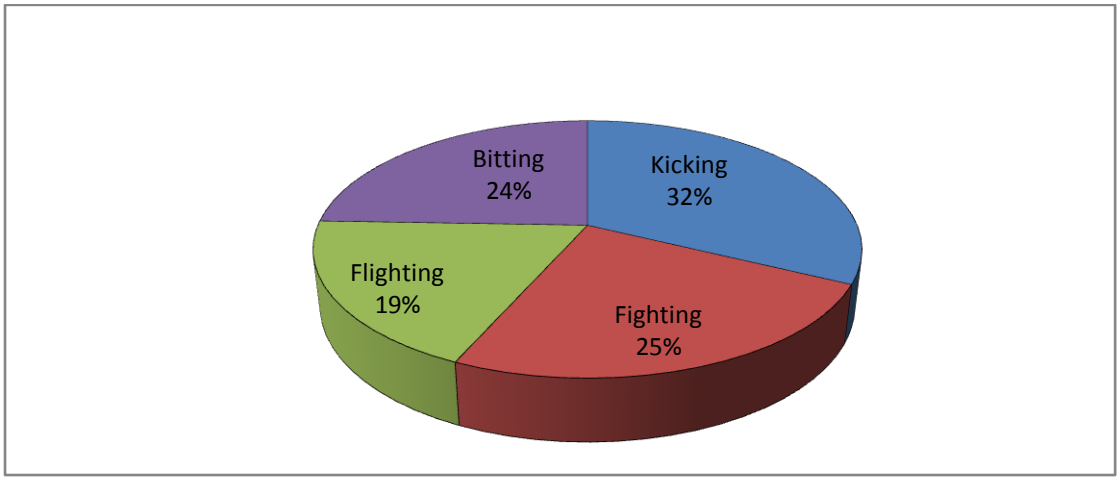


Figure 2: Behaviour of colt-A during secondary stage of walking (Source: Field Survey, 2014).

During tertiary stage of walking average 85 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-A.

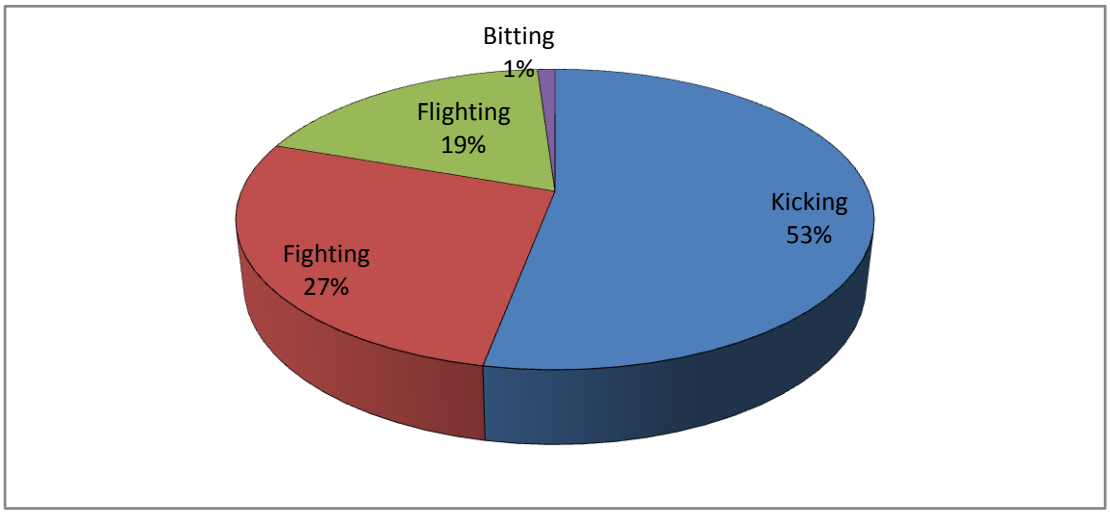


Figure 3: Behaviour of colt-A during tertiary stage of walking (Source: Field Survey, 2014).

4.2 Behaviour of colt-B during different stages of walking.

During primary stage of walking average 24 trials were given in the rectangular path in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-B.

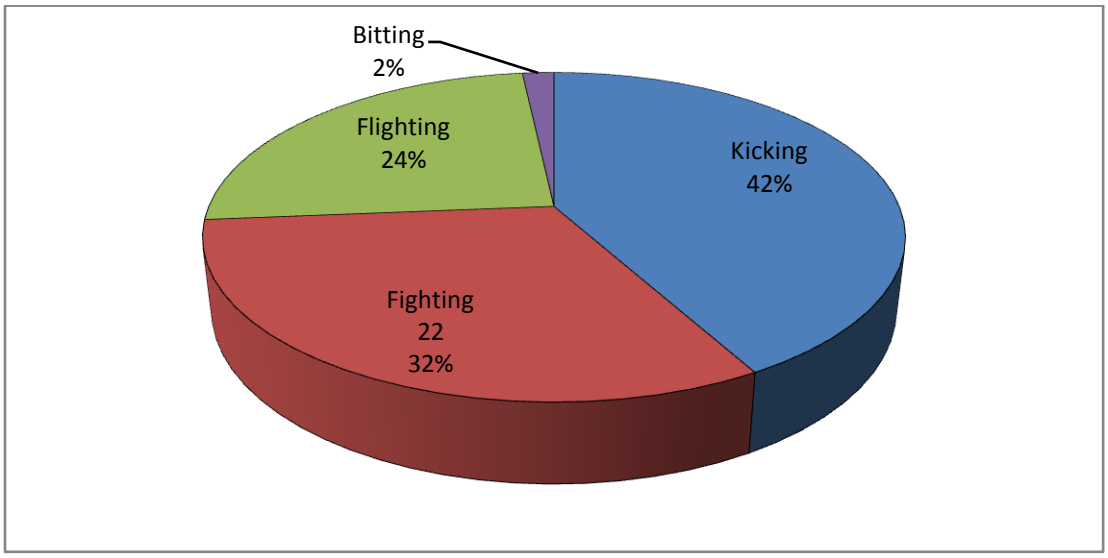


Figure 4: Behaviour of colt-B during primary stage of walking (Source: Field Survey, 2014).

During secondary stage of walking average 80 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 1% biting behaviour showed by colt-B.

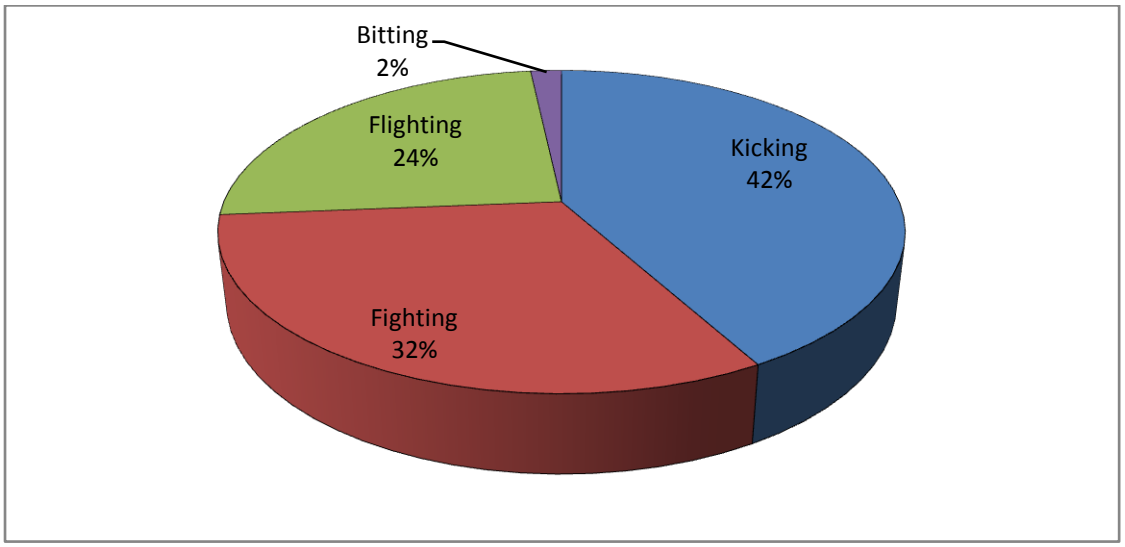


Figure 5: Behaviour of colt-B during secondary stage of walking (Source: Field Survey, 2014).

During tertiary stage of walking average 80 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-B

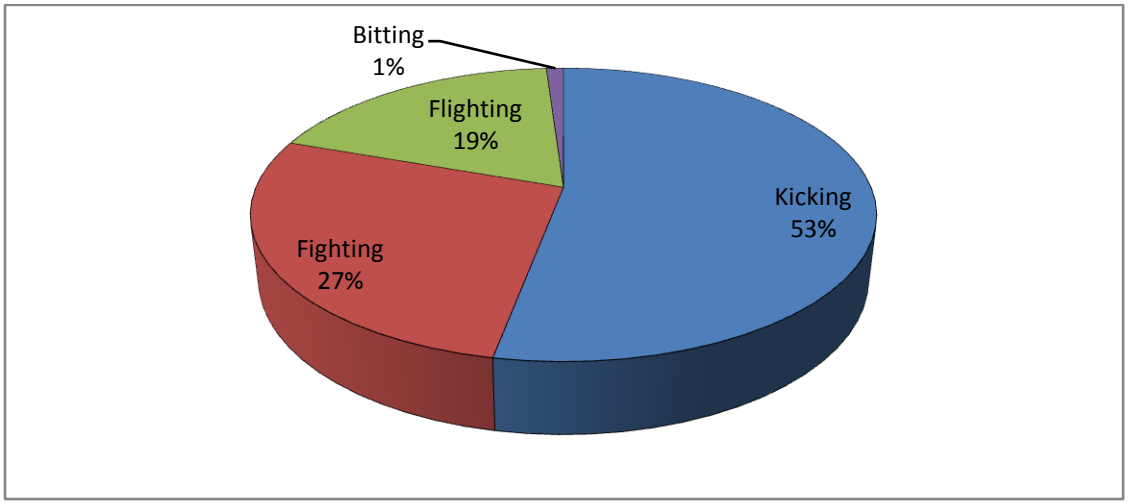


Figure 6: Behaviour of colt-B during tertiary stage of walking (Source: Field Survey, 2014).

4.3 Behaviour of colt-C during different stages of walking.

During primary stage of walking average 24 trials were given in the rectangular path in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-C.

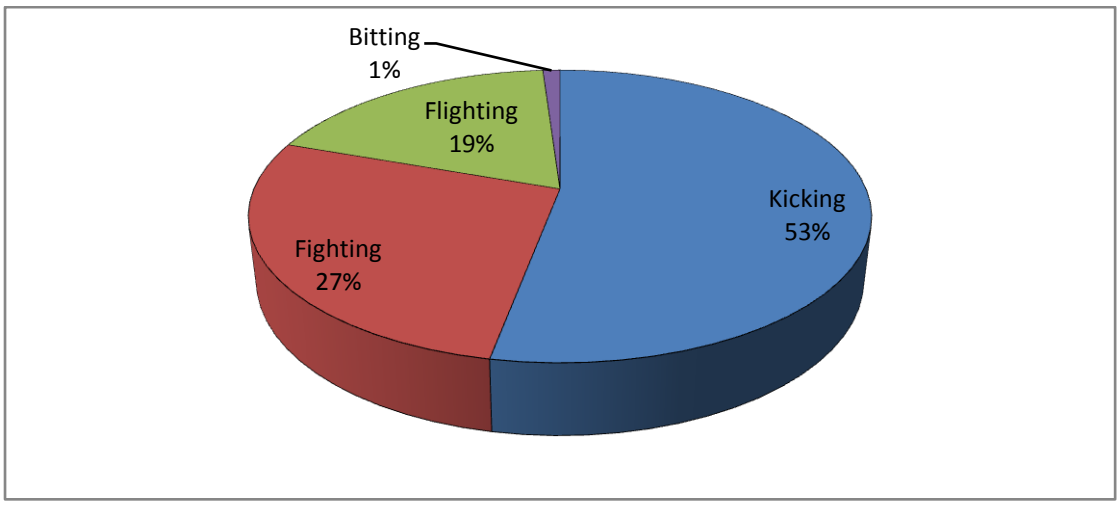


Figure 7: Behaviour of colt-C during primary stage of walking (Source: Field Survey, 2014).

During secondary stage of walking average 80 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-C.

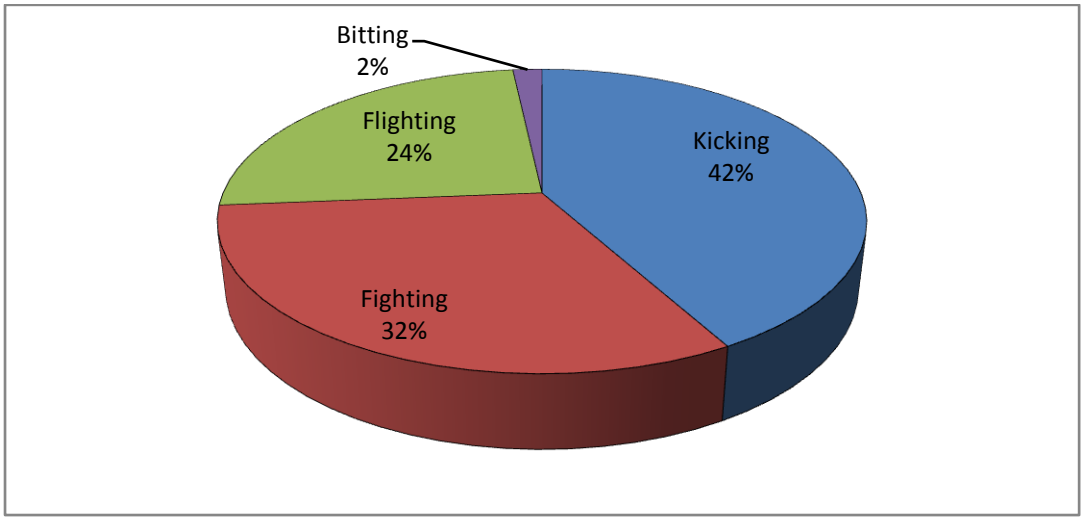


Figure 8: Behaviour of colt-C during secondary stage of walking (Source: Field Survey, 2014).

During tertiary stage of walking average 77 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-C.

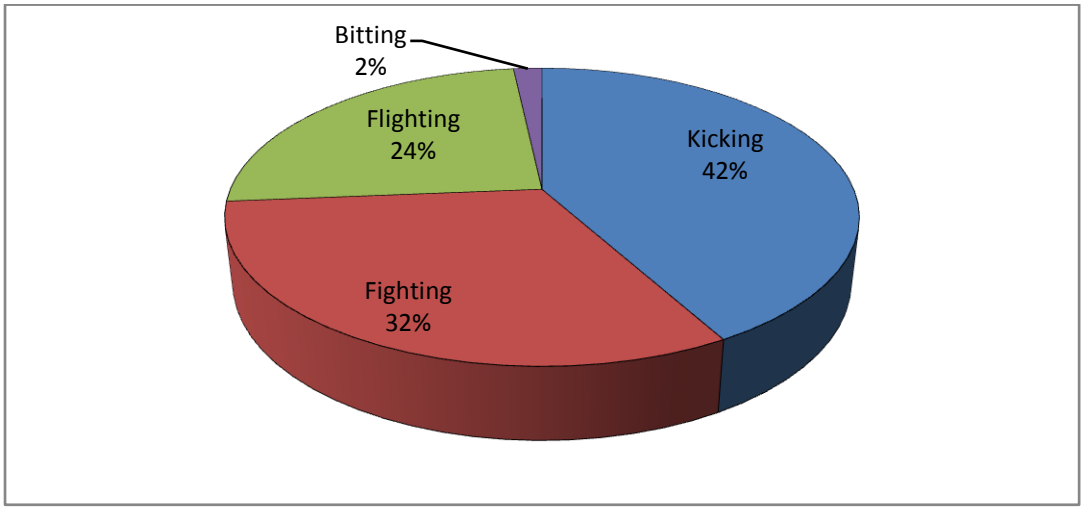


Figure 9: Behaviour of colt-C during tertiary stage of walking (Source: Field Survey, 2014).

