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Feeding Habits of Sambhur *Cervus unicolor* kerr, 1792 and Hog Deer *Axis porcinus* Zimmermann, 1780 in Hlawga Wildlife Park

San San Hmwe¹, Moe Sanda Oo², Mie Mie Than³, Tin Lay Mon⁴ and
Aye Mya Phyu⁵

Abstract

A study of resource partitioning between Sambhur *Cervus unicolor* kerr, 1792 and Hog Deer *Axis porcinus* Zimmermann, 1780 was conducted in Hlawga Wildlife Park located in Mingaladone Township, Yangon from 2008 to 2010. Both deer species depend on varied plant species in their habitat such as bamboo, grasses, ferns, herbs, and mushrooms etc. Sambhur mostly fed on browsing plant species while hog deer on grasses. A total of 34 plant species (68%) for hog deer and 43 species (86%) for sambhur were recorded by dung analysis. Seasonal variation of diet breadths were summer (0.04, 0.09), Rainy (0.02, 0.01) and winter (0.00, 0.02) for Sambhur and Hog deer, respectively.

Key words: Sambhur, Hog deer, feeding habits, competition, diet breadth

Introduction

Most of the world's species conservation problems, concerning many of the world's species are threatened with extinction. Large numbers of species are already extinct, and many others have reduced population sizes as a result of increasing human activities. Myanmar is well known for its rich biodiversity, having an unusually large number of indigenous plant and animal species representing a total of 360 species of mammals, 1027 species of birds and 278 species of reptiles (Win Naing, 2009).

Sambhur is included in "protected" species and Hog deer is included in the declared objectives of a number of sanctuary and park systems in Myanmar. Hlawga Wildlife Park was a project of the Nature Conservation and National Parks Department (NCNPD). The NCNPD was officially created in April, 1982 & long for seven years and opened in August, 1989 as the Nation Wildlife Park. Mainly mammalian fauna of the

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park are Sambhur, Hog deer, Elk's deer, Barking deer and Wild Boar and Monkey. The present study was conducted for the development of the appropriate management strategies and actions as the effective conservation on deer species.

Material and methods

Study area

The present study was conducted at Hlawga Wildlife Park from 2008 to 2010. It covers an area of 1540 acre (616 ha) including buffer area about 660 acre (264 ha), a mini-Zoo about 62 acre (24.8 ha) and wildlife core area about 818 acre (327.2 ha) which enclosure by fence (2 m height) and composed of about 278.4 ha total land area and 48.6 ha water body estimated about 271ha in core zone & about 56ha is tourist zone. The study area was subdivided into five compartments (Area: I – V) depend on the roads & paths, etc (Fig. 1).

