

Assessment of Feeding Pattern of Asian Elephants (*Elephas maximus*) in Brahmagiri-Thirunelli Elephant Corridor

Introduction

Elephants inhabit in some of the most biodiverse habitats in Asia. The Asian elephants are primarily forest animals, preferring a shady environment. Availability of food is one of the major components for their habitat preference. Elephants are mega herbivores and they need minimum 300 kg food per day. Diversity in food plants is essential for nutritional availability and also to maintain a healthy population too. They may spend more than two third of the day for feeding. Grasses, tree bark, roots, twigs, leaves and small stems are their major food (WWF, 2002).

Elephant is a highly wide ranging animal traversing great distances for its basic requirements. Western Ghats is an important habitat for Asian elephants. The elephant population in the Western Ghats has been adversely affected by the loss and fragmentation of the natural habitat, considerably limiting its movement (P.S. Easa, 1988). Therefore elephant corridor is an important concept to link the fragmented habitats. There are 88 identified elephant corridors in India, in that 13 are in South India. Brahmagiri-Thirunelli elephant corridor is the most important one among them.

Brahmagiri-Thirunelli elephant corridor is a mosaic of forest, human settlements and agriculture lands. Elephants haunt the agriculture fields for crop raiding. Therefore this area is facing severe human elephant conflict. Even though this corridor is important for elephant conservation there is no studies were carried out in this area. A clear understanding about the nutritional requirement of elephants is needed for their conservation, basically for their habitat conservation (Santra, A.K. et al. 2008) So that feeding studies are very important for the conservation of elephant habitat and also to mitigate human elephant conflict.

There is no specific study is carried about the feeding pattern of elephants in this region. Even though the mega herbivore needs a huge quantity of food every day, and all of their migration and movement is related to the availability of food. This study was carried out to assess the preference of plant species and their parts utilized for feeding in the Brahmagiri-Thirunelli elephant corridor. As well we made an attempt, to understand the distribution of feeding plant species; in this study area.

Methodology

Study Area: The study was carried out in the Teak plantations of the Brahmagiri-Thirunelli elephant corridor, located at the south eastern side of the Brahmagiri hills of Thirunelli and Hill dale Reserve forests under Begur range of North Wayanad Forest Division.

Temperature: The temperature in the area varies between 13^o and 35^o C. The reduction in temperature is mainly attributed to the altitude. Frost is almost unknown in this region. The dry season commences from February and lasts till May. Mist is common during the period from November to February, mostly at higher elevations of Brahmagiris.

Monsoons: Both the southwest and northeast monsoons bring rain, but the major portion of the rain is from South -West monsoons, which starts with pre-monsoon showers by middle of April. The heaviest rainfall is received during June and July. October- November brings Northeast monsoon. Occasional rains are received in November. Precipitation during the period from December to March is very rare. The average annual rainfall varies from 3000mm to 3500mm.