4.4 Behaviour of colt-D during different stages of walking.

During primary stage of walking average 24 trials were given in the rectangular path in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-D.

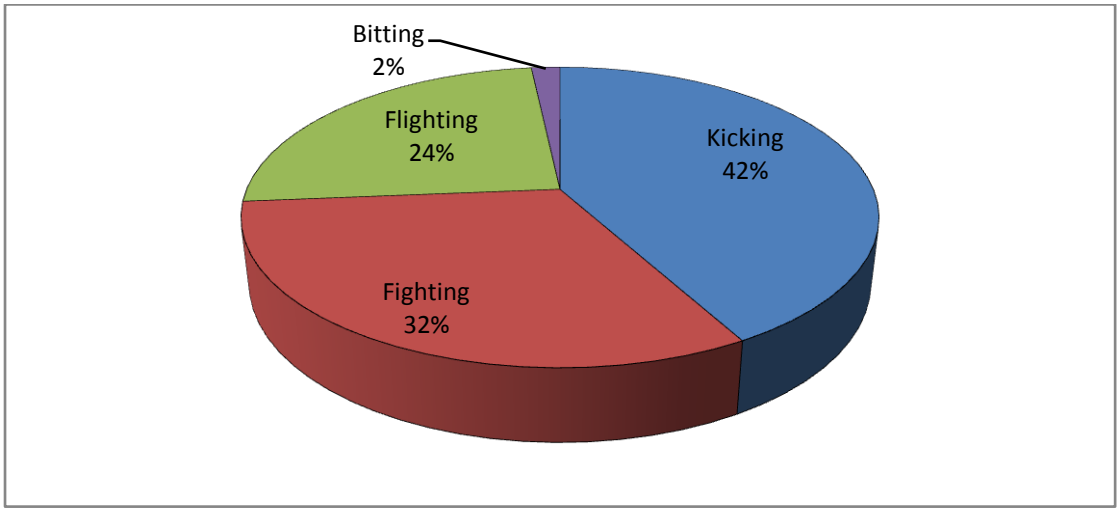


Figure 10: Behaviour of colt-D during primary stage of walking (Source: Field Survey, 2014).

During secondary stage of walking average 76 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% is flighting and 2% biting behaviour shown by colt-D.

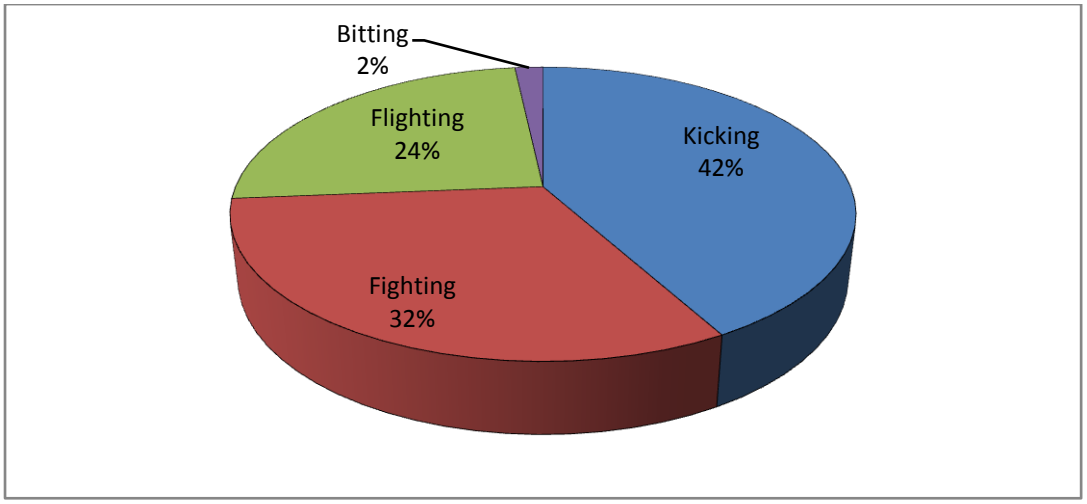


Figure 11: Behaviour of colt-D during secondary stage of walking (Source: Field Survey, 2014).

During tertiary stage of walking average 83 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-D.

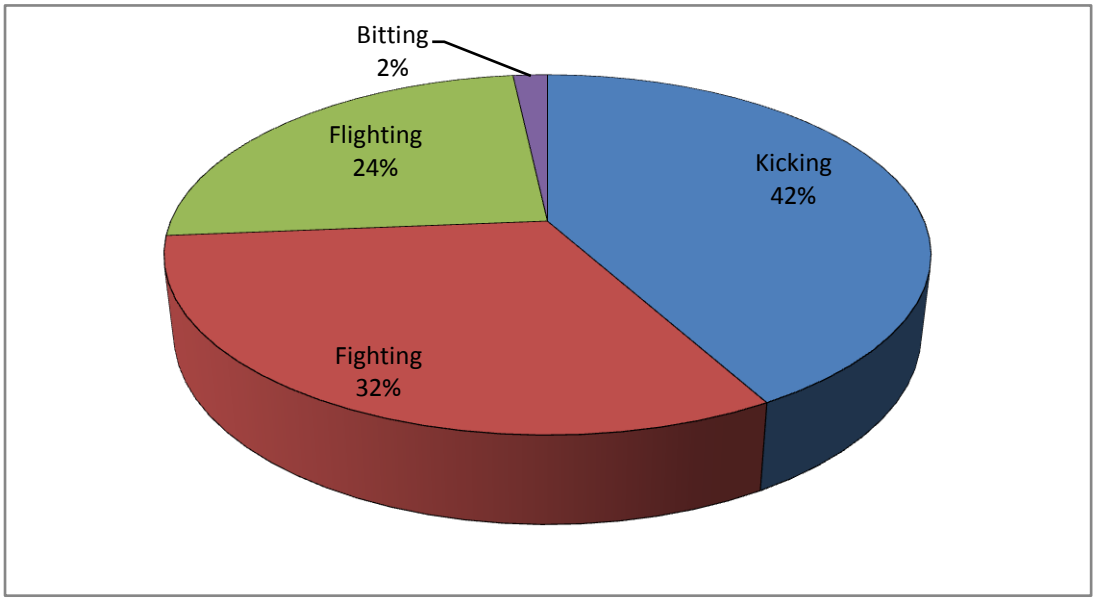


Figure12: Behaviour of colt-D during tertiary stage of walking (Source: Field Survey, 2014).

4.5 Behaviour of colt-E during different stages of walking.

During primary stage of walking average 24 trials were given in the rectangular path in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-E.

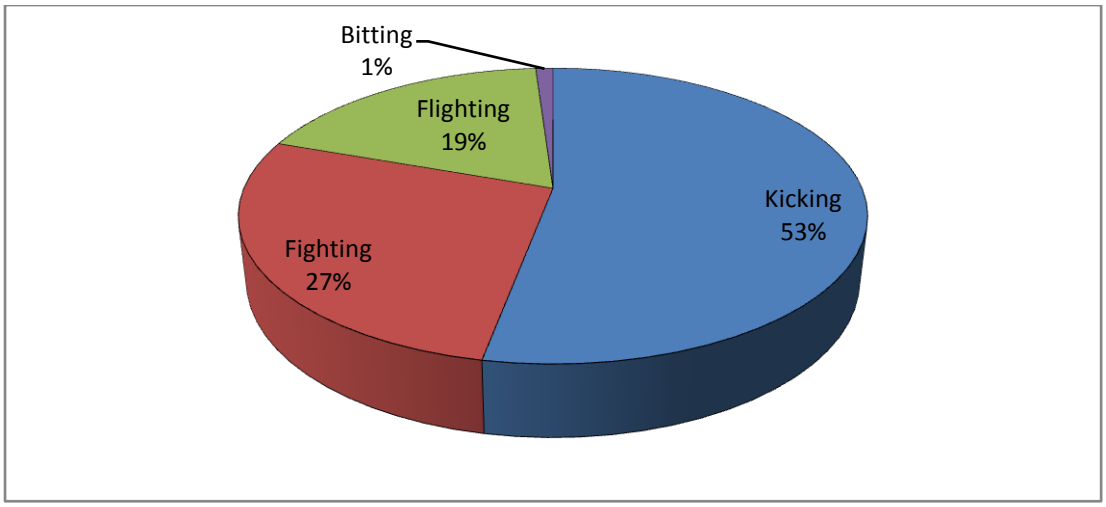


Figure 13: Behaviour of colt-E during primary stage of walking (Source: Field Survey, 2014)

During secondary stage of walking average 80 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-E.

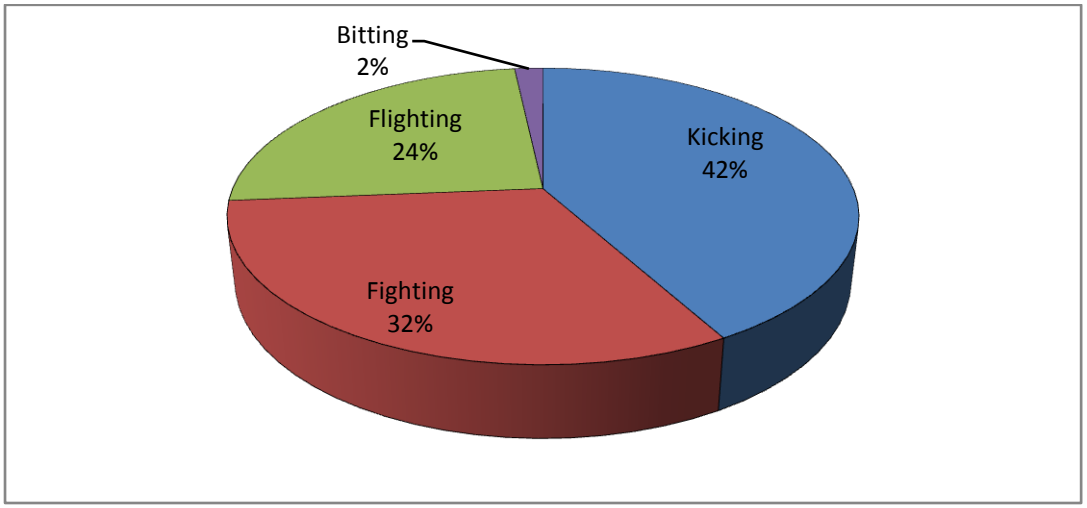


Figure 14: Behaviour of colt-E during secondary stage of walking (Source: Field Survey, 2014)

During tertiary stage of walking average 77 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-E.

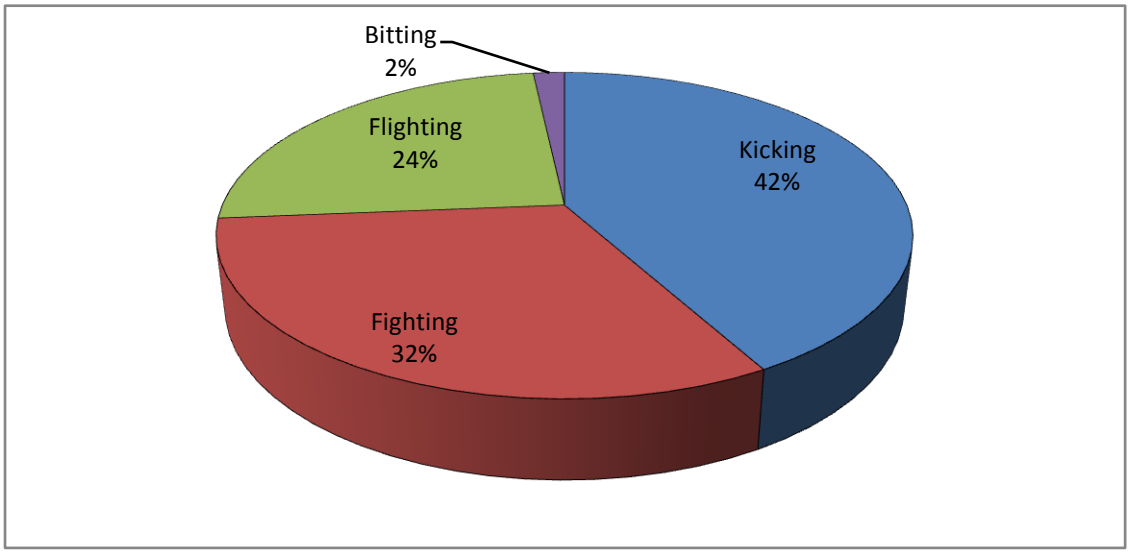


Figure 15: Behaviour of colt-E during tertiary stage of walking (Source: Field Survey, 2014)

4.6 Behaviour of colt-F during different stages of walking.

During primary stage of walking average 24 trials were given in the rectangular path in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-F.

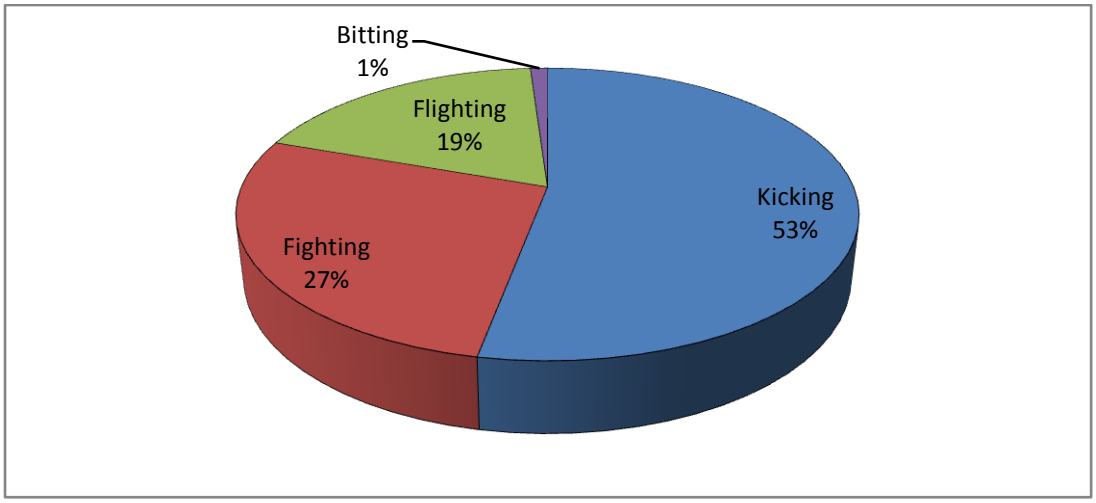


Figure 16: Behaviour of colt-F during primary stage of walking (Source: Field Survey, 2014)

During secondary stage of walking average 80 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-F.

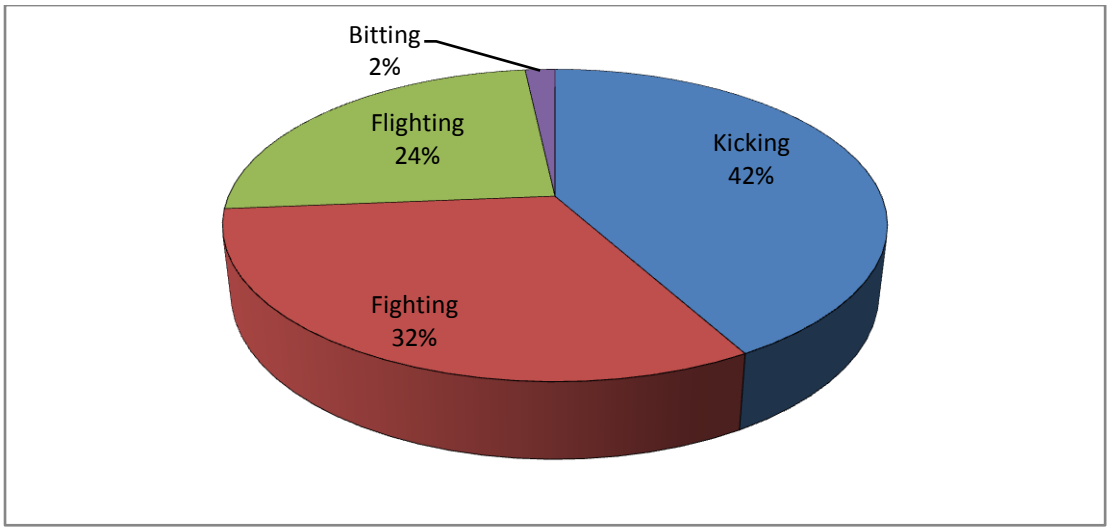


Figure 17: Behaviour of colt-F during secondary stage of walking (Source: Field Survey, 2014).