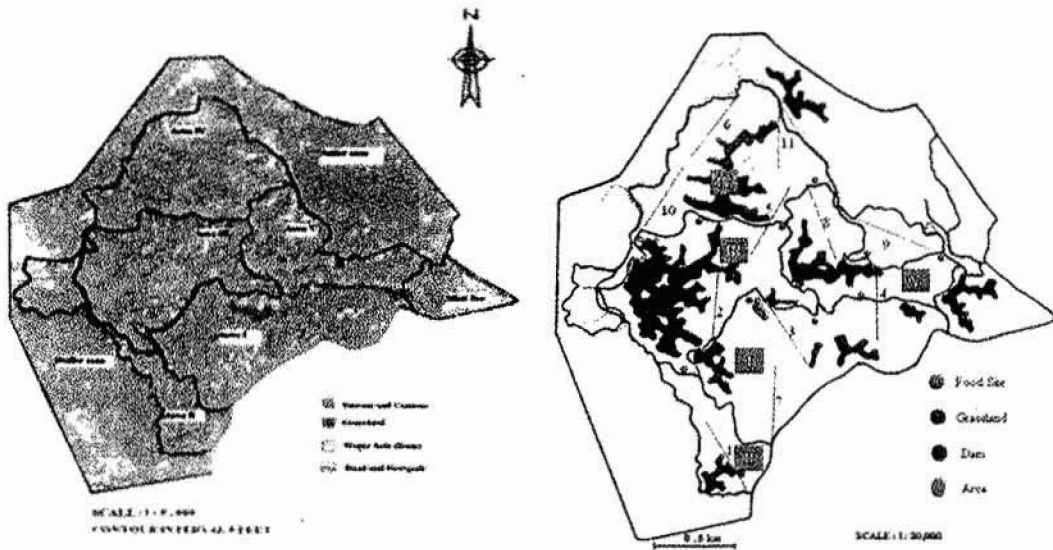


Fig. 1 Map of showing Hlawga Wildlife Park and location of studied area

The direct observation of their feeding was conducted by the signs of considerable high for browsing (>2m) (Wallmo *et al.* 1973) and the dung analysis (Stewart, 1967; Storr, 1961; Kelton & Skipworth, 1987; Zyznar & Urness, 1969; Lensing, 1980). The diet breadth among deer species studied according to Khan, 1994. Identification of the plant species was based on Kress *et al.*, (2003). Comparison of their feeding habits among deer species was calculated by Chi- χ^2 test.

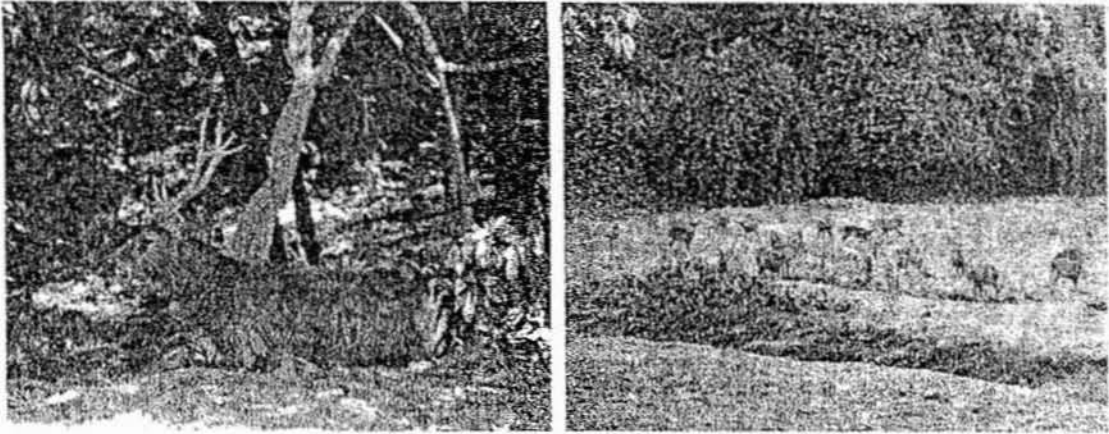


Fig.2 Sambhur (Male) and hog deer at the grassland at area

Results

Available food plants of both deer species based on direct observation

A total of 84 species were recorded according to the as the food available items for both deer species in the study area comprising 4 species bamboo, 16 species of climbers, 4 species of grass, 11 species of shrubs and herb, and 49 species of trees (Fig. 3). Consuming different parts of plants by both deer species was shown in Fig. 4.

Among them, the most preferable plant species were O boke *Melastoma malabathricum*, Yin deik *Dalbergia cultrata*, Thit seint *Terminalia bellerica*, Kyein Phan *Phoenix mocrstachya*, Saethanbyar *Canthium parvifolium*, Pauk *Butea frondosa*, Su yit *Acacia pennata*, Tha byae nyo *Eugenia kurzii*, Dant ta laung *Delbergia rimosa*, Gyut new *Calycopteris floribunda* and Maniawga *Carallia integerrima* for both deer species.