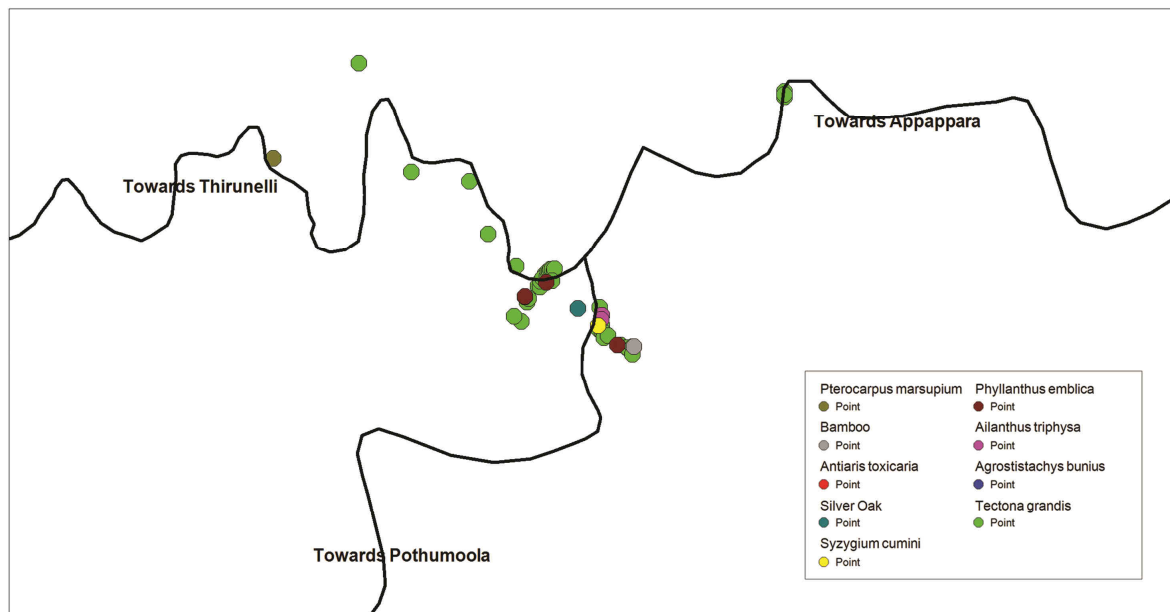
Methods: Feeding Trail and opportunistic sampling were the methods used in this study. Three transects were selected for the feeding trail. Every feeding signs from the trails were recorded. Whenever a feeding sign was noted from the study area, apart from the transect, was also recorded. Feeding signs including the species, part of the plant consumed and the length of the peeled portion were collected. Coordinates of each sign were recorded for mapping the distribution of food plants. Type (species, parts) and status (very new, new, old, and very old) of signs are noted. Status of feeding sign is used for assessing the period of elephant visit and to understand their food preference in the particular period.

Result

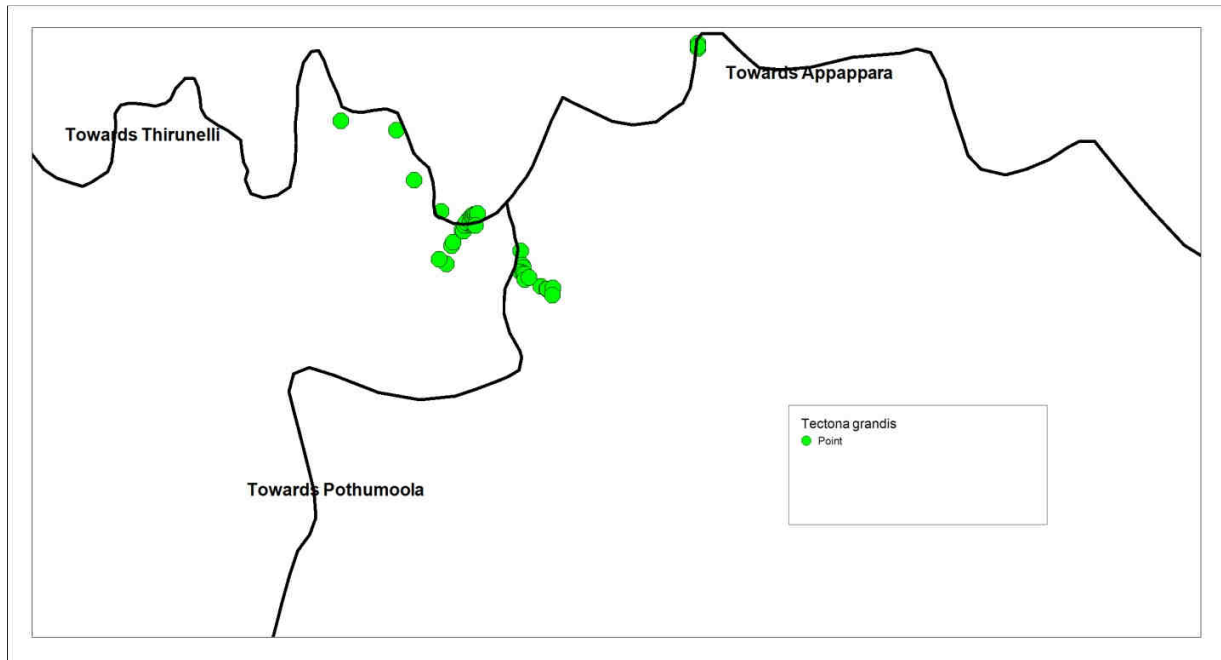
Total ninety seven feeding signs were recorded in this study. Nine tree species were observed as fodder plants of elephants. They are *Tectona grandis*, *Pterocarpus marsupium*, *Agrostistachys bunius*, *Antiaris toxicaria*, Silver oak, *Ailanthus triphysa*, Bamboo Sp. and *Syzygium cumini*. The fruits and seeds of *Mangifera indica* and *Artocarpus heterophyllus* were observed in dung piles during the study. The plant parts used for feeding include Bark, twigs, branches, and leaves. The bark feeding is observed more in the study area, where they contributed 85% of total feeding sign encounter. Encountered consumption rate of twigs and bark is 3.23%. 2.1% encounter was bark, twigs and branches together fed from a few uprooted trees. Out of 97 feeding sign encounter 84 were *Tectona grandis*(86.57%), *Pterocarpus marsupium* (1.03%) , *Agrostistachys bunius* (1.03%), *Antiaris toxicaria* (3.09%), Silver oak (1.03%), *Ailanthus triphysa* (2.06%), Bamboo Sp. (1.03%) and *Syzygium cumini* (1.03%).