During tertiary stage of walking average 75 trials were given in the rectangular path, circular path from left to right and circular path from right to left in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-F.

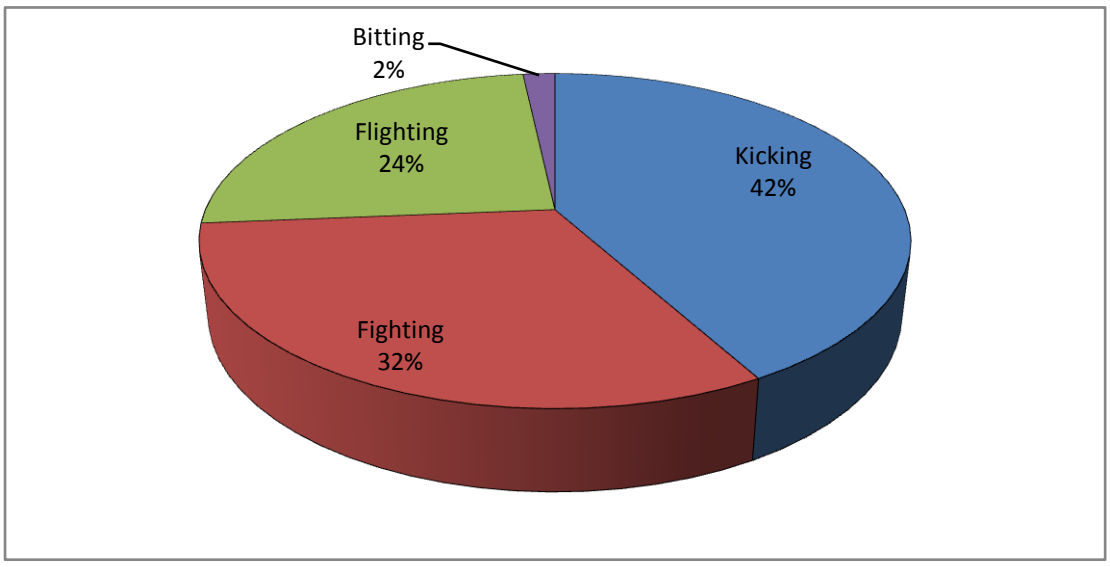


Figure 18: Behaviour of colt-F during tertiary stage of walking (Source: Field Survey, 2014)

4.7 Behaviour of colt-A during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 32% was kicking, 28% fighting, 38% flighting and 2% biting behaviour showed by colt-A.

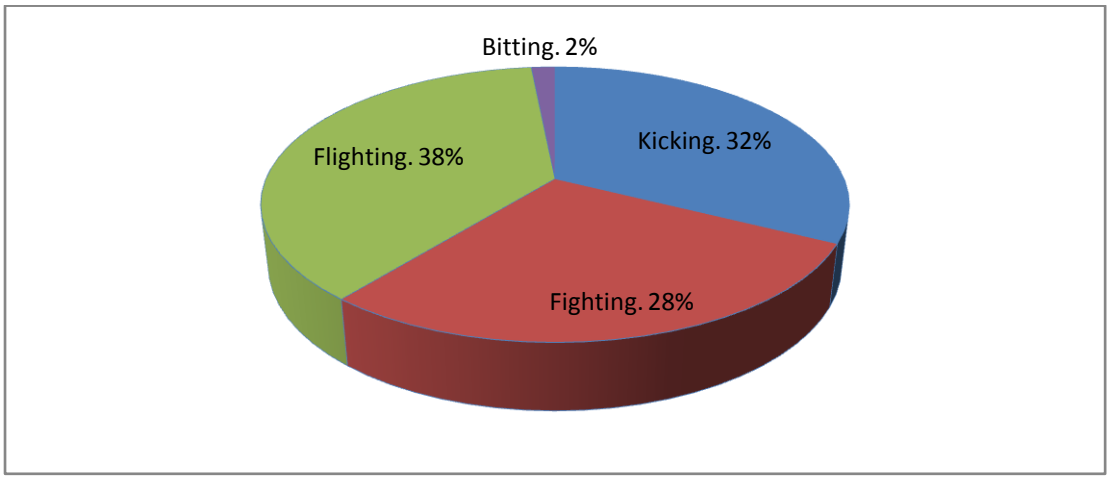


Figure 19: Behaviour of colt-A during primary stage of obstacle walking (Source: Field Survey, 2014)

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 34% was kicking, 26% fighting, 20% flighting and 20% biting behaviour showed by colt-A.

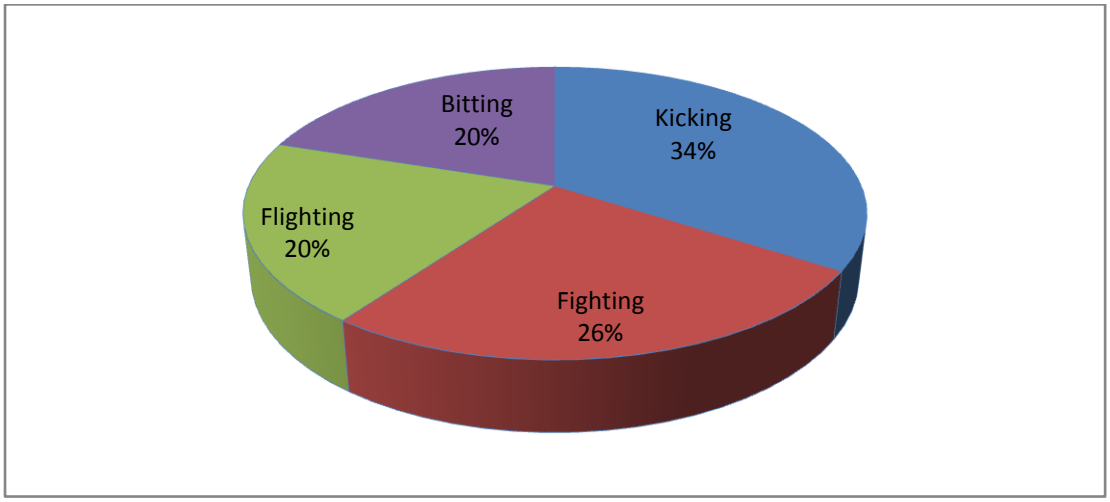


Figure 20: Behaviour of colt-A during secondary stage of obstacle walking (Source: Field Survey, 2014)

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 26% was kicking, 34% fighting, 38% flighting and 2% biting behaviour showed by colt-A.

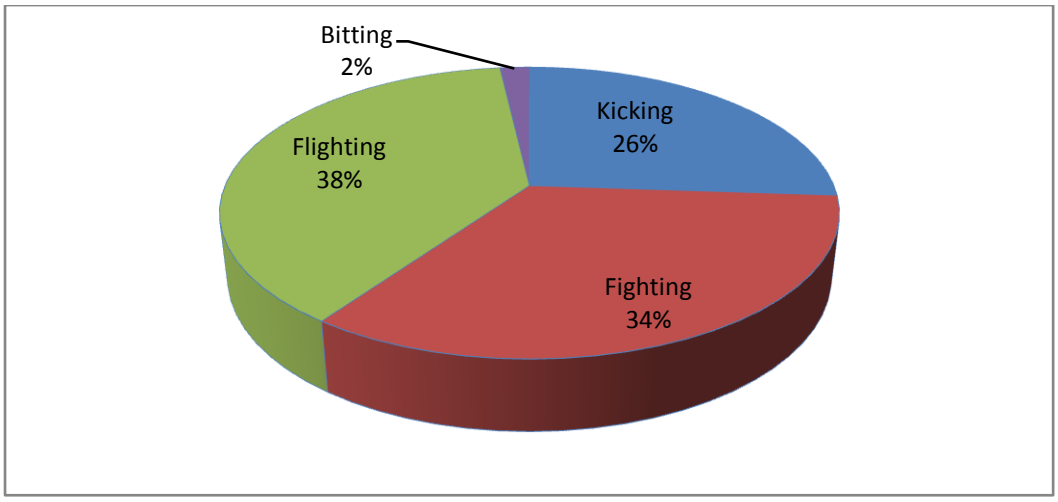


Figure 21: Behaviour of colt-A during tertiary stage of obstacle walking (Source: Field Survey, 2014)

4.8 Behaviour of colt-B during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-B.

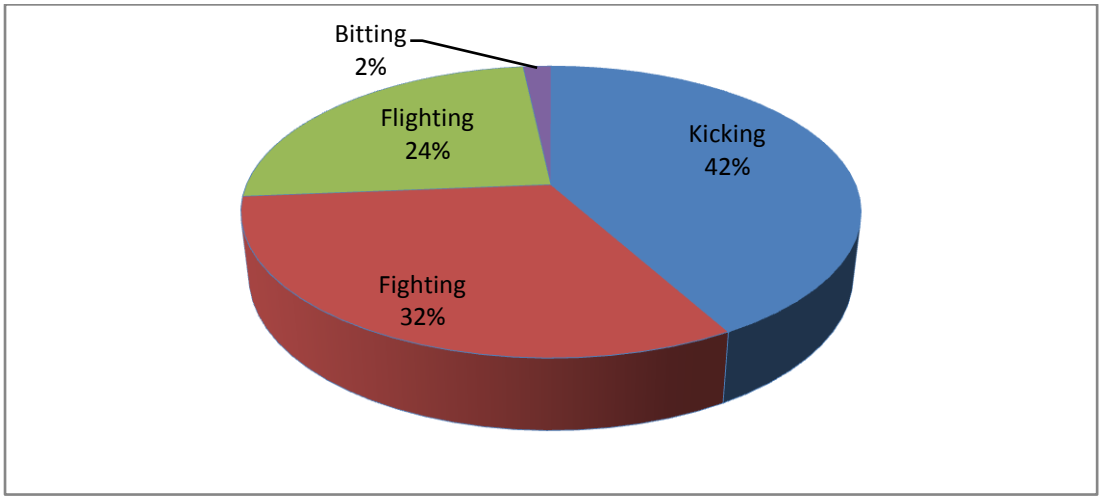


Figure 22: Behaviour of colt-B during primary stage of obstacle walking (Source: Field Survey, 2014)

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 32% was kicking, 28% fighting, 38% flighting and 2% biting behaviour showed by colt-B.

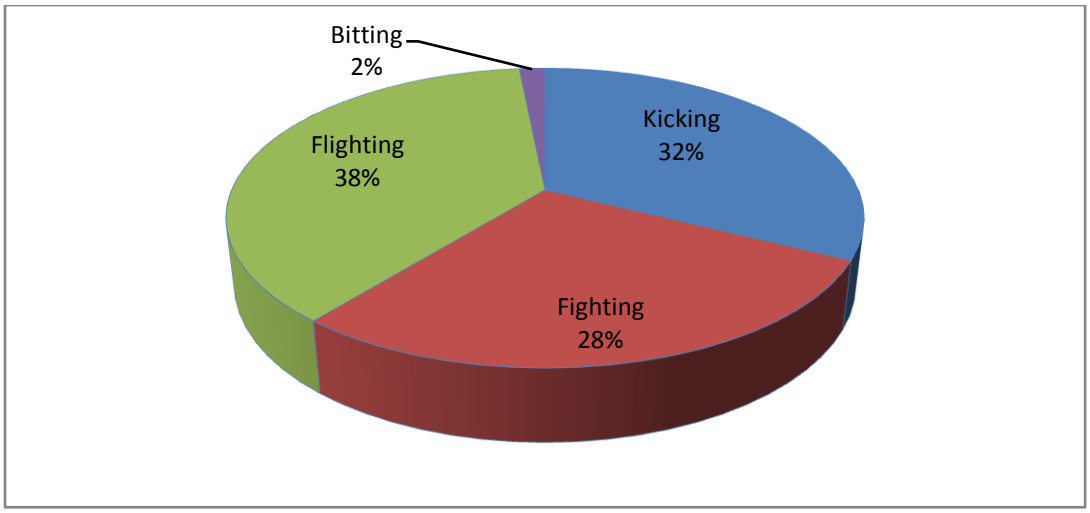


Figure 23: Behaviour of colt-B during secondary stage of obstacle walking (Source: Field Survey, 2014)

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-B.

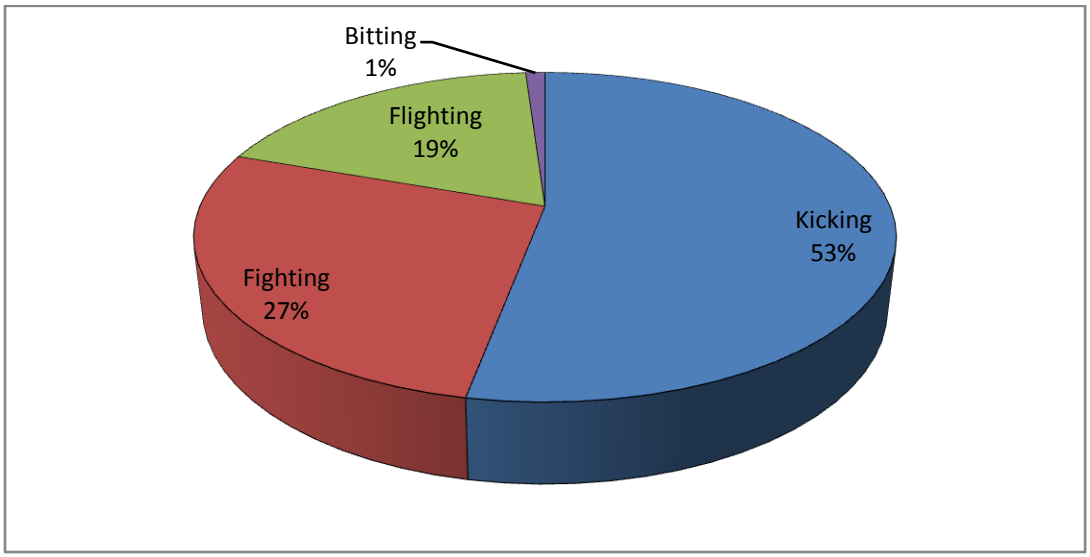


Figure 24: Behaviour of colt-B during tertiary stage of obstacle walking (Source: Field Survey, 2014)

4.9 Behaviour of colt-C during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 43% was kicking, 29% fighting, 26% flighting and 2% biting behaviour showed by colt-C.

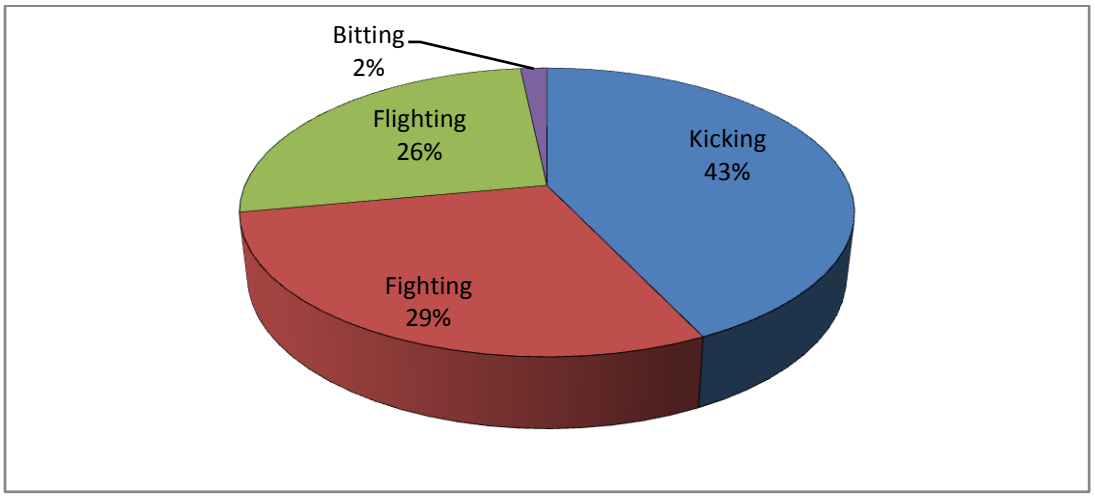


Figure 25: Behaviour of colt-C during primary stage of obstacle walking (Source: Field Survey, 2014)

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-C.