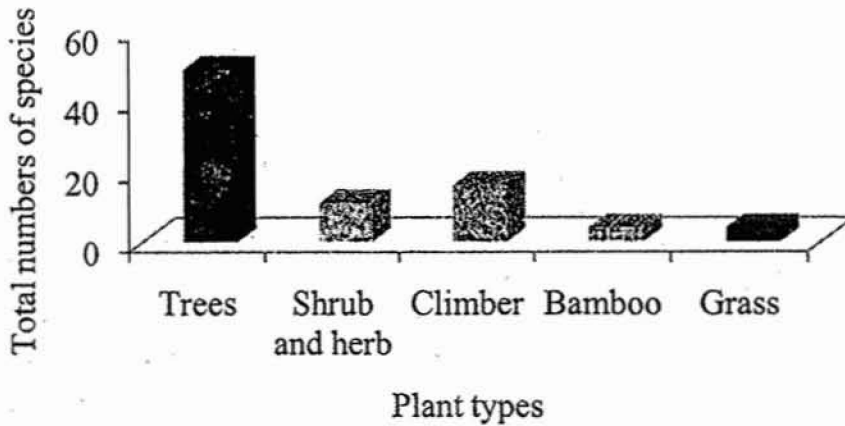


Fig.3 Recorded food available items for deer species in the study area

Feeding habits of both deer species based on the dung analysis

A total of 50 plant species were recorded as their foods based on the dung analysis. There were 34 species (68%) for hog deer and 43 species (86%) for sambhur. The seasonal preference of feeding rate was shown in Table 1. No significant differences was found in plant groups among season for sambhur ($\chi^2 = 12.078$, $df = 8$, $P > 0.05$) whereas the significant difference was observed for hog deer ($\chi^2 = 16.99$, $df = 8$, $P < 0.05$).

Table1 Seasonal differences of feeding habit for both deer species

Plant	Sambhur				Hog deer			
	Cool season	Dry season	Wet season	Diff. sp.	Cool season	Dry season	Wet season	Diff. sp.
Trees	44.8	47	48.3	19	39.5	43	33.5	23
Shrub	9.2	18.4	10.0	3	17.9	25	14.3	4
Climber	16.1	18	20.0	3	15.6	14.5	15	7
Grass	25.2	10.2	15.0	4	17.8	9	30.5	4
Bamboo	4.7	6.4	6.7	4	9.2	8.5	6.7	4

The food preference calculations indicated as percentage of grazing and browsing for both species such as 76%, 24% for hog deer and 22.5%, 78.5% for sambhur, respectively.

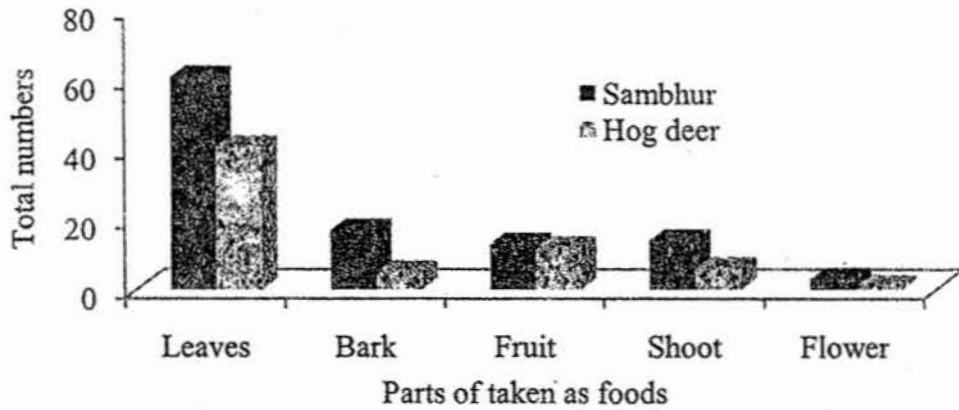


Fig.4 Different parts of food plants for deer species in the study area

The diet breadths were hot season (0.04, 0.09), wet season (0.02, 0.01) and cool season (0.00, 0.02) for Sambhur and Hog deer, respectively (Fig.5).