Table 1. List of food plants

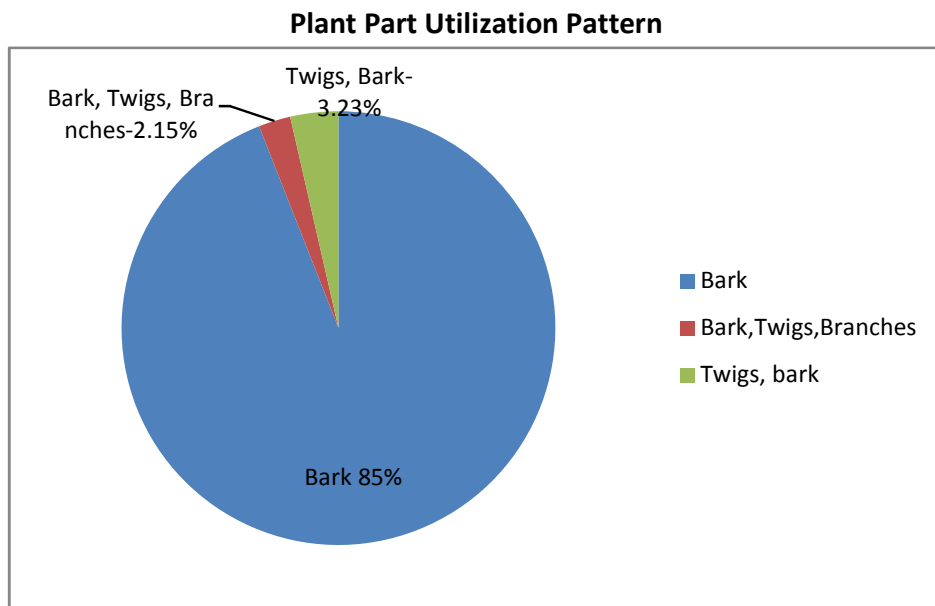
Common Name	Scientific Name
Arayanjili	<i>Antiaris toxicaria</i>
Karivetti	<i>Agrostistachys bunius</i>
Matti	<i>Ailanthus triphysa</i>
Nelli	<i>Phyllanthus emblica</i>
Njaval	<i>Syzygium cumini</i>
Silverrock	<i>Grevillea robusta</i>
Venga	<i>Pterocarpus marsupium</i>
Teak	<i>Tectona grandis</i>
Bamboo	Bambo sp.