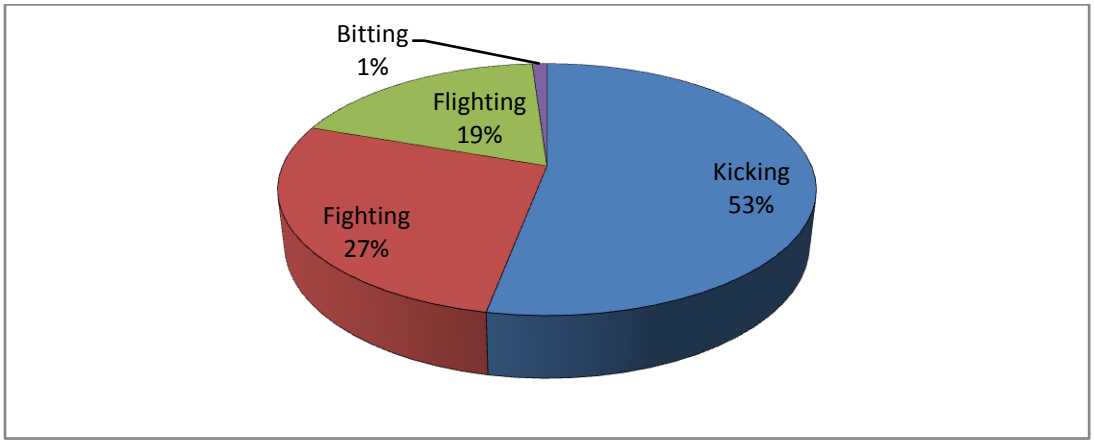


Figure 26: Behaviour of colt-C during secondary stage of obstacle walking (Source: Field Survey, 2014)

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 42% was kicking, 32% fighting, 24% flighting and 2% biting behaviour showed by colt-C.

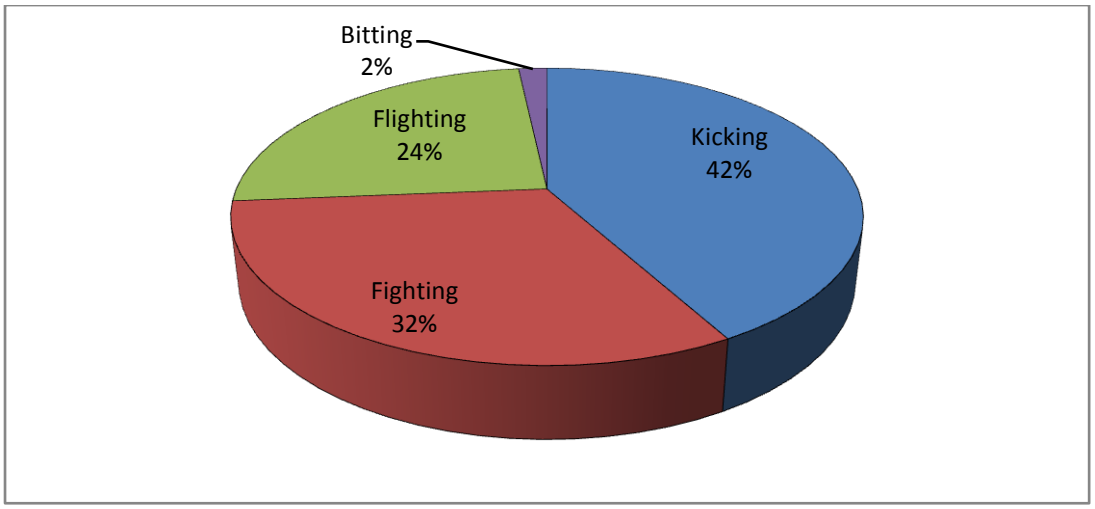


Figure 27: Behaviour of colt-A during tertiary stage of obstacle walking (Source: Field Survey, 2014)

4.10 Behaviour of colt-D during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 32% was kicking, 28% fighting, 38% flighting and 2% biting behaviour showed by colt-D.

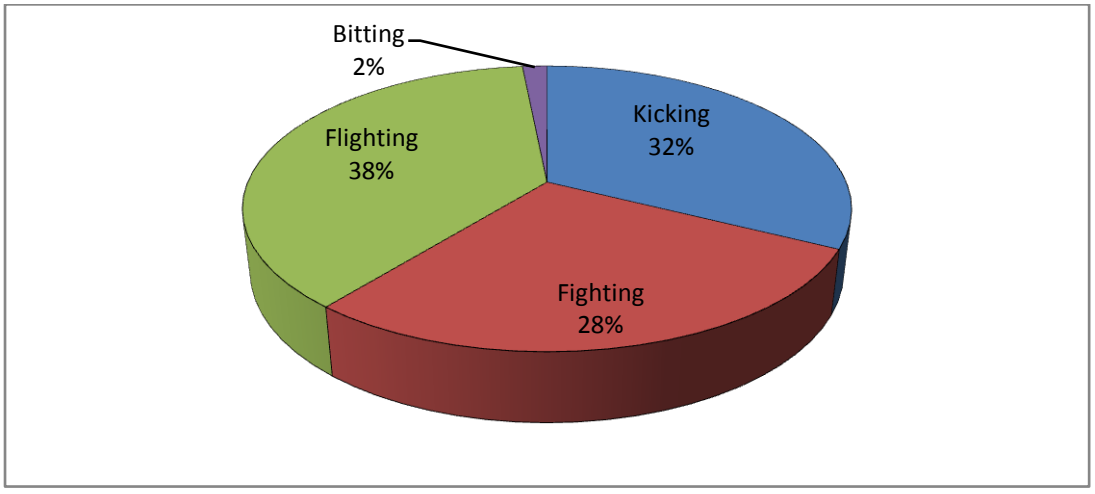


Figure 28: Behaviour of colt-D during primary stage of obstacle walking (Source: Field Survey, 2014)

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 26% was kicking, 34% fighting, 38% flighting and 2% biting behaviour showed by colt-D.

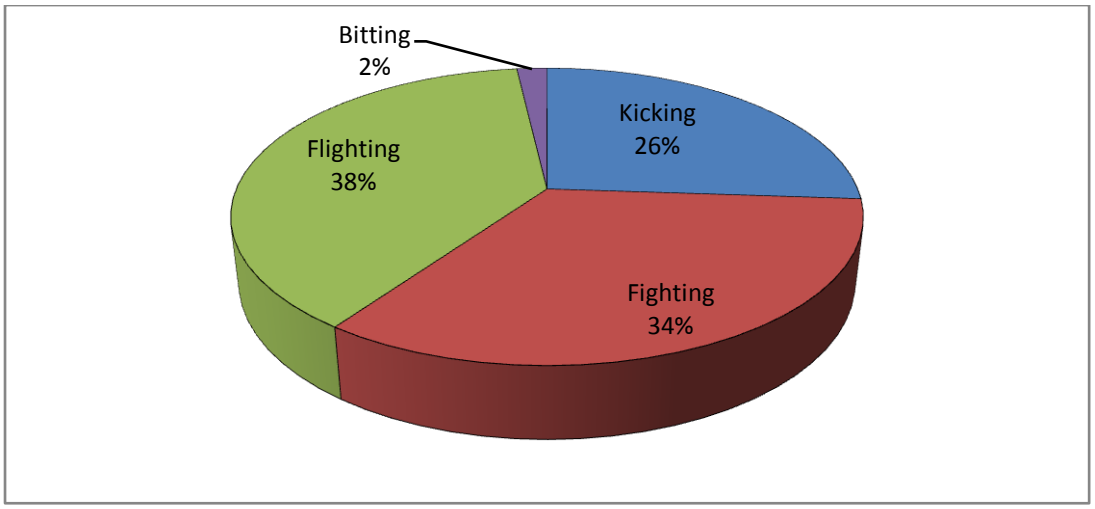


Figure 29: Behaviour of colt-D during secondary stage of obstacle walking (Source: Field Survey, 2014)

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour shown by colt-D.

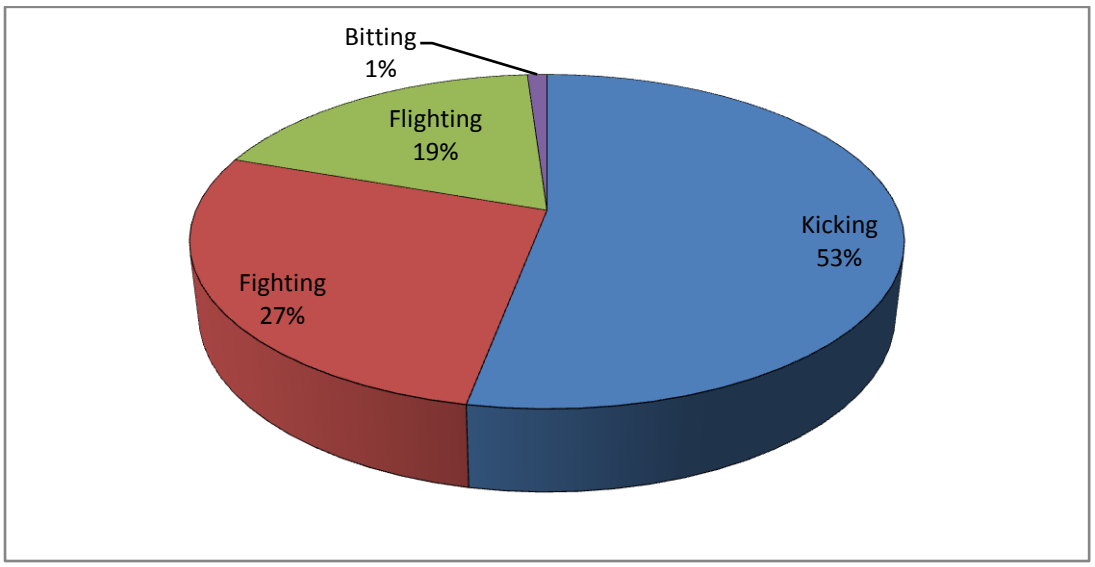


Figure 30: Behaviour of colt-D during tertiary stage of obstacle walking (Source: Field Survey, 2014)

4.11 Behaviour of colt-E during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-E.

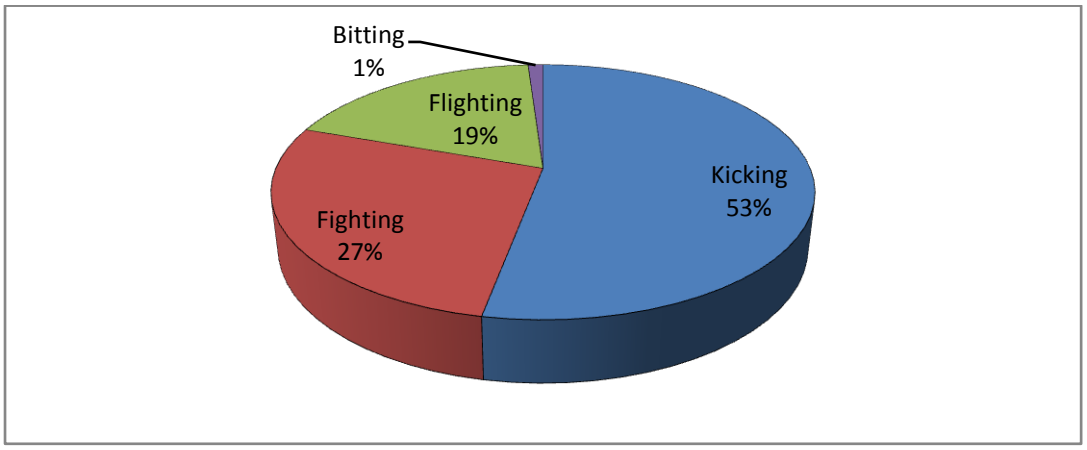


Figure 31: Behaviour of colt-E during primary stage of obstacle walking (Source: Field Survey, 2014)

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 53% was kicking, 27% fighting, 19% flighting and 1% biting behaviour showed by colt-E.

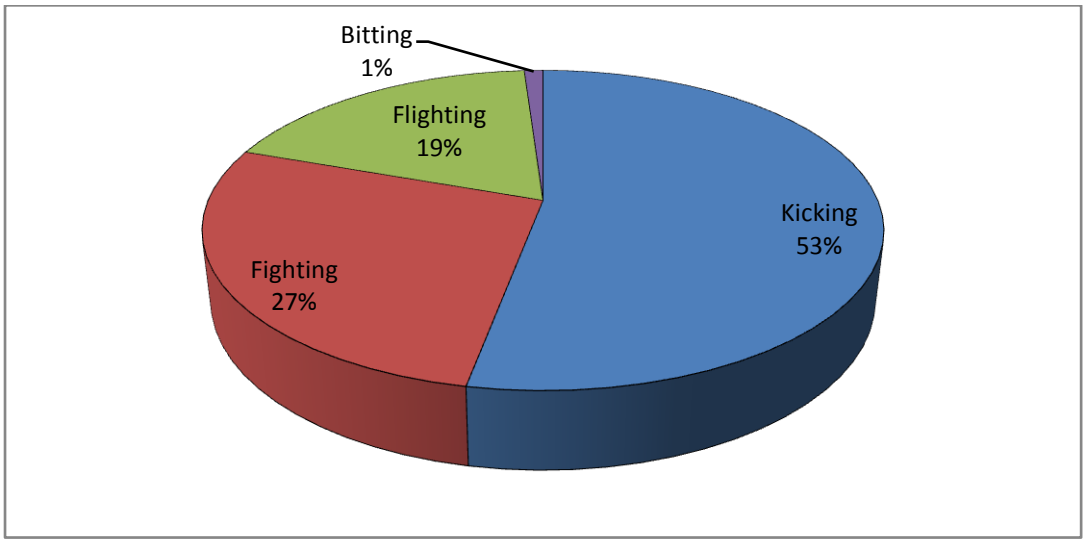


Figure 32: Behaviour of colt-E during secondary stage of obstacle walking (Source: Field Survey, 2014)

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 26% was kicking, 34% fighting, 38% fighting and 2% biting behaviour showed by colt-E.

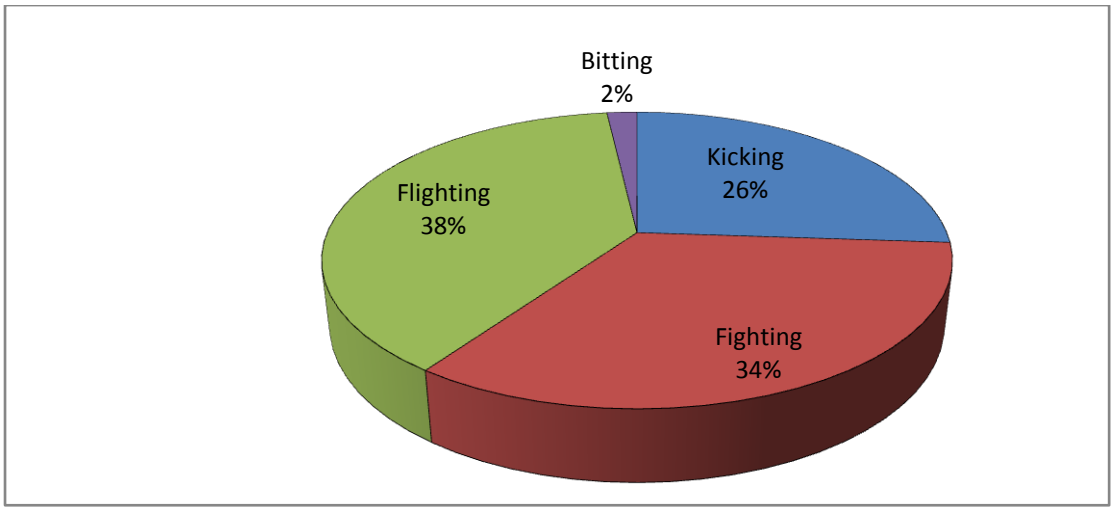


Figure 33: Behaviour of colt-E during tertiary stage of obstacle walking (Source: Field Survey, 2014).

4.12 Behaviour of colt-F during different stages of obstacle walking.

During primary stage of obstacle walking average 4 trials were given in the obstacle path without seat and rider in which 42% was kicking, 32% fighting, 24% fighting and 2% biting behaviour showed by colt-F.

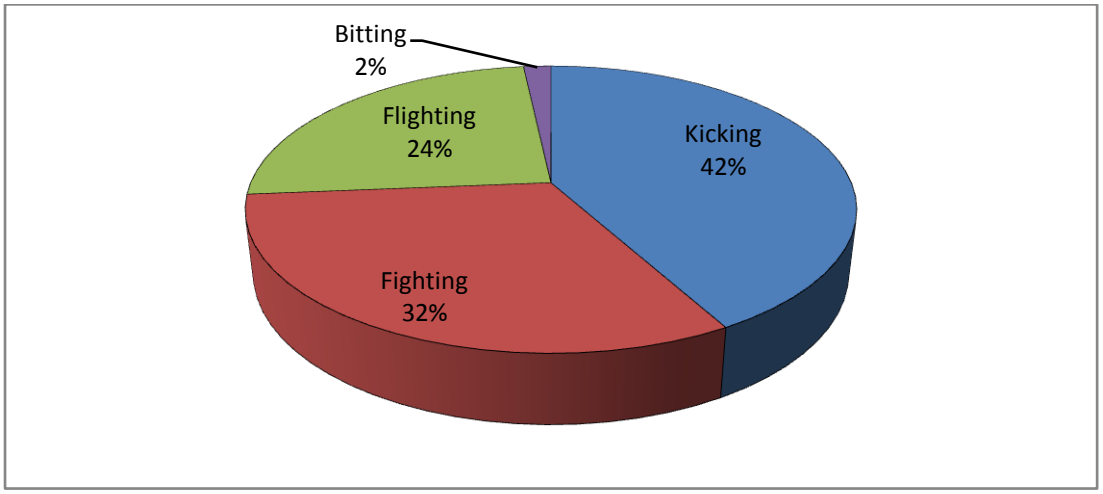


Figure 34: Behaviour of colt-F during primary stage of obstacle walking (Source: Field Survey, 2014).

During secondary stage of obstacle walking average 6 trials were given in the obstacle path with seat in which 26% was kicking, 34% fighting, 38% fighting and 2% biting behaviour shown by colt-F.

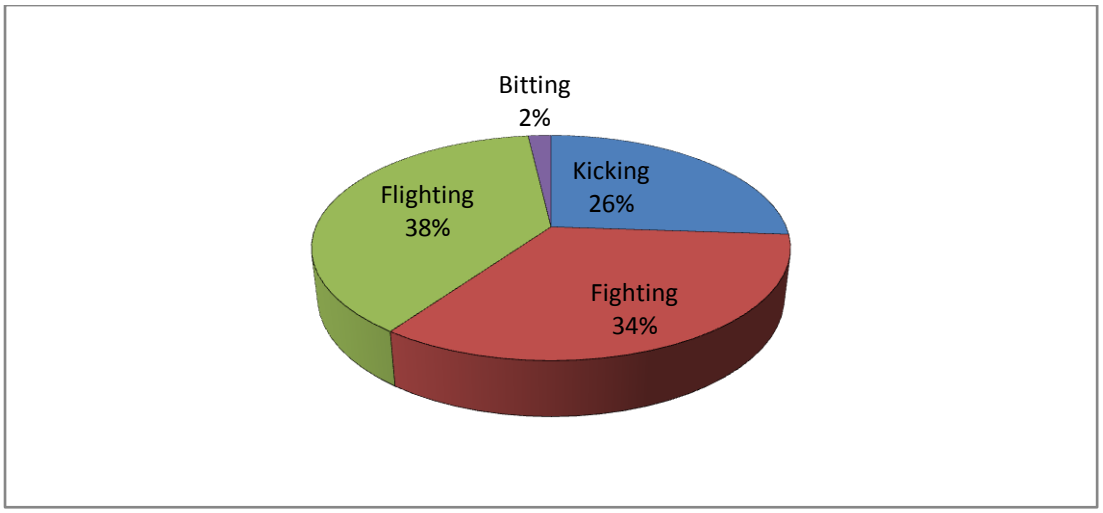


Figure 35: Behaviour of colt-F during secondary stage of obstacle walking (Source: Field Survey, 2014).

During tertiary stage of obstacle walking average 7 trials were given in the obstacle path with rider in which 32% was kicking, 28% fighting, 38% fighting and 2% biting behaviour showed by colt-F.

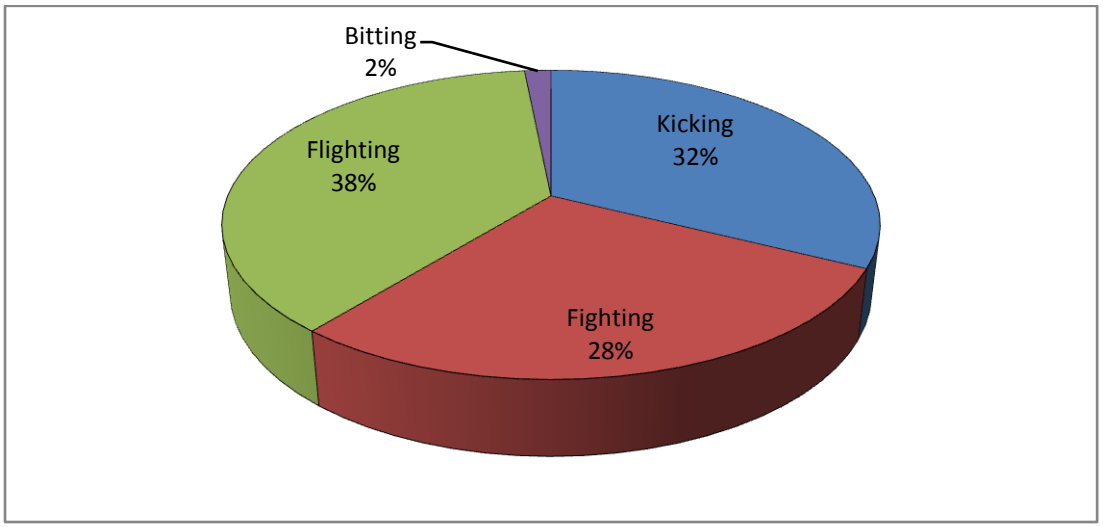


Figure 36: Behaviour of colt-F during tertiary stage of obstacle walking (Source: Field Survey, 2014).

4.13 Behaviour of colt-A during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 32% was kicking, 36% fighting, 30% fighting and 2% biting behaviour showed by colt-A.

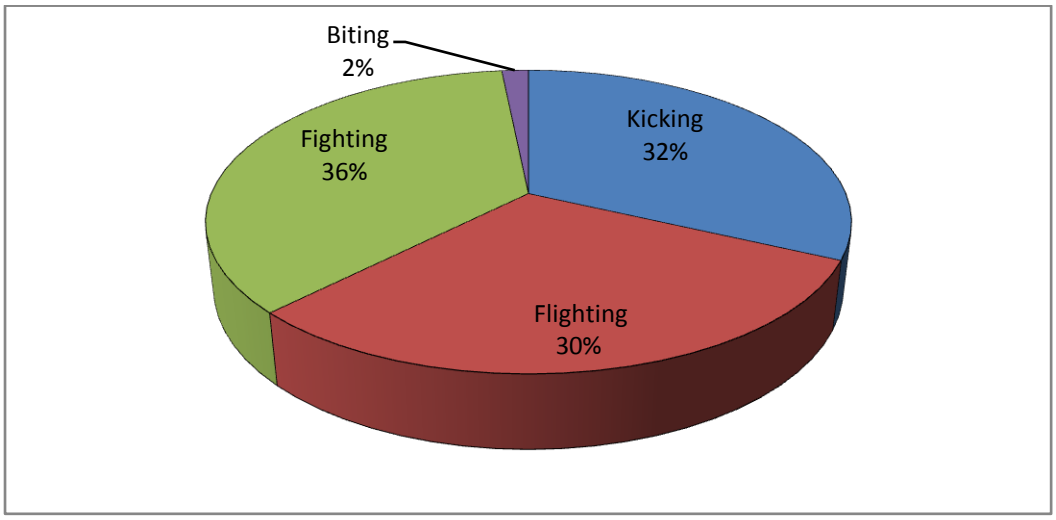


Figure 37: Behaviour of colt-A during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 33% was kicking, 33% fighting, 33% fighting and 1% biting behaviour showed by colt-A.

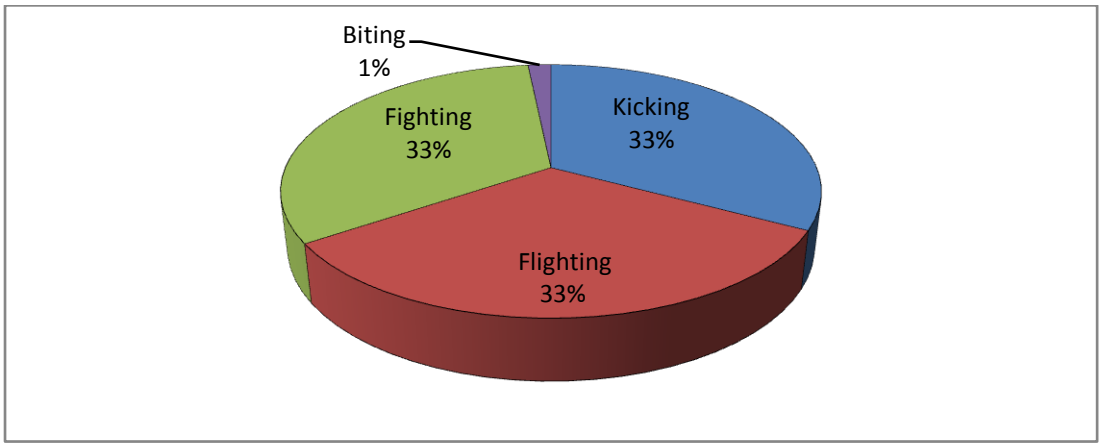


Figure 38: Behaviour of colt-A during secondary stage of jumping (Source: Field Survey, 2014).

4.14 Behaviour of colt-B during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 31% was kicking, 36% fighting, 31% fighting and 2% biting behaviour showed by colt-B.

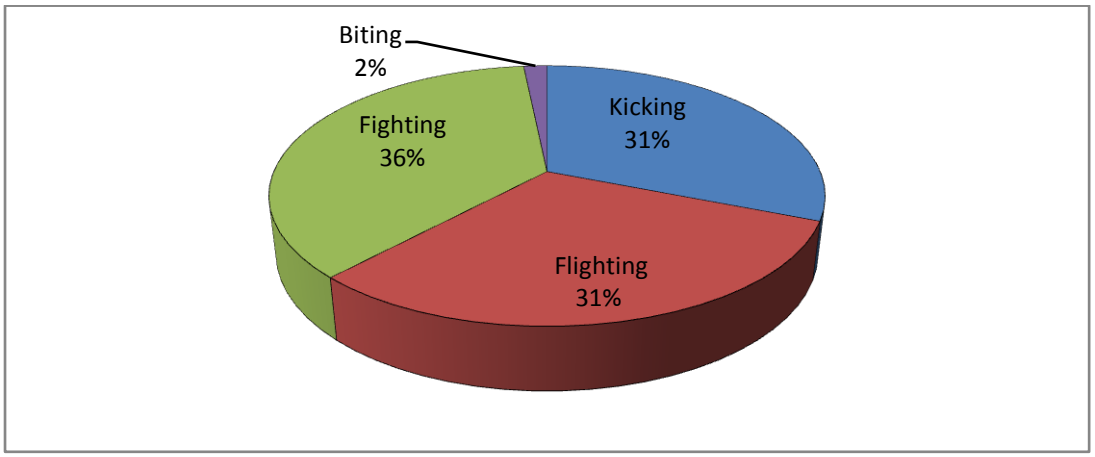


Figure 39: Behaviour of colt-B during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 34% was kicking, 36% fighting, 28% fighting and 2% biting behaviour showed by colt-B.

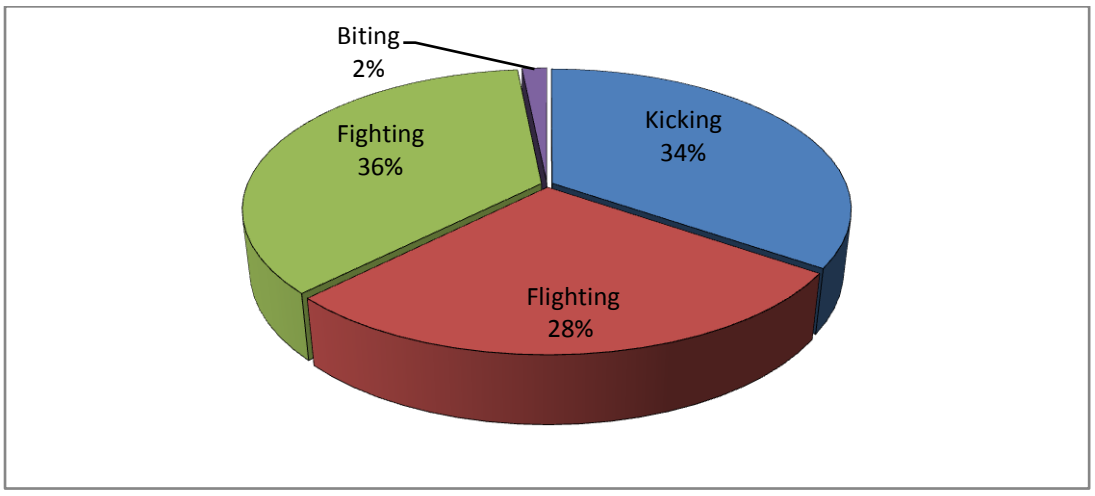


Figure 40: Behaviour of colt-B during secondary stage of jumping (Source: Field Survey, 2014).

4.15 Behaviour of colt-C during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 33% was kicking, 35% fighting, 30% fighting and 2% biting behaviour showed by colt-C.

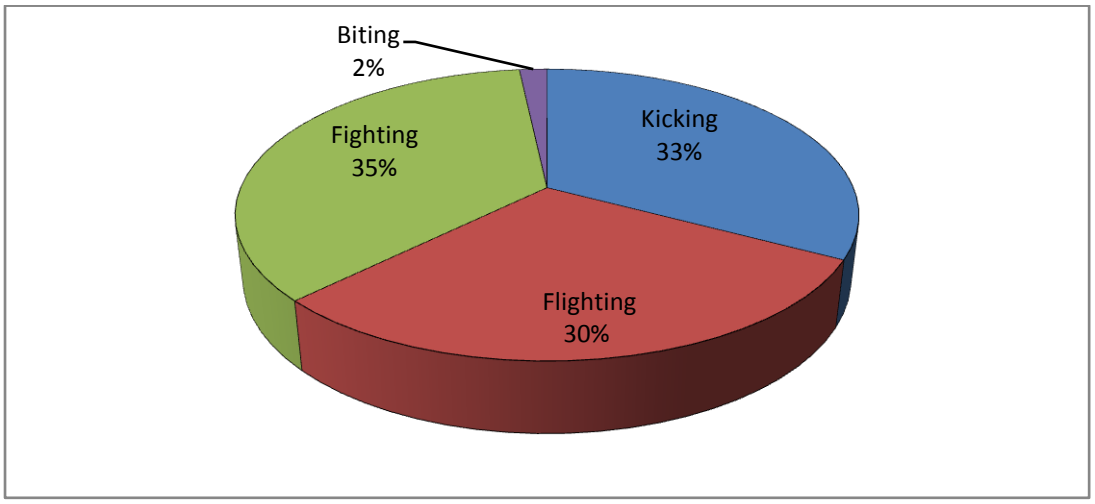


Figure 41: Behaviour of colt-C during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 33% was kicking, 30% fighting, 36% fighting and 1% biting behaviour showed by colt-C.

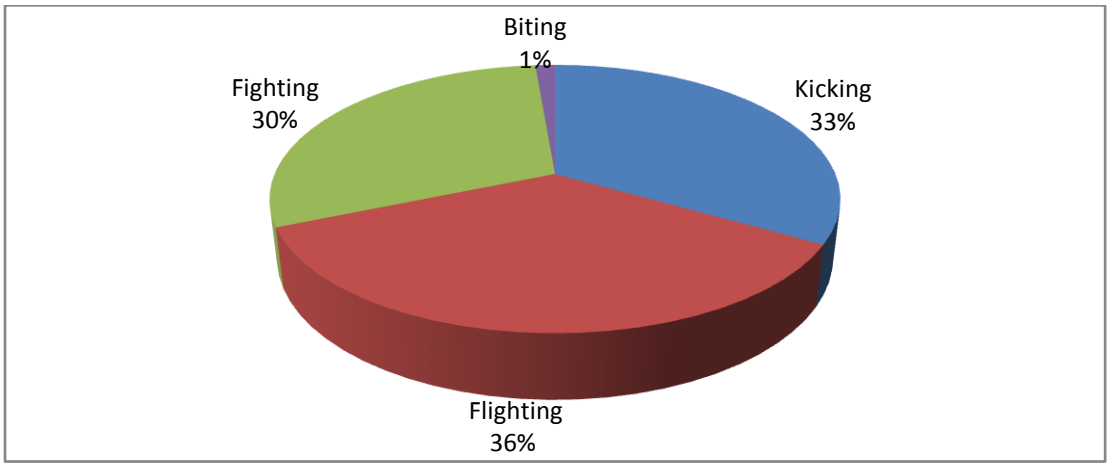


Figure 42: Behaviour of colt-C during secondary stage of jumping (Source: Field Survey, 2014).

4.16 Behaviour of colt-D during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 32% was kicking, 39% fighting, 28% fighting and 1% biting behaviour showed by colt-D.

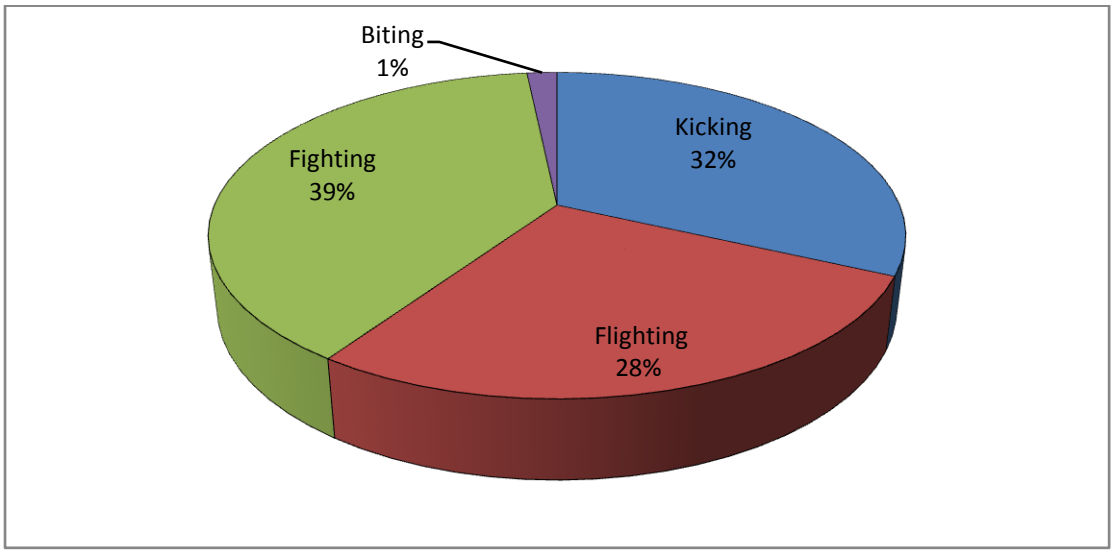


Figure 43: Behaviour of colt-D during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 35% was kicking, 35% fighting, 28% fighting and 2% biting behaviour showed by colt-D.

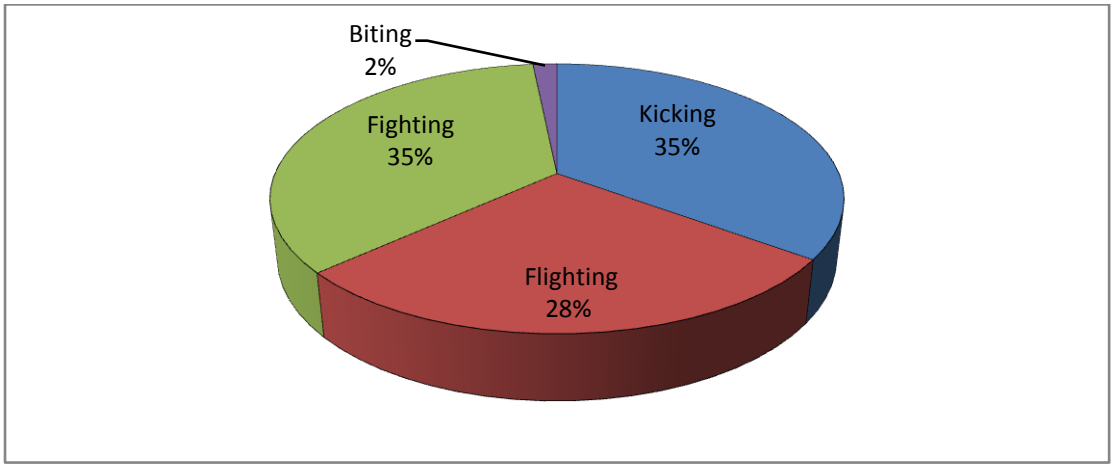


Figure 44: Behaviour of colt-D during secondary stage of jumping (Source: Field Survey, 2014).

4.17 Behaviour of colt-E during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 35% was kicking, 33% fighting, 30% fighting and 2% biting behaviour showed by colt-E.

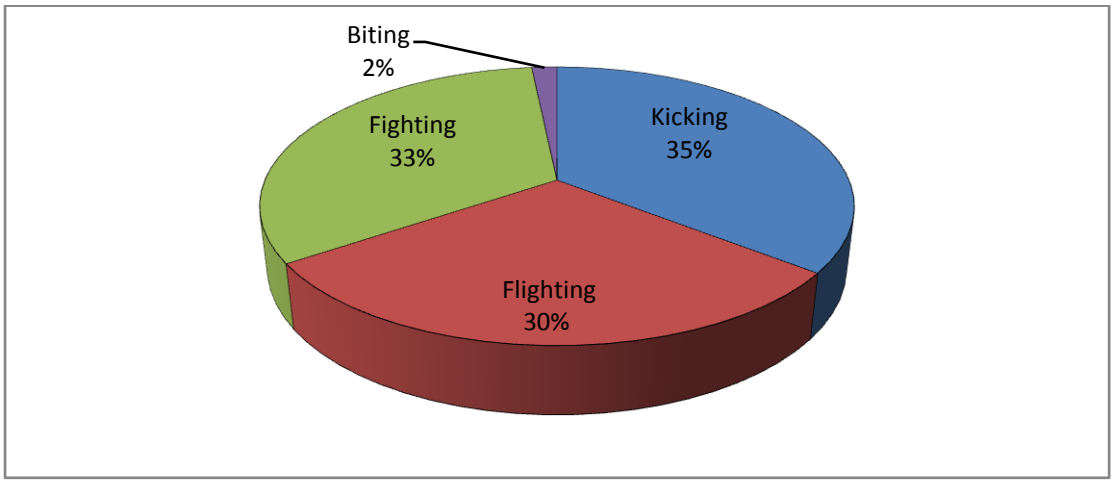


Figure 45: Behaviour of colt-E during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 33% was kicking, 38% fighting, 27% fighting and 2% biting behaviour showed by colt-E.

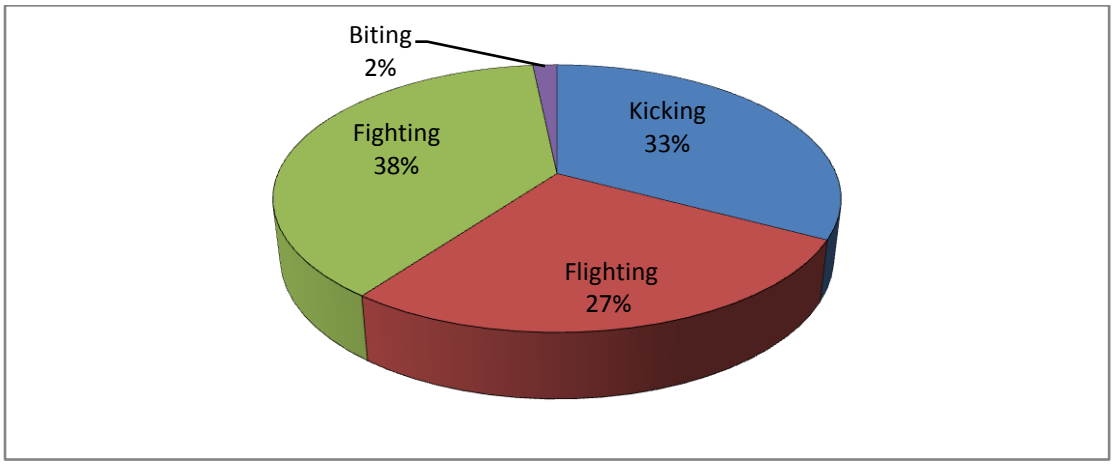


Figure 46: Behaviour of colt-E during secondary stage of jumping (Source: Field Survey, 2014).

4.18 Behaviour of colt-F during different stages of jumping.

During primary stage of jumping average 5 trials were given in the different height with seat only in which 31% was kicking, 36% fighting, 31% fighting and 2% biting behaviour showed by colt-F.

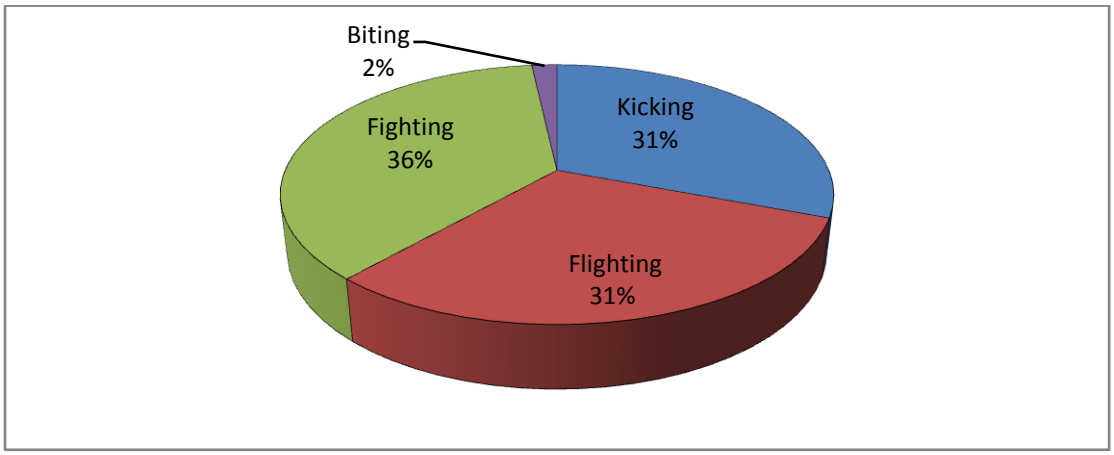


Figure 47: Behaviour of colt-F during primary stage of jumping (Source: Field Survey, 2014).

During secondary stage of jumping average 5 trials were given in the different height with seat only in which 32% was kicking, 37% fighting, 29% fighting and 2% biting behaviour showed by colt-F.

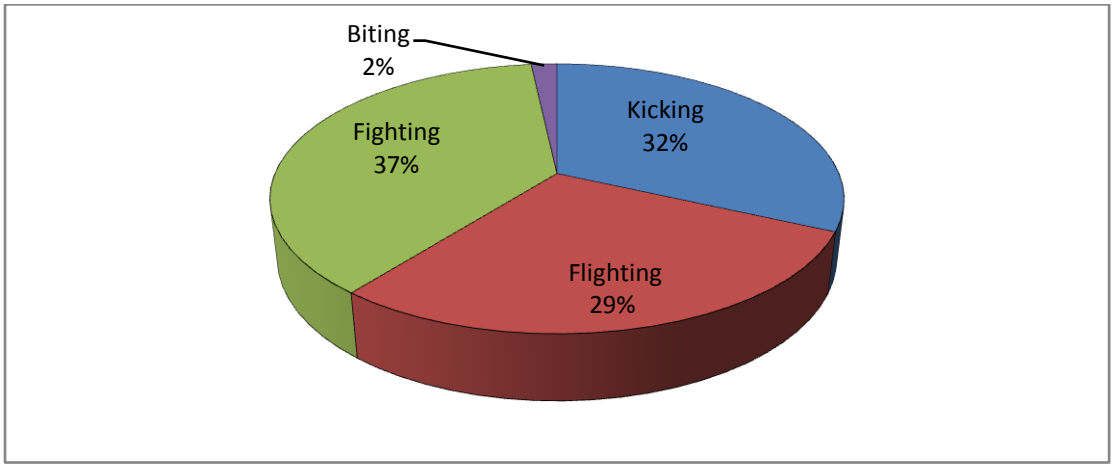


Figure 48: Behaviour of colt-F during secondary stage of jumping (Source: Field Survey, 2014).

4.19 Reward and punishment given to colts during different stages of walking.

During different stages of walking among six colts, colt-A got more punishments. It was also rewarded more. Colt-D was rewarded less than others and it got less punishment. Other colts got punishments and rewards in similar patterns.

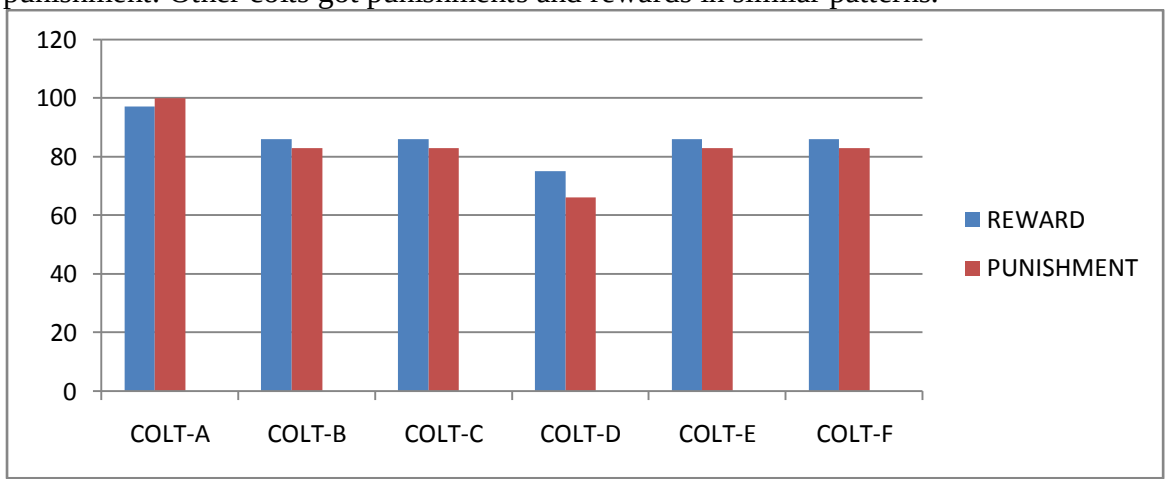


Figure 49: Bar diagram of reward and punishment during different stages of walking (Source: Field Survey, 2014).

4.20 Reward and punishment given to colts during different stages of obstacle walking.

During different stages of obstacle walking among six colts, colt-C and colt-E got more punishment and also they were rewarded more. Colt-A and colt-F was rewarded and punished less than colt-B and colt-D.

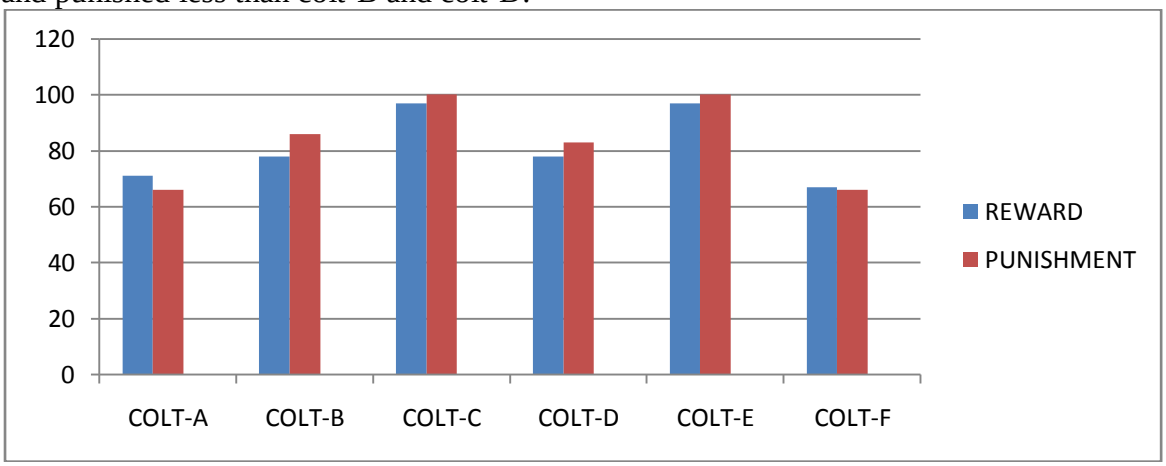


Figure 50: Bar diagram of reward and punishment during different stages of obstacle walking (Source: Field Survey, 2014).

4.21 Reward and punishment given to colts during different stages of jumping.

During different stages of jumping among six colts, colt-A got more punishment. It is also rewarded more. Colt-D was rewarded less than others and it got less punishment. Other colts got punishments and rewards in similar patterns.

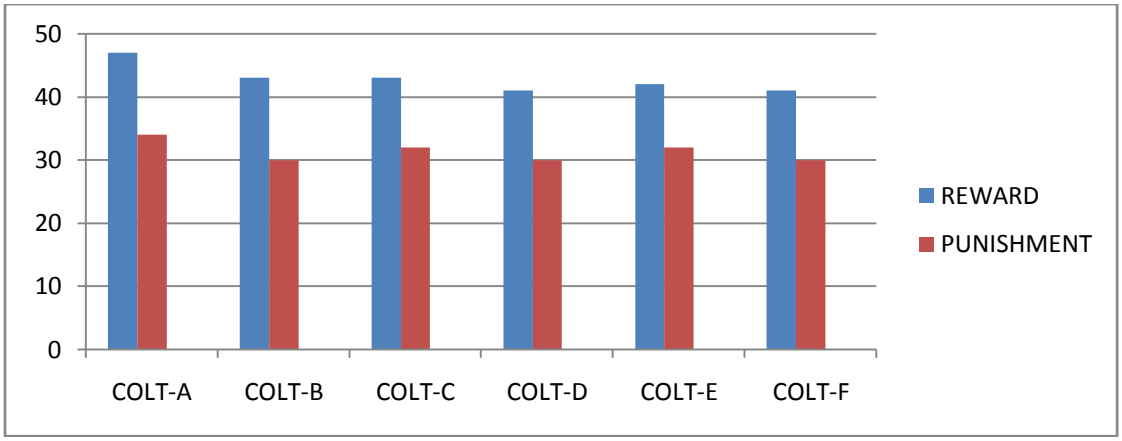


Figure 51: Bar diagram of reward and punishment during different stages of jumping (Source: Field Survey, 2014).

4.22 LAI of colts during different stages of walking.

LAI of colts during primary stage of walking showed that Colt-B and colt-D was better learner than other colts. During secondary stage all colts showed same learning ability and at tertiary stage of walking colt-A and colt-B showed less learning ability then other colts.

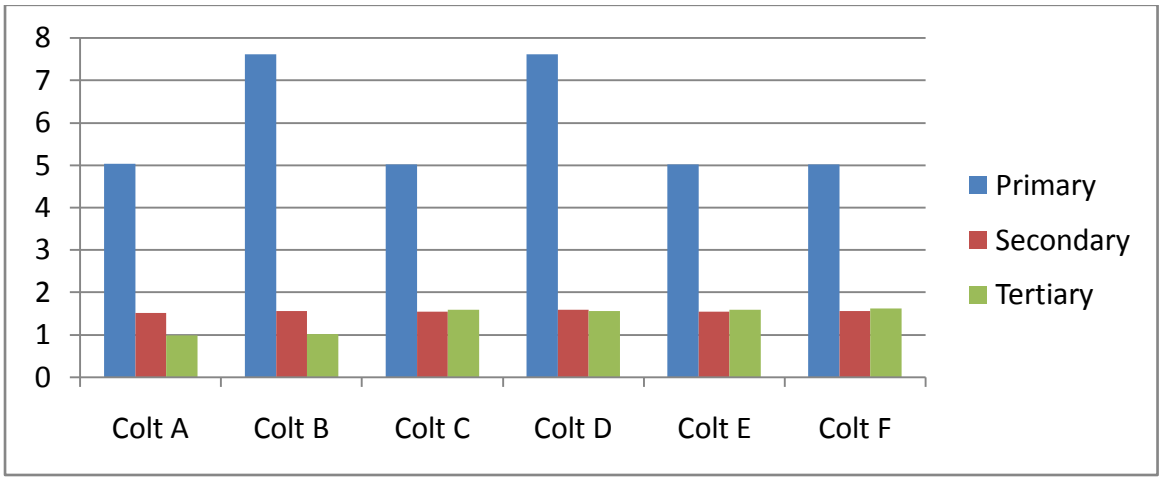


Figure 52: Bar diagram of LAI of colts during different stages of walking (Source: Field Survey, 2014).

4.23 LAI of colts during stages of obstacle walking.

LAI of colts during primary stage of obstacle walking showed that Colt-B was better learner than other colts. During secondary stage colt-A, colt-D and colt-F showed best

learning ability than colt-B, colt-C and colt-E. In tertiary stage colt-F showed the best learning ability than others but least ability was observed in colt-B and colt-D.

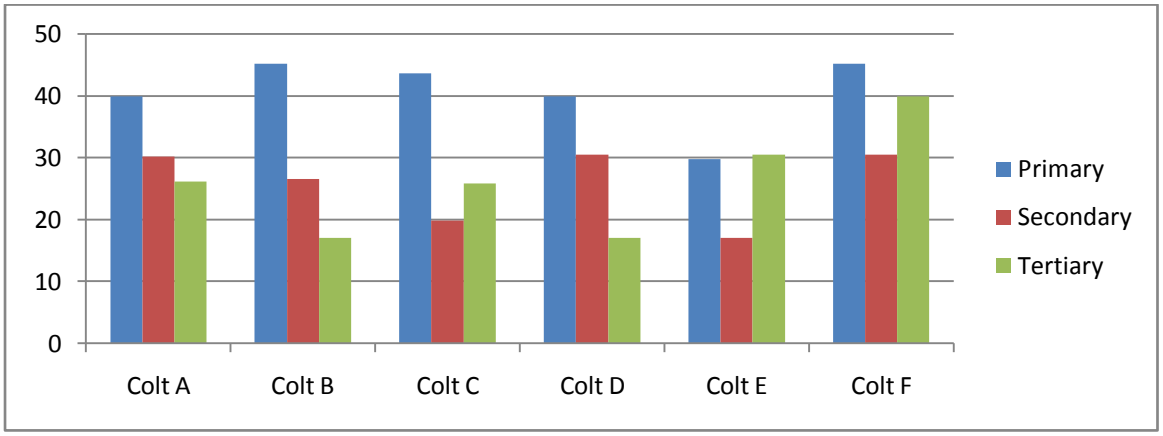


Figure 53: Bar diagram of LAI of colts during different stages of obstacle walking (Source: Field Survey, 2014).

4.24 LAI of colts during different stages of jumping.

LAI of colts during primary stage of jumping showed that Colt-C and colt-D was better learner than other colts. During secondary stage colt-E and colt-F showed better learning ability than other colts.

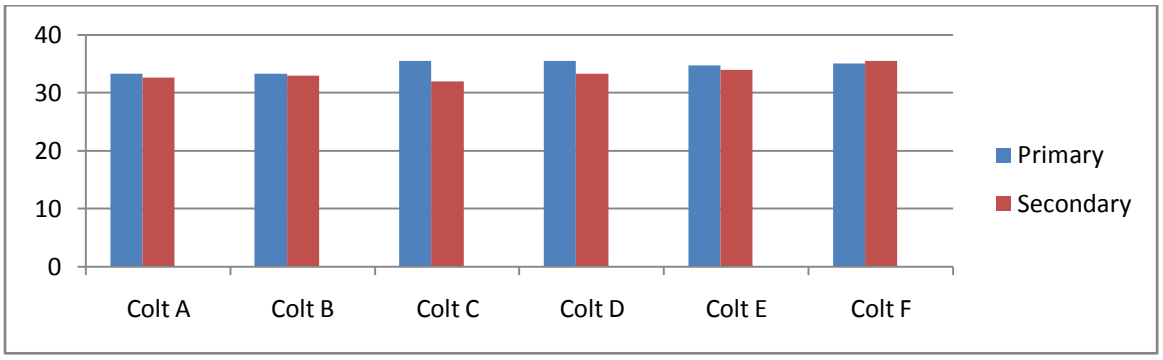


Figure 54: Bar diagram of LAI of colts during different stages of jumping (Source: Field Survey, 2014).

4.25 LAI of colts.

The LAI value was calculated 56, 55, 54, 55, 51 and 64 for the colts A, B, C, D, E and F; respectively. The age of colts A, B, C, D, E and F was 3 years 2 months, 3 years 2 months, 3 years 0 months, 2 years 11 months, 2 years 9 months and 2 years 8 months;

respectively. All the colts were observed as similar learner but colt-F had higher value of LAI and less in colt-E.

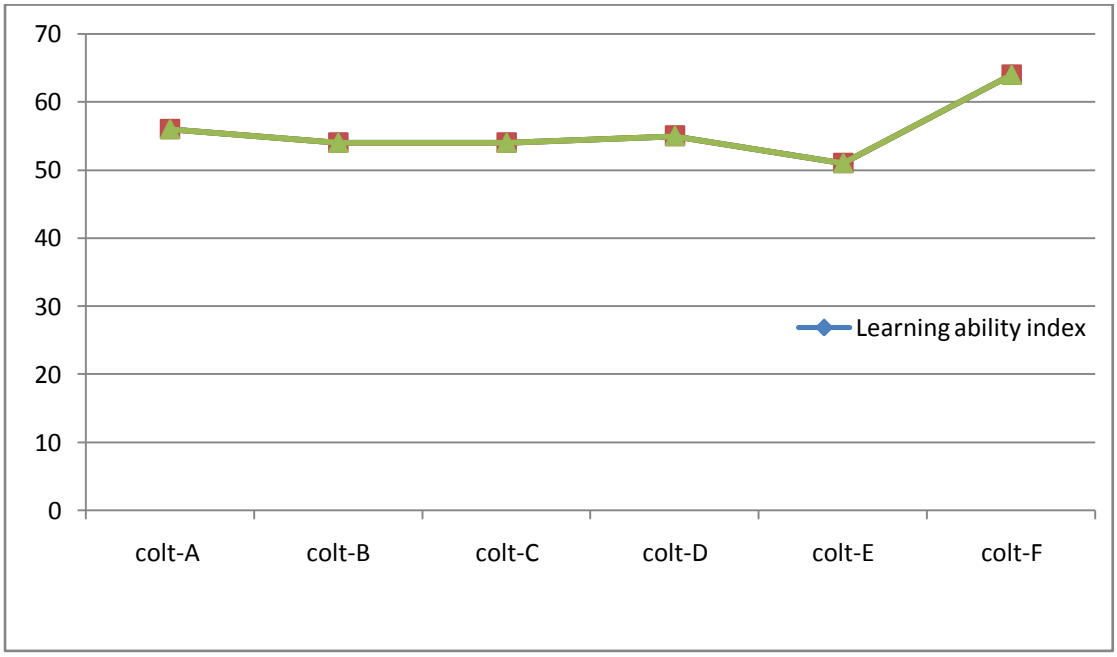


Figure 55: Scatter diagram of LAI (Source: Field Survey, 2014).

5. DISCUSSION

The total counted populations of horses during this study were 101 among them 50 were gelds, 6 colts, 13 stallions, 4 fillies and 28 mares in NCB. Learning behaviour of colts was only observed during this research. Newsmonger (2007) reported about

strong flight-fight response of horses. The flight-fight response of colts was seen average 2 times a day during studied period. Clarkson (2007) reported horses could learn to accept human. The colts were seen to be learning after giving reward and punishment by trainers, which was acceptance of colts to trainer. Leste-lessere (2009) explained about bad behaviour of horse when they got more rest. In horse stable, the colts were observed wall kicking, soil licking, wood chewing and grooming when they were in rest.

Myers and Mesker (1960) reported horse could response different positive reinforcements. The colts were observed responding positively to the trainer after getting sweet foods. They responded the trainers after the positive reinforcements. Mccall (1981) reported horse could learn each new problem. It was observed that colts were learning every new steps of walk like troat, cantor and gallop as ordered by trainers. Pfungst (1907) documented horses had very good discriminating stimuli, it was clearly demonstrated horse kluge hans. The colts were observed every day to enter inside the school without any confusion. Trapy (1975) reported the positive and negative reinforcement connected the specific stimulus, so that when the specific stimulus presented again there was greater chance of the horse making the correct response. The colts were observed learning same skills either by reward or punishment.

Hagg (1980) reported *Equine* learning ability was similar under positive and negative reinforcement, he also reported that horses learned better in both positive and negative reinforcement. It was reflecting in this research that the colts obtained similar LAI value for the reward and punishment condition. Mader and Price (1980) reported younger horse had faster rate of learning, learning rate decrease as their age increased. During this research the colts were observed learning different skills within 3 months. Baer (1983) reported horses learn bad behaviour from each other. The colts were seen learning bad behaviour from each other inside horse school at NCB. Nicol (2002) documented recall ability of the horse. The colts were observed remembering the past taught skills by trainers. Williams (2002) reported that there was no difference in learning ability at three months different age of horses. It was observed no significant difference of learning ability among three months different age of colts.

The LAI value is calculated 56, 55, 54, 55, 51 and 64 for the colts A, B, C, D, E and F; respectively. The age of colts A, B, C, D, E and F is 3 years 2 months, 3 years 2 months, 3 years 0 months, 2 years 11 months, 2 years 9 months and 2 years 8 months;

respectively. It was observed that LAI value of six colts is in similar range. Different 30 respondents gave interviews in which they explained that it was more difficult to teach geld than colts, due to their aggressive behaviour and strength. It was observed that colts learned hardly and they showed different aggressive behaviour. About 80% of respondents explained it was difficult to teach colt during primary stage of learning. Another 50% of respondents suggested that during secondary and tertiary stage they showed aggressive behaviours at first due to load on back of them.

Leste-lessere (2009) reported intillegent horse was the reflection of intillegent trainer. It was observed Colt-F learned more nicely than other colts which were the reflection of intelligent trainer Jagat Pandit Chhetry. He was the most intelligent trainer as reported by the Colonel Kiran K.C during this study. The LAI value of this colt-F was observed 64 which was the higest value among all other colts.

6. CONCLUSION

In NCB there are 101 horses among them 50 are gelds, 6 colts, 13 stallions, 4 fellies and 28 are mares. Horse school in NCB is rectangular having height 3m, length 60 m and breadth 20m. Inside the horse school export trainers give training to horses having age below 4 years and above 2 years. On the ground of horse school there is sand up to 15 cm height. Each horse is controlled by single trainer. Training is given every day until they do not complete their training. During training horses show different behaviours like fighting, fighting, kicking and biting. Trainers of horse teach them by repeating every event for many days. They reward and punish the colts during training. They reward by giving food. Every trainer takes stick to punish them.

Learning behaviour of colts was studied in NCB to explore the idea about the learner horse and trainers. NCB brought the horse for training from the horse breeding centre Chitwan, Nepal. Sometimes they import horse from India and Pakistan which was explained by the NCB veterinary doctor. It is not easy to teach the horse because the horse was from the wild ancestor. They showed the wild behaviour during the learning time. In context of Nepal, wild horse is not found in the wild habitat. But in domesticated habitat they are in Himalayan region for transportation. Horse is the most useful animals as they are used in different tasks like riding, transportation, sports etc. Nepal army uses the horse for the riding purpose and sports. They show different sports activities during the *ghoday-jatra,* army day, and different occasions. The average punishment given by the trainer for each colt was also observed one time per day. The colts were observed negative reinforcements one time per day. The trainers were observed giving sweets to colt average two times per day. It was observed positive reinforcements two times per day. Biting behaviour was observed one time per day. Flighting behaviour was observed more in primary stage then in secondary and tertiary stages. Fighting behaviour was observed average three times per day in primary stage but two times per day in secondary and tertiary stages during study. Kicking behaviour was observed 1 time per day. Intelligent trainers can wisely train the horse. Horse having bad behaviour can be good due to the intelligent trainer due to their wisdom. Expert and intelligent trainer is required to give training to horse. There is not any significant difference of learning ability among different colts having similar age group it means age ranging from two to three months**.**

7. RECOMMENDATIONS

NCB uses the horse for different occusions like Dashain festival, Ghoda jatra, Shivaratri, Nepal Army day, different ceremonies etc. It was only for the internal uses of horse. It should be used for the economic activities of the nation as well as for the Nepal Army. Some recommendations for the NCB are as follows:

1. **Scientific technology.** NCB should use different scientific tools and technologies for the training of horse. They should give emphasis on scientific research which may initiate them for the introduction of new technology and method to carry out the training activities of the horse.

2. **Horse breeding.** Horse breeding system should improve inside Nepal. It is not good to depend on their foreign country for the export of horses. They should breed the horses in Nepal sufficiently.
3. **Use of horses in international games.** NCB shouldn't use horses only for the internal activities and national games. They should use the horses to take part in the international games for recognition of our country.
4. **Public participation.** Public participation for the horse sports is very low in Nepal. So, NCB should make the plans and programs for the public participation for horse husbandry, horse breeding and horse games. NCB should give chance to public to take part in different occasions.
5. **Involvement of retired army.** Retired Army of NCB should involve in horse club, horse school and horse breeding center for their improvement.
6. **Budget for Horse sports.** Ministry of Youth and Sports, Government of Nepal, Singhadurbar, Kathmandu, Nepal should separate some budget for the horse sports. They should make plans and policies for the horse sports.

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APPENDICES

Appendix-I. Questionnaire survey

Name of Respondent:
Cavalry entry date:
Address:
Mobil number:

1. How you feel to teach the horse?

a. very easy b. easy c. difficult d……..

2. At first How you feel to teach the horse?

a. very easy b. easy c. difficult d……..

3. At first how you feel to handle the horse?

a. very easy b. easy c. difficult d……..

4. How you feel to teach the new horse now?

a. very easy b. easy c. difficult d……..

6. Which horse is easy to teach?

a. colt b. filly c. Male yearling d. Female yearling

7. Which horse is difficult to teach?

a. colt b. filly c. Male yearling d. Female yearling

8. Which skill is difficult to teach?

a. handling b. jumping c. running d. walking

9. Which horse have more memory power (not forget easy)?

a. colt b. filly c. Male yearling d. Female yearling

10. What they do if they become angry in stable?

a. kicking b. biting c…… d……

11. What they do if they become angry during ridding?

a. kicking b. biting c…… d……

12. What they do if they become angry during teaching?
a. kicking b. biting c…… d……..
13. At which time they become angry?
a. working b. teaching c. resting at stable d……..
14. Is any season is favorable for teaching?
a. yes b. no
15. Which season is favorable for teaching?
a. Summer b. Winter c. Autumn d. Spring
16. Is trainer is responsible for learning of horse?
a. yes b. no
17. Which trainer is good for teaching?
a. export b. new c. medium d……..
18. How it will easy to teach by food or punishment?
a. food b. punishment c…… d……
19. What are the methods do you teach here?
a. b. c d
20……
……..?
a. b. c. d

Appendix-II. List of gelds in NCB.

S.No.	Name of Horses	Date of birth	Birth place	Age
1.	Ram	2058/7/9	Cavalry	14
2.	Samman	2055/12/15	Cavalry	17
3.	Upphar	2055/12/15	Cavalry	17
4.	Bag	2052/8/29	Bharatpur	20
5.	Bakuni	2050/1/18	India	22
6.	Samba	2049/12/4	India	23
7.	Anjan	2057/12/13	Cavalry	15
8.	Nagarjun	2055/12/18	Cavalry	17
9.	Ashish	2058/3/9	Cavalry	14
10.	Rakesh	2051/7/27	Cavalry	21
11.	Tika	2053/7/8	Cavalry	19
12.	Pukar	2057	India	15
13.	Prakash	2054/4/22	Cavalry	18
14.	Laden	2055	India	19
15.	Kalp	2057/9/18	Bharatpur	15
16.	Ijjat	2057/12/10	Cavalry	19
17.	Sudhir	2059/10/3	Bharatpur	13
18.	Romio	2047	Pakistan	25

19.	Bijaya	2045/9/15	Cavalry	27
20.	Ravan	2050/5/5	Cavalry	22
21.	Sugat	2058/5/19	Cavalry	14
22.	Bir	2054/2/6	Cavalry	18
23.	Bhadur	2045/10/13	Cavalry	27
24.	Bapak	2053/5/9	Cavalry	19
25.	Masuam	2058/6/8	Cavalry	14
26.	Karun	2060/5/04	Bharatpur	12
27.	Rakik	2062/10/14	Bharatpur	10
28.	Sulamen	2048/1/15	Cavalry	24
29.	Vijet	2059/1/15	Bharatpur	13
30.	Binaya	2058/11/8	Bharatpur	14
31.	Prakesh	2059/4/18	Bharatpur	13
32.	Pawan	2052/3/1	Pakistan	20
33.	Parbat	2052/4/20	Pakistan	20
34.	Himamsu	2057/7/15	Bharatpur	15
35.	Mangal	2060/3/16	Bharatpur	12
36.	Jungaus	2052/4/13	Pakistan	20
37.	Tilachu	2057/7/15	Bharatpur	15
38.	Indrinay	2062/12/30	Bharatpur	10
39.	Arjun	2059/3/10	Bharatpur	13
40.	Abhiman	2065/2/21	Bharatpur	7
41.	Sooup	2065/2/21	Bharatpur	7
42.	Sikhar	2053	Cavalry	19
43.	Lahuray	2055/12/4	Cavalry	17
44.	Mechi	2057/11/11	Cavalry	15
45.	Chulbulay	2057/11/04	Cavalry	15
46.	Chacker	2058/02/16	Cavalry	14
47.	Uttpati	2061/5/23	Cavalry	11
48.	Parbat	2054/2/1	Cavalry	18
49.	Munal	2052/9/4	Cavalry	20
50.	Bamay	2055/12/11	Cavalry	17

Appendix-III. List of colts in NCB.

S.No.	Name of Horses	Date of birth	Birth place	Age
1.	Hemanta	2067/12/2	Bharatpur	4
2.	Tilak	206712/10	Bharatpur	4
3.	Kuber	2068/2/22	Bharatpur	3
4.	Manish	2068/3/5	Bharatpur	3
5.	Amulya	2068/5/2	Bharatpur	3
6.	Sugam	2068/6/1	Bharatpur	3

Appendix-IV. List of stallions in NCB.

S.No.	Name of Horses	Date of birth	Birth place	Age
1.	Pritana	2059/12/13	Bharatpur	13
2.	Sangram	2064/10/14	Bharatpur	8
3.	Gagan	2060/2/24	Bharatpur	12
4.	Vagyman	2053/12/9	Cavalry	19

5.	Karan	2062/10/18	Bharatpur	10
6.	Parch	2062/12/6	Bharatpur	10
7.	Chitwan	2065/9/13	Bharatpur	7
8.	Rekha	2040/12/24	Cavalry	32
9.	Badal	2041/5/18	Cavalry	31
10.	Sustek	2068/10/3	Narayanhite	4
11.	Sapana	2053/1/3	Cavalry	19
12.	Huski	2062/10/25	Cavalry	10
13.	Rochak	2062/10/25	Cavalry	10

Appendix-V. List of fellies in NCB.

S.No.	Name of Horses	Date of birth	Birth place	Age
1.	Ragani	2064/1/22	Bharatpur	8
2.	Pari	2064/4/15	Bharatpur	8
3.	Makali	2063/6/2	Bharatpur	9
4.	Soni	2063/12/6	Bharatpur	9

Appendix-VI. List of mares in NCB

S.No.	Name of Horses	Date of birth	Birth place	Age
1.	Bagmati	2052/11/21	Cavalry	20
2.	Narayani	2045	Bharatpur	27
3.	Kishori	2050/2/1	India	22
4.	Phayali	2049/12/22	Cavalry	23
5.	Ponum	2058/5/14	Cavalry	14
6.	Hamsika	2055/10/2	Cavalry	17
7.	Charu	2056/8/1	Cavalry	16
8.	Anjali	2054/4/9	Cavalry	18
9.	Asmita	2058/6/1	India	14
10.	Rojina	2055	India	17
11.	Amba	2050/5/21	Cavalry	22
12.	Tribhani	2050/3/26	India	22
13.	Sujata	2057	India	15
14.	Parbati	2057	India	15
15.	Mohani	2053/10/15	Cavalry	19
16.	Muna	2062/1/18	Bharatpur	10
17.	Rashmi	2062/10/18	Bharatpur	10
18.	Dabaki	2062/10/12	Bharatpur	10
19.	Rubi	2064/11/4	Bharatpur	8
20.	Niru	2051/5/9	Bharatpur	21
21.	Bandana	2055/11/3	Bharatpur	17
22.	Malbika	2057/10/10	Bharatpur	15
23.	Jayainti	2062/10/27	Bharatpur	10
24.	Srijan	2055/11/02	Cavalry	17
25.	Pramina	2062/1/21	Bharatpur	10
26.	Sabitri	2059/11/8	Cavalry	13

27.	Pramila	2058/12/4	Cavalry	14
28.	Tilu	2057/8/14	Cavalry	15

Appendix-VII. Total number of Horses in NCB.

Type	**Ridding**	**Baggikhan**	**Tangon**	**Total**
Geld	27	14	9	50
Colt	5	1	-	6
Stallion	3	4	6	13
Felly	3	1	-	4
Mare	19	3	6	28
Total	57	23	21	101

Appendix-VIII. Measurement of Horse school in NCB.

Height	3m
Length	60m
Breadth	20m
Area	1200m^2

Appendix-IX: Classification of Horse used in research.

Colt	**Name of Horses**	**Data of birth**	**Age during training**	**Colour**	**Type**
A	Hemanta	2067-12-2	3years 2 month	Chestnut	Male
B	Tilak	2067-12-10	3years 2 month	Bay	Male
C	Kuber	2068-2-22	3years 0 month	Chestnut	Male
D	Manish	2068-3-5	2years 11month	Bay	Male
E	Amulya	2068-5-2	2years 9 month	Chestnut	Male
F	Sugam	2068-6-11	2years 8 month	Bay	Male

Appendix-X: Photo plates

Photo1: Horses walking during primary stage.

Photo 2: Horse walking during secondary stage.

Photo 3: Horse walking during tertiary stage

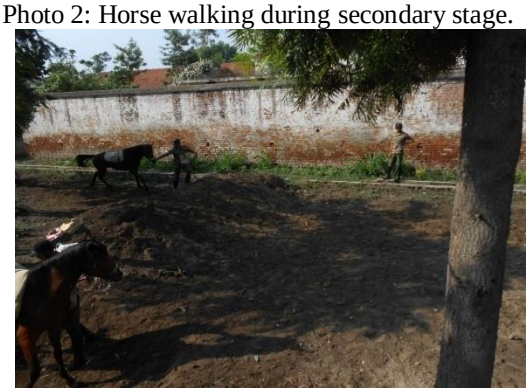

Photo 4: Horses obstacle walking during Primary stage.

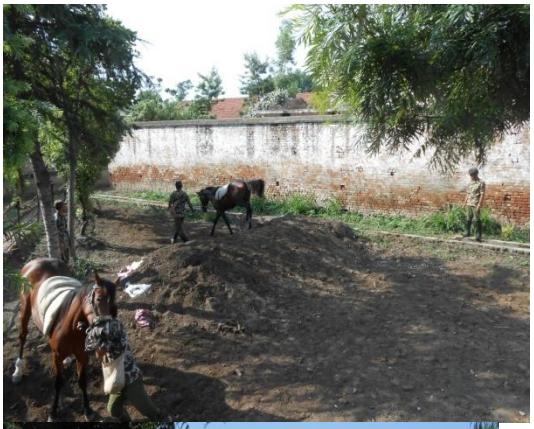

Photo 5: Horses obstacle walking during secondary Stage.

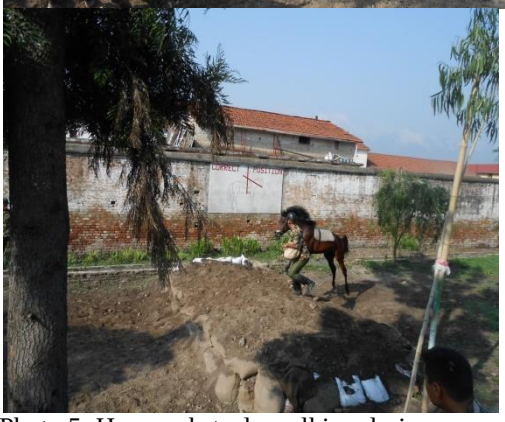

Photo 6: Horses obstacle walking during Tertiary stage.

Photo 7: Horse jumping during primary stage.

Photo 8: Horse jumping during secondary stage.

Photo 9: Measuring punishment stick inside Horse school.

Photo 10: Horses in NCB.

Photo 11: Horses using in research

Photo 12: Rider ridding on Baggi.

Photo 13: Rider on horse.

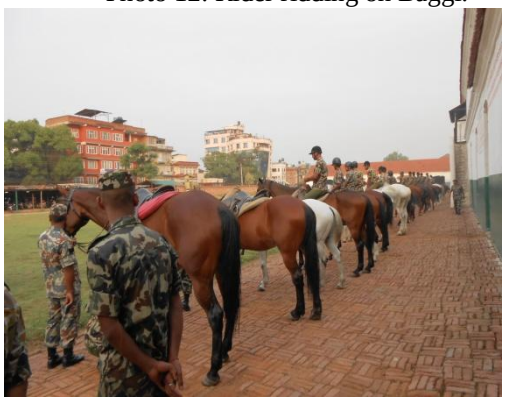

Photo14: Horse checking by Veterinary.

Photo 15: Horse grazing on ground.

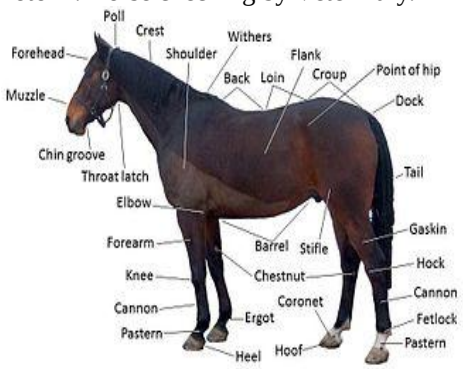

Photo 16: Horse