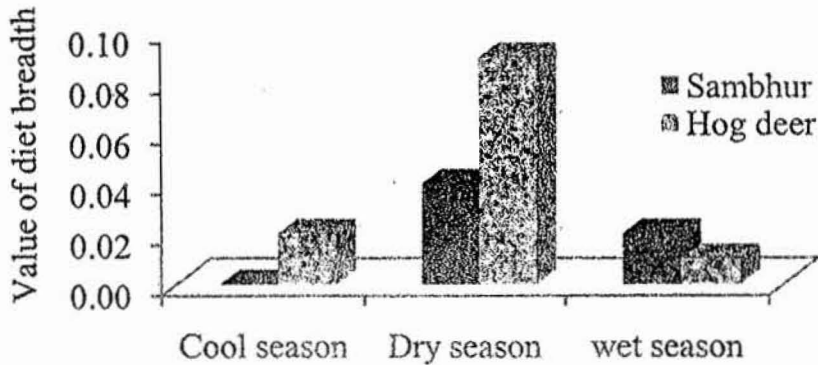


Fig.5 Seasonal variation of diet breadth of both deer species

Discussion

According to the report of Porwal (1996), moist mixed forest has been given the very good condition for food and shelter value for deer species. The present study area is the good condition for both deer species

depend on the forest types & ground cover information. Based on the direct observation and dung analysis, sambhur was mostly preferable on that of browsing plant species whereas hog deer fed mostly on grasses. Sambhur also fed on green grasses in favourable condition. Both deer also sustained on dry leaves during unfavourable condition. Through they feed on many other plants but details of which are not available.

The differential resource selection is one of the most principal relationships which permit species to coexist (Rosenzweig, 1981). Sympatric ungulate species maintain a resource partitioning mechanism among them to avoid competition to co-existence by utilizing different food components (Schoener, 1974 and Green, 1985). The present result shown that both deer species utilized a wide range of tree and shrub species and its diet composed of grasses and sedges. A total of 25 species out of total recorded species (50 species) were dietary overlap (50%) between sambhur and hog deer based on dung analysis. Nevertheless they ate these plants in different seasons. It may be to reduce the competition of feeding among deer species. The highest grassing rate was recorded in cool season for sambhur while in wet season for hog deer.

Both deer species fed on grass species Paungsa Myeat *Ischaemum aristatum* for all seasons and Hti myet *Cyperus alternitoli* in cool season and wet season. But Hog deer fed on Myaesa myet *Cynodon dactylon* in cool and wet seasons than sambhur. These data suggested that the food availability of grazing decreased in hot season. Both deer species have the competition on two grass species Paungsa Myeat and Hti myet in their diet. In the diet of sambhur composed of a mixed diet of grass (23%) and plant species (78%). It was clearly seen that sambhur are mixed intermediate feeders. The browsing of sambhur deer was not significantly difference among seasons. It was suggest that the deer was widely used of browsing species depend on their food availability in the study area. Dinnerstein (1987) suggest that the changes in leafing and fruiting patterns of food plant are affected as important ways for deer, and seasonal changes in forage production would then influence both diet and habitat selection by deer.

Regarding to the diet breadth of both deer species were wide in hot season than cool and wet seasons, especially hog deer was more wide than sambhur. It was suggested that the competition pressure was high for hog deer as sambhur. A decrease in selectively of diet mainly in hot season due to low food availability and its poor quality according to the reports Khan

(1994) and Skogland (1991) stated that the wider diet also reduced digestive capacity, hence net energy gain. And also a doubling of the diet- niche breadth caused a 50% reduction in reproductive success; a deterioration of body conditions with age; and a decreased ability to utilize high- quality food essential for growth, fattening and lactation during summer.

Consequently as the result of feeding observation, the dry dropped leaves feeding comprehended that there were competition between the two deer species during this unfavourable conditions. It should be consider the nutritional quantity of available food has been the most limiting factor of both foraging efficiency and carrying capacity of habitat for deer population. That may reduce the potential for high population densities, decrease the lengths of breeding seasons, and further affect community structure (Hanley *et al.* 1991). Therefore the management of grasslands and some competitive main-food plants were valuable and should be managed effectively to maximize useful forage production for the long-term survival of deer species in Hlawga Wildlife Park.

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