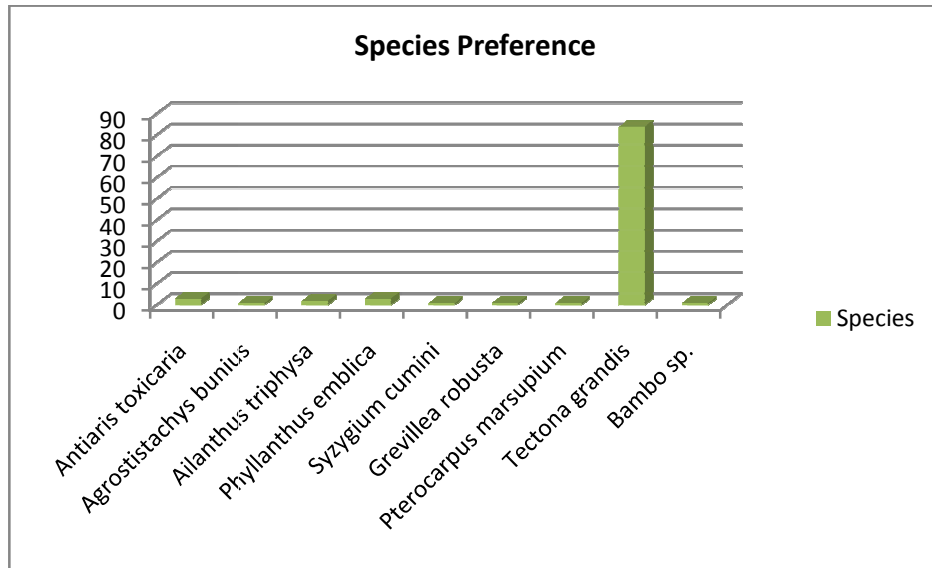


Map 1: Showing the distribution of feeding plants



Map 2: Showing the distribution of Teak fed by elephants





Discussion

The elephant is a broad spectrum feeder on a variety of species but nevertheless seems to favor certain tax both in Africa and Asia. The browse plants that are favored by elephants generally include those from the botanical under malvals (including the families Malvaceae, Sterculiaceae, and Tiliaceae) and the families Leguminosae(sub families papilionoidae, caesalpinoideae, Moraceae, Anacardiaceae and palmae) in addition to the bamboos (gramineae)(Sukumar, R. and Ramesh, R. 1995). Present study enumerated nine plant species in the diet of elephants in Brahmagiri Thirunelli elephant corridor. A large area of this elephant corridor is monoculture tree plantations like Teak and Eucaliptus (Williams, S. 2001) This study conducted in the Teak plantations, due to that the enumeration rate of teak(Verbenaceae) is higher in this pilot study.

Browsing is commonly defined as consumption of forbs and the tender shoots, twigs and leaves of trees and shrubs. Grazing is the consumption of grasses and sedges. There is considerable seasonal variation in the average quantities of browse and grass consumed by an elephant population with predominant browsing during dry season and grazing during the early wet season (R. Sukumar 1989). Many studies from different part of the world show that browse is more important for elephant's diet. The Asian elephant's diet consisted of 24 % grass and 65 % browse (Geir Steinheim et al. 2005). Present one is an experimental feeding trial study. In this

rapid feeding trial survey, in the peak of rainy season reveals a higher rate of browse plants utilization for feeding.



Fig. 1 Seeds in elephant dung. Fig. 2: Peeled tree (*Pterocarpus marsupium*) Fig.3: Uprooted tree (*Tectona grandis*)

Elephants are generalist feeders and tend to eat what is available to them, but they can be very specific about which part of a plant they eat and when. Elephants prefer to feed at the lowest height but in some cases they uproot the trees and feed the whole tree bark. It shows the nutritional specialty of those plants. In this study we noticed, 2.06% of the total feeding is; on uprooted trees. The elephants are very keen on their food selection. Throughout this study we observed that in many trees they just removed a small portion of bark, and in some cases they have uprooted the tree and fed the whole bark. In the case of teak, elephants feed bark, twigs and branches but they are not interested in leaves. This is an indicator to their selective feeding among the feeding species.

Habitat of Asian elephants has become fragmented and degraded, have been converted into plantations. This has been disrupted their feeding and migratory patterns. This pilot study and observations reveals that the food plant diversity is very less in Teak plantations even the mega herbivore's nutritional requirement is very high. This can be the reason for the high rate of crop raiding and human animal conflict in this Elephant Corridor. It is high time for

conservation measures to be put in place to ensure of the safety of the gentle giant. Therefore long term scientific study on elephant ecology is crucial for their conservation.